Risk Perception and Safety Practices; the Implications for Safety Initiatives and Incident Prevention in an Outdoor Adventure Activity

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Environmental Health and Applied Psychology

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The Research was undertaken under the auspices of Cardiff Metropolitan University
DECLARATION

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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I appreciate the support and valuable advice of my supervisory team and in particular the encouragement of Professor George Karani who kept me moving forward.

I am grateful to all those who have stimulated and kept alive my passion for adventure, excitement and thrill. My mother and father introduced me to mountains, sea, rivers, safaris, jungles and different cultures before I was ten years old. My wife has encouraged, supported and shared adventures in far away places. My son lets me tag along and experience new adrenalin rushes.

May the adventure continue!
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Abstract

Participation in outdoor adventure activities can result in injuries, medical conditions and fatalities. Whilst risk is present in outdoor adventure, the literature indicates that engagement with risk is often desired and results in valued outcomes.

The way in which risk is perceived and responded to has been described as being linked to a range of socio-psychological variables. These variables may act as a filter to messages that are designed to promote safety and reduce incidents. This thesis proposes that an understanding of participants’ knowledge, beliefs, and experience and the meaning of an activity to them, can support the development of approaches to the promotion of safety that have contextual relevance.

Using participant centred methods, this research aimed to generate recommendations to inform the development of safety initiatives and incident prevention strategies associated with an outdoor adventure activity. Kayaking in the sea environment was used as a case study.

Questionnaires administered to individuals who use kayaks in the sea, identified a range of health impacts, perceived cause and safety practices. Variation in response was noted according to the type of kayak used, activities undertaken and characteristics of respondents. These findings, together with the results of an observational study and issues identified in the review of the literature, were used to generate themes to be explored in semi-structured interviews with interviewees who used different types of kayaks and varied in experience and immersion in the activity.

The interviews identified a range of motives for participation and illuminated the meaning of risk to participants. Socio-psychological factors influencing both their own and others perception, assessment and response to risk were described. The interviewees proposed measures to enhance safety; these focused upon education, training, planning and preparation.

The quantitative and qualitative findings were utilised to generate specific recommendations that could inform safety initiatives and incident prevention strategies linked to kayaking. Broad themes identified in the recommendations were regarded as being of relevance to other voluntary risk taking activities.

It is concluded that there is a need to recognise that there are different reasons for engaging with risk and that within a broad activity, there are likely to be differential experiences of risk. On the basis of this, it is proposed that a generic approach to the management of risk may be inappropriate; it is advocated that there is a need to target safety initiatives and incident prevention strategies at particular subgroups of participants and for safety guidance to be context specific.
Publications and Presentations Emanating From the Research

Academic papers and presentations have been generated as a result of this research. The academic papers published are as follows:


Presentations have been delivered to groups from a range of backgrounds these include search and rescue specialists, representatives of national accident prevention organisations, outdoor activity leaders, emergency response professionals and health professionals. Presentations are listed below:-

**International Conferences**


UK Presentations


"Psychosocial Factors in Risk Decisions. Invited presentation to a closed meeting of the UK Adventure Activity Licensing Service: (2007).


In addition to the outcomes directly associated with the research topic, the broad concepts reviewed within and emerging from the thesis have formed the basis of presentations linked to public health; these presentations are listed below:-


Chapter 1

Introduction to the Rational and Conceptual Frameworks Underpinning the Research

Risk and Adventure Activities

Thomas and Raymond (1998) discuss the term outdoor adventure and outline how it can be applied to experiences taking place in the outdoors that are exciting, physically and/or mentally challenging and present uncertainties. Mortlock (1984) believes that “risk is as basic to adventure as competition is to sport, but the stakes are usually higher”. Literature related to outdoor adventure disciplines present descriptions of incidents and associated consequences to both health and life (for example see Broze and Gronseth 1997; Coffey 2003). These descriptions also provide an insight into factors that lead to incidents. Causation is frequently attributed to a combination of variables linked to the environments entered, equipment utilised, the abilities of those engaging in activities and the decisions that are made in relation to risk (Broze and Gronseth 1997, Lull 2008).

A range of theories and models of health behaviour suggest that responses to health risks are associated with factors such as the assessment of costs and benefits, perceptions of seriousness, perceptions of susceptibility, perceptions of what others believe, perceptions of what is viewed as acceptable and appropriate behaviour and feelings of self efficacy or control (Weinstein 1993; Bandura 2004; Ajzen 2012). Literature relating to the perception of risk describes a range of factors that influence the response to risk, these include availability heuristics, whether information conforms to existing attitudinal frameworks, the
significance of information to the individual and whether risks have been directly experienced (Renn 1988). Thus, perspectives drawn from a range of fields indicate that cognitive processes influence views as to what constitutes a risk and the response to risk. An understanding of what those engaged in outdoor adventure activities regard as being risks, what is perceived to be the cause of negative outcomes, what participants do to manage risk (be it avoidance or engagement) and an understanding of participants’ perspective and rationale for their decisions, may provide information to guide safety initiatives and incident prevention strategies.

