Decision Making and Intuition of Outdoor Leaders

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Abstract

Decision making theory has been applied to many facets of professional and group behaviour. However, in the field of outdoor leadership, it is still an emerging theory. Although there is considerable literature regarding decision-making and outdoor leadership, no known research describes the mechanics of how intuition works in decision making process. In outdoor settings, outdoor leaders bear responsibilities of ensuring that their participants remain safe throughout the program. Apart from having technical competencies, an outdoor leader also needs to make appropriate decisions and display good judgement. The purpose of this research was to examine what sort of evaluation processes outdoor leaders use in naturalistic decision making situations, and to investigate how they use intuition and analysis in their evaluation. The research focus was to elicit decision making processes of outdoor leaders through use of a cognitive task analysis technique called Critical Decision Method. Ten experienced outdoor leaders were interviewed and this allowed insights into their evaluation processes in their decision making episodes. The outcomes of the research provided case-based support for both Recognition-Primed Decision (RPD) model and Dual-process theories. Applications from research findings includes defined strategies that an organisation might want to employ in their training and professional development of future outdoor leaders.
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Chapter One: Introduction

Human cognition frequently entails individuals making judgements and decisions “without explicit use of all relevant information available from the environment and from their memory” (Plessner, Betsch and Betsch, 2008, p.vii). This decision making typifies a commonplace experience of everyday life in outdoor settings. Furthermore, even if outdoor leaders are cognisant of all the details, they do not necessarily analyse every piece of information on a deeper analytical level before making decisions – a concurrent processing model of decision making. Serial processing in decision making occurs when outdoor leaders focus on the option which initially seems most useful in solving the problem and evaluating only this option until either it succeeds or it becomes clear that the option will not work and another is selected.

Both forms of processing are experienced with intuitive and affective responses representative of the degree of familiarity and confidence one has with the situation at hand – even to the level of recognition that “this is the best choice” (Ibid, p.vii). However, intuition has many definitions. Dane and Pratt (2007) suggest that intuition draws on our inborn ability to synthesise information quickly and effectively – an ability hindered by mere formalised procedures. Hogarth (2001, p.14) defines intuition as “thoughts that are reached with little apparent effort, and typically without conscious awareness; they involve little or no conscious deliberation”. Simmons and Nelson (2006) claim that intuitions generated with difficulty are held with low confidence whilst intuitions that are easily generated are associated with high confidence. As a result, people choose intuitive options with greater frequency as intuitive confidence increases (Simmons and Nelson, 2006). More recently, Evans (2010) suggests that
intuition is a matter of cognition and personality; corresponding to the distinction of Type 1 (intuitive) and Type 2 (reflective) processes. Type 1 (intuitive) process is quick, provides feelings of confidence, reflects large amounts of information processing, is low in effort and does not compete for central working memory resources. The Type 2 (reflective) process is high in effort, slow, conscious, deliberate and logical (Evans, 2010). Outdoor leaders represent a group of decision makers where intuition and reflection play a big part in their everyday professional lives. This study investigates to what extent the outdoor leaders use these two processes and how other factors also come into play.

**Background**

The quality of decisions made by outdoor leaders in naturalistic settings affects the safety and quality of the experience for the participants involved. To accommodate further growth and development of the outdoor leaders’ profession, this study attempts to understand how outdoor leaders actually make decisions. To begin, we thus need to clearly define the term “outdoor leadership”. Petzoldt (1984) defines outdoor leadership as shouldering the heavy responsibility of safety and quality of experiences of a group on outdoor adventure trip or expedition. He suggests that effective outdoor leaders recognise and accept their abilities and limitations. The outdoor leader does not necessarily possess the best knowledge or is the most experienced in order for them to make the right decision, although these qualities do help in their decision making process.

For the purpose of this research, I adopt a general definition of outdoor leadership as: “the practice of leading individuals and groups into natural settings via a variety of modes of transportation: walking, biking, canoeing, caving, kayaking, and mountaineering, [etc.]”
(Martin, Cashel, Wagstaff and Breunig, 2005, p.6). Outdoor leadership embodies a multi-disciplinary approach and is practiced within a variety of contexts. Most of it falls within two broad categories: outdoor and adventure education and outdoor and adventure recreation. Both consist of many similarities in terms of emphasis on disciplines, applications and end-goals, among other aspects. Outdoor education is part of the broader field of education, while outdoor recreation is part of the broader field of recreation and leisure (Martin et al., 2005). Both encompass a broad spectrum of knowledge and skills and hence in outdoor leadership, it helps if outdoor leaders have a basic “repertoire of practice” in understanding of skills (Seaman and Coppens, 2006). Given the naturalistic component of outdoor leadership’s multi-disciplinary concept, outdoor leader’s views are always partial and evolving. Outdoor education context contains not only specific skills, but also how those skills ought to be employed (Seaman and Coppens, 2006). Given the increasing number of programmes leading people into remote places in search of wilderness experiences, the issue of who is qualified to lead these programmes becomes more important (Ewert, 1988). Outdoor leaders must constantly monitor the environment, the activity and the programme’s goals, coupled with a duty of care for the individuals they lead within naturalistic and dynamic settings.

Galloway (2007) theorises that outdoor leaders operate in naturalistic environments, which are defined as having: ill-structured problems; uncertain, dynamic environments; shifting, or competing goals; action/feedback loops; time stress; high stakes; multiple players; and organizational goals and norms (Zsambok & Klein, 1997). He postulates that the environment in which outdoor leadership functions is shared with other professional milieu such as those studied by Klein (1993) in the field of naturalistic environments. What sort of evaluation processes do outdoor leaders use in naturalistic decision making situations? How do
they use intuition and analysis in their evaluation? These are the fundamental questions that motivate the undertaking of this research. Through the lens of naturalistic decision making theory with outdoor leadership and decision making, I hope to explore these questions further.

**Conceptual Underpinnings of Study**

**Decision making and Outdoor Leaders**

In outdoor settings, outdoor leaders’ decisions are classified by specific situations and by the person or group affected by the decisions (Ewert, 1988). This is more so when decisions by these outdoor leaders in outdoor adventure settings have direct ramifications on the safety and quality of leisure experiences of participants (Boyes & O’Hare, 2011). The New Zealand Department of Labour (2010) cited 21 incidents of fatalities across outdoor adventure in the tourism and educational sectors from 2004 to 2009. Furthermore, in a coroner’s inquiry (Devonport, 2010) into incidents from 2008 to 2010, more than half of the 20 fatalities in the formal education and tourism adventure recreation sectors were due to decision errors. The term *decision error* then emerged from research in clinical and manufacturing settings. The cause for these decision errors resulted from systematic errors and biases in humans based on classical decision making theories (Tversky and Kahneman, 1974). One such theory - *Heuristic and Biases* (HB) – focuses on the field of prediction under uncertainty and estimation of probabilities and frequencies, where the researchers documented many responses which were incompatible with normative considerations. Researchers in HB adopt a skeptical attitude to expertise and expert judgement as they tend to focus on flaws in human cognitive performance (Kahneman & Klein, 2009). Kahneman and Klein reiterated the HB claim is not that “intuitions
that arise in heuristics are always incorrect, only that they are less trustworthy than intuitions that are rooted in specific experience” (Ibid, p. 522). This approach stems from an earlier compilation of studies where the focus was on the application of HB practices rather than describing experimental-based studies of human performance (Kahneman, Slovic, & Tversky, 1982).

Few studies examine the nature of decision making of outdoor leaders in terms of cognitive processes and intuition (Galloway, 2002; Boyes and O’Hare, 2003; 2011). Traditionally, outdoor leaders are taught to use concurrent evaluation processes in making decisions (Ewert, 1988). Such expectations ensure that the safety of the participants is looked after as all outdoor activities are associated with higher risks and uncertainties. On top of this particular reason, concurrent evaluation processes have the characteristics of logic and rationality. For example, the work of Priest and Gass (1997) on outdoor leaders’ decision making indicates a process of choosing the most probable option from a collection of possible options. Priest (1988) develops a problem-solving flowchart that involves three phases. The assessment phase questions whether a problem exists and is identifiable. This is followed by the analytical phase, which consists of procedures leading to a solution being put into action. The creative phase identifies possible solutions, selects the best solution and puts it into action. The feature of a comparative process used to compare options is a characteristic of a concurrent evaluation process and typically illustrates a feature of the classical decision making approach. I discuss further examples of classical decision making in my literature review.

Conversely, the serial evaluation process stipulated by Klein’s (1989) Recognition-Primed Decision (RPD) model provides a more ecologically appropriate description of how professionals make decisions in naturalistic settings. According to Klein (1993), decision
making consists of a joint function of (1) task features and (2) the actor’s knowledge and expertise relevant to that task. As such, decisions made in natural settings tend not to be ends in themselves, but rather means to achieve broader goals; more appropriate to outdoor leaders who often find themselves in naturalistic settings. A recent departure from classical-rational decision making models, Naturalistic Decision Making (NDM) studies how professionals make decisions in dynamic, uncertain and fast paced environments (Zsambok, 1997). It stems from Klein, Calderwood and Clinton-Ciroccos’ (1988) investigation of fireground commanders who were required to “make decisions under uncertain conditions and time pressure that preclude any orderly effort to generate and evaluate sets of options” (Kahneman and Klein, 2009, p.516). Naturalistic decision making theory stipulates that decisions by experts are guided by their prior experiences to understand a situation, identify a course of action and implement it (Klein, 1989).

The main catalyst for this study came from my reading of the decision making literature in outdoor leadership and the identification of many disparate points of view which were often inconclusive or contradictory. The outdoor leadership literature places more emphasis on behaviours and development skills (i.e., judgement and decision making), mentoring and on-going feedback as valuable components of the leadership development process (Cain, 1985; Priest, 1990; Hunt, 1984; McAvoy, 1980; Petzoldt, 1984). Priest and Gass (1997) listed experience-based judgement and decision making skills as core competencies for effective outdoor leaders. Decision making is crucial to an outdoor leader as the outdoor environment is uncertain, risky time constrained and fast-paced. Decision making is identified as an essential component of being an effective outdoor leader (Petzolt, 1984; Galloway, 2007; Tozer, Fazey and Fazey, 2007). A number of outdoor adventure researchers employ NDM theoretical
perspectives in their research as its features fit many of the settings of outdoor adventure environments (Beare & Lynch, 2005; Boyes & O’Hare, 2003, 2011; Galloway, 2002, 2007). Beare and Lynch’s (2005) and Galloway’s (2002, 2007) studies show how the experiences of outdoor leaders are important in the decision making process in naturalistic settings. Boyes and O’Hare’s (2003, 2011) research points to the development of NDM model that challenges situational recognition and prior experience using RPD model which illustrates the use of serial evaluation process in decision making. More recently, they also studied the RPD model and serial evaluation process using applications of computer simulations in outdoor settings. The literature review section further examines these articles.

**Experience and Decision making of Outdoor Leaders**

In NDM, expertise is defined in relation to successful outcomes. Shanteau (1992, p. 255) provides a definition of expertise as “those who have been recognized within their profession as having the necessary skills and abilities to perform at the highest level”. Expert decision-makers decide on the basis of their prior experiences that are predominantly drawn from real encounters. This accumulation of knowledge does not come instantaneously or in a short period of time but rather, takes quite a considerable time. Tozer et al., (2007) estimate that for outdoor leaders to be experts, they have to have at least five years of on-the-job involvement. Chase and Simon (1973) estimate that chess masters acquire a repertoire of 50,000 to 100,000 immediately recognisable patterns through a decade of serious play. These players possess this perceptual skill, which allows them to make a good move in their game without calculating all possible contingencies. According to Galloway (2007), experienced outdoor leaders respond differently and are less context dependent as compared to novice leaders.
Novice leaders are defined as those who “are intermediate in skill and knowledge; they frequently have studied for years and may even work at sub-expert levels” (Shanteau, 1992, p.256). Novice leaders have difficulty in understanding a situation or even identifying the course of action as they lack one or more of the abilities needed to function as experts (Shanteau, 1992). It is important to note that my study does not specifically focus on experts or novice leaders. It does not try to differentiate the experience level of the leaders but rather, to consider the role experience plays in leaders’ decision making. After all, different levels of experience do influence outdoor leaders to make decisions and this is clarified in the later part of the literature review.

My research focuses on what sort of evaluation processes outdoor leaders use in naturalistic decision making situations, and investigates how they use intuition and analysis in their evaluation. In this paper, I use the dual process theories by Evans (2010) of Type 1 (intuitive) and Type 2 (reflective) to discuss intuitive judgments that arise from genuine skill—the focus of the NDM approach—but that they can also arise from inappropriate application of the heuristic processes on which students of the HB tradition have focused (Kahneman & Klein, 2009, p.524). Evans (2010) argued that intuition corresponds to these dual process theories of thinking which distinguishes Type 1 (intuitive) and Type 2 (reflective) processes. Other intuition studies under classical and NDM theories are discussed later on in the paper.

**Problem Statement**

Decision making theories apply to decision sciences, physics, organisational theory and group behaviour, but to outdoor leadership literature, it is still an emerging theory. While there is literature on decision making on outdoor leadership in naturalistic environments, very little research describe the mechanics of how intuition works in decision making process in outdoor
leadership. The research problem for this thesis investigates how outdoor leaders’ decisions are driven by intuition within naturalistic environments. The study seeks to find what sort of evaluation processes outdoor leaders use in naturalistic decision making settings as compared to previous research done in field-based settings; and it also seeks to investigate how leaders use intuition and reflection in their evaluation processes.

**Significance of Study**

The main purpose of this study is to better comprehend the decision making process in naturalistic settings. Do outdoor leaders make decisions using serial or concurrent evaluation processes; and do they rely on intuition within these processes? This study also attempts to contribute to the research in decision making and outdoor leadership literature by providing insights into an individuals’ decision making ability and the role of intuition. This study motivates me to address the lack in the literature in two ways. First, the research enables a better understanding whether outdoor leaders use serial or concurrent evaluations when making decisions. Second, this study examines how intuition and analysis support outdoor leaders’ evaluation processes. Therefore, documenting the presence, or lack of evidence of intuition in naturalistic settings in the outdoor leadership context, is a critical addition to the on-going research of decision making in the outdoors. The outcomes of the research also provide some contributions to the outdoor fraternity on the role of intuition in decision making.

**Definition of Terms**

Concepts which arise from intuition and decision making have different interpretations and connotations unique to a broad field from decision sciences, physics, organizational theory,
and group behaviour but to the outdoor leadership it is an emerging theory. Several terms
associated with decision sciences are core concepts of this study and they are defined as
follows.

_Cognitive Task Analysis:_ Allows identification of cognitive skills, or mental demands,
needed to perform a task proficiently. The product of the task analysis can be used to inform
design of interfaces and training systems (Militello and Hutton, 1998).

_Dual-process Theories:_ Provides an account of how a phenomenon can occur in two
different ways, or as a result of two different processes. Often, the two processes consist of an
implicit (automatic), unconscious process and an explicit controlled), conscious process.
(Evans, 2010).

_Expertise:_ A definition of expertise as those who have been recognised by their
profession as having the necessary skills and abilities to perform at the highest level (Shanteau,

_Naturalistic Decision making:_ The means of studying how people actually
make decisions and perform cognitively complex functions in demanding situations. These
include situations marked by time pressure, uncertainty, vague goals, high stakes, team and
organizational constraints, changing conditions, and varying amounts of experience. (Zsambok
& Klein, 1997).

_Outdoor Leaders:_ People, by the nature of vocation or interest, maintain an active role
in the organising, instructing, supervising, and/or caring for a group involved in outdoor
pursuits or adventure activities, and who are legally or morally responsible for the safety,
learning and/or experience of that same group (Sirois, 1980).
**Situation Awareness**: Defined as the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projections of their status in the near future (Endsley, 1995).

**Recognition-Primed Decision making (RPD)**: Rapid decision making by decision makers who were able to generate a single option based on their recognition of experiences (Klein, 1989).

**Overview**

This chapter outlines the need for an investigation into the role of intuition and its relationship to decision making. It also describes the background and framework from which the idea for this study has evolved. This chapter begins with the premise that decision making does not always follow a concurrent evaluation process in thinking but rather that serial evaluation might precede or cause the emergence of intuition. The chapter then describes the problem statement and the significance of the contribution of this research. Chapter Two discusses dual-process cognition, naturalistic decision making, the role of experience and outdoor leadership. The selections of literature reviewed include theories, models, and ideas directly linked to the relationship between decision making and outdoor leadership.

Chapter Three considers the research methods used to answer the research questions. The chapter discusses a qualitative design to research the convergence of decision making and the presence of intuition within the NDM framework. The existence of intuition indicates evidence of cognitive traits of innate, “gut feel”, and phrases that correspond with automaticity. To address the research questions, this study collected data from several outdoor leaders within
New Zealand. These leaders possessed specialised knowledge and unique experiences in outdoor leadership. Their sharing of their experiences involving high risks in the naturalistic environments, adds breadth to the understanding of decision making processes of outdoor leaders.

The thesis ends with a detailed presentation of the findings and interpretations in Chapters Four and Five. The results pose many challenging questions from the emerging themes and patterns. Significant findings in this study also suggest possible future research to add value to the literature of outdoor leadership. While I do make recommendations from the findings, I also include my reflections in Chapter Five which indicate valuable educational lessons learnt from this research journey.
Chapter Two: Literature Review

This chapter presents the theoretical basis of my research. The literature review begins with the rational actor assumption and bounded theory followed by Evan’s (2010) account of dual-process theories of human cognition which serves as the foundational theory which explains the relationship of intuition to the rest of the review. This review outlines details of the decision making processes of outdoor leaders, using the NDM theory, as well as early perspectives on rational and classical decision making models. Naturalistic Decision Making encourages the reader towards a deeper understanding of decision making processes in real world settings. I adopt Klein’s Recognition Primed Decision model because the model offers a clearer insight into the workings of NDM. My review also discusses the importance of experience and its relationship to the decision making process of outdoor leaders. The review puts forth the role of experience in outdoor leadership as it further substantiates the importance of NDM.

The Rational Actor Assumption

The dual-process theories of judgement and decision making traces back as far as Smith’s (1937) attempt to articulate the Rational Actor theory and von Neumann and Morgenstern’s (1947) expected-utility theory, which maintains that “it was rational to maximise expected utility” (Goldstein, 2004, p.37). The classical economists’ views on expected–utility theory differ from social scientists in their explanations of human behaviour. Smith (1937) postulates that human nature pursues “his individual self-interest and if there is no government interference, the true market will serve as an invisible hand to ensure that the common good will emerge” (Monroe, 1995, p.2). Monroe further explains the seven basic assumptions on how human psychology and the world should work. They are: 1)
Actors pursue goals; 2) These goals reflect the actors’ perceived self-interest; 3) Behaviour results from a process that involves, or functions if it entails, conscious choice; 4) The individual is the basic agent in society; 5) Actors have preferences that are consistent and stable; 6) If given options, actors will choose the alternative with the highest expected utility and 7) Actors possess extensive information on both the available alternatives and the likely consequences of their choices. These assumptions prove important as they provide how the term ‘classical’ is adopted to decision making and how ‘bounded rationality’ develops.

**Bounded Rationality**

The concept of bounded rationality (Simon, 1956) explains a phenomenon where people deviate from presumed standards of rationality in making choices. These deviations result in suboptimal choices. Bounded rationality maintains that humans are limited in their decision making ability due to limitations in their ability to retain and process information (Simon, 1956). This concept influenced the development of subsequent approaches to judgement and decision making, namely the Heuristics and Biases-perspective (HB) (Tversky and Kahneman, 1974) and fast and frugal (Gigerenzer and Goldstein, 1996) theories. To illustrate this, let’s look at the HB study (Tversky & Kahneman, 1971), based on a performance task that researchers often perform by choosing a number of cases for a psychological experiment without computation. The participants in the study were methodologists and statisticians who answered realistic questions about the sample size they considered appropriate in different situations. Tversky and Kahneman concluded that sophisticated scientists reached incorrect conclusions and selected inferior options when they followed their intuition, and failed to apply rules with which they were familiar. The scientists did not consider intuition highly as a factor when making decisions. Their study also recommended that researchers faced with the task of choosing a sample size should
forsake intuition in favour of computation. Such judgements relied on heuristics, or shortcut rules of thumb. Evans (2008) mentions that rational decision making approaches are sometimes perceived as superior to intuitive approaches because they are always “associated with normatively correct responding and [intuition] with cognitive biases” (Ibid, p.267).

The Rational Actor Assumption and The Bounded Rationality emphasise on rationality as a key factor to maximising expected utility (Goldstein, 2004). Intuition is not fully considered as important as both studies believe that human judgement follows a sequence of patterns in reaching their final decision. However, my study is contrary to these in that I suggest intuition is part and parcel of human cognition. Thus, it is crucial for outdoor leaders to use intuition when making their decisions. Intuition plays a greater role in outdoor leaders’ decision making process especially when experience and familiarity of the environments affects their decision making. The next section looks into dual process theories and how intuition is related to the theories.

**Dual-Process Theories of Judgement and Decision Making**

Dual-processing accounts of human behaviour remain extensively linked to cognitive and social psychology. Several authors utilise dual-process theories in different ways, including the study of learning, memory, attention, social cognition, thinking, reasoning, and decision making (e.g. Epstein, 1994; Evans & Over, 1996; Reber, 1993; Sloman, 1996; Smith & DeCoster, 2000; Stanovich, 1999). This proves an intricate and challenging task to draw together any coherent overview of this topic (Evans, 2008). The dual-process theories of cognition are closely connected to thinking, reasoning, decision making and social judgement domains. The common thread of the dual-process theories points to the two different modes of processing, System 1 and System 2 processes (Kahneman and Frederick, 2002; Stanovich, 1999). The dual-system processes correspond to Evan’s (2007) work on cognitive processing
systems where System 1 (intuitive) is categorised as being fast, automatic, implicit and emotional, while System 2 (analytical) is typified as slower, conscious, deliberate and logical. Recently, Evans (2010) proposes that the two systems should be replaced as two minds. Type 1 (intuitive) replaces System 1 and Type 2 (reflective) as System 2. It inherits a number of characteristics of earlier dual system accounts. Each mind accesses a different and distinct form of knowledge together with corresponding learning and memory systems. A Type 1 (intuitive) system corresponds with the utility of knowledge through experiential learning. Type 1 (intuitive) processes are fast, intuitive and high capacity while Type 2 (reflective) processes are slow, reflective and low capacity (Evans, 2010). A Type 2 (reflective) system manipulates explicit representations through the working memory.

Though it is preferred that the mind operates at Type 1 all the time, it is not possible as the high capacity use would result in the mind being exhausted in a short time.

Macrocognition is broadly defined as understanding how people make decisions in complex, naturalistic environments (Schraagen, Klein, & Hoffman, 2008). The term macrocognition acknowledges cognitive functions such as sensemaking, planning, adaptation, problem detection and coordination. It provides for study of “cognitive phenomena found in naturalistic settings, especially (but not limited to) cognitive work conducted in complex sociotechnical contexts” (Schraagen et al., p.8). Macrocognition provides a broader contextual paradigm for NDM. In contrast, microcognition focuses on the building blocks of cognition (Klein et al., 2003). However, one must view both as complementary, in that “together they might provide a broader and more comprehensive view of naturalistic settings than either by itself” (Schraagen et al., p.20). In terms of dual-processing of human cognition, microcognition refers to cognitive processes that access the working memory whereas macrocognition refers to the cognitive processes like intuition, that do not require access to working memory (Evans, 2010).
According to HB scholars (Tversky & Kahneman, 1974; Gilovich, Griffin and Kahneman, 2002), decision makers identify optimal ways of making decisions in controlled, well-structured settings. Scholars who focus on HB adopt a skeptical attitude towards expertise and expert judgement; not that they devalue expertise and expert judgement but rather “the scholars are predisposed to recommend the replacement of informal judgement by algorithms whenever possible” (Kahneman & Klein, 2009, p.518). Many later studies also confirm the persistence of a diverse set of intuitive biases in the judgements of some professionals (Kahneman and Klein, 2009). According to Kahneman and Klein’s view, humans use HB reasoning strategies as “mental shortcuts because of information processing limitations. The need to conserve limited mental resources was seen as the driving force in reasoning, judgement, and decision making” (Reyna, 2004, p.60).

Evans (2008) traces the development of dual-process theories to the development of psychology of deductive reasoning in the 1960s and proposes the emergence of dual-process theory within the development of psychology of deductive reasoning as a result of interest in the role of bias in reasoning and judgement tasks. He notes that this focus on bias results in a shift in focus to “a pragmatic and preconscious level that preceded any attempt at analytic processing” (2008, p.263). But he states that in Klein’s (1999) naturalistic studies of decision making on groups of fire officers and paramedics, there is very little rational decision making. Klein describes the Recognition Primed Decision making (RPD) model as when experts recognise previous situations and rapidly retrieve schema or mental models that provide a solution which is mentally simulated in a process of progressive deepening. The application of RPD involves some explicit reasoning like using mental simulations to check feasibility of solutions, but the key to intelligent action is the automatic retrieval process which we experience as intuition (Evans, 2008). These mental simulations tend to focus on a single hypothesis, unless there is a good reason to give it up and Evans (2007) calls it the
singularity principle of hypothetical thinking. Intuition and decision making theories evolve from solely relying on rationality and reasoning to acknowledging and accommodating automaticity and intuition.

**Intuition in Dual-Process Theories**

Intuition represents an enormous challenge for researchers in decision making. It is important for readers to comprehend the different meanings of intuition and how it has developed over the years before selecting the best representation. One lay definition of intuition positions it as *an immediate apprehension in the absence of reasoning*. Evans (2010) uses the term *reasoning* as a restrictive sense of slow, reflective, deliberate and goal-oriented thinking – linked to working memory. Evans (2010) argues that intuition should be viewed as the opposite to reasoning and furthermore, intuition links itself to cognitive processes that do not require access to working memory and characterises itself as fast, high capacity and lacking consciousness of the underlying process (Evans, 2007; 2010). Hence, intuition corresponds to the dual-process theories of cognition which distinguishes Type 1 (intuitive) and Type 2 (reflective) processes. Each type of process accesses different and distinct forms of knowledge together with corresponding learning and memory systems. Evans (2010) suggests that Type 1 (intuitive) utilises knowledge gained from experiential learning, using evolutionary ancient mechanisms, linked to animal cognition and mostly operates unconsciously. This then manifests itself as intuitive judgements and behavioural dispositions as well as any instinctively programmed behaviours. In contrast, Type 2 (reflective) manipulates explicit representations through the working memory. Underlying mechanisms such as the conscious perceptions, episodic memory, and high level outputs of explicit meaning produce such representations.
Meehl (1954) documented intuitive judgements using the comparison between statistical decision rules and unaided human judgement. The statistical predictions were more accurate than human predictions in almost every case from academic success to patient recidivism and propensity for violence. This investigation then progressed to a “bootstrapping effect” which provided an illustration of the effect of inconsistency on the validity of judgements by a group of clinicians in a set of cases (Goldberg, 1970). The inconsistency in these predictions was due to the difference in conclusions reached by different human judges. Chapman & Chapman (1967) establish an occurrence of illusory correlation that recognised the view of an unaided human judgement (i.e., intuition) that can be mistaken in systematic ways. The most influential “heuristic and biases” perspective relies on probabilistic reasoning (Kahneman, Slovic, & Tversky, 1982) which contributed to the impression where, in many inferential tasks, intuitive judgements are systematically biased. These earlier models attempt to lessen the role of intuition in the decision making process because their assumptions are generally focussed on experimental reasoning and decision tasks which are abstract and novel in nature (Evans, 2010).

A review of literature conducted by Dane and Pratt (2007, p.35) provides definitions of intuition from 17 different authors. Dane and Pratt highlight that the similarities are more prominent than the differences. They suggest that intuition draws on our inborn ability to synthesise information quickly and effectively - an ability that may be hindered by formalised procedures (Dane and Pratt, 2007). They argue that inborn ability or innate capabilities originate outside the experiential processing system. They suggest two broad sets of factors which influence intuition effectiveness; (1) domain knowledge factors and (2) task characteristics. In domain knowledge factors, individuals who want to form complex domain-relevant schemas engage in repetitive practice over a long period of time. The practices provide individuals with accurate feedback about their performance. In task characteristics,
they posit that when decision making tasks in environmental uncertainty results in a shift away from structured problems and standard operating procedures, this leads to a multitude of “plausible alternative solutions” rather than a single objective criterion for success.

Intuition consists of different meanings when viewed from the perspectives of cognitive, developmental, social, educational, health and organisational psychology. Mayer (1996) compares intuition to “insight” which involves incubation (Mayer, 1996), a long gestation period following an impasse in problems solving (Harper, 1989) and a final insightful experience (an ‘aha’ or ‘Eureka’ moment) (Knoblich et. al, 2001) in which there is a distinctive and sudden understanding of a problem, or of a strategy that aids the solving of the problem (Mayer, 1996). This is in contrast to intuition as described by Hogarth (2001, p.14): “the essence of intuition or intuitive responses where they are reached with little apparent effort, and typically without conscious awareness. They involve little or no conscious deliberation.” Hodgkinson, et al. (2008) suggest that intuition involves a complex interplay of cognitive, affective and somatic elements. This suggestion arises from recent developments in the study of neuroscience (Lieberman, 2007) which identifies a correlation of dual-process theories to cognitive functioning of the brain. Hence, Hodgkinson, et al. (2008) conclude that there is a need for further advancement in understanding of intuition in terms of these components and how they integrate with one another.

**The Default-Interventionist Mechanism**

Evans (2010) coalesces a number of dual-process theories of decision making that have a functional structure described as *default-interventionist*. Basically, such theories stipulate a fast Type 1 (intuitive) process that provides a quick default solution to a problem, which may be accepted or intervened upon with explicit Type 2 (reflective) reasoning. The default intuition may (or may not) be overridden if the intervention occurs. Evidence from
neural imaging suggests that the brain appears to detect conflict when intuitive and reflective processes deliver different judgements – as seen in the anterior cingulate cortex. On the other hand, when the default response is overridden, it is detected in the right lateral prefrontal cortex (De Neys, Vartanian, & Goel, 2008; Goel and Dolan, 2003; Tsuji and Watanabee, 2009). Evidence from the social neuroscience literature also suggests that distinct neural systems are responsible for implicit and explicit social judgements and that the former are inhibited when the latter take control (Lieberman, 2007, 2009).

Intervention occurs when Type 2 (reflective) processing includes amount of time available, presence or absence of competing demands, motivation to think ‘rationally’, and feelings of confidence in the initial intuition (Thompson, 2009). Evans (2010) suggests that intuition comprises of cognition and personality. He wrote that when one relies on immediate feelings of rightness or confidence, one’s Type 1 (intuitive) processes are at work, without the intervention by a slower and more effortful Type 2 (reflective) reasoning. Evans (2010) concludes that intuition dominates control over behaviour and reasoning. He postulates two reasons for this; the first refers to intuitive feelings which largely reflect experiential learning, where intuition serves us well in dealing with real situations within familiar environments. The other refers to basic architecture of the human mind itself. An intuitive process as mentioned above operates rapidly, in parallel and with no effort, but reflective reasoning points to the exact opposite. Reflective reasoning requires the use of our central working memory and is of low capacity, high effort and is applied only to one task at a time.

Confidence and Familiarity

Evans (2010) defines intuition where “one relies on immediate feelings of rightness or confidence” (p.321), and that confidence is a common thread that links intuition to experience. Simmons and Nelson (2006) mentioned that generating an intuition often feels
easy, but sometimes it can also feel quite difficult. The more easily intuitions are generated; the more confident people use them. “High intuitive confidence signals intuitive accuracy and that intuitive option should be chosen. In contrast, low intuitive confidence signals intuitive inaccuracy and that nonintuitive option should perhaps be chosen” (Simmons and Nelson, 2006, p.411). As a result, people choose intuitive options with greater frequency as intuitive confidence increases (Simmons and Nelson, 2006). In their study of intuitive confidence of gamblers on the predictions against point spreads of National Football League (NFL) games, Simmons and Nelson establish that intuitive confidence affects choices even in a non-prediction, risk-free decision context. As for outdoor leaders, one tends to wonder how much outdoor leaders rely on their confidence when making their decisions. Confidence enhances the outdoor leaders’ level of expertise in their work, their prior experience in the activities carried out as well as their familiarity to the natural environment where they make their decisions.

Apart from understanding a situation, outdoor leaders need to appreciate the role of feeling states as cues to complex judgements as these cues not only help explain the accuracy of intuition, but also why such accuracy is impaired by analytic thought. According to the affect disruption hypothesis (Halberstadt and Hooton, 2008), analytic thought interferes with the detection and/or use of affective responses. Halberstadt (2010) explains that in principle, a particular feeling is accurately described but individuals may have difficulty in separating and identifying the relevant response. Several studies support the hypothesis that analytic thought, through a range of mechanisms, disrupts the relationship between affective cues and judgement (Halberstadt & Catty, 2008; Catty & Halberstadt, 2008). Catty and Halberstadt (2008) study the use of subjective familiarity in judgements of music popularity. Participants are given pairs of pop songs with instructions to select the more objectively popular pair. Results illustrate that participants tend to choose the more popular songs than those more
familiar to them. The study illustrates both the value of familiarity as a proxy for judgement and the potential for analytic thought to impair (or enhance) its use. The same also applies to outdoor leaders, especially since many outdoor leaders go back to similar environments to either conduct an activity or to enjoy the place for leisure. The influence of familiarity does affect the way outdoor leaders make their decisions.

Evan’s account of dual-process theories of human cognition provides a convincing foundation for my study and one that draws on a convergence of thought in multiple domains from intuition, experience, confidence and familiarity. The dual-process theory gives depth to the meaning of intuition and its components reflect a clearer distinction between Type 1 (intuitive) and Type 2 (reflective) processes. As my study uses the Naturalistic Decision Making theory to answer my research questions, the next section is devoted to summarising the NDM theory.

**Naturalistic Decision Making Theory**

Klein (2008) comments the classical approaches of theories on decision making process pose inaccurate descriptions of how experts actually make decisions in naturalistic settings. On the other hand, the focus of NDM theory is on the operation of expert decision makers in context-rich, real-life environments. Naturalistic Decision making describes how experienced people make decisions in dynamic, uncertain and fast paced environments (Zsambok, 1997). The early works leading to the NDM approach began as an attempt to describe and to analyse the decision making process of commanders of fire-fighting companies (Klein, Calderwood, and Clinton-Cirocco, 1986). Fireground commanders need to make decisions under circumstances that contain uncertainty and time pressure, which
exclude any orderly effort to produce and to evaluate sets of options. Here, an initial
hypothesis of the commanders restricts their analysis to only a pair of options, but that proves
to be wrong. Instead, the study finds out that fireground commanders generate a single option
to make a decision, just based on drawing from a repertoire of patterns that they possessed
from more than a decade of experiences. They implement a course of action if it is deemed
appropriate but if it has inadequacies, they proceed to modify it. Nevertheless, if they are still
unable to modify it, the next possible option is selected and the same procedures are applied
until the course of action is implemented. It is an example of how processes are executed
before an experienced leader makes a final decision.

Naturalistic Decision Making Theory explains the operation of expert decision makers
in context-rich, real-life environments defined with the characteristics of: ill-structured
problems; uncertain, dynamic environments; shifting, or competing goals; action/feedback
loops; time stress; high stakes; multiple players; and organisational goals and norms
(Zsambok and Klein, 1997). In NDM, Klein and his associates found that the naturalistic
decision making model remains relevant because of its importance on how experts use
intuitive pattern recognition in their professional judgements (Klein, Oranasu, Calderwood, &
Zsambok, 1993). Intuitive judgements which arise from experience, with skills manifested,
are within the province of NDM, which explores the cues that guided such judgements and
the conditions for the acquisition of skill (Kahneman and Klien, 2009). This approach focuses
on the successes of expert intuition and traces back to earlier research on master chess players
conducted by deGroot (1946/1978) and later by Chase and Simon (1973). DeGroot posited
that often mediocre chess players did not consider the best moves, unlike that of the chess
grand masters who identified the most promising moves rapidly. The chess grand masters
differ from the weaker players by their sheer ability to understand the dynamics of complex
positions and rapidly judge a line of play promisingly. Chase and Simon (1973) postulate that
expert chess players are able to form a perceptual skill where complex patterns are recognised as being repertoires. These repertoires enable them to identify good moves without having to weigh all possible contingencies. “The situation has provided a cue: This cue has given the expert access to information stored in memory, and the information provides the answer. Intuition is nothing more and nothing less than recognition” (Simon, 1992, p. 155). Based on this definition, Simon (1992) further defines intuition as the recognition of patterns stored in memory. He then offers a concise definition of skilled intuition. The recognition model requires two conditions that must be satisfied for intuitive judgement (recognition) to be genuinely skilled: 1) an environment with adequate cues to the nature of situation and where 2) people must have an opportunity to learn these cues (Kahneman and Klein, 2009, p. 520).

In terms of associating confidence to fractionated expertise, which means the mixture of grades of professionals who exhibit genuine expertise in some of their activities but not in others, Klein views the experts, who perform a constant task (e.g. putting out fires) but encounter unfamiliar situations, as able to recognise that a situation is anomalous and poses a novel challenge. It is one of the manifestations of authentic expertise (Kahneman and Klein, 2009). However, Kahneman from the HB camp, explains that fractionation of expertise is one element in the explanation of the illusion of validity, which is the overconfidence that professionals sometimes experience in dealing with problems in which they have little or no skill at all. This is also an example of systemic bias. I explain this issue with the help of the RPD model in the next section.

**Recognition Primed Decision Model (RPD)**

To further explain how these decision makers generate a single option based on their recognition of experiences, the study uses the RPD model of rapid decision making developed by Klein (1989). It comprises four main features; *situational recognition,*
situational understanding, mental simulation, and serial evaluation (See Figure 2). In situational recognition, experts have the ability to quickly recognise a problem that is similar to one that they have experienced or heard about before. Situational understanding happens when the decision-maker distinguishes four types of information that gives directions on how to proceed. The information represents recognition and has four aspects (plausible goals, relevant cues, expectancies and typical actions). The third feature in the RPD process is mental simulation. It is basically employed to make sense of the events and forms an explanation when faced with uncertainty and ambiguity of a situation. It often takes the form of a metaphor or an analogy where parallels are drawn between the current situation and others. It also involves imagining how an option is executed, hence forestalling probable reactions and implications. The most important feature of Klein’s RPD model is that situational understanding leads to the identification of an effective option for action. The option is accepted if no serious violations are found. If an option appears inappropriate, another option is generated. This unique feature is defined as serial evaluation as compared to the concurrent evaluation process of classical decision making. Klein (Kahneman and Klein, 2009) views the Recognition-Primed Decision (RPD) model as a blend of intuition and analysis with pattern matching being intuitive and mental simulation being more analytical. This claim parallels with Evans (2010) dual-process theories of Type 1 (intuitive) processes – being fast, intuitive and high capacity while Type 2 (reflective) processes are slow, reflective and low capacity. Martin, Schmid and Parker (2009) applied the dual-processing system to novice outdoor leaders where they found that contextual aspects are intrinsically linked to the decision making process of the outdoor leaders.
Figure 2. Model of recognition-primed decision making. (Naturalistic decision making G.Klein. Human Factors, 50(3), 2008, p.459).

**Situation Awareness**

As mentioned in RPD, situation understanding or awareness – an internalisation of the current situation – remains the main catalyst in naturalistic decision making (Endsley, 1995). Endsley (1995) defines situation awareness as “the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the
projections of their status in the near future”. She cites three levels of situation awareness based on its role in dynamic human decision making in a variety of domains. Level one is the perception of elements in the environment. To illustrate this, an outdoor leader in a trekking expedition perceives the elements such as temperature, weather and surrounding terrain as important details as his points of reference, or cues, when he makes his decision making.

Level two refers to the comprehension of the current situation. This level “goes beyond simply being aware of the elements that are present to include an understanding of the significance of these elements in light of pertinent operator goals” (Endsley, 1995, p.37). For example, the outdoor leader comprehends that the sudden change in weather, such as the formation of black clouds and windy conditions, indicates possible changes to his plans to reach his objectives. Level three is the projection of future status. The achievement of the third level occurs when the dynamics of the elements combines with the comprehension of the situation. The outdoor leader must now understand that a threat from the change in weather conditions may alter the objectives of the programme and thus he provides a necessary course of action. These levels depend on pattern matching between critical cues in the environment and elements in the model. Situation awareness is important for outdoor leaders as they need to be familiar with cues in the environment in order for them to act decisively. A quick and decisive action directs the appropriate actions carried out which is especially crucial for activities conducted outdoors, where weather is not within the leaders’ control.

By adopting both the RPD model and the theory of situation awareness in my paper, readers can better understand the connection between the role of situation awareness and the decisions outdoor leaders make; which possibly suggests the leadership style of the decision maker. Readers can thus have a better understanding as to how and why these leaders make certain decisions.
The Role of Experience and Expertise

The study of domain experts interweaves with the development of the judgement and decision making field whereas the analysis of expert systems is quite a recent undertaking and has begun to affect decision making research (Shanteau & Stewart, 1992). Decision researchers have looked primarily at experts in the behavioural domains (e.g., clinical psychology), whereas cognitive researchers have concentrated on experts in static domains (e.g., physics) (Shanteau, 1992). However, before attaining the ranks of an expert, several factors influence this level of professional achievement. Ericsson (2006) mentions that an extensive experience of activities in a domain is pertinent to reach a very high level of performance although it does not necessarily lead to an experts’ level of achievement. For the next section, I refer to the Theory of Expert Competence by Shanteau (1992) to explain the role of experts.

Theory of Expert Competence

The Theory of Expert Competence provides readers with a perspective on how expertise and experience are inter-related and are functions associated with being an expert. Shanteau (1992) provides a definition of expertise as “those who have been recognized with their profession as having the necessary skills and abilities to perform at the highest level”. Conversely, novice leaders “are intermediate in skill and knowledge and they lack one or more of the abilities needed to function as experts” (Shanteau, 1992, p.256). Naïve decision makers on the other hand, possess little or no skill in making decisions in a specific area. In fact, Shanteau (1992) states that many “expert-novice” studies are better described as “novice-naïve” studies. Bearing in mind that Shanteau’s theory applies to the general description of experts and novices, his theory does help as a reference when it comes to understanding the level of expertise of the outdoor leaders in this study.
To better understand how expert and novice leaders make decisions; let’s examine the skills and abilities of these two groups from the lens of the Theory of Expert Competence. Shanteau (1992) posits that the skills and capabilities which emerge in experts depend on the following factors: domain knowledge, psychological traits, cognitive skills, decision making, strategies and task characteristics. Domain knowledge is a prerequisite for being an expert. It includes insights gained from experience in working in the real world on top of the knowledge that the expert possesses. Expert outdoor leaders who have vast experience, lead groups in activities and spend most of their time in outdoor settings, certainly possess knowledge far greater than novice outdoor leaders who are fresh out from training. Novices on the other hand, do know a great deal but lack what it takes to perform as experts. Shanteau (1989) argues that experts often display a common set of psychological traits with high worth in self-confidence; a “self-presentation” trait of a personal style found in many experts (Goffman, 1959). Unlike experts, novices lack traits of self-confidence and the ability to adapt to new situations. Experts also exhibit cognitive skills known as highly developed attention abilities, relevancy, ability to identify exceptions and the capacity to work effectively in stressful domains as opposed to novices. Experts display a variety of decision strategies (Shanteau, 1989) that aid them in systematically making decisions and overcoming cognitive limitations. Finally, the task characteristics determine how competent experts behave. Even with the combination of the last four factors discussed, the competence of an expert depends largely on the task. In contrast, novices display limitations in their decision making strategies and are not systematic in making decisions. Furthermore, they are unable to overcome cognitive limitations. Hence, the theory suggests that both judgemental heuristics and cognitive science analyses are right in their own aspects but incomplete. This probably points to the fact that both literatures appear to be a function of the different domains studied.
Expert decision-makers make decisions based on their prior experiences. The accumulation of knowledge does not come instantaneously or over a short period of time but takes quite a considerable amount of time. Tozer et al., (2007) estimate that for outdoor leaders to be an expert, they have to spend at least five years of on-the-job involvement. Galloway (2007) finds that experienced outdoor leaders respond differently and are more context dependent as compared to the novice leaders when determining whether or not to evacuate injured students from the field. He found that experienced outdoor leaders are less influenced by group cohesion when making decisions than novice leaders. Hoffman and Millitello (2009) point to research findings where experts have considerable knowledge foundations that are organised to be contextually useful. The experts are also more effective in forming mental modes and the build-up of knowledge on situational awareness for future reference. In a complex situation, they are able to prioritise tasks more effectively and they possess better metacognitive skills (Hoffman and Millitello, 2009).

Guthrie (1996) argues that in order for leaders to make sound judgements, they have to be experienced decision makers who rely on their tacit knowledge and habits. This knowledge and habits develop through previous experiences and theoretical knowledge. McCammon’s (2001) review of research findings from two emerging areas of decision sciences: heuristics and expertise, proposes some teaching methods for novice leaders in the wilderness to avoid these decision making traps. He suggests that in order to avoid heuristic traps, novice leaders should test the trigger features of the heuristics against the actual conditions. If the test shows no meaningful relationship then the novice leader must use other more appropriate heuristics or choose a more conservative course of action. As for the expertise trap, Klein (1998) suggests using the experience test, where intuitive decisions are challenged by group members with the question, “What experience are you basing that
decision on?” A leader with years of experience behind him can certainly convince the
followers easily as compared to a leader with a lesser number of years. Another way to avoid
the trap is using the pre mortem test (Klein, 2007). Here, the group members imagine that the
leader’s intuitive-based decision is executed flawlessly but failed. The members then generate
ideas and reveal errors as to why the plan went wrong. It also invites creative simulation of
possible outcomes through this process.

Therefore, one can affirm that insights gained from experience in working on real
problems are important for an expert leader (Shanteau, 1984). Research shows that leaders
did not generate multiple options which are compared on utility value to select the best
choice (Klein, 2008). Instead, a leader uses prior experience and intuition to rapidly
categorise situations which lead to the next action to be taken. However, these are findings
from the field of professionals and study of experts, and are not from outdoor leaderships
perspectives. Whilst studies from Guthrie, 1996; McCammon, 2002; Galloway, 2002, 2007
point to the importance of experience and experts in outdoor leadership, there needs to be
studies to investigate whether experiences of outdoor leaders do have an influence on the way
decisions are made, and whether outdoor leaders use intuition. The inclusion and
confirmation of the use of intuition by outdoor leaders can thus provide some meaningful
answers to the literature of outdoor education.

**Outdoor Leadership**

Before I discuss judgement and decision making in outdoor leaders, let us look at the
many definitions of outdoor leadership. Cox (1984) lists out the most desirable outdoor
leadership traits as courage, integrity, patience, humility, competency and potency.
Cousineau (1977) supports personality as an important aspect of outdoor leadership, and adds
in outdoor skills, leadership experience, safety skills, age and fitness. McAvoy (1978) considers skills in group interaction, decision making and administration as important to outdoor leaders of “risk creators”. He believes that training for outdoor leaders is necessary in the areas of judgement, outdoor skills, expedition behaviour, safety, environmental awareness, and trip planning. Johnson and Ewert (1983) identify a set of core components essential to outdoor leadership as judgement, outdoor knowledge, medical skills, human resource management, personality and environmental ethics. Petzoldt (1984) puts forth the skills component of the effective outdoor leader which is associated with activity and safety, organisational, instructional, group counselling and judgement firmly based upon experience.

Outdoor leadership is complex, especially when outdoor leaders lead a group of participants for an outdoor adventure experience. The leaders face many different contexts of challenges and responsibilities from both the physical environment and social interaction within group members. Petzoldt (1984) identifies three critical goals of outdoor leadership: (1) participant safety, (2) quality of experience and (3) environmental stewardship. Leaders have their own styles of leadership which they use to lead others. Leaders also need to guide, facilitate experiences and learning; and have a moral obligation for the welfare of the group members as well as to nature. Furthermore, they need to exercise good judgement as well.

Wagstaff and Cashel (2001) cite Petzoldt’s philosophy and method in training outdoor leaders. They include (1) crucial components in the first twenty four hours of an educational expedition, (2) the “Grasshopper Teaching Method” and (3) judgement and decision making. The first twenty four hours refers to, learning from experience as a predictable progression unfolds on an educational expedition and not to worry about unimportant aspects, such as teaching them how to pack their stuffs. The next lesson, “Grasshopper Teaching Method,” refers to teachable moments or the opportunity to convey information by “hopping” from one subject to another. Finally, Petzoldt’s judgement and decision making involves a combination
of information available at that moment and past experience, to yield a decision. He further explains that all decisions reduce the odds of injury or loss to people, conserves the environment and protection of equipment for the expedition. Thus, his emphasis on searching for ways to find effective ways to teach future outdoor leaders is an important contribution to outdoor leadership literature.

Since skills knowledge, experience and training will in turn enhance judgement, (Cain & McAvoy, 1990; Green, 1990; Wagstaff & Cashel, 2001), most centres offer structured outdoor programs that have a stated purpose with an organised curriculum aimed to provide participants with opportunities to develop all these outdoor skills, knowledge and experiences. The outdoor leadership literature places more emphasis on behaviours and development skills (i.e., judgement and decision making), mentoring, and on-going feedback as valuable components of the leadership development process (Cain, 1985; Priest, 1990; Hunt, 1984; McAvoy, 1980; Petzoldt, 1984). The literature supports the idea that leadership development is not an end in itself. Instead, its development entails multiple stages of progression in many areas of skills and ability.

Leadership development is a function of active participation in a variety of outdoor-related activities such as classes, workshops, personal experiences, reading, leadership responsibilities and past outdoor-related jobs (Cain & McAvoy, 1990; Ford & Blanchard, 1985; Green, 1990). A prerequisite of effective outdoor leadership and better judgement is active participation in such experiences. Continued participation is considered a precursor to leadership (Cain and McAvoy, 1990; Green 1990). Consequently, it affects the outdoor programs which have both a stated purpose and an organised curriculum, aimed at providing participants with opportunities to develop skills, knowledge and experience. Skills, knowledge and experience in turn enhance judgement (Cain and McAvoy, 1990; Green
1990). A trend points to judgement being essential and decision making as important, based on these examples. Judgement refers to the process of making decisions with incomplete information concerning either the outcome or the decision factors (Clement, 1997). Decision making has been described as a joint function of task features and the actor’s knowledge and expertise relevant to that task (Klein, 1993). However, Clement’s (1997) work on the psychology of judgement for outdoor leaders, mentions that judgement is a process of making decisions with incomplete information concerning the outcomes or the decision factors. He explains that the accuracy of human judgement mostly seems to plummet when confronted with ambiguity and uncertainty or ego and desire, which are tenets of the Heuristics and Biases theoretical perspective. This is in contrast to what NDM suggests. He further explains that this phenomenon is linked to theories of evolution and social judgement and gives some strategies to mitigate them. His study points out that classical decision making seem to be unfit for the dynamic nature of outdoor settings. The fact that all decisions occur in a time continuum, trying to generate large sets of options and to systematically evaluate them in the outdoor context, situations might be too time consuming.

Recently, a study was conducted to challenge the previous research which concentrates on the models of outdoor leadership skills like hard, soft and conceptual skills (Shooter, Sibthorp, and Paisley, 2009). Shooter et al. (2009) propose a programme-perspective model that addresses the perspective of the programme. They recommend that this model integrates programme-level thinking with outdoor leadership skills and has identified judgement and decision as a mediator between a leader’s understanding and ability with regards to the specific course components and ability to implement a technical skill. This model, however, is not concerned with structuring outdoor leader skills and competencies into a pre-determined hierarchy but it offers to integrate the outdoor leadership
skills into organisational, programme and course-specific goals. Next, the programme perspective model displays a variety of programme-specific attributes to match the leader’s working experience in a specific type of terrain or population. The third layer pertains to the judgement and decision making which serve as a mediator between a leader’s understanding of a specific course component and his/her abilities to implement a technical skill with the greatest course outcomes. Instead of using a hierarchical approach, this model considers the organisation’s mission or programme’s goals as the foundation to determine the importance of outdoor leadership skills. It is particularly interesting why this model is a better option as it integrates the skills of an outdoor leader to the needs of the organisation.

Brymer and Gray (2006) then extended thinking about effective outdoor leadership when they drew upon transformational leadership theory (Bass, 1999). Transformational leaders are identified as empathetic, motivational, adaptive and inspiring. It builds on positive relationships and the individual is key. It focuses on the development of leaderships in others that distinguishes it from situational and conditional theories of leadership. Penney and Smith (2010) then proposed that extraordinary leaders displaying key skills, characteristics, values and behaviours that are associated not only with transformational leadership, but also spiritual leadership. They further explained that extraordinary leaders also demonstrating a commitment to the experience as a collaborative learning journey and a sense of calling and greater purpose aligned with spiritual leadership.

**Judgement and Decision making in Outdoor Leadership**

Current outdoor leadership literature adapts the classical definition of decision making from the classical theorist discussed earlier. These definitions do not align themselves to the dynamic and uncertain settings of the outdoors. Neither do they justify the simplistic decision making made in a complex setting like the outdoors. In the next section, a transition from the
classical decision making to the NDM theory in recent research of outdoor leadership demonstrates the future direction of decision making process in the outdoors. This is further supported by studies done by researchers in professional settings.

**Classical Decision Making**

The earlier works of classical theories are manifested in the outdoor leadership literature but soon progressed to naturalistic decision making theory. To illustrate the use of classical decision making models in outdoor leadership, let’s look at three models as examples for discussions. These include, but are not limited to, the Wilderness Education Association (WEA) model (Drury et.al, 2005), the Priest model (Priest, 1988; Priest and Dixon, 1990) and the COLT model (Priest and Gass, 1997). The first model compares the decision making process of a hybrid of analytical thinking and ‘inductive reasoning’ as to ‘really just brainstorming and reflecting in a slightly different way’ (Ibid, p.151). It then uses judgement to fill in the gaps via the logical deductive rule before going on to make a judgement. Once the decision is made and implemented, the next step is to assess the results of the decision making. This is done by reflecting on past decisions made and incorporating insights for future decisions like a learning cycle. Priest (1988) develops a textbook problem solving flowchart that involves three phases. The assessment phase asks the question as to whether a problem exists and is identifiable. Next, the analytical phase consists of procedures that lead to a solution being put into action. Finally, the creative phase identifies possible solutions, selects the best solution and puts it into action. The comparative process use to compare options or concurrent processing is a typical characteristic of a classical approach.

Another example of a textbook model that does not seem to fit the outdoor leaders’ decision making process is the COLT model. Priest and Gass (1997) develop the situational
leadership model and adapt it specifically for outdoor leaders; Conditional Outdoor Leadership Theory (COLT) model. They postulate that outdoor leaders must go beyond different styles of leadership like autocratic, abdicratic and democratic and apply these styles at the level of conditional favourability too. The degree to which there is a high or low favourability within each these conditions - environmental dangers, leader proficiency, group cohesion, member competence and decision consequences will create circumstances conducive that shift the style in one direction or another. Immediate danger can require autocratic leadership whilst a united and competent group may well flourish under an abdicratic leader, even under adverse conditions (Martin et al., 2006). The model is too abstract sophisticated one and considerable effort is required to grasp its essential sufficiently to be of any use in practice. It combines leadership styles with leadership orientations of relationship and task and conditional favourability. It helps the leader to identify whether the conditions are low, medium or high. Low favourability indicates that dangers may be extreme; medium means more typical outdoor setting where dangers are within acceptable means. Lastly, high indicates desirable favourability as dangers are construed as being minimal. Nevertheless, this decision making rubric, does not necessarily help outdoor leaders to decide easily. This is especially so when some of the conditions fall into two or more of the favourability options and thus, readers deem the model as too confusing to be adopted (Priest and Gass, 1997).

The WEA’s model maintains that a leader recognises a need to make a decision, collects all available relevant information, identifies and then analyses potential options for action, and thus proceeds to select an option after identifying the consequences, then evaluates the results once the option is executed. The shortcoming of this model is that it does not explain how a leader knows what the appropriate potential options to deliberate on are, or
even the potential concerns involved. In naturalistic settings, where perceptions and possibilities exist, the model requires rejecting a large number of possibilities without any consideration. With all these limitations, all three models do not clearly indicate how a leader unconsciously or consciously makes a decision and they also seem to parallel analytic thinking. Hence, there is a need for a more adaptive model to explain judgements made by outdoor leaders and how they arrive at their final decisions.

**Decision Making: Roles and Tasks**

Seaman and Coppens (2006) cite feministic inequalities in their study in outdoor leadership which gives the participants of the study an inadequate picture of adventure practice as it is actually carried out in USA. Instead, they suggest that in order to improve an instructor’s development and practice, it is beneficial to view both the knowledge and skills of the field and of the instructors as a co-evolving repertoire of practice (Wenger, 1998). Wenger (1998) describes the repertoire of practice as “routines, words, tools, ways of doing things, stories, gestures, symbols genres, actions, or concepts that the community has adopted over the course of its existence, and which have become part of its practice.” (Ibid, p.83).

Understanding skills as a repertoire of practice aims to locate the outdoor educator amidst a broader field, with a view that is always partial and evolving. In outdoor education, it contains not only specific skills, but also assumptions about how those skills ought to be employed (Seaman and Coppens, 2006). Similarly, a study by Tozer, Fazey, and Fazey, (2007) presents a number of perspectives intended to assist individuals in making better use of experience to develop an adaptive expertise within their leadership roles. Their analysis of the literature suggests that leaders must develop their expertise in a manner that enables them to deal flexibly with novel, unstructured situations. They suggest that when learning to enhance adaptive expertise, individuals benefit from extensive deliberate variation in
practice. The inclusion of some variation in that practise and reflection on their experiences mould them to become better leaders.

Leadership in outdoor settings is an on-going developmental process. Leadership comes with certain roles and tasks. My research stands by these premises as they befit the nature of a leader in the outdoors, where there is a never ending development to enhance their expertise. The next segment shows how decision making theories govern outdoor leaders’ decision making processes and how the focus on naturalistic settings is more current in the research on decision making of outdoor leaders.

Outdoor Leaders & Naturalistic Decision Making

The NDM theory fits many of the settings of outdoor adventure environments (Beare & Lynch, 2005; Boyes & O’Hare, 2003, 2010; Galloway, 2002, 2007). Many NDM researchers in outdoor education have examined the processes of NDM of outdoor leaders (Beare & Lynch, 2005). In addition, the development of its NDM model that challenges situational recognition and prior experience and also applications of computer simulations in outdoor settings (Boyes & O’Hare, 2003; 2011). There exist studies on differences in medical decision making by experience level in NDM settings and suggestions for training practices of novices and experts in outdoor leadership (Galloway, 2002, 2007).

Galloway (2002) theorises cognitive differences in novice and expert outdoor leaders’ decision making based on the available literature and suggests that the goal for professional training and development in outdoor leadership focusses on naturalistic contexts to provide experiences, which in turn develops good judgement while limiting participants’ or clients’ exposure to accidents or mishaps. He also cites that experience plays a key role in the development of an outdoor leader; a crucial element to include in the development of
naturalistic decision making and ability. Experience is also factored in Beare and Lynch’s (2005) comparative study of decision making strategies in unknown and unexpected situations. They study the decision making processes of 23 expert mountaineers and kayakers based on Beare’s (2001) earlier study and conclude that “experts assess situations in an active, on-going way by seeking out typical cues and anomalies rather than passively waiting for an indication that something is not right” when faced with uncertain, dynamic, time constrained and “high stakes” contexts (Beare and Lynch, p. 214).

Boyes & O’Hare (2003) utilise a framework model of outdoor adventure decision making and propose that expert leaders need to keep on-going decisions in an ideal balance of challenge between the interaction of risk and competence. Their model draws on the NDM processes and they stress the importance of situational recognition and prior experience as the basis for decision making. Failure to recognise or act on critical information leads to crises. The results from the case studies provide anecdotal support for these overall propositions of the model. Their study outlines the leaders’ utilisation of serial evaluation as opposed to concurrent evaluation when making decisions. The case studies are also compatible to the earlier work of Klein’s (1989) RPD model where the leaders generally consider options serially before acceptance or rejection. Only one case shows evidence of a concurrent evaluation.

Galloway’s (2007) study examines differences between the experts and novices in medical decision making, and suggests, that the outdoor instructors in his study vary in their perceptual thresholds of particular factors (i.e. when they notice that isolation is a factor in the decision) in the decision making environment. Using a grounded theory selective coding process combined with quantitative data analysis methods, he concludes that experienced leaders tend to have more cognitive resources to make their decisions, and were less
influenced by the group. The data provides a positive response for group cohesion only and is also the only factor for which experience make a significant difference in instructions to evacuate for medical reasons.

One other study that actually looked into the *contextual variables*, which influence the decisions of outdoor leaders through the dual-process theory is a study by Martin, Schmid and Parker (2009). They were interested to know the degree to which their findings confirm the dual-process approach to judgement and decision making as a framework for considering the progression of novice to expert judgement within the practice of outdoor leadership. This dual-processing approach applies to outdoor leaders and its contextual aspects are found to be intrinsically linked to decision making processes. They also find a similar result, which corresponds with Galloway’s (2007) study, where outdoor leaders are less influenced by group cohesion when making decisions than that of novice leaders. Here the novice leaders rely on group cohesion as a major consideration when making decisions.

Another study conducted by Boyes and O’Hare (2011) examine the differences between advanced and intermediate performance of outdoor leaders in recognition-primed decision making. It is on field-based identification of factors followed by their use under controlled experiments conditions employing high fidelity computer simulations. 104 experienced outdoor leaders participated in the study which aimed to examine the differences between the intermediate and advanced performance in the RPD model. The results point to empirical support of the “NDM model rather than the concurrent decision making processes by the classical models” (Ibid, p. 18). It also verifies that before confirming a decision choice, the experienced leaders examine information within an option (serial evaluation) rather than comparing information across options (concurrent evaluation). It concludes that experts
experience an increase in confidence in decision making when they are predisposed to a higher level of familiarity with the settings i.e. their experiences.

Thus, these studies and examples provide us with a better understanding of the relationship between outdoor leaders and their decisions made in naturalistic settings. With references to these studies, I use NDM as a theoretical framework for my study on outdoor leaders’ decision making. Some of the studies also provide anecdotal support of the usage of serial evaluation processes by the outdoor leaders in decision making, which provides the rationale for me to undertake it as my research, “Do outdoor leaders make decisions using serial or concurrent evaluation processes; and do they rely on intuition within these processes?”

Conclusion

This chapter reviewed the dual process theories of decision making, intuition, recent ideas on experience theories, NDM and classical decision making in outdoor leadership. Evidently, the issues discussed point to the complexity of decisions made by the outdoor leaders in naturalistic settings. It also reveals how the literature of judgement and decision making tends to overlap with the literature on intuition. Undoubtedly, there is an interweaving element that exists between outdoor leaders’ experiences and their reliance on either serial or concurrent evaluations; or even the Type 1 (intuitive) and Type 2 (reflective) dual-processes theories before they make a decision. Insofar, there are a number of studies that support the use of NDM settings in outdoor literature but in terms of serial evaluation processes, only a few stand out. Hence, on the subject of intuition, the review presented many different definitions, as well as a selection of dual-process theories available on issues raised and discussed in this research. The literature provides varying alternatives for discussion of the role of intuition in outdoor leaders and the factors that determine their decision making.
abilities. The lack of research support on the use of intuition by outdoor leaders has spurred me to conduct an investigation on the topic of intuition in outdoor leaders’ decision making.

**Chapter Three: Method**

Previous research investigating NDM and intuition relies primarily on Cognitive Task Analysis (CTA) (Hoffman and Millitello, 2009) and in particular the Critical Decision Method (Hoffman and Millitello, 2009), which is a retrospective cognitive task analysis interview technique. Cognitive Task Analysis is a method routinely used by NDM researchers to extend traditional behavioural task analysis methods as they explore cognitive processes underlying behavioural components of a task (Millitello and Hutton, 1998). Hoffman and Millitello (2009) suggest that the use of cognitive task analysis allows the researcher to uncover perspectives on human cognition based on the context of their work using interview protocols. Many of them use CTA methods to investigate the cues and strategies that skilled decision makers apply (Crandall, Klein, & Hoffman, 2006; Schraagen, Chipman, & Shalin, 2000; Crandall and Getchell-Reiter 1993).

This research involves the study of outdoor leaders’ attempts to recall their decisions made in a previous situation. The study also tries to understand how leaders identify cues through Situational Awareness (Endsley, 1995) and how their different levels of experience in the outdoors help them to guide their decisions and this experience is discussed through the Theory of Expert Competence (Shanteau, 1992). The data collected are then analysed concurrently via ‘Describe-Compare-Relate Analysis’ (Bazeley, 2009) and the ‘Thick Description’ (Geertz, 1973).
Cognitive Task Analysis

Skilled decision makers often apply Cognitive Task Analysis methods to investigate cues and strategies (Crandall, Klein, & Hoffman, 2006; Schraagen, Chipman, & Shalin, 2000). Cognitive Task Analysis allows the identification of cognitive skills, or mental demands, needed to perform a task proficiently. The product of the task analysis is used to inform design of interfaces and training systems (Militello and Hutton, 1998).

A study conducted by Crandall and Getchell-Reier (1993) noted that nurses in a neonatal care unit detected infants develop life-threatening infections even before blood tests were found to be positive. The inability to describe how the nurses made their judgements prompted Crandall et al. (1993) to use CTA; they then probed specific incidents and identified a range of cues and patterns from these incidents. Cognitive Task Analysis reveals knowledge about domain concepts and principles, schemas for typical scenarios, problems types, data types, displays, tools and so on, including memories about rare or tough cases, unusual situations, and critical incidents (Hoffman and Militello, 2009). Cognitive Task Analysis provides a basis for making inferences about judgement and decision making processes. I chose CTA due to its insight into the cues and strategies of the decision making processes of outdoor leaders and the inferences I made based on the specific incidents they shared during the interviews. The CTA method allows me to interview these leaders regarding the cues and strategies they use during their decision making processes.

A study by Boyes and O’Hare (2011) also showed support for the use of CTA in outdoor leadership. They implemented a Critical Decision Method (CDM) with ten experienced outdoor leaders. They used seven scenarios derived from CDM and designed these scenarios as computer simulations in their study. These simulations were then administered to 104 participants to enact a decision in a controlled experimental setting.
Their study revealed unexpected relationships between variables through the assignment of themes to data chunks in a process that is unique to CTA. Boyes and O’Hare (2011) administered a computer simulation exercise in a controlled experimental setting whereas my study involves a retrospective account of a memorable incident shared in my participants’ interviews. My study involves face to face interviews with the outdoor leader which allows me to ask the outdoor leaders probing questions when in doubt. It also allows me to better understand the varying contexts the participants were in at the time of their story. These probing questions together with the timeline paper given to these leaders help to verify events in the story shared. It also captures their immediate reactions and replies about their stories.

Cognitive Task Analysis is an appropriate design for my study because of its iterative nature which allows researchers to reflexively shift between idea generation, data collection, and data analysis. With each phase, idea generation advances in sophistication. For example, after I transcribed my data and related them to converging themes, I needed to revisit my data sets again to understand the context further, as well as to relook at the initial themes so as to be accurate in describing what the participants’ felt. It was a process of comparing elements and looking for relationships, first generally and later more specifically, until the categories and themes are exhausted. Any difference or divergent view prompted me to try to understand the context for the disparity in views. In my study, I include the CDM to explore possible themes through personal interviews. These interviews are then analysed using a qualitative approach – Thick Description (Geertz, 1973) and Describe-Compare -Relate (Bazeley, 2009) Analyses. The goal of my research also considers any possibilities of support to an existing theory.
Critical Decision Method

Cognitive Task Analysis is an inquiry method which is broken down into storytelling, interviews and self-reports. I chose the Critical Decision Method (CDM), as it is a type of interview that involves task retrospection (Boyes and O’Hare, 2003, 2011; Hoffman and Militello, 2009). The CDM procedure allows recalling of events well after they have actually occurred. It derives from recognition of critical information and prior knowledge as described in the Recognition Primed Decision (RPD) model. Recognition Primed Decision model describes expert knowledge and systems in naturalistic decision making environment design (Klein and Brezovic, 1986; Wong, Sallis and O’Hare, 1997; Boyes and O’Hare, 2003).

Critical Decision Method is used on a study of engineers, who studied design simulators, where CDM elicits expert knowledge and systems in NDM using the RPD model. Klein and Brezovic (1986) explored 72 design decisions involving cases in which ergonomic data were needed to decide about trade-offs. Though decisions were made over a period of weeks to months, the designers felt they were under time pressure, which resulted in 60% of them utilising the RPD model, while the remainder used concurrent evaluations. In my study, the possibility of the outdoor leaders to use either serial or concurrent evaluations in their decision making bears a resemblance to Klein and Brezovic’s study. Wong et al.’s (1997) study of ambulance dispatch in Sydney resulted in the identification of goal states which when used together with strategies, invoked an appreciation of the situational factors involved. These in turn drove the design of the display formats for the ambulance despatch to clearly read from. In my study, it is the comprehension of a similar situation which invokes a sense of familiarity to the outdoor leaders, hence triggering intuition or analysis in their decision making processes.
Similarly in outdoor leadership, Boyes and O’Hare (2003) utilised CDM to focus on memorable and specifically recalled incidents. Cognitive probes were used to acquire information on natural and sequential flow of events. Their results suggested that outdoor leaders who have a higher level of familiarity with the setting, predisposed the application of expertise which leads to increased confidence in the decision made. This study strikes a chord with my research because of the similar context of outdoor leaders and the environment they are in. Aside from that, the CDM method employed is also similar to my study. Through CDM, potential decision making episodes from outdoor leaders are elicited so that readers become aware of the possible decision making processes used. These examples convince me to adopt the CDM method in my study, where the focus is on analysing memorable and specifically recalled incidents based on the outdoor leaders’ involvement in making an important decision presumably they know it is important in a lot of situations retrospectively. The use of CDM in my study is significant as the interview questions help me to understand the context of the outdoor leaders’ use of intuition or analysis and the evaluation processes (serial or concurrent) in their decision making episodes.

**Interview Protocol**

I used an interview format for the CDM questions (See Appendix C). The researcher elicits information about cognitive functions like decision making within a specific incident which is conducted in four phases: (1) Incident identification, (2) Timeline verification, (3) Deepening and (4) What If queries. In Phase 1(Incident identification), the CDM focuses on identification and selection of appropriate incidents for the Deepening phase later on. Participants provide a brief account of a particularly memorable incident they have experienced in the course of their work. I checked with the participants if they are comfortable with the story they were sharing because some of them may have vivid details of
the incident which they were trying to forget. The next criteria of sharing includes their involvement in a decision making process within the incident. Once an incident is agreed upon, the participant is then asked to briefly describe the incident. The actual account of the situation provides the interviewer a context to ask subsequent questions and to understand events that occurred at that time.

In Phase 2 (Timeline verification), the interviewee authenticates the segments of key events in the precise order by validating the timeline. Participants are invited to a dialogue, aimed at clarifying and contextualising the key events, as well as providing prompted recall with accordance to the participant’s story through the development of the timeline. They are offered paper and a pen to elaborate on a timeline sketch which I prepared while listening to the initial account. This exercise enables me to confirm the decision points, promote vivid descriptions of their shared scenario. By doing so, participants remember other details, which I then add to the diagram and confirm again that the earlier story shared in Phase 1 (Incident identification) is reflective of the incident. This procedure is also known as ‘member-checking’ (Creswell and Miller, 2000) which is to help ensure internal validity of the study.

The next phase is Phase 3 (Deepening) where the interviewer probes for additional details. Questions are asked to yield information about domain concepts and their interrelations, as well as information about domain procedures and reasoning rules or even information about rare cases and special procedures (Hoffman & Militello, 2009, p. 63). Here, the participants and interviewer identify major decision points to elicit more details. Cues used are identified through probes, the knowledge needed to make that decision, options and courses of action available and time taken on decisions made. The probes on a professional’s recollection of a past critical event is very similar to Klein’s (2000) data gathering technique referred to as retrospective accounts. Phase 3 is important as it highlights
more additional details which includes interrelations of domain concepts or even information that the participants excluded earlier in the interview.

Finally, Phase 4 (What-Ifs), allows the interviewer to round up the interview and to pose various hypothetical scenarios on the incident (Crandall, Klein, & Hoffman, 2006). Other additional training, knowledge and information were asked to seek its usefulness during a situation. Then, participants are asked to give their opinions, if any, on the expected performance of a less experienced outdoor leader when faced with these similar situations. It is probable that these interviews illuminate patterns or themes through the interviews (Glesne, 1999). With the understanding of the four phases in CDM, I conducted a pilot study to try out the questions and prompts used in my study. The pilot study also allowed me to refine the interview questions so as to be as clear as possible based on the feedback given by the participants. The study allowed me to experiment with the questions before the actual research survey was conducted on my research participants.

**Pilot Study**

I conducted a pilot study to assess the type of questions and probes that I used in my survey to the outdoor leaders during the interviews. Four leaders volunteered for the interview process. They were interviewed using the prompts from the main questions and their responses recorded using an audio recorder. The leaders answered all the interview questions and they were assessed on their understanding of the questions. I noted down any confusion in understanding the meanings of the prompts and questions by the leaders and I also repeated or paraphrased a question if the leaders misunderstood it. After the four main questions found in the phases of CDM were tested for its clarity and understanding, my main concern was on the subsequent prompts that followed.
The prompts I used were reviewed and changed after feedback was gathered from the pilot study. For example, initially the leaders were asked some prompts like “What were you hearing, smelling etc.” in Phase 1 (Incident Identification, See Table 1). The leaders found this prompt unclear and not specific to them. They had to clarify with the interviewer which aspects of the question were required of them to elaborate. The question referred only to a specific sense like hearing or smelling, but the new question allowed the participants to answer with no specificity. The new prompt was changed to; “What was your sense of things?” The new question did not limit the types of responses the participants want to share with the interviewer. Responses vary from a specific sense of hearing to the awareness of danger. Furthermore, the new question is a probe question designed specifically on Situation Awareness. The refinement made to the earlier question elicited the participants’ awareness of the situation so as to suggest possible evidence to the theories I have discussed earlier. Another question, “What in your background prepared you for the situation we’re discussing?” is included to elicit from the participant any background experience involved in the situation that we are discussing.

Another example where I made a change is in a question from Phase 3 (Deepening), which was “What information did you use in making the decision?” The leaders initially found it ambiguous. “Information” could mean their experience, knowledge or skills. It was changed to “Did you have a strong feeling about a particular course of action when you decided to make that decision?” The new question is clearer in its attempt to elucidate the kind of ‘feeling’ from the participant (See Table 1). I included another question, “Can you recall in this experience of a situation that just “popped” out at you, where you noticed that others did not catch?” The question is purposefully worded to link it to any possible use of intuition by the participants. As my study includes the investigation on the lack of or use of intuition, it is necessary to include such a question.
Finally, in Phase 4 (What-ifs), the question “What if you had followed your [intuition or analysis] – how would the outcome be different?” is added to my list of questions. This question allows me to compare the difference between the types of decision they had chosen earlier to an alternative outcome. It is also important to note any discrepancy in the answers that they had given earlier. Similarly, some other questions in my pilot study were refined or added to the list. These additional questions have the same intention of eliciting evidence to draw parallels to the theories I adopt in my study.

The leaders’ responses in the interviews were recorded into an audio-recorder. The recorded interviews were transcribed and uploaded into the NVivo software for data analysis. The NVivo software enables coding of data through the identification of common nodes or emerging themes, as well as establishing links to one another. I also draw conclusions on the relationships between the groups of nodes with further analysis. Nodes are formed based on the transcription data that are analysed and the possible emergent themes are considered. The process allows me to effectively “practice” ways to search for emergent themes, compare sets of transcribed responses and to relate to current literature on decision making of outdoor leaders.

From the pilot study, a pre-classification of emerging themes was found. Though this classification cannot be included in the study, the experience of interviewing the participants and the process of transcribing data to search for patterns and themes encouraged me to make further refinements for my actual interview. It also helped me to code the data with extra care to prevent bias. Furthermore, my pilot study helped me to conduct my actual interviews more confidently.
Table 1

*CDM Interview Questions (Changes Made to Original)*

<table>
<thead>
<tr>
<th>Phases</th>
<th>Original Questions</th>
<th>Current Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>What were you seeing, hearing, smelling, noticing, etc.?</td>
<td>What was your sense of things [at the time]?</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>What in your background prepared you for the situation we’re discussing?</td>
</tr>
<tr>
<td>Phase 2</td>
<td>No Change to Questions</td>
<td>No Change to Questions</td>
</tr>
<tr>
<td>Phase 3</td>
<td>What information did you use in making the decision?</td>
<td>Did you have a “strong feeling about a particular course of action” when you decided to make that decision?</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Can you recall in this experience of a situation that just “popped” out at you, where you noticed that others did not catch?</td>
</tr>
<tr>
<td>Phase 4</td>
<td>-</td>
<td>What if you had followed your [intuition or analysis] – how would the outcome be different?</td>
</tr>
</tbody>
</table>

Trustworthiness of CDM

A significant advantage of CDM is its psychological validity. Critical Decision Method is dependent on expert memory for stories as it is retrospective in nature. This is supported by the details available in episodic memory (Tulving, 1972) and the advantages of recall with structured probes. A second advantage of CDM derives from its character as an
open-ended process. The expert subject, not the researcher, defines the domain by choosing
events and critical incidents experienced by them. Critical Decision Method is, thus, a
particularly useful strategy in complex, novel, or real-life domains, where the researchers are
relatively naïve (Hoffman and Millitello, 2009). Another advantage of CDM is that it allows
the interviewees to tell stories. By providing structure and guidance in storytelling, the
interview process flows more naturally like a dialogue. Klein et al. (1989) maintain that this
is essential in continuing the expert’s cooperation and interest. They state that their focus was
to “allow the details to emerge with the [expert’s] own perspective and emphasis intact”

In assessing the validity of the CDM interview method, a study of forest firefighters is
used as an illustration (Taynor, Klein, & Thordsen, 1987). The study explored the effects of
delay in recalling of the events testing the reliabilities based on a timeline and selected
transcripts from randomly selected event recall sessions. The study examined inter-coder
reliability of the CDM by having the subsets of the verbatim transcripts (representing one to
two-and-a-half hours of interviewing) coded by different researchers coding independently.
The results of reliabilities across experts of the identified timeline decision points to an
average of 82%, with a range of 56% to 100% over elicitors. The findings suggest that the
completeness and accuracy of event recall varies from expert to expert over time. A similar
assessment of the reliability of the classification of decision strategies was then conducted for
the earlier forest fire fighting study. This time, two independent judges, one of whom had
been the elicitor, classified the decision strategies involved in 18 points. Overall, for five
coding categories, the rate of agreement was 74%. The findings concerning reliability in the
classification of decisions suggest that any fine-grained analysis of decisions or strategies
depends on its analysts. In establishing trustworthiness, Lincoln and Guba (1985) argued that
ensuring credibility is one of the most important factors in any study. As such, I ensure that
the operational measures of coding categories are correctly employed and recorded so as to promote its reliability to my study. Since the CDM components have been tested for reliability, it is therefore acceptable to adopt it for the purpose of this study.

One limitation to the usefulness of CDM is when participants are unable to generate useful and appropriate incidents. Crandall, et al. (2006) shared that in combat-like situations, where people work under severely stressful conditions and handled very high workloads, a blur of events are created which are difficult to recall as discrete cases. Their interview study involved Air Force personnel, who were deployed to the Persian Gulf during Operation Desert Storm in 1990. These personnel worked long shifts handling hundreds of targets. The personnel described many aspects of the targeting task, but found it extremely difficult to describe an intact case from beginning to end and to provide details of it. In my study, I need my participants to recall and share a specific memorable incident which they have encountered in their line of work. They think of another one if the first one is unsuitable for them to share or they find it difficult to remember any aspects of their stories shared. It is crucial for my participants to recall as accurately as possible the events in their stories, especially as these details aid me to understand their decision making processes. These conversations via the interviews were then recorded and analysed for my study.

There is evidence to point that this qualitative method is a creative way to critically question an existing theory. It may present patterns or themes from the collected data primarily just through interviewing participants (Glesne, 1999). The Describe-Compare-Relate (Bazeley, 2009) and Thick Description (Geertz, 1973) analyses are then used concurrently to further assist me in my investigation to find other possible themes in my data.
Describe-Compare-Relate and Thick Description Analyses

Since qualitative data derived from CDM are retrospective in nature, data are analysed concurrently using two analyses; Describe-Compare-Relate (Bazeley, 2009) and Thick Description (Geertz, 1973). The ‘Describe-Compare-Relate Analysis’ is a simple three step formula that consists of ‘describe, compare and relate’. It records the results of an analysis. ‘Describe’ is an important starting point, as it “outlines the context for a study and it provides details about sources of data, such as demographic features of samples and their inter-relationships between these features” (Bazeley, 2009, p.10). It provides a necessary background against which further analyses can be read.

‘Comparing’ differences in “characteristics and boundaries for a category or theme across contrasting demographic groups or across variations”, is the next step to the analysis (Bazeley, 2009, p.10). Here, I recorded meaningful details or even the absence of association. In doing so, it allowed me to create a systematic referencing of the data. Finally, the last step is to ‘relate’ “categories or themes which have already been written about” (Bazeley, 2009, p.10). For example, I recorded and coded the data under what conditions a particular theme or category arises. The data categories support a process of comparing elements and a search for relationships; first generally, and then more specifically, until categories and themes are exhausted. Utilising a computer method (NVivo) in the thought process, the coding process advances in sophistication as themes are discovered. Theme selectivity and complexity are achieved by breaking qualitative responses apart and putting them back together in new ways (Corbin & Strauss, 1990). The analysis here is on category building, discovering relationships, and comparing elements.

With some theoretical expectations shared in the literature review on the Recognition Primed Decision (RPD) model, Dual-Process theories of Cognition and Situational Awareness, some of these categories might emerge. Any additional coding techniques
mentioned above will therefore be helpful. Data analysis, particularly coding and categorising of information, begins when all interviews are completed. Data are coded separately for each data collection method. Later, when data are collected and broken down, they are reassembled into one big picture. This process, referred to as axial coding, occurs after the open coding process and before the selective coding process (Corbin & Strauss, 1990; Glaser & Strauss, 1967). To substantiate the usage of coding mechanism in qualitative data, I referred to Galloway’s (2007) study on the effect of experience on medical decision making for outdoor leaders. Galloway (2007) utilised a selective coding process that categorises outdoor leaders’ decision making into emergent themes to form decision transcripts for that study. The study was different because it combined grounded theory data collection and analysis with a quantitative component, from which he triangulated data. The study investigated medical decision making in the wilderness and suggested support for the NDM theory (Galloway, 2007). Although my research does not adopt the grounded theory approach like Galloway’s, there are some parts of the approach, like coding to emergent themes, which I utilised in my study. Thus, I am justified to use this process of coding in my analysis, as it has an emphasis on looking for relationships in data by constant comparisons (Glaser 1978; Glaser & Strauss 1967).

The use of ‘Thick Description’ concurrently with the Describe-Compare-Relate analysis strengthens the analysis process of my findings. As suggested by Geertz (1973), it goes beyond spoken details to include a wider semiotic analysis, attention to context, and other products of careful observation. Though the first stage of ‘Thick Description’ is similar to ‘Describe-Compare-Relate Analysis’ on describing, its next two stages include analysing and interpreting, which involve detailed portrayals of participants’ experiences, going beyond a report of surface phenomena in their interpretations, and thus uncovering feelings and meanings to their actions. ‘Thick Description’ entails factual, theoretical and analytic...
description. It develops from data and through the context, and it describes the location and the people within it. Denzin (1989a, p.83) defines ‘Thick Description’ as “deep, dense, detailed accounts of problematic experiences … It presents detail, context, emotion and the webs of social relationship that join persons to one another.” It involves describing a small slice of interaction, experience, or action; locating individuals in specific situations, bringing a relationship or an interaction alive between two or more persons, or providing a detailed rendering of how people feel (Denzin, 1989). ‘Thick Description’ also provides readers as many details as possible in the data analysis. With vivid details available, readers understand that the account is credible. Using this procedure to establish credibility, researchers employ a constructivist perspective to contextualize the people or sites studied. ‘Thick Description’ allow the readers to empathise what these leaders experienced, or could experience, as the events are described in the study. Thus, its credibility is established by the readers, who are reading a narrative account of events and are transported to a setting or situation as they read the accounts.

‘Thick Description’ analysis enables me to design a transcript of the scenarios shared by the participants from the interview transcripts (Refer to Appendix D). The transcripts are written so that readers understand the viewpoints of the participants. These transcripts included the participants’ decision making, description of scenarios and actors involved. The transcripts are extracted to form major themes and hence any possible comparison is made for convergent and divergent views in the themes selected. Specific references to the transcripts are portrayed in the analysis so as to present a better picture of any themes and patterns found. Overall, the analytical process of this study strengthened the use of ‘Thick Description’.
I decided to adopt Bazeley’s (2009) ‘Describe-Compare-Relate Analysis’, which presented a more meaningful and coherent way of analysing data, together with ‘Thick Description’ by Geertz (1973), so as to convey a deeper understanding of a culture or an experience. Furthermore, the strengths mentioned within these two analyses assisted me in answering my research questions.

**Research Participants**

The primary data collection method was conducted through semi-structured interviews and self-estimation questionnaires completed by individuals, who were involved in a memorable incident they had encountered before, either professionally or personally.

These participants were identified and contacted through their affiliated organisations, either by means of a phone call or via e-mails. All interviews took place at the participants’ work places during their off-peak periods and a conducive room for interviews was provided.

I conducted ten face to face CDM interviews in August 2011. The duration of each interview varied between 45 and 70 minutes. All the participants in my interviews came from the South Island of New Zealand. I contacted them via a search in the NZ’s website under polytechnics, outdoor institutions and Outward Bound schools. Since putting up an advert would only entice interested participants to respond, I decided to take a more proactive approach by contacting them via email. I also conversed with them on the telephone to confirm the initial point of interest in the research work. Once the contacts have been confirmed, the next step was to establish an agreed time for the scheduled interviews to take place. Initially, 12 instructors responded to my request for an interview. Two instructors who were from the North Island, did not reply to my request to interview them. Nevertheless, a target of ten instructors for my study was met. As I was trying to complete the research realistically within a certain timeframe (one year), I was advised by my supervisor that I
should concentrate on ten participants only. This was because the research process entails transcribing recorded data to the point of alluding of themes, followed by revisiting of data over and over again until the themes were exhausted. Thus, this is a realistic and appropriate timeframe for me to concentrate on.

Participants gave their consent before the interview. The participants were considered as experienced outdoor leaders since most of them held leadership or managerial positions in their organisations and/or had acquired senior instructor status. Only one participant from the Outward Bound School was considered relatively ‘new’ as he had the least number of years - only five - of experience with the organisation. Since outdoor leaders who had encountered a memorable incident while conducting outdoor activities in New Zealand were willing to share their stories, these participants were selected based on access, availability, and prior knowledge of their work.

During the interview, to exercise consistencies across all participants, they were asked the same questions from the four main phases as described in the CDM. Any gaps and discrepancies to create a clearer picture of the incident were addressed with probe questions. Manual transcribing of each interview into written data took an average of 2-3 hours, as some descriptions by the leaders were difficult to interpret and hear. I used a timeline verification of a story process, known as ‘member-checking’ (Creswell and Miller, 2000), which is to validate whether the storyline was correct during interviews with participants. The validity procedures consisted of sending and accordance of interpretations back to the participants so that they could confirm the credibility of the information and narrative account (Lincoln and Guba, 1985) in the form of story transcripts. Lincoln and Guba (1985) describe this process as “the most crucial technique for establishing credibility” (p. 314) in a study. Another round of ‘member-checking’ was administered once themes and findings were finalised.
Data from the audio-recorder were then transcribed using Sony Voice Editor V3 software in .wav files format. The participants are referenced by pseudonyms in my analysis and their real names and their gender and age are kept confidential.

Confidentiality

The following ethical considerations were considered for this research project. The purpose and aims of the inquiry were included in the consent form and the research participants were asked to sign it (See Appendix A). The privacy of the research participants was kept confidential and identity was not disclosed at any point of the research. The participants were allowed to withdraw from the project at any one time for any reason whatsoever. All original research information, such as the interview recordings, notes, transcripts, and electronic sources are kept for six months after the completion of the thesis when they will either be returned to the research participants or destroyed according to the University of Otago’s policy.

Quantitative Data

Experience Estimation

A modified version of the self-classification approach combined with the Outdoor Leader Experience Use History (OLEUH) measurements adapted from Galloway (2002) and Scott, Ditton, Stoll & Eubanks (2005) respectively, were employed during the interview sessions (See Appendix B). As these constructs were theoretically based, researchers like Galloway (2002, 2007) and Scott et al. (2005) developed some constructs to measure the levels of experience of leaders in their respective domains. Galloway (2002) suggests the potential uses of OLEUH include the assessment of staff development needs (individually or a group), and its use as a research variable to investigate the effects of experience on a
leader’s performance, decision making, and programme and participant outcomes. The OLEUH serves as a preliminary effort to develop a psychometrically sound instrument for the measurement of outdoor leader’s expertise for use in future research and training and professional development (Galloway, 2002). Galloway’s (2007) study is also considered when I made references to the importance of experience in experts’ decision making, as his study proposes the OLEUH measurements as an assessment of the experience level of the leaders. Using the modified OLEUH and Self-classification approach, these constructs seek to understand the outdoor leaders’ perception of their own level of experience in the industry, and their professional and personal experiences in outdoor activities. The data were entered into SPSS software for data analysis.

As mentioned in the literature review, expert decision-makers make decisions based on their prior experiences that are predominantly drawn from real encounters (Shanteau, 1992). To further support the notion that the outdoor leaders interviewed in this study represent the group that fits this criteria, the experience level is determined from the Experience Estimation as well as through the cue in the CDM question: “What specific training or experience was necessary or helpful in making this decision?” Hence, after the experience level is ascertained, further propositions are made with reference to their decision making scenarios.

**Conclusion**

Data collection and analysis for this research was an iterative process, which is consistent with Cognitive Task Analysis methodology. The proposed analyses such as Describe-Compare-Relate (Bazeley, 2009) and Thick Description (Geertz, 1973) and their
relevance to this study were discussed in this chapter. Within the timeframe mentioned, research participants shared their retrospective accounts (Klein, 2000) after I contacted and interviewed them, when I also administered a survey before the start of the interview. With these methods, it was my intention to use the analysis and interpretation of data to achieve interesting findings, and to promote further discussion, which can possibly lead to answers to my research questions. The propositions of themes and patterns derived from my data using the methods discussed are listed out and considered in Chapter Four.
Chapter Four: Data Analysis

The purpose of this study investigates what sort of evaluation processes outdoor leaders use in naturalistic decision making situations and how they use intuition and analysis in their evaluation. This analysis considers the demographics of the participants, nature of their programmes which they run and their decision scenarios shared. It describes the important steps and elements that are required to systematically extract the themes from the interview transcripts. Every attempt is done to ‘exhaust’ and filter the data and code them for potential themes that resonate with the theories discussed in the review.

The data also examines convergent and divergent views using the two analyses mentioned earlier to explain the research questions and describe as many details as possible. Every effort is made to analyse the participants’ transcripts and to ‘double-check’ them for support from the list of literature and theories chosen for this study. This allows readers to ‘feel’ for the participants and hence presents a clearer understanding of the process of decision making by the participants in this study. My qualitative analysis presents three propositions of themes which I induced from data collected, primarily from the surveys and semi structured interviews. The three propositions are: 1) Experience influences decision making, 2) Situation awareness and familiarity acts as a precursor to serial evaluation; and 3) Outdoor leaders’ utilisation of dual-process cognition in decision making. All the proposed main themes in the propositions contain sub themes, which lend support in the explanation of the main themes. I provided excerpts from my interviews as evidence to support the proposed themes so as to distinguish their relevancy and relationship to answer my research questions. References to the participants’ transcripts add a clearer picture to readers about the incidents shared by the participants.
The Process

First, I explain the analysis of data using the demographics of participants, the context of programmes shared and decision scenarios shared by the participants during the interview. The process directs the readers towards a greater understanding of the participants’ perspective and context that they were in when they made the decisions.

Demographics of Participants

Participants in my study consisted of 10 outdoor leaders from the South Island of New Zealand. Seven of them were male. The median age for the group is 40 (39.8); the youngest being 25 and the oldest, 51. In terms of age there was no difference as to whether a younger or older participant is intuitive or reflective in cognition, with reference to one participant I interviewed in my study (See Transcript 1). Michael was the youngest participant in my study and yet he reacted intuitively when he made the decision to go into the waters to save his participant. He sensed that there was danger and he reacted fast. He made the right decision at that point of time with the quick assessment of the environment and the potential consequences. In contrast, my other participant, Jenna, 38 years old, who rated herself high on the experience level, affirmed strongly that she deliberated rationally on her decision making process. To her, she would rather ‘play it safe’ and not risk any negative repercussions later. It is interesting to note that even though the cognitive process of these two leaders is different where one infers to use intuition and the other reflection, the underlying reason for their actions is still towards participants’ safety. In fact, Jenna shared that as one grows older and more experienced; one tends to be more careful about their decisions when they are in the outdoors. The thought of negative consequences on their charges becomes their prime factor during their decision making process.
The importance of experience is manifested through the average of their own ‘Ranking of experience level’ in the experience estimation survey used, which was 8 out of 10 (See Table 2). The participants in my study rated themselves an average 8 out of 10 on how they thought their peers would have ranked them in the industry, too. However, this data only reflects the average scale ratings, and it is not enough to show the reliability of its data in terms of statistics. So, in terms of descriptive statistics collated via the experience estimation survey, it represents stronger sets of data that have the means and standard deviations for all 11 variables. This was followed by a reliability test (Cronbach Alpha) on the 11 items (1) Self-ranked experience, 2) Estimated peer ranking experience, 3) Trips past 12 months, 4) Days past 12 months, 5) Days past month, 6) Longest Professional Expedition, 7) Number of Activities Led, 8) Number of Certifications, 9) Personal Experience in the Past 12 months, 10) Average length of personal experience and 11) Longest personal trip).

Cronbach’s alpha allows us to estimate the reliability of a composite when we know the score variance and the covariances among all its components (Crocker and Algina, 1986, p. 117). Hence, if the Cronbach Alpha is above (.70) it will meet the accepted level for reliability coefficients (Nunnally, 1978).

Using the Experience Estimation survey, all the variables are determined to be significantly high and has a reliability test of $\alpha=.843$ (Cronbach Alpha) showing the estimate of the reliability of a composite among all its components are significantly high.
Table 2

*Experience Estimation (Modified OLEUH and Self Classification Approach)*

<table>
<thead>
<tr>
<th>Items</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-ranked Experience</td>
<td>10</td>
<td>6.0</td>
<td>10.0</td>
<td>7.800</td>
<td>1.1353</td>
</tr>
<tr>
<td>Estimated peer ranking experience</td>
<td>10</td>
<td>7</td>
<td>10</td>
<td>8.00</td>
<td>.943</td>
</tr>
<tr>
<td>Trips past 12 months</td>
<td>10</td>
<td>3.0</td>
<td>40.0</td>
<td>13.200</td>
<td>10.6124</td>
</tr>
<tr>
<td>Days past 12 months</td>
<td>10</td>
<td>15.0</td>
<td>180.0</td>
<td>75.200</td>
<td>58.2710</td>
</tr>
<tr>
<td>Days past month</td>
<td>10</td>
<td>.0</td>
<td>18.0</td>
<td>5.600</td>
<td>5.2957</td>
</tr>
<tr>
<td>Longest Professional Expedition</td>
<td>10</td>
<td>9.0</td>
<td>120.0</td>
<td>27.200</td>
<td>33.0481</td>
</tr>
<tr>
<td>Number of Activities Led</td>
<td>10</td>
<td>3</td>
<td>12</td>
<td>7.50</td>
<td>3.342</td>
</tr>
<tr>
<td>Number of Certifications</td>
<td>10</td>
<td>0</td>
<td>7</td>
<td>2.90</td>
<td>2.234</td>
</tr>
<tr>
<td>Personal Experience in the Past 12 months</td>
<td>10</td>
<td>8.0</td>
<td>150.0</td>
<td>53.300</td>
<td>39.5532</td>
</tr>
<tr>
<td>Average length of personal experience</td>
<td>10</td>
<td>1.0</td>
<td>12.0</td>
<td>3.200</td>
<td>3.7653</td>
</tr>
<tr>
<td>Longest personal trip</td>
<td>10</td>
<td>3.0</td>
<td>80.0</td>
<td>16.300</td>
<td>23.3716</td>
</tr>
</tbody>
</table>

*Context of Programmes*

In terms of their vocation, five of the participants work at the tertiary level in Polytechnic Institutes (See Table 3). Three of them work as Adventure Therapy instructors. The remaining two are Outward Bound instructors. As these outdoor leaders come from different vocations, their objectives and their focus for their programmes are different as well. The one thing that they have in common in their line of work is the naturalistic setting of the outdoors and their passion for the outdoors. With reference to the sharing of the participant’s
decision scenarios (See Appendix D) there were differences at the programmatic level. The Polytechnic Instructors were instructing a leadership training course module, the Adventure Therapy Instructors were on an adventure therapy programme targeting the at-risk group of the community, who were either having drug related or mental health issues, one of the OBS Instructors was on an adventure race with her staff, whilst the remaining one was on an open programme for students and the general public under the Outward Bound School’s programme. Thus, due to these differences in the objectives of their programmes from the Polytechnic Instructors, Adventure Therapists and Outward Bound Instructors, any changes they made during their activities were in accordance to the situation and profile of their participants.

The main objective of the group of instructors from the Polytechnic Institutes, is to train future outdoor leaders and hence, the duration of the teaching course for their students encompassed a longer period of time. The students enrolled in the programme were on a three year course with many objectives to be reached, ranging from courses on decision making, activities to lead groups out and certifications to be attained. The instructors are also involved in teaching and learning, a dimension different from the other two groups of interviewees. This difference influenced the way these instructors make their decisions during the activities they conducted. For example, they sometimes need to consider between allowing their students to make the decision themselves and when to intervene. The milieu that the instructors’ at the polytechnic range from being a trainer, assessor and teacher. Their cognition process becomes more complex as they weigh between interfering with their students’ decision making and letting their students carry on with the activity. The instructors had to step back and also became observers and participants for their students.
### Table 3

**Decision Scenarios Grouped by Adventure Programmes**

<table>
<thead>
<tr>
<th>Scenarios described in Interview</th>
<th>Leadership Training (LT/Polytechs)/ Therapeutic Counselling (TC)/OBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tramping over the Mangatuas</td>
<td>LT</td>
</tr>
<tr>
<td>Participant ran away from the camp after Tramping</td>
<td>TC</td>
</tr>
<tr>
<td>Students on Alpine track in National Park</td>
<td>LT</td>
</tr>
<tr>
<td>Sea Kayak in Milford Sound</td>
<td>LT</td>
</tr>
<tr>
<td>Adventure race for staff - Navigation over terrain</td>
<td>OBS</td>
</tr>
<tr>
<td>Sea kayak trip over the Manapouri</td>
<td>TC</td>
</tr>
<tr>
<td>Alpine tramping over the Otahataki Gorge</td>
<td>LT</td>
</tr>
<tr>
<td>Bushline tramp over some muddy terrain</td>
<td>TC</td>
</tr>
<tr>
<td>Tramping over the Coral ranges</td>
<td>LT</td>
</tr>
<tr>
<td>Kayaking over shallow rapids</td>
<td>OBS</td>
</tr>
</tbody>
</table>

It also implies that the instructors ‘know’ the students well enough to step back during the activity and stepped in to interfere only when they felt that the safety of the participants are compromised. The outdoor leaders in this group display a confident nature towards their charges as well as possess an ability to trust them to know when is the ‘right time’ to intervene and make the decision to take over. These two qualities imply the leaders’ experience in executing these activities and their decision making abilities.

The Adventure Therapy group dealt with an at-risk group of the community, who were referred to them either by the court of law, the police or members of the community. They are trained in counselling, as well as the outdoors, which they use as a medium to apply their therapeutic skills. They had the highest risk in terms of group dynamics, as compared to the other two groups of interviewees, as the people involved in their programmes were trying to quit drugs, alcohol and/or smoking. Their programmes’ objectives included taking good care of participants, whilst showing them avenues to quit their addiction to their problems. Counselling their participants is a necessity in their programmes. The naturalistic setting in
In this case, acts as a stage for their objectives to be met. The cognitive process for these instructors is affected by the backgrounds of their participants. The group dynamics is ever changing due to the different backgrounds of their charges and the instructors needed to always be on the alert to make quick decisions.

Finally, the OBS Instructors mainly dealt with a great diversity of groups, which ranged from school students to members of the public. They also have programmes for the disabled, as well as for corporate team building. The teaching element in their programmes differs when compared to the groups from the polytechnic. The OBS Instructors planned and conducted the programmes themselves. They were more concerned with their participants going through the activities, and challenging them to their limits in the various activities prepared for them, whereas with the Polytechnic Instructors, they concentrated more on allowing their student leaders to practise leading and making decisions before they themselves took over the lead. The OBS instructors’ decision making process is simpler as they were the sole decision maker in the settings.

It is again interesting to note that though the vocation, programmes and objectives of these three group of interviewees differ to one another, they converge on a fact that participants’ safety is still the important factor in their decision making process. The participants in my study had different objectives in their outdoor programmes at the time they shared their decision scenarios with me. But all shared a common goal of ensuring that their participants’ safety was not compromised. The outdoor leaders portrayed a sense of responsibility over their participants’ safety and well-being as it was part and parcel of their vocation. This sense of responsibility is pervasive across all age ranges of my participants. Due to the high stakes of the activities and the uncertain, dynamic environment, the outdoor leaders had to remain vigilant at all times. The decisions of all the outdoor leaders in my study, either by intuition or reflection, displayed an overwhelming desire to ensure the safety
of their participants. Though they made no mention of the possibility of not achieving their programmes’ objectives when the incident happened, readers can infer from their stories that their decisions allowed them to make changes based on the context of the environment and situation of the charges under their care. The welfare of their charges was also key in many of the changes they made in their decision making process.

It points to the fact that safety is always the main issue to consider in any decisions made by outdoor leaders due to the uncertainty of the naturalistic environment. Thus, readers can try to understand the relationship between the naturalistic settings to the type of decisions made by these leaders as evident in the transcripts.

**Decision Scenarios (Transcripts)**

In Critical Decision Method, the interview process is paramount for researchers adopting the method. Thus, the interviews I conducted in my study forms the basis from which I drew up the decision scenarios (See Appendix D).

The decision scenarios give insights into the different kinds of situation that the participants faced. These steps were replicated for each possible generation of themes and patterns. I included the decision scenarios (transcripts) so that the readers can make reference to them as the findings are shared and analysed. The transcripts included the scenarios shared, participants involved, decision making process of the participants or their students and the context they were in. These decision scenarios also allow the readers to better understand the context that the participants were in- a typical process in ‘Thick Description’. Initially, while selecting the decision scenarios, two of the ten scenarios shared were rejected. One participant was asked to think of another decision scenario as the initial story shared did not elude any form of decision making process. The other scenario was replaced by the
participant herself, as she found it more appropriate to share the second story in the interview instead of the first. These decision scenarios are supported by quotes from the interview transcripts, and references are made to the theories discussed in the literature review, hence they form the proposed patterns or themes as presented in the next section.

Qualitative Findings

Proposition 1: Experience Influences Decision making

The findings suggest that the experiences of the outdoor leaders in my study seemed to impact and influence the type of decisions they made. The reason is as novices develop greater and greater levels of knowledge and experience on which to base decisions, they can progress along a continuum from more analytical, ritualised approaches to more intuitive, automatic approaches to judgement and decision making (Martin et al., 2009). Experience is explored through three sub themes, namely their prior experience in the outdoors, their confidence and their comparisons with other less experienced outdoor leaders.

Prior Experience

Shanteau (1992, p.256) defines expertise as “those who have been recognized with their profession as having the necessary skills and abilities to perform at the highest level”. Expert decision-makers decide on the basis of their prior experiences that are predominantly drawn from real encounters (Shanteau, 1992). All the participants in my study agreed that prior experience helped them to become more confident and less uncertain about the decisions made. The prior experience that they encountered basically came from their personal experiences and time spent in the outdoors. These ‘real encounters’ resonate with what Shanteau (1992) theorises. When probed with the question, ‘What specific training or
experience was necessary or helpful in reaching this decision?’, all instructors mentioned their prior experiences and not their training, as the preference for making their decisions in their shared stories. They mentioned that training differed greatly with experiences as one stands on the premise of simulation whilst the other consisted real encounters. The context with which they were in also affected how they arrived at their decisions. The following quotes were testimony to this question:

So I made that call just based on my tramping experience and figuring in the dark and hopefully that be easier to follow by having things like clearing to follow, like a bush line to follow, the ridgeline travel was relatively easy.

Karen (Transcript 5)

And,

Just experience I think, experience on the water is the big one, because it’s not a very technical rescue. It’s literally me just going there and grabbing her. …And having that knowledge I think you have big problems if you didn’t know if you could walk through that water.

Michael (Transcript 10)

It was also interesting to note that most of them mentioned they had no specific training in decision making per se, despite having trained only in medical scenarios or those involving technical skills. It seems that although training is important to outdoor leaders, it may not be a key reason for them when they make decisions.

They also referred to their prior experiences as something that they most valued, as they learnt quite a lot from others when making good decisions:

Twenty five years of working in the industry with different clients and different organisations and working with amazing people that I have learnt from … Getting genuine and honest feedback from as many people when I worked with them.

Antonio (Transcript 1)

And,

…yeah, lots of experience in the mountains and been out there before.

Peacan (Transcript 9)
Evidently, the four quotes shared by the participants, rated their prior experiences very highly, in aiding them to make good decisions. They also implied that having been in the industry for so long, their experiences also informed their decisions. The lessons they learnt throughout the years in the outdoor field and interactions with different characters and situations give these outdoor leaders the extra knowledge on how to select a course of action. As the naturalistic environment is unpredictable, the experience of having been out there before becomes more important to these leaders as they go through the thought process of deciding the right decision at that point of time of the incident. They demonstrated domain knowledge, which is one of the skills and capabilities that emerge in experts, as pointed out by Shanteau (1992). Domain knowledge is a prerequisite of an expert. It includes insights gained from experience in working in the real world on top of the knowledge that the expert possesses. The participants reiterated their prior experiences played a big part in leading them to achieve a sound positive outcome to the scenarios they shared. Furthermore, they shared their prior experiences motivated them to make their decisions, pointing to their sense of confidence that their decision is the best decision for that situation. The quotes also seem to suggest a highly experienced leader makes good decisions which are crucial to the success of their activities.

Notably, the participants from the Polytechnics and Adventure Therapy held senior positions and have been in service for some time, with the exception for participants from the Outward Bound who only had five years of experience. A senior position in the organisation also suggests these leaders possess various forms of training and experience in their vocation. I inferred from the data, the level experience ratings by these instructors confirm the claim that they are experienced. Furthermore, the participants mentioned that they drew their experiences from time spent by themselves performing similar activities before. For example, one participant Karen (Transcript 5) stated her experience leading participants in navigating
and time spent in the outdoor helped her in making good decisions. She felt had she not spent her own time in navigating through the ridgeline and gaining experience, she would not be as confident as reported in her story.

To further support my proposition that experience do influence decisions made by leaders, I coded my participants into the following categories to allow a multiple comparisons between groups. The groups are 1) Polytechnic Instructors, 2) Therapeutic Instructors and 3) Outward Bound Instructors. A Tukey-test on the homogeneity of instructors and multiple comparisons amongst groups are made to show in terms of the dependent variables of ‘Days spent leading a group in the last 12 months’ and ‘Days spent leading in the last month’. The number of days spent by leaders in the outdoors performing their work means they have more time and experience in the said work. In both dependents, the Polytechnic Instructors seem to be more significant, having spent more days in the field as compared to the next group, Outward Bound Instructors, and the Therapeutic Instructors (p<.001) respectively. It showed how much contact time they spent with their participants, because their students are enrolled in a three year programme and so have more contact time with the leaders, in contrast to a nine day course or so for the OBS leaders with their participants. Furthermore, the participants doing the programme with the OBS group are ever changing depending on the number of days of the course and most times, these participants do not see one another anymore after the programmes end. Thus, rapport and contact with their participants for the OBS group is limited to only the length of the course. Naturally, the time spent by the polytechnic instructors needing to consistently maintaining rapport with their students in the programmes is high when compared to the rest of the groups of interviewees.

Polytechnic Instructors also held significantly more Certificates (e.g. NZIOA Bush 1) than the other instructors (p<.024). As teaching students to become competent to lead others
is one of the main objectives in the polytechnic’s course, evidently there are a large number of their students attaining some sort of certifications in the relevant skills of the outdoors like New Zealand Outdoor Instructors Association (NZOIA) Bush 1, Kayak 1 and so forth during the duration of their course.

Given the notion that more certificates equates to more skills attained in a particular field, and hence more experience in that field of study, I can only assume that these certifications do help to guide the decision making process of these outdoor leaders.

The data shows that the Polytechnic Instructors spend significantly more time in the field leading their students as compared to the Outward Bound and Therapeutic Instructors. This ‘spending of time’ implied the nature and duration of programmes that the Polytechnic offer. The three year duration of the Polytechnic programmes certainly has an effect on the frequency of time spent between the students and instructors. It also seems to imply that the Polytechnic Instructors spend significantly more time in terms of getting themselves certified to remain relevant in their scope of work as compared to the other two groups. Furthermore, the high frequency of time spent with their students result in the polytechnic instructors becoming more familiar with the students under their charge. This reason suggests why the data indicated that in terms of experience, they regard themselves as highly experienced in their line of work (8 out of 10). With the relevant quantitative data presented here, the group of participants in this study are highly experienced or regarded as experts in their field of work by their peers. Hence, my data suggests that the number of days spent in the leader’s work adds to the experience level in their job, and thus influences the decision making process of the outdoor leaders.
Confidence

Six out of ten participants interviewed mentioned their confidence backed by their prior experiences helped them make good decisions. The confidence that the participants shared revolves around what sort of experience they had before. The less experience they had with an activity, the less confidence the participants had. The following quotes showed the effect of confidence on the participants:

I was definitely monitoring those people. And I was confident that I wouldn’t need to intervene at any point of time and I didn’t need to other than giving a few suggestions about they might have to create a little bit of shelter you know build some pegs up, stump a bit of snow down, get the fly out, put the stove there kind of things.

Dean (Transcript 3)

And:

And possibly because both of us were more confident with our experience with our students we made a fast decision.

Jenna (Transcript 4)

And:

And yeah definitely as we've started moving and got into different points and got exactly where I was going to get and the confidence sort of grew is like good you know my plan is working out and everyone was happy to follow along.

Karen (Transcript 5)

These excerpts cited the participants’ strong confidence when they decided not to intervene with their students’ decision making, to stand by to their decisions and not to falter from their stand; and to communicate their decisions to others and to feel comfortable with their chosen decisions. At first glance, these participants seemed to act on their intuition alone, but upon further scrutiny, their decisions pointed to their confidence when they made those decisions. They also seemed to imply their experience in the familiar activities and environments affects their confidence level when making those decisions. This finding relates to Simmons and Nelsons’ claim that intuitions that are generated with difficulty are held with low confidence whilst intuitions that are easily generated are associated with high confidence
(Simmons and Nelson, 2006). Thus, people choose intuitive options with greater frequency as intuitive confidence increases (Simmons and Nelson, 2006).

**Less Experience**

When prompted with the question ‘What-If a less (or more) experienced person had been in charge during the incident, how might they have handled it?’, all ten instructors answered that a less experienced instructor might not have noticed what they had noticed, or these less experienced leaders might instead end up making bad calls in their decisions. The leaders’ experiences in my study seem to suggest strongly that experience level of leaders determines the quality of the decisions. The following quotes showed their views of a less experienced outdoor leader on decision making:

Yeah, a less experience person, they might not have made the call to stop pursuing him at that point, and who knows probably in that case, the outcome may be worst……Yes, the less person might not have noticed what I did.

Clint (Transcript 2)

And,

I can see several things that a lesser experience person might have done. They might not have thought of framing the decision in the saddle and to go higher. They might just let students to make the decisions to turn back and to not go high and they would have gone with that and they might have missed the opportunity. Or they might have not been able to frame it well enough and ended up telling the students to go up there which is not empowering the students which is not part of the goal of that particular trip.

Dean (Transcript 3)

Upon further utilising ‘Compare and Relate Analysis’, the responses from seven of them associated that less experienced leader or a novice makes a bad call, whilst the other three shared that it takes a longer time for less experienced leaders to eventually make the same call as more experienced ones. The following quote illustrated this claim:

Less experience - they might come to the same result but same process but I think it will be slower. ……….Yeah, you didn’t know your limits and you’re not 100% sure
of what you are capable of because you hadn’t that experience, so it just slows it down a bit and makes you a little bit of hesitant in doing things.

Michael (Transcript 10)

And,

I guess a less experienced person, did come out with an option I still agree that wasn’t a good an option which I came out with. It still would have got us there but not that fast. The navigation was potentially going to be harder to go through especially during the dark……I think most of their decision making process was probably quite similar but I think that they were lacking in navigation experience.

Karen (Transcript 5)

Based on the points discussed, I induce that prior experience in bringing groups out or even for personal trips within an outdoor setting is important in influencing the decisions made by outdoor leaders. Prior experience seems to reduce uncertainty in decision making of leaders and leaders seem to make associations to their prior experiences before implementing a course of action. This experience implied increase of confidence in decision making. Even though four of the participants did not support this proposition, as they did not make a direct link between experience and the use of confidence, they did however, mention that experience made their decision making easier. Nevertheless, as for the issue of less experienced participants, all ten agreed that the less experienced leader will either make a bad call or take a longer time to arrive at the same decision as a more experienced leader. Hence, I induced that experience plays a role in influencing the decisions made by outdoor leaders.

**Proposition 2: Situation Awareness and Familiarity Acts as a Precursor to Serial Evaluation**

The second theme I induced from my findings is situation awareness and familiarity. I found that situation awareness is a precursor to serial evaluation, which is to generate a single option based on their recognition of experiences (Klein, 1989). The data suggested that situation awareness is heightened by the participants’ experience and their familiarity with
the natural environment, which eventually led to the decision made using serial evaluation. These sub themes are discussed to substantiate my proposition.

**Situation Awareness**

Situational Awareness is central to my study because it allows the decision makers to interpret cues correctly. Endsley (1995) defined situation awareness as “the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projections of their status in the near future”. Though the context and situations were different for each participant, the way that the leaders interpreted the cues with the help of their prior experiences to assess the situations, was the same. They perceived elements in the environment, comprehended their situations and projected the future status through their courses of action. To illustrate this process, Michael (Transcript 10) saw that a particular kayaker was having problems stabilising and immediately he recognised the potential situation. Next, he comprehended that help was needed to be rendered to the participant in the kayak and at this point of time he felt an ‘adrenaline rush’. Finally, he identified multiple options he can take and executed them as displayed in his actions to save his participant from drowning. His quick assessment (using the cues present such as the nature of the environment, the struggles faced by his participant to control the kayak and the probable negative consequences of drowning), directed his decision at that point. The adrenalin he mentioned implies his state of mind where his concern for the safety of his participant is paramount. His intuitive judgement is mainly triggered by the cues in the situation.

The decision scenarios (transcripts) shared by all participants mentioned their ability to exercise situation awareness with the cues that they identified. They made the necessary courses of action; as they can sense where the source was from (See Table 3). This was
implied as the outdoor leaders described their ability to recognise and interpret the environment that triggered their starting point into the decision making process. Though they did not specify clearly or single out the information during the interview, they perceived the context they were in, comprehended it and projected a future status. The following excerpts from the interviews in this study support this claim:

We were on top of the Mangatuas and I was with my second year group. It was seven o’clock at night. There was a wind that was about 25km/h and it was increasing. The temperature was 4.8 degrees with a wind chill of -3 degrees and our students have to get to a certain location.

Antonio (Transcript 1)

And,

…. we had a fairly severe weather happening. So there is [was] rain and the river is [was] rising that sort of thing and it involved how we managed the rest of the group and the search for this young person.

Clint (Transcript 2)

Cues are factors considered in order to make an assessment of a situation. The cues stem from events or actions, triggering a start in consideration about a particular occurrence (Endsley, 1995). These excerpts also suggest these outdoor leaders were experienced enough to identify the cues, pointing to their ability to assess the situation using these cues and making the appropriate decision from these cues. Furthermore, upon ‘relating’ all responses from the interviews to one another, I found a consistency in their responses. The participants recalled dynamic environments (weather) and high stakes (threat of injury), which are components of NDM as the two main features that triggered their situation awareness. ‘High stakes’ are the domains in which NDM processes are often employed in.
Table 4

*Characteristics of NDM and Situation Awareness in Decision Scenarios (Transcripts)*

<table>
<thead>
<tr>
<th>Decision Scenarios</th>
<th>Ill-structured problems</th>
<th>Uncertainty</th>
<th>Dynamic environments</th>
<th>Shifting, or competing goals</th>
<th>Action/feedback loops</th>
<th>Time stress</th>
<th>High stakes</th>
<th>Multiple players</th>
<th>Organisational goals and norms</th>
<th>Situation Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tramping over the Mangatuas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>A Runaway</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Students on Alpine track in National Park</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sea Kayak in Milford Sound</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Adventure race for staff -Navigation over terrain</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sea kayak trip over the Manapouri</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Alpine tramping over the Otahataki Gorge</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Bushline tramp over some muddy terrain</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Rock Sleet Over Ranges</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Overturned Kayaker</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
The outdoor leaders consider these ‘high stakes’ cues seriously to ensure the safety of participants going through the activities. As stated earlier in this chapter, the underlying reason for many of the decisions is safety. Eight participants highlighted that they noticed the ‘high stakes’ and were aware of the situation. References from Jenna and Karen concerning their decisions as exemplified in these quotes below show how they used high stakes to make their decisions, even though their decisions are made in a different context:

We made a very brief 3 minute conversation, what do you think? Have we got a big enough gap to get around? Are these guys up to it? Yupp, I think they are up to it. I think we have a big enough gap on the weather. Let’s go.

They will be blown onto rocks which it is not ideal but not life threatening.

Jenna (Transcript 4)

And,

At three in the morning it’s not the time to be you know trying to be going as fast as you can. That’s when people are going to be their most fatigued and you can see it where people are getting to stumble a bit more. We were in a pretty tricky terrain and just realising that it’s not worth it for trying to go faster and have somebody fall or something. It’s much better to go slower but more controlled.

We wanted to get there as quickly as we could but definitely as safely as we could that was a major thing.

Karen (Transcript 5)

From the quotes shared above, the participants used the cues for the different contexts that they were in. Jenna took charge over her students’ decision making, perceived the calming of the weather as a window of opportunity for them to quickly move out of camp to the jetty, which they eventually executed that course of action. She portrayed confidence that her decision is backed by the changing weather cue and ensured the safety of the students was not compromised. Her understanding of the changing weather guided her decision to quickly react and decide. On the other hand, Karen who was leading her group, noted that since fatigue had set in, she wanted the group to move as safely as they
could. However, both made their decisions based on the safety aspects of their charges using NDM environments to guide their decisions.

‘Dynamic environments’ is one of the characteristics of NDM setting, defined as the situation that is continually changing, making it difficult to assess what is happening. Static representations of the system are of little use since the situation is changing very quickly. There is no control of the changes. Seven participants shared that dynamic environments was one of the cues they were aware of before making their decisions. It implies the ability to take this cue seriously is crucial especially as the activity is carried out in the outdoor settings where one has no absolute control over the naturalistic environment. The following quotes support this claim:

The vehicle's temperature was dropping and I was sort of thinking that this is getting to be too much wind, too much rain, temperature dropping and just thinking out that need to come out with plan B. Malfoy (Transcript 8)

And,

Deciding whether to make a break for it and duck back to the sheltered harbour for our pick up or whether to stay put at the beach and miss the picked-up. 50 knots wind, big gusts fine weather but extremely strong winds blowing tents over. Jenna (Transcript 4)

Hence, using dynamic environment (weather change) and the identification of high stakes (threat of injury), the experienced instructors can sense that another option was needed to achieve their programme goals. As Klein (1989) posits that provided the option is accepted if no serious violations are found but if it is inappropriate, then another option is generated. Thus, interpretation of cues in a situation is important and has implications on the way leaders make their decisions, especially when it involves participants’ safety under their charge.
Familiarity

The next sub theme is familiarity; defined as an appreciation of the role of feeling states as cues to complex judgements which not only helps explain the sometimes bewildering accuracy of intuition and conversely a thought that interferes with the detection and/or use of affective responses will affect familiarity adversely (Halberstadt and Hooton, 2008). Even if a particular feeling is accurately described, individuals may have difficulty in isolating and identifying the relevant responses. So, referring their feelings as intuitive or analytic for that matter may be inaccurate depending on the interference of the affect responses. However, in this study, eight participants were familiar to certain situations, either from ‘knowing’ their students well or being in familiar settings. They also mentioned no interference to their affective responses at all when coming up with an appropriate choice.

Familiarity does help outdoor leaders identify cues to make decisions in their jobs. An example from my study on this was Jenna, who knew Milford Sound well and she was able to ‘read’ the weather, suggesting her prior experience (Transcript 4). It also suggests her ‘familiarity’ of the environment she is in. In dual –process theories feelings of familiarity is a subset of feelings of rightness, which essentially requires trusting your Type 1 (intuitive) without intervention. Jenna’s ability to recognise the weather patterns for 15 minutes was an indication that she was familiar to the environment at Milford Sound and it actually assisted her to form her decision. The following quote supports this claim:

I had a lot of experience in the Sound with the weather there with the nature and the weather that can be gusting and that [then] calm. Being able to look at the sky and there is nothing coming for at least 15 minutes… Jenna (Transcript 4)

The associations of a particular change in environment and being familiar (knowing) to the contexts the outdoor leaders are in, have important ramifications on the process of decision making. The leaders usually decide to proceed with caution, abort or even redirect
resources to change the activity if it involves participants’ safety. This ‘knowing’ of the place is also linked to their prior experience, in the sense that the participants are familiar to the settings before the incident happens. They know what sort of environment they are facing with, the designated routes to be taken, potential areas to avoid and so forth, which are either triggered by their prior experiences or being in similar places that they have been to before.

These quotes below are selected to imply ‘knowing’ as being familiar with the group that the leaders in charge of. As mentioned by these participants, knowing their competencies and the group well certainly benefitted them when making decisions:

It’s based on that thin line where you need to know the group and you need to know their capabilities and you are watching intently about where they are at and whether they are going to cope with anything. Antonio (Transcript 1)

And,

...I was the instructor who knew the student best .. Jenna (Transcript 4)

In these quotes, I notice that the ability to make decisions relies upon the participants’ ‘familiarity’ with their students. They seem to recognise that understanding their students really well, helps to better assess their situations they are faced with. The participants knew their competencies well enough to decide if the option of moving out quickly was viable too. I had to be careful with Jenna’s case, as interpreting ‘familiarity’ with students well did not mean group cohesion of the students. These two constructs are not the same. Furthermore, the participant only highlighted her ‘understanding of her students’ but did not specify the inter group dynamics of her students, which could influence her decision.

Thus, I suggest the presence of familiarity as a proxy for judgement played a role in the decision making process of the outdoor leaders in my study, and that outdoor
leaders do utilise their ‘familiarity’ to enhance their situation awareness when making decisions.

**Serial Evaluation**

The participants in my study are deemed as highly experienced as they are able to recognise situations and understand them and are often able to achieve appropriate course of actions. The most important discovery in my findings is these instructors understand a situation and come up with an identification of an effective option for action; the most important feature of Klein’s (1989) RPD model. The ability to generate a single option based on their recognition of experiences shared by them, answers one of the research question of this study. All instructors in my study generated one or the best option (serial evaluation) and executed it to their best ability, as shown in most of the scenarios. With the exception to one scenario, where the instructor had exhausted it; the next best option was considered and then executed.

To illustrate support to serial evaluation processes utilised by the instructors, let’s look at the following quotes:

… a fairly obvious way of getting to the next place and making our way through the bush and ill-defined spurs and that kind of terrain. That kind of terrain was going to provide the best decision making navigation group kind of situations and it did provide us with great ones. So that was clearly the best option, the rest of the options weren’t going to put us in the terrain that we want to be to generate those kind of situations.

Dean (Transcript 3)

And,

... I mean, I guessed considered that possibility, that a boat could come into the beach and the plain answer is no. I considered other options but they weren’t the best.

Jenna (Transcript 4)
There were plenty of options. ...I only wanted to give them a little bit of information and minimal so that they can figure out for themselves.

Antonio (Transcript 1)

On the other hand, these quotes below mention that they had thought of other options, though they tended to seek out the “best or only one” option when they finalised their decision, a characteristic of serial evaluation.

Well it’s sort of like, the factors involved in, made pretty clear sense that the best decision we could make. Malfoy (Transcript 8)

And,

I think I work like the first thing that comes into my mind, how we do that successfully. And then I would think of the other options, the first thing that comes into my head is usually the one that I'm going with. Peacan (Transcript 9)

And,

And this is where mighty quick instant decision and I paddled my boat up and pulled up and ran out into the current and rolled her over and pushed her down. Its a quick one of those one you really think about it much, and you go okay well...and that’s what I gonna do. Michael (Transcript 10)

All participants shared that they effectively choose a viable option after understanding the situations that they encountered. All of them generated options that had no serious violations. Except for one participant, when that option appeared inappropriate, another option was generated in his decision making. Interestingly, the time taken to decide on this serial evaluation process shared range from immediate to about eight hours.

Evidently, these excerpts inferred that a single option (serial evaluation) was generated by the participants, with the understanding of the situation they were in, before the final decision. The examples extracted showed that the outcomes were positive and they
had no serious violations which took place, hence there was no need to generate another option. Though nine participants had their best option used in the decision making, there was one instructor, who had to generate another one when his first option was violated (Refer to Transcript 2). In that particular case, he had to regroup with his other staff and contacted the authorities to conduct a search and rescue operation.

So far, my analysis suggests that the outdoor leaders in my study identify situation awareness, with the help of their personal experience and familiarity, to decide their final one option. Their understanding of the natural environments and its impact on their charges aid them to arrive to a good decision. The examples listed out also imply the use of serial evaluation by these leaders in their decision making process. Thus, I induced that situation awareness, with the presence of familiarity, acted as a precursor for serial evaluation to take place. It also answers my first research question on what sort of evaluation processes outdoor leaders used in naturalistic decision making situations.

**Proposition 3: Outdoor Leaders Usage of Dual-Process Cognition in Decision making**

My third proposition discusses dual-process theories (Evans, 2010), in relations to all the participants’ stories in my interviews. Dual-process theories are explored in relation to the decision making processes of the outdoor leaders. Thus, I propose that the outdoor leaders in my study lends a case base support of utilising dual process theories – either the Type 1(intuitive) or Type 2 (reflective) processes or both. In terms of displaying ‘default intervention’ (Evans 2010), as an automatic response in their decision making processes, it seems all participants are unclear of intuition as being their default mode when coming up with an appropriate solution to the problems.
Dual-Process Theories

The transcripts were compared for convergence and divergence to study the evaluation process of the outdoor leaders. I also analyse how they use intuition or analysis (reflective) in their evaluation process of decision making. Evans (2010) suggests that intuition is a matter of cognition and personality, implying that when one relies on immediate feelings of rightness or confidence, it means trusting your Type 1 (intuitive) processes, without intervention by a slower more effortful Type 2 (reflective) reasoning. Type 1 (intuitive) corresponds with utility of knowledge through experiential learning. In contrast, Type 2 (reflective) manipulates explicit representations through the working memory. Type 1 processes are fast, intuitive and high capacity while Type 2 processes are slow, reflective and low capacity. I represented the transcripts by categories in a table (See Table 4) to infer which type of process the participants used. This table is represented by categories of Time Taken to Make the Decision, Instructor’s Intervention and Dual Process Theory. The instructors vary in the length of time taken to make decisions as they differ in context. Some requires almost immediate intervention whilst others had the luxury of time as there is no imminent danger posed to the groups. Based on the table, out of ten participants interviewed, I inferred that five participants (50%) used both Type 1 (intuitive) and Type 2 (reflective), four participants (40%) used Type 1 (intuitive) only and the only one participant (10%) used Type 2 (reflective) only.
Table 4

*Decision Scenarios Grouped by Categories*

<table>
<thead>
<tr>
<th>Decision Scenarios (Transcripts)</th>
<th>Time Taken to Make Decision</th>
<th>Instructor’s Intervention</th>
<th>Dual-process theory (Intuitive &amp; Reflective)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antonio (Transcript 1)</td>
<td>Entire night</td>
<td>No</td>
<td>Reflective</td>
</tr>
<tr>
<td>Clint (Transcript 2)</td>
<td>Immediately</td>
<td>NA</td>
<td>Intuitive</td>
</tr>
<tr>
<td>Dean (Transcript 3)</td>
<td>10 mins</td>
<td>No</td>
<td>Intuitive and Reflective</td>
</tr>
<tr>
<td>Jenna (Transcript 4)</td>
<td>3 mins</td>
<td>Yes</td>
<td>Intuitive and Reflective</td>
</tr>
<tr>
<td>Karen (Transcript 5)</td>
<td>5-10 mins</td>
<td>NA</td>
<td>Intuitive</td>
</tr>
<tr>
<td>Seaman (Transcript 6)</td>
<td>20 mins</td>
<td>NA</td>
<td>Intuitive and Reflective</td>
</tr>
<tr>
<td>Samuel (Transcript 7)</td>
<td>Immediately</td>
<td>Yes</td>
<td>Intuitive</td>
</tr>
<tr>
<td>Malfoy (Transcript 8)</td>
<td>5-10 mins</td>
<td>NA</td>
<td>Intuitive and Reflective</td>
</tr>
<tr>
<td>Peacan (Transcript 9)</td>
<td>5 mins</td>
<td>Yes</td>
<td>Intuitive and Reflective</td>
</tr>
<tr>
<td>Michael (Transcript 10)</td>
<td>Immediately</td>
<td>NA</td>
<td>Intuitive</td>
</tr>
</tbody>
</table>

**Combination of Type 1 and Type 2**

Evans (2010) mentions that dual-process theories have a common structure described as default intervention. Basically, such theories assume a fast Type 1 (intuitive) process that provides a quick default solution to a problem, which may be accepted or intervened upon with explicit Type 2 (reflective) reasoning. The default intuition may (or may not) be overridden if the intervention occurs. In my study, there was no clear evidence to purport a quick ‘default’ solution to a problem that the instructors were facing. Neither do they suggest any claim the default mode was intuition per se or rationalistic.
However, based on my findings, five participants claimed using a combination of Type 1 (intuitive) and 2 (reflective), most had reacted intuitively at first but preferred to balance their ‘gut feelings’ decision by switching to reflective reasoning before settling on a decision. To them, this was some sort of a ‘safety check’ mechanism, so as to be sure with their decision. However, it was not clear to me as to whether they utilised a ‘default’ intuitive solution to the problems they encountered. None of the participants mentioned in the back of their mind, they programmed a quick solution to any of the situations they faced. The only mention was a switch from intuitive to reflective. One cannot generalise the switching from intuitive to reflective types corresponds to the ‘default intervention’ postulated by Evans (2010). I induced that this switching relates to the safety component of running the activities by the outdoor leaders to the experience and objectives of each programmes. It also implies that the safety aspect had a role to play in them deciding to be reflective in their initial decision.

The following quotes suggest the combination of Type 1 (intuitive) to Type 2 (reflective) processes made by the participants:

I know that I tend to make decisions intuitively and I will follow my immediate gut feeling about a choice is what I tend to follow[and] I am conscious of that. I often need to tamper it or not making decisions right away and kind of step back and have a more rational rounded approach to those decisions. …before I actually make the decisions.  
Dean (Transcript 3)

And,

We made a very brief conversation 3 minutes conversation, what do you think? Have we got a big enough gap to get around? Are these guys up to it? Yupp, I think they are up to it. I think they are up to it, I think we have a big enough gap on the weather. Let’s go.
Jenna (Transcript 4)

Another interesting reference to the switch of Type 1(intuitive) to Type 2(reflective) processes is found in one of the transcripts relating the incident on ‘Kayak at Milford Sound’ whereby the instructor had to make the shared decision between the co-instructor
only minutes after she herself had intuitively made a decision. She later confirmed me that she had also relied on her ‘rational thinking’ before making her final decision. She pointed out that her instantaneous reaction after studying the weather was to leave, but she claimed that if her co-instructor had felt uncomfortable with her decision, they had to be conservative in their shared decision, and would opt out to go to the bush instead and stayed another day and then missed the pick-up at the jetty. Hence, these examples suggested the presence of a combination of Type 1 and Type 2 processes occurring when a switch to Type 2 (reflective) processing includes amount of time available, presence or absence of competing demands, motivation to think ‘rationally’, and feelings of confidence in the initial intuition (Thompson, 2009).

**Type 1 (Intuitive) Process Only**

Four participants used Type 1 (intuitive) only, suggesting that they had relied on their intuition in the decision making process. The following excerpts support this suggestion:

I think I did because this is the one that really "jumped out at me" as I think a good a good way to go… With your experience what you would expect that terrain to be like and probably was just a bit of sort of gut reaction like it sort of jumped out at me and grab my attention, this will be a good way to go and not second guessing your decision.  

*Karen (Transcript 5)*

And,

... but there is also there is a "knowing" that is quite clear in the head, is yes the best decision is not to go up there and to do something else.  

*Malfoy (Transcript 8)*

The instructor, Karen, confirmed that the use of intuition playing a main role in determining her decision when she said “gut reaction” and “not second guessing” – giving a stronger inference of Type 1(intuitive) being used in the decision making process. Interestingly, these leaders also associated their experience, familiarity and confidence which assisted
them in their intuitive decisions made. These three factors, already discussed earlier on, seemed to influence the ‘gut feeling’ decision of these leaders. Interestingly, these leaders portrayed high levels of experience in situations they were in and seemed comfortable to follow their intuitive judgement as the best decision at that point in time. They did not falter from their gut feeling decision.

**Type 2 (Reflective) Process Only**

The participant’s reason to remain ‘rational’ as described in the excerpt below pointed to the fact that he was exercising Type 2 (reflective) processing even though he could have switched to Type 1 (intuitive) and intervened but had refused to do so as he had designed the programme specifically for his students:

No, I have a rational reason why I didn’t tell them. It was not a strong feeling not to tell them it was a valid good reason that I have designed the programme to do what we are doing really, that was the key thing really. Antonio (Transcript 1)

My findings show that the majority of the outdoor leaders in my study utilise a combination of Type 1 (intuitive) and Type 2 (reflective) processes which were used to ensure their participants’ safety in their activities. They agreed that balancing their ‘gut feel’ (i.e. Type 1) moments with rational thinking (i.e. Type 2) served prudent in their daily dealings of ‘high stakes’ domain in their profession. This switching of Type 1 (intuitive) to Type 2 (reflective) is termed as ‘default intervention’. Hence, I induced from my proposition that outdoor leaders in my study support the use of dual-process theories in their decision making processes. In other words, the use of dual process theories by these leaders also answers my second research question on how leaders use intuition or analysis in their evaluation.
Conclusion

Using Thick Description and Describe-Compare-Relate analyses, my aim to answer my research questions on 1) what sort of evaluation processes outdoor leaders use in naturalistic decision making situations and 2) how they use intuition and analysis in their evaluation, are addressed. Data from interviews I conducted in my study were a primary source for the themes with which I interpreted my findings. Data from the survey yield supporting evidence to some themes arising from the interviews. A series of themes emerged when data were organized in an event continuum and decision making perspective. It resulted in an organizational pattern from which data could be fragmented, reorganized, and understood (Glaser, 1992; Goulding, 2002). The data analyses (Describe-Compare-Relate and Thick Description) displayed characteristics of theories used in this study such as dual-process, NDM, experience and situation awareness. The analysis uncovered individual’s responses and cognitive processes (decision making) that emerged following retrospective accounts from ten outdoor incidents. Its findings revealed potential support for Klein’s (1989) RPD model and Evan’s (2010) dual-process theories. Outdoor leaders in my study potentially relied on the RPD model to evaluate their decision making, which was supported from Evans’ (2010) dual-process theories. After going through the rigour of the qualitative analyses employed across all ten decision scenarios (transcripts), I summarised their responses into major patterns in terms of the highest unit of analysis: Experience, Situation Awareness, Serial Evaluation, and Dual Process Theories as presented in this chapter.

The Potential Findings in Support of Theories table below is a graphical description compartmentalising the theories (See Table 5). The table shows the transcripts give a case-based support to the theories used in this study, particularly to experience, serial evaluation and dual-process theories. Chapter Five further discusses my findings and interpretations
and examines the significance of support to the theories in my literature review. It also addresses the findings in relation to previous theories of intuition and evaluation processes in outdoor leadership studies.
Table 6

*Potential Findings in Support of Theories*

<table>
<thead>
<tr>
<th>RPD Model</th>
<th>Theory of Expert Competence</th>
<th>Dual-Process Theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision Scenarios (Transcripts)</td>
<td>Intuitive Single Automatic Type 1 (Intuitive) and Type 2 (Reflective)</td>
<td></td>
</tr>
<tr>
<td>Transcript 1</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Transcript 2</td>
<td>X</td>
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<td>Transcript 5</td>
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<td>Transcript 6</td>
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<td>Transcript 9</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Transcript 10</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**RPD Model**
- Intuitive
- Automatic

**Theory of Expert Competence**
- Single Option

**Dual-Process Theories**
- Type 1 (Intuitive)
- Type 2 (Reflective)
Chapter Five: Discussion and Recommendations

Introduction

The possible applications and recommendations from this research to specific people or organisation are articulated in this chapter. Suggestions for any future research is identified and explained next. Though intuitive processes are important, just how much of it can be relied upon, is also looked into. The question to balance intuition with reflective processes also renders some discussion and is further discussed and explained in this chapter. The possible contributions my research findings have on outdoor leaders and outdoor organisations are further discussed in detail as well. There is also a possibility that my findings in the propositions are used as a training element for outdoor leaders to better understand the need for sound decisions for different outdoor situations, which they may encounter in their line of work. The findings concerning the role of intuition and its importance to outdoor leaders, are also highlighted. Furthermore, with the presence of empirical evidence collected in this study and presented in the analysis, it may lend more support to the current literature, and may spark off more interest for future research.

The purpose of this study investigates decision making processes of outdoor leaders in naturalistic settings. The two research questions proposed were: 1) what sort of evaluation processes outdoor leaders use in naturalistic decision making situations, and 2) how they use intuition and analysis in their evaluation. Serial evaluation, as readers may recall from earlier pages of this study, is defined as a model where situational understanding should lead to the identification of an effective option for action and the option is accepted if no serious violations are found (Klein, 1989). Concurrent evaluation processes refer to defining of goals, gathering information, compare alternatives and then decide to make a decision (Plous, 1993). I relied on Evan’s (2010) dual-process theory as a matter of
cognition and personality, implying that when one relies on immediate feelings of rightness or confidence, it means trusting one’s Type 1 processes, without intervention by a slower more effortful Type 2 reasoning. My study suggests that serial evaluation appears to be the main process used by the leaders, and the presence of intuition within the dual-process theories is suggestive in their evaluation processes. Notable exceptions considered in my findings include the importance of experience, situation awareness, confidence and familiarity as influencing factors determining the outdoor leaders’ decision making.

Following from these findings, the next segment discusses an overview of how the research process had taken shape in this study.

The literature review was a continuous process throughout the data collection and analysis. There were very few new studies found using the same keyword search parameters used in the original search. Research studies selected and reviewed in Chapter Two, drawn from five major theoretical foundations, provided the framework of this study. They were Dual-Process Theories, NDM, Experience, Situation Awareness, and Outdoor Leadership. The references to these theories make it possible to view the intersection of outdoor leader’s decision making and its reliance on intuition or lack of it, in NDM settings. The most prominent starting point of my research process started from the works of Evan’s (2007, 2010), Galloway (2002, 2007), Boyes and O’Hare (2003, 2011) and Klein (1989). These researchers inspired me to pursue my research in outdoor leadership. Their work represents a collage of ideas which are stimulating, unique, and parallel the direction of this thesis.

Findings and Interpretation

The three propositions discussed in Chapter Four detail my findings from this data. Each proposition had sub themes explaining the proposition. In this section, the themes
found in my proposition are compared to my literature review and any relevance to the study is addressed accordingly. The findings and interpretation to my themes follow the same sequence as the propositions I have considered in Chapter Four.

Proposition 1: Experience Influences Decision making

The first proposition is: Experiences Influences Decision making. My findings support this notion that outdoor leaders depend on their prior experiences when they make decisions. These experiences result in an increased sense of confidence, which is evident enough to suggest differences in their decisions when compared to the less experienced leaders. My findings corroborated Shanteau’s (1992) claim that expert decision-makers decide on the basis of their prior experiences that were predominantly drawn from real encounters. This similarity is not only assumed in theory but also resonates with the literature regarding outdoor leadership. Similar findings were reported in Galloway’s (2002) study on cognitive differences between novice and expert outdoor leaders’ decision making, where he cited that experience played a key role in the development of an outdoor leader especially in the NDM context. A study conducted by Boyes and O’Hare (2003) on utilising a framework model of outdoor adventure decision making, stresses the importance of prior experience as the basis for decision making for expert leaders. Another study that corroborated this representation was Beare and Lynch’s (2005) comparison on decision making processes between kayakers and mountaineers. They concluded that experts assess the situations in an active, on-going way rather than passively waiting for an indication that something is not right.

The similarity of my proposition and the literature discussed, recognised that experience did influence the decision making of the outdoor leaders. The findings are significant as they lend as a case-based support to current literature of outdoor decision making. Interestingly, the methods employed within these studies were contrastive to my
study as I focussed mainly on the use of a structured-interview alone to gather my data whereas those studies were mostly quantitative in nature, with the exception of Boyes and O’Hare (2003) who also utilised CDM (case study). The importance of experience in outdoor leaders are thus crucial for outdoor leaders and organisations in ensuring that activities carried out are done safely and with care. Boyes and O’Hare (2003, p. 74) suggest ‘one of the on-going aims of the experienced leader in these environments is the maintenance of a balanced risk and competence to ensure a safe and quality experience for the participants’.

**Proposition 2: Situation Awareness and Familiarity Acts as a Precursor to Serial Evaluation**

The findings suggested that serial evaluation was generated by the participants with the understanding of the situation and familiarity (experience) as their background that they were in. The proposition aligned itself to earlier studies conducted by Boyes and O’Hare (2003, 2011) on outdoor leaders and both studies outlined the leaders’ utilisation of serial evaluation as opposed to concurrent evaluation when making decisions. Their studies also mentioned other contexts which influenced serial evaluation like familiarity (i.e. experience). With reference to the literature available, serial evaluation in the NDM settings seem to be the favourable evaluation process in the decision making of outdoor leaders.

The analysis of data collected in this study resulted in a greater understanding of the mechanics of decision making processes of the outdoor leaders. My findings suggest that the outdoor leaders in my study demonstrate behaviours convergent with serial evaluation in their decision making process and hence lending case-based support to recent literature available. Recognition Prime Decision Model entails using serial evaluation in decision making in the NDM environments (Klein, 1989). Boyes and O’Hare (2011) also found that outdoor leaders relied on serial evaluation more than on the concurrent decision making
processes proposed by the classical models. Similarly, all the participants in my study applied single options when making decisions. Their decisions were based on their experiences and their awareness of the situations they were in at that particular time.

The findings suggest that serial evaluation was generated by the participants with a clear understanding of the situation and their sense of familiarity of the environment that they were in. The proposition was aligned to earlier studies on outdoor leaders conducted by Boyes and O’Hare (2003, 2011) on outdoor leaders where both studies outlined the leaders’ utilisation of serial evaluation as opposed to concurrent evaluation when making decisions. Their study (2011) also mentioned other contexts that influenced serial evaluation such as familiarity of the settings and confidence. In terms of comparing the findings to a broader literature outside of outdoor leadership, the pervasiveness of serial based information processing has been a hallmark of naturalistic decision making across a wide range of domains (Lipshitz, Klein, Orasanu and Salas, 2001). The alignment of the proposition to the literature indicates that in NDM settings, serial evaluation seemed to be the favourable evaluation process in the decision making of outdoor leaders. The significance of these findings in the study suggests that the outcomes are more supportive of the NDM model than the concurrent decision making processes proposed by the classical models. In connection to experiences in outdoor leadership situations, we do know that there are times when we make decisions where a number of options are compared and the best one chosen, as ascribed by classical decision theorists. But these situations involved features that are low in risk, no time pressure, stable conditions and low in uncertainty. A key feature of outdoor adventure situations often includes uncertainty and situations that are dynamic, time pressured and emotional. Other features of NDM environments may be evident too. Thus, my first part of the research inquiry is answered.
An interesting indication from my findings points to the theme of familiarity. In my study, familiarity relates itself to the experience of the leaders which also affirms previous studies. It seems that the familiarity to the environments, enhanced by the experience level and confidence triggered their serial searching patterns in decision making. Boyes and O’Hare’s (2011) study found that the level of familiarity predisposed serial evaluation more than the level of experience. My study is consistent to Boyes and O’Hare’s (2011) study in that both the interaction of familiarity and confidence are evident in the leaders’ evaluations. They mentioned that site visits, familiarity to environments and situations, did increase the familiarity as well as the outdoor leaders’ confidence. This significance of an increased sense of familiarity suggests that a leader's right decision is enhanced if he has prior knowledge of the place and activity. In comparison to findings outside outdoor literature, there is a vast support of familiarity and confidence suggesting familiarity and confidence as proxies of judgement and decision making (Catty & Halberstadt, 2008; Simmons and Nelson, 2006).

*Proposition 3: Outdoor Leaders Usage of Dual-Process Theories in Decision making*

The third proposition answered my second research question which was how intuition and analysis were used in the outdoor leaders’ evaluation. My findings shows that the CDM interview reveals behaviours consistent with the switching of Type 1 (intuitive) to Type 2 (reflective); only Type 1(intuitive); and only Type 2 (reflective) dual-process theories by outdoor leaders. I concluded that these outdoor leaders supported dual-process theories by using either intuition or reflection only, as well as using both intuition and then reflection in their evaluation process. According to Evan’s (2010), who suggested intuition as a matter of cognition and personality, he explained that when one relies on immediate feelings of rightness or confidence, it means trusting one’s Type 1 (intuitive) processes,
without intervention from a slower more effortful Type 2 (reflective) reasoning. The majority of the participants in my study initially used intuition when they made their decisions but there after they balanced it with reflective processes and hence further supported Evans (2010) dual-process theories of cognition. This finding is further corroborated by the fact that the initial intuitive decisions are fast and automatic but intentionally switched to reflective reasoning so as to ensure a ‘balance’ in decision making. This ‘balance’ is presumed to be important to the outdoor leaders, firstly as a safety measure to the charges they are responsible for.

Secondly, the ‘balance’ also ensures that no major incidents can happen. The repercussion of any mishaps in the outdoors can have negative ramification to the industry as a whole. Evan (2010) describes default-interventionist, as the decision maker utilises a fast Type 1(intuitive) process that provides a quick default solution to a problem, which may be accepted or intervened upon with explicit Type 2 (reflective) reasoning. The default intervention may (or may not) be overridden if the intervention occurs. In this study, it was inconclusive that though the switch is made from Type 1 (intuitive) to Type 2 (reflective), no overriding of the intervention occurs, i.e. the leaders went with the first initial option that they thought of. None of the participants cited Type 1 (intuitive) process as the default solution to a problem. Overall, the findings suggest evidences that intuition had played a key role in the leaders’ decision making as explained using the dual process theories.

The key themes in this study’s findings revealed that the outdoor leaders used serial evaluation when making their decisions. Other themes, which emerged in the study included the use of dual-process theories where intuition was evident in their decision making process. Their decision making was also supported by experience, confidence and familiarity to both the environments and/or activities they were in. Following these findings, a number of possible recommendations are presented in the next section. These
recommendations are written in the hope that they might assist both outdoor leaders and outdoor organisations involved in outdoor activities.

**Reflective Journey as a Researcher**

The journey in completing of this study is interesting and educational. There have been several notable factors to remind myself in the completion of this study. The first was the possibility of researcher’s bias or trustworthiness (Lincoln and Guba, 1985). Trustworthiness tends to happen when a researcher has motives to skew the interpretation of the memorable incidents shared by the participants to the researcher’s own interpretation. Member-checking (Lincoln and Guba, 1985) was employed to maximise credibility and to prevent or minimise the issue of trustworthiness. This method in the ‘Phase 2- Timeline Verification’ of CDM allows both the researcher and participant to agree on the decision points over a period of time that was shared in this study’s interviews. In this phase, clarification was sought on the description of incidents and confirmation that no other details were left out in the sharing, hence relying mostly on the participant’s point of view and confirmation. Another layer of trustworthiness that had taken place in my research is the bias in categorising transcription that would address the research questions. In this study, the integrity of the research was upheld by revisiting the transcriptions and coded data time and again so that all possible themes had been exhausted so as to retain the researcher’s objectivity. Patton (1990) recognises, however, the difficulty of ensuring real objectivity, since, even tests and questionnaires are designed by humans which means the intrusion of the researcher’s biases is inevitable. The concept of confirmability is the qualitative investigator’s comparable concern to objectivity. Steps were taken to help ensure to, as far as possible that the work’s findings were the results of the experiences and ideas from the participants, rather than the researcher’s characteristics and preferences.
The next realisation that I encountered was when I made assumptions that the stories being shared the first time, were correct. So, when the ‘Phase 2-Timeline Verification’ was employed, I found that this assumption was inaccurate. The participants verified the initial story shared was inaccurate or they remembered more facts as the interview progressed. Another assumption I made was on the background of the participants. I thought that they would be representative of different levels of experiences i.e. combination of novice and experts, but I was proven wrong when I studied the Experience Estimation forms. The leaders ranked themselves and perceived their peers to rank them as high in the industry which implied that they were considered experts in their fields. Being relatively new to qualitative interview, I discovered that assumptions cannot be made without further investigation on it, especially with regards to data collection.

This study has also elevated my experience as a qualitative researcher. As I was the interviewer in my study, my interview skills have been limited to the methods and questions limited to a defined and structured interview plan. While conducting the pilot study, I was learning to ask probing questions to help understand the interviews. The interview process in the pilot study allowed me to make adjustments mentioned in the methods segment so that the participants understood what I was asking for. During the categorisation of themes (coding) and numerous revisits to ensure coding was done correctly, I not only discovered convergence to themes but also divergent issues as well. An example of a divergent view was from an instructor who utilised Type 2 (reflective) of the dual-process theory in his decision making process.

From the education perspective, conducting qualitative research had taught me greatly in my research journey. It was definitely more challenging when compared to conducting quantitative research. Qualitative research can be arduous at times due to the amount of time spent in transcribing, numerous times in revisiting of data to ensure
credibility and many inferences had to be made to theories. It also involved writing and rewriting of findings. The interview process itself proved to be an impetus towards improved communication skills, such as persuading my participants to divulge as many details as possible with my probes. The research has taught me values like perseverance, honesty in dealing with data and patience in persuading my participants’ co-operation. This educational experience has been invaluable to me. The ability to create a positive rapport with my participants is also important for me in this study so as to ensure the dialogue between interviewer and interviewee is established. This educational experience I gained has been invaluable to me.

Finally, the research journey has taught me not to harbour any preconceived ideas to any variable in the interview process itself. To illustrate this point, I had the preconceived idea that the participants agreeing to the interview would have stories which would easily connect to the questions. But this was not the case as two of the participants’ stories had to be rejected due to grounds of them being uncomfortable with the initial story shared and no decision making process involved in the scenario shared respectively. Another preconceived idea is the ease to which a participant is ready to share a story. One participant had to be comforted that the confidentiality of his participants would be kept anonymous and details left out before he divulged any further details during the interview. I was quite surprised that even though he had initialled the consent form and read about the confidentiality clause, he was still feeling insecure about the sharing.

The revelations and the invaluable experiences gained in this study have added a new dimension as to how I view a qualitative research. I am glad that I am able to complete this research journey solely based on mostly my independent learning style and resourcefulness, with some guidance given by my supervisor.
Limitations of the Study

There were several limitations found in this research study. The first pertains to the sample size of the study. The research used a small sample size of a case-based study hence it was not enough to make generalisations on outdoor leaders’ decision making on the whole. Even though the findings from the data analysis imply that serial evaluation is utilised by leaders, a greater number of participants across both islands are needed to be studied before any generalisation or final conclusion can be made.

Another limitation to this study was a method of triangulating data from qualitative sets with others, which can make the data results more significant to this research. This study only relied on two types of data source which were interview transcripts and a survey. By adding another data source, triangulation (where correlations can be suggested from three different data sources) can take place and make the trustworthiness of the outcomes of the study more reliable.

Another limitation concerns member-checking (Creswell & Miller, 2000). A second round of member-checking is required in order to enhance credibility of the themes suggested in the findings. Unfortunately, this was not carried out due to time constraint. This second round of member-check allows the participants to agree or disagree to the themes I proposed. Thus, possible details which I may have missed out are rectified and explanation for the disagreement clarified. However, I ensured that information shared with me during the face-to-face interviews was accurate and as detailed as possible during the interview stage. I clarified my doubts and repeated my questions to my participants whenever I felt that certain details were unclear and doubtful. The use of the timeline acts as a guideline to present the story in a coherent and accurate manner. I took down notes to reconfirm the details shared in the interviews were accurate.
Recommendations

This section provides a list of recommendations in accordance to the main themes in the propositions induced detailed in the previous section. The recommendations present possible actions and applications, for outdoor leaders and/or outdoor organisations to ascribe to. It is also possible these recommendations may generate future research for the outdoor leadership literature.

The first finding in this research suggests experience seems to influence decision making of the leaders. Experience was evident in all the other themes such as situation awareness and intuition. Thus, my first recommendation pertaining to experience is towards planned training of future outdoor leaders by outdoor organisations.

Outdoor organisations should pair one experienced leader with a novice in an outdoor programme to lead participants, provided they have the luxury to spare two or more leaders in its training programme. The pair can adopt Paul Petzoldt’s ‘grasshopper teaching method’ and allow the experienced leader to educate the less experienced leader by letting them know of every moment of decision making and its rationale behind it ‘aloud’ (Wagstaff and Cashel, 2001). The learning curve, though might be variable, should be steeper for a novice leader as the leader has to do things more exploratory and can only rely on previous technical training and personal experiences. The benefits of having such a sharing environment are improved communication skills of its instructors, learning how to make decisions as demonstrated by the expert leader and finally allowing the less experienced learner to clarify the decision making process. The experience gained benefits both parties; the less experienced leader gets to increase his knowledge and asks questions when in doubt, and the more experienced leader gets to refine and share his leadership skills and knowledge. At the end of the day, leaders’ gains experience and confidence and the organisation they work for will benefit from them.
However, if an organisation lacks resources i.e. qualified manpower, then teaching a less experienced leader is quite challenging. The organisation must now purposefully categorise levels of risks for programmes they plan and they may need to assign higher risk activities to better experienced instructors. The lower level risk activities may be assigned to less experienced leaders. Hopefully, this will effectively minimise incidents from taking place. They may even use the case-based information from this study to associate risk levels and assign leaders to theoretical models of decision making processes used in them.

Another suggestion for organisations with minimal manpower is to plan training for outdoor leaders using scenario based computer simulations or using case studies from previous encounters of expert leaders. The expert’s insights and sharing serve as an invaluable support of reference and impact on novices’ or inexperienced leaders’ learning curve.

In this study, the outdoor leaders predominantly utilised serial evaluation processes in NDM environment where situations like high stakes, uncertainty and time pressure are evident. Outdoor organisations and senior managers may want to apply theoretical underpinnings from this research to their everyday practical operations. When faced with the NDM environment, a senior instructor may want less experienced instructors to adopt intuitive processes or RPD in providing an option for the situation in a training simulation. Furthermore via RPD, the senior instructor with a broad base of experience understands a situation that befits NDM via cues presented. He recognises the situation (albeit going through RPD model) he is facing by recalling through ‘pattern matching’ through his experience. He then comes out with an option when he finds a match, provided there is no violation to that option. Then he executes the action. This intuitive response is also similar to Evan’s Dual-Process Theories, where personality and cognition represent the basis for it. This process may be replicated in a training simulation for the inexperienced. Thus, an
outdoor organisation may apply serial evaluation in decision making for its leaders’ training plans.

Another application for serial evaluation processes by leaders may be considered by outdoor organisations where they match the types and duration of programmes to the experience level of instructors conducting the programme. The managers or senior instructors may wish to ascertain the different entry level of instructors coming into the industry and based on how they make decisions, assign the different programmes with difference degree of risk to the level of experiences these instructors possess. For example, an instructor freshly graduated from a polytechnic may be assigned to instructing and carrying out a top-rope rock climbing activity rather than leading an activity at a natural rock face with multiple climbs and requiring leading, which requires the expertise of an experienced instructor with climbing experience.

The results in the findings suggest intuitive type process was mostly used by leaders, although reflective decision making was present too. Leaders who understood the theoretical underpinnings of decision making processes and intuition may appreciate this knowledge and may apply them to situations befitting them. In cases where leaders are motivated by intuitive, rapid, and high capacity kind of decision making, they may take a step back and ‘balance’ their decisions with reflective reasoning. The experience levels they possess seemed to trigger these Type 1 (intuitive) processes. It suggests that their experiences were a factor to intuitive judgement too. As outdoor leaders have responsibilities over their participants’ safety, it is imperative that as professionals, they must avoid accidents from happening. Therefore, it is recommended in situations where low risk, minimum uncertainty and less of dynamic environments are present outdoor leaders may want to employ Type 2 (reflective) reasoning in making decisions. This would allow the leaders to really contemplate their best decision, and if they have a relatively low
experience, they may want to tap on their training experience that they had gone through before they finalise their decisions. For outdoor leaders, the knowledge that experience hold over intuitive judgements can spur them to improve themselves in their field.

**Suggestions for Future Research**

Following the findings and recommendations from this research, some areas of future research emerge: (1) The transition between intuition and reflection; when it takes and why? ;(2) How can we be sure that a leader is firmly in one place (process) or the other? and (3) When does a decision-maker move to the default mode? These questions will be addressed later. The studies can shed some light on outdoor leaders’ evaluation processes. It is another area of study worthy of additional empirical studies, which can add value to the current limited literature of outdoor leadership in NDM settings.

The first suggestion for future research is the transition between intuition and reflection; when it takes place and why? It comes about as the current study only focuses on the types of processes used in decision making. It did not explain how the decision maker transits from intuitive to reflective processes and vice versa. Neither does it explain why the instructors choose to rely on only one type of processes and when they would be using them. The next second question is, ‘How can we be sure that a leader is firmly in one place or the other? The investigation based on this may shed some light on how the cognitive processes of the outdoor leaders are being utilised. It may reveal information as to how comfortable the instructors are, at relying on their intuitive or reflective processes. It may shed some light on the certainty of instructors relying on their intuitive or reflective processes as well. As for the question on ‘When does a decision maker move to the default mode?’ it may address whether the outdoor leaders already have a default mode of
processes in place in their minds or not. It may also explain at which juncture or situation does the decision maker decides to move to the default mode.

The next possibility for future research from this study is to increase the sample size of the study. This study was limited to a small population of the outdoor leaders and the data sample could not be used to give greater credibility that all outdoor leaders evaluate using serial evaluation process. Quantitative data can be used concurrently with qualitative data to give a deeper understanding of the subjects in the research. There is great potential for new discovery when a study of a broader group of sample is used as its result may have a better representation of outdoor leaders in New Zealand per se. It presents an opportunity to really study the evaluation processes of outdoor leaders and how they use intuition and analysis in their evaluation. From bigger sampling and size, a strong credibility may be gathered from the study and shared to the outdoor fraternity to possibly include recommended training methods to further improve decision making of their future outdoor leaders. This may even possibly lowering accident rates in outdoor education activities and programmes.

Another possibility for future research is a comparative study on the quantitative data and the qualitative data used in this study. This process may deepen the understanding of serial evaluation or analysis of options used via the two methods. Themes which emerged from qualitative data may be validated with the quantitative instruments or vice versa. The survey instrument administered in this research was only to gather activities and experience level. This may have possibly misaligned to the rest of the themes. A redesigned quantitative study though deductive in nature is needed to launch from the findings, possibly with a Delphi survey instrument. This may be a way to quantify qualitative data extracted from interviews for further empirical research.
Conclusion

Current research on leadership development models focus almost exclusively on judgement and decision making in terms of the rational approach to decision making. However, little discussion on the process of intuition and serial evaluation in outdoor leaders’ decision making has been done. Though some studies have cited the importance of decision making and experience (Galloway, 2002, 2007; Martin, Schmid, & Parker, 2009; Tozer, Fazey & Fazey, 2007; Boyes & O’Hare, 2011), there is inconclusive evidence on how intuition and analysis are used in decision making. The contributions of this qualitative study are the provision of evidence to support the role of intuition and analysis in outdoor decision making. The findings also suggested the prevalence of serial evaluation and the role of expertise of the outdoor leaders. This suggestion was consistent to what Martin et al., (2009, p.51) maintained that they can move “in relation to one another on a continuum along which leaders can progress from one style of cognitive functioning to another as they develop greater levels of expertise in the practice of outdoor leadership”. Thus, both rational and intuitive decision making are important. But rather than pointing to one being superior to the other, psychologists need to use this knowledge to teach and educate others on how to fully utilise them instead. Take for instance the late Paul Petzoldt who had dedicated his life to outdoor leadership and teaching of decision making, where we can use his “grasshopper teaching” technique and teach aloud to novice leaders on how expert leaders make good decision. The uncertainties in environment that outdoor leaders face in their daily activities leading their charges make it crucial for them to be equipped with sound decision making process so as to minimise accidents or mishaps. Though suggestions are made to utilise either intuitive or reflective types of dual-process theories, it is not definitive or ironclad that outdoor leaders must choose one over the other. It is a combination of how these processes work and when to use them which is important at the time they make decisions.
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Appendix A: Consent Form for Interview

Reference Number *as allocated upon approval by the Ethics Committee*

[Date]

**Decision making and Intuition in Outdoor Leaders: A Naturalistic Perspective**

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

**What is the Aim of the Project?**

Current research investigates whether outdoor leaders employ classical decision making models (concurrent evaluation), or do they follow the designs as outlined by Naturalistic Decision making theory (NDM) and utilize serial processing. NDM theory focuses on how experts make decisions in dynamic, uncertain and fast-paced environments (Zsambok, 1997). Since the outdoors corresponds to the elements of the NDM settings, it is hoped that the leaders will show consistency of using serial evaluation processes as compared to previous research done in field-based settings. A commonly-identified reliance on intuition among experienced professionals suggests that intuition also constitutes an important component of the decision making process in outdoor leaders. Though there is a growing awareness of the role intuition plays in professional judgement, there is still much to be studied in the outdoor education settings. Hence, the purpose of the research is to investigate the role of intuition in the decision making processes of outdoor leaders. Further research on whether serial evaluation processes are supported with intuition or are intuition supported by analysis in the serial evaluation process, will be looked into in the paper.
What Type of Participants are being sought?

I am looking for participants (instructors) who are in the outdoor education field. You have been approached as you are an instructor from an outdoor education programme in New Zealand. At the end of the research, I will share the findings of the research with you and will make known to you of the Journal that I will be publishing.

What will Participants be Asked to Do?

You will be asked to fill in a self-classification questionnaire that will measure your experience level before the start of the interview. You will then be asked to be involved in a qualitative interview that will roughly last about one hour. You will be asked a series of questions about your experience as an outdoor instructor with a focus on decisions you have been part to, and your answers will be digitally recorded. Recording allows me to listen closely, and still be able to analyse the data from the interviews.

Please be aware that you may decide not to take part in the project without any disadvantage to yourself of any kind.

What Data or Information will be Collected and What Use will be Made of it?

The data collected will be digitally recorded and then analysed into emerging themes, if possible. These data could shed some light on current theories. You at one stage are allowed to verify that the data collected represented what had been mentioned earlier. A pseudonym will be used name during transcribing or reporting to protect your confidentiality.

The data collected will be securely stored in such a way that only those mentioned below will be able to gain access to it. At the end of the project any personal information will be destroyed immediately except that, as required by the University's research policy, any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed.

The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve your anonymity.

On the Consent Form you will be given options regarding your anonymity. Please be aware that should you wish we will make every attempt to preserve your anonymity. However, with your consent, there are some cases where it would be preferable to attribute contributions made to individual participants. It is absolutely up to you which of these options you prefer.

This project involves a semi-structured technique. The general line of questioning includes asking the participants’ level of experience in outdoor leadership, as well as, eliciting the thought processes in their decision making. The precise nature of the questions which will be asked have been determined in advance, but will depend on the way in which the interview develops. Hence, the research title: Decision making and Intuition in Outdoor Leaders: A Naturalistic Perspective.

In the event that the line of questioning does develop in such a way that you feel hesitant or uncomfortable you are reminded of your right to decline to answer any particular question(s) and also that you may withdraw from the project at any stage without any disadvantage to yourself of any kind.
“This proposal has been reviewed and approved by the School of Physical Education, University of Otago.”.

Can Participants Change their Mind and Withdraw from the Project?

You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind.

What if Participants have any Questions?

If you have any questions about our project, either now or in the future, please feel free to contact either:-

Mohammad Shah B Razak and/or Dr Shayne Galloway

Department of Physical Education

University Telephone Number 034798946 University Telephone Number 034798649

Email Address razmo208@student.otago.ac.nz Email Address Shayne.galloway@otago.ac.nz

This study has been approved by the Department stated above. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479-8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
Decision making and Intuition in Outdoor Leaders: A Naturalistic Perspective

CONSENT FORM FOR PARTICIPANTS

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:

1. My participation in the project is entirely voluntary;

2. I am free to withdraw from the project at any time without any disadvantage;

3. Personal identifying information like audio tapes will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for at least five years;

4. "This project involves a semi-structured technique. The general line of questioning includes asking the participants’ level of experience in outdoor leadership, as well as, eliciting the thought processes in their decision making. Hence, the research title: Decision making and Intuition in Outdoor Leaders: A Naturalistic Perspective. The precise nature of the questions which will be asked have been determined in advance, but will depend on the way in which the interview develops and that in the event that the line of questioning develops in such a way that I feel hesitant or uncomfortable I may decline to answer any particular question(s) and/or may withdraw from the project without any disadvantage of any kind."

5. There will be no discomfort or risks during the interview. But if I am uncomfortable of the questions I may decline to answer or withdraw at any point of time during the interview.

6. The results of the project may be published and available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve my anonymity.

I agree to take part in this project.

.................................................. ..........................................
(Signature of participant) (Date)
Appendix B: Experience Estimation

Research in Outdoor Leadership Decision making

First of all, thank you for your participation in this research project. By providing your information you are helping to further our understanding of how outdoor leaders make decision and aiding those who will follow in your footsteps.

I am interested in how outdoor leaders develop their personal and professional experiences outside and in Section A, you will be asked to list the range and amount of those experiences – as best as you can recall. Section B will be the interview itself.

All of the information you provide will be held confidentially. I will not share your information with anyone for any reason in any way that you could be identified. The only reason I ask for your name is so that I can compare the information you provide today with information that you provide later on. By comparing the two, I will be able to better understand how you have developed. I will assign you a pseudo name and once I have entered your information into the computer, I will destroy the paper copies.

Lastly, there are no correct or wrong answers. Please provide only the answer that best describes you as you are today.

Faithfully,

Mohammad Shah Bin Razak  
School of Physical Education  
Otago University
Section A: This section measures the extent of personal experience in outdoor pursuits and professional experience as an outdoor leader. Please answer each question as completely and as accurately as possible. All information will be held strictly confidential.

________________________ Name  Age: ______ Sex (Circle one): M / F  Qualification (clarify what you mean):___________

Experience Questions

1) How do you rank your level of experience in outdoor leadership? (Please circle one number)

   1 2 3 4 5 6 7 8 9 10

          Low                           High

2) How do you think your peers would rank your level of expertise in the outdoor leadership?
(Please circle one number)

   1 2 3 4 5 6 7 8 9 10

          Low                           High

Professional Experiences

Check the response that most accurately reflects your professional experience in outdoor leadership.

3) In the past 12 months, how many trips or courses have you led?

   __________

4) In the past 12 months, how many days were you involved in leading outdoor trips or courses?

   __________

5) In the past 1 month, how many days on average were you involved with outdoor trips or courses?

   __________

What was the length of your longest professional field experience? (in days) __________

Please indicate the activities that you have been employed to instruct (Check all that apply.)

   ____ Whitewater paddling  ____ Flatwater paddling  ____ Alpine tramping
   ____ Alpine climbing  ____ Rock climbing  ____ Ice climbing  ____ Tramping
   ____ Caving  ____ Other (please list)_________________________________

Please list any certifications (NZOIA Kayak I, MSC etc.) that you currently maintain:__________________________________________________________________________________
**Personal Experience in Outdoor Pursuits:**
Check the response that most accurately reflects your *personal experience* in outdoor pursuits.

1) In the last 12 months, please estimate your number of days of personal outdoor experience?


2) In the last 12 months, what is the average length (in days) of your personal trips?


3) What was your length of your longest personal trip/expedition? (in days)


Please indicate how frequent do you participate in these activities personally – not as an instructor? (Times per year)


- _____ Whitewater paddling
- _____ Flatwater paddling
- _____ Alpine tramping
- _____ Alpine climbing
- _____ Rock climbing
- _____ Ice climbing
- _____ Tramping
- _____ Caving
- _____ Other (please list)
Appendix C: Interview Questions

Name: _____________________(___________) Date:_______
Time:_______(Start) Time: _________(End)

Instructions for Interview:

I have several questions that I’m interested in asking you, but we can also discuss other points of interest as they arise. What I would like you to do first is, think of a situation where you were involved leading a group of (_____________) in an outdoor education context and where you were involved in making an important decision. Once you have thought of a situation or two, we can discuss them briefly and pick one that suits.

[Pause and allow time for the subject to reflect.]

1 Selecting an Incident.

2 Sweep
   A Please describe the scenario to me.

   Prompts and clarifiers
   1) Why did you do that?
      [Refer to story]

   2) What was your sense of things?

   3) What was there something that had you concerned?

   4) What were your specific goals and objectives at the time?

   5) What was most important for you to accomplish while this was going on?

   6) Is it a type of event you were trained to deal with?
7) What in your background prepared you for the situation we’re discussing?

**Sweep 2 Constructing a Timeline**

1) Let’s put the scenario that you have described into a timeline.
   a. What happened first? Or ‘When do you think this scenario began?’
   b. Ok, then what happened next.

2) Does this timeline represent the incident that you have just described to me?

3) Do we have the sequence and the details right so far?

4) Are there any facts that you think I have left out and needed rectification?

5) Does this change reflect a clearer and more accurate detail of what had happened?

**Sweep 3 Deepening**

1) Can you recall in this experience of a situation that just “popped” out at you, where you noticed that others did not catch?

2) Did you have a “strong feeling about a particular course of action” when you decided to make that decision?

3) Did you think of only this option or were others considered as well? What other courses of action did you consider or think were available to you? (Analysis on options)

4) How did you know that some options would not ‘work’ and that some would?
5) What actually let you know that this was the right thing to do at this point in the incident?

6) How long did it take to actually make this decision?

7) Did you imagine the possible consequences of this action? Did you visualize events unfolding?

8) What specific training or experience was necessary or helpful in reaching this decision?

Sweep 4 “What If” Queries

1) If a less (or more) experienced person had been in charge during the incident, how might they have handled it?

2) What if you had followed your [intuition or analysis] – how would the outcome be different?

3) Would they have noticed what you had noticed? Would they have known to do….?

4) What training might have offered an advantage in this situation?

5) What would you have done differently if you had the opportunity to go back?
Appendix D: Decision Scenarios (Transcripts)

Antonio (Transcript1)

A Decision Without a Decision.

This programme was a leadership course on an alpine tramp over the Mangatua. The participant was with his second year students. He was familiar with the environment and weather conditions. It was seven o’clock at night and the wind was travelling at 25km/h and was increasing and the temperature was dropping. He was aware of the changes in the weather around him, where their location was and certainly knew his students well enough. The students had to navigate to a certain location and were unsure where they were. They asked him for directions but he refused to tell them their whereabouts. He wanted to push them over the edge and find their own answers and at the same time, he wanted them to be more independent. He was concerned about the group dynamics of the students.

He wanted them to communicate to one another as he noticed them to be in their own norms and lacked the intellectual conversation with one another. He had a rational reason for doing this and knew what was needed to ‘open up’ his students. He was not concerned about the rest of the factors except for one time when the winds were getting strong. The student leaders started asking him whether he knew where they were as they felt that they were getting lost. He mentioned that he was well aware of their position on the map but had refused to do anything about it. He could have intervened but had refused to do so. It showed his ability in using familiarity of the environment to chart his student’s progress. Finally, at 3 am in the morning, a student fell (due to being tired) and bruised herself and they decided to stop there and camp for the night.
Clint (Transcript 2)

A Runaway.

The programme involves a trip where the Adventure Therapy Instructor and some at-risk group participants over a 9 day programme. They had just completed a camp and some tramping activities, sort of 3 day 2 night activity and returned to the main lodge. Two young participants from the group were having an altercation due to a misunderstanding. One of the young participant who had mental health issues took off and ran into the bush in the middle of the night. He had a medical condition too which was a form of epilepsy that was managed by medication. However, when he took off, he had no gear with him. He also didn’t have his medication with him. Later on when they had a look at his medical log and they found that he had taken his medication the last scheduled time. The next medical dose to be taken was supposed to be at night, so there was a worry that he might collapse and have a fit. To worsen things, they had a fairly severe weather happening. So there was rain and the river was rising and that sort of thing and it involved how they managed the rest of the group and the search for this young person. The instructor had to chase the runaway as soon as possible but after trailing him for about half an hour and could not contact the runaway, he decided to head back to camp to get additional manpower, resources (radio) and inform the authorities. Another search entailed combing the possible area that the runaway might have ran to, based on their familiarity of the surroundings of the camping area. They went to the river, road leading to the main road and some other areas not covered by the initial search. The search was called off at about 2-3 am. By this time the authorities (police), told them that they will all resume the search at first light about 6 am with additional help from the company, police and search and rescue teams. After resuming the search, he was later found when he heard the helicopter flying
pass his area. He had been hiding near the trees at the river bed looking at them frantically looking for him. He just came out of the hiding and was met by the police. The instructor and his team had a de-brief and cancelled the last day of activity as they were worn out after looking for him.

Dean (Transcript 3)

**Students Leaders’ Navigation.**

The programme was essentially an urban tramp with second year students. The participant, Dean, and his co-instructor had framed the programme which was a 5 day off track tramping trip designed to challenge their navigation, teamwork and to some degree fitness of the group. Dean was very familiar with the area that they were in. Once they have made their way up to a saddle which was just below snowline, they wanted the students to cover this particular area that would be the general route they wanted them to follow. So they framed it up for the students and the students actually chose that route. However, upon reaching the top, the weather was getting colder and visibility worsened. The students were clearly unsure whether it was safe to set up shelter and deciding later where to navigate. The participant than led the students to build a shelter there and looked after themselves as it was getting colder, before they decide where to go from there. From there on, the students were able to take a break and deal with the particular situation rather than worry about the navigation or getting over the hill. Dean had framed the programme as such that it involved those guys making decisions about self-management and group leadership and all that kind of stuff in difficult conditions. It was a
good outcome as they managed to navigate and choose a route that would further challenge their decision making.

Jenna (Transcript 4)

Sea Kayakers in High Winds.

Two instructors were on a kayaking expedition with their 12 students at Milford Sound and it was their last day of a five day expedition. It was a programme where students took turns to be leaders in leading one another. The instructors knew the experiences and competencies of their students as well as the area around the Sound very well. The instructor, Jenna, noticed that the winds were getting stronger by nightfall. As they were resting near the beach after a kayaking expedition, they needed to decide what would be the best scenario to adopt by early morning; either to hurry to the sheltered harbour and not miss their pick up time as they were ending their trip, or make it back to the bush line where they will be safe from the elements and stay for another day. Winds were gusting about 50 knots and then they had a moment of calm. After studying the clouds, they intervened in the decision making process of their students and told them to quickly pack their stuffs as they decided to make it for the jetty. The outcome turned out positive as there was no real danger of their students getting blown off against rocks, simply because they were experienced in weather understanding and were moving really fast as a team. Hence, this allowed them to reach the jetty on time and they managed to board the boat.
Karen (Transcript 5)

Staff’s Adventure Race.

This programme involved an adventure race for the OBS staff at the Kanatatika, Lockwood range. It started with 18 hours of race with about 3 hours of sleep for the first day. The next day, they had the tramping section in the day and a mountain bike leg before they rested again for about half an hour and then probably around 9 o’clock at night had another half hour sleep before they commenced on the tramping leg of the race. The participant, Karen, and her colleagues all presented the best route that they had interpret from reading the map. Upon presenting her route that she had planned, they all decided that the Karen had the best navigation amongst the rest. She based this decision as something intuitive that “jumped out at me” and also on her experience of a similar race that she had gone through and the fact that she was very experienced in navigating and tramping. Her only concern was fatigued setting in for her colleagues and their safety as they were out tramping in the dark. With her proper guidance in navigating the terrain, she managed to travel correctly based on her planned route and they made to their destination safely.

Seaman (Transcript 6)

Sea Kayak: Changing Venues and High Winds.

It was a multi-day sea kayaking trip the participant had planned in Manapouri. This programme consisted of eight youngsters from the at-risk group. Two of them had the attention of the participant as both of them had gone to prison before, one of them with quite a serious issue.
Their programme includes the using of the outdoors as medium for counselling and therapy. So when they got there, the weather was marginally windy but as they were preparing to get into the lakes, the winds got stronger. They then decided to go to Teana, a nearby lake, but again when they got there, the winds became even windier than Manapouri. So that had to look for another site for the kayaking trip, Mavoura lakes. By the time, they had finalised, the group had become quite restless. One of the two concerned (from prison) began to talk in profanities, started riling everyone else in the group that night and had some altercations with some of the group members. She finally stopped when she was told off by the other person who had been to prison. She had mental issues as well but took quite a long time in the second night of the trip before she calmed down. At that point, the participant and his colleagues were really concerned about the safety of the group as anything could have happened. They kept an extra vigil around her just to be cautious. Finally, when they decided that they settled for Mavoura lakes, they did a recce at the site before the rest of the group got in to kayak. The girl was embarrassed by her actions the night before and withdrew from the group and stayed with another staff as they were concerned with her well-being.

Samuel (Transcript 7)

Boulder Fell on a Student.

This scenario involved a participant and his students who were out on an Alpine tramping down the Otahaki Gorge and it was quite a rough tramp. The weather was getting slightly overcast, drizzly day and there was not much wind. It was about two in the afternoon, when
they were just going down through a little gorge and some river banks and big boulders.

Suddenly, a humongous rock was dislodged and crushed one of his student’s leg. The participant was about twenty metres away when that incident happened but by the time he arrived at the scene, the student had miraculously managed to push off the boulder as it landed on her leg as it was rolling. Her friends around her heard a loud ‘snapping’ sound when the boulder landed on her. So they quickly got her out of the water, the participant told some of his students to pitch a tent while he administered first aid to his student. Upon assessing her, he knew that she was unable to walk on one leg. His background knowledge as a Ski-patroller rendering first aid to ski-enthusiasts helped him in his primary assessment of her student’s condition. So he was quite familiar in that kind of situations. They option to stretch her off as they were in a gorge and it was difficult to navigate with a stretcher, was not considered too as they might end up injuring others. The clouds were also coming in and based on his experience he had about two to three hours gap to get help from the helicopter to come and pick his student. So without delay, he went off to higher spot so that he could set off the EPIRB, as he considered it as the best option. He then went back to the injured student and continued rendering first aid. About forty-five minutes later, he heard the sound of a helicopter coming towards their spot. He managed to send his injured student to the hospital for further treatment.

Malfoy (Transcript 8)

Reflection over Muddy Terrain.

The participant brought a small group of young people and staff. There were 12 people in total. They brought an at-risk group for a short hike to a mountain top and had a debriefing session
and reflection time after going through some activities in the afternoon. Before reaching the mountain top, they were driving up into a sort of a sub-alpine area in higher pass. They were concerned about the changing temperature. However, on the way up to the car park, the temperature got colder and dropped very fast while it was still raining. The participant ‘intuitively predicted’ that it would snow, and quickly came up with another option for the night activity, as the reflection activity for any at-risk group was one of the most important elements in an Adventure Therapy. As predicted, it started to snow. As such, he decided that going up was too dangerous due to the snow, suggested that they went for a hike downwards instead, into the bush-line where there was an area for them to shield them from the snow and to conduct a reflection. The area was muddy due to the rain earlier. As they have to cross the muddy terrain, they did not anticipate that going through it would actually generate fun for the at-risk group. Hence, with a rapid change in weather conditions, the experienced instructor could tell that another option was needed to achieve the programme goals of an adventure therapy. Going through the adventure element was just one of the objectives of the Adventure Therapy that the at-risk groups needed to go through. The most important one was the counselling and reflection objectives. It allowed them to experience some ‘soul searching’. It was a good outcome, and the group went through the programme successfully. At the same time, the participant managed to conduct the reflection session too.

Peacan (Transcript 9)

Rock Sleet Over Ranges.
This programme was with a group of first year students and the participant on a wilderness expedition. The students were supposed to run the activity themselves. The participant was supposed to be there overseeing what was happening. They got to climb a mountain called Tapionoku of the Coral ranges. They got to a point where it was kind of the last thing of the trip of the 5 days and that activity was the last thing to do. At some point of the trip, they arrived at a place where some rocks were starting to come down (sleets) due to the sun's warmth and ray. Immediately, she took over the decision making and suggested they would carry on meeting the programmatic goals but they will manage it differently. They got to underneath a snow bank and walked underneath it carefully as they had no helmets with them at that time. They set up some precautionary measures, like spotting and yelling if any loose rocks were to fall, and ensured that they avoid that same route altogether when they returned. It turned out to be a good outcome, nobody got injured.

Michael (Transcript 10)

Overturned Kayaker.

The programme that the participant shared was about a white water kayaking that was quite recent. Both his colleague and himself were in the waters at the bottom of the eddy waiting for their students. Most of the kayakers had any problems except for one of them who got pushed by the rock and pinned. As it was a shallow rapid, she managed to roll and she could still breathe. With an instant quick decision, he decided to paddle his boat up and pulled up and ran out into the current and attempted to roll her over quickly. He felt an adrenaline rush but as soon as he saw the student’s hand reaching out and able to lean to the side to breathe, there was
much relief that she was going to be okay. He went into the waters and equipped with his water experience and knowledge, he could tell whether he would make it quickly against the current to help her out. In this case, he was confident to cut through the current and helped her out of her predicament. They then continued with the activity.