Taylor-Gooby (2006a) argues positive and negative aspects form part of current conceptions of risk and a key challenge is the balancing of risk against advantage. Lupton and Tuloch (2002a, 2002b) and Tulloch and Lupton (2003) propose that whilst there is a tendency to categorise risk as negative, there are also positive meanings associated with risk. Positive aspects include adventure, excitement, elation, enjoyment and the opportunity to engage in self actualisation and self improvement (Lupton and Tuloch 2002b). In an evaluation of the lay meaning of the concept of risk, Lupton and Tuloch (2002a) quote “...risk, in posting challenges is what living as a human being is all about.” This view is echoed by Le Breton (2000) who argues that surviving in a symbolic game with pain, injury and even death can be a way of affirming the Self and individualism and achieving personal generated spirituality. Le Breton argues that a key element in this risk taking behaviour is the freedom to submit to it or refuse it and this is a result of conscious choice.
The United Kingdom Health and Safety Commission, Adventure Activities Industries Advisory Committee (AAIAC) highlights that there is a need for a balance between challenge and safety. They state that with regards to the control of risk, the public’s acceptance does not necessarily extend to the elimination of all risk or the establishment of standards that are so high that they reduce potential benefits (AAIAC 2004). This view is mirrored by the British Canoe Union (BCU) (BCU 2002). In the BCU Handbook, it is pointed out that going into the outdoors, paddling and facing dangers makes it an adventure experience. Risk is seen to be an inherent part of the activity. Key issues are seen to be what level of risk is to be accepted and then to manage it.

Gill (2010) proposes that solely focusing on safety can result in people not experiencing situations that can support the development of the ability to manage challenge. The Chief Executive of the UK Health and Safety Executive (see Gill 2010) argues that young people experiencing and managing risk prepares them for future life; being protected from all risk results in people who are “risk naive”. She is quoted as saying "life itself is full of risks we cannot avoid. We all survive by learning how to deal with risk". The position expressed shows there being benefits as well as losses associated with risk. This suggests that the avoidance of risk may in itself result in risks. Lord Young, in his report "Common Sense Common Safety" commissioned by the UK Government Cabinet Office, advocates that there is a need to shift from a system of risk assessment to a system of risk benefit (Lord Young of Graffham 2010). The Chief Executive of the Royal Society for the Prevention of Accidents (see Gill 2010), recognises that adventure activity can result in adverse outcomes but also positive outcomes such as personal development. Thus, at an individual and societal level,
there may be value in supporting engagement with risk. The literature indicates that engagement with risk via adventure activities is often instrumental in achieving a range of desired outcomes such as excitement, thrill, self-affirmation and personal development. The control of the activity to reduce risk may negate reasons for participation (Ewart 1994) or result in behaviours that allow for the reintroduction of target levels of risk (Wilde 1976; Adams 1985).

Di Maggio (1997) proposes that there is an overlap between sociology and cognitive psychological phenomena influencing knowledge and information processing. Culture is seen to be comprised of rule-like structures that can be put into use, however within the cultures to which people are socialized, there is scope for variation and the existence of choice and this is linked to individual cognitive processes. Thus, both cultural and individual variables influence knowledge and information processing. Brewer et al. (2007) describe how risk perception is core to many theories of health related behaviour. They conclude that there is evidence of a relationship between the perception of risk and behaviour. Slovic (2000a) states “...risk is subjectively defined by individuals who may be influenced by a wide array of psychological, social, institutional and cultural factors.... many of these factors and their interrelationship can be quantified and modelled in order to illuminate the response of individuals and their societies to the hazards that confront them.”

The recognition of the central role of information processing has implications for the management of risk in outdoor activities. The perception of risk and individuals’ desire to encounter risk may determine subsequent responses to risk. These perceptions may
influence motivation to develop skills and knowledge, the safety equipment and practices adopted and the environments entered.

Taylor-Gooby (2006b) proposes that risk research increasingly acknowledges the social and cultural factors in the framing of risk perceptions. Lofstead (2011), in his UK Government commissioned review into health and safety legislation, stated that considerations of risk should take into account the social context and recognise that different groups in society will hold different views. Breakwell (2001) argues that subcultures often hold socially constructed mental models of hazards. These models are seen to serve specific purposes within groups and influence individual mental models associated with hazards. Advocates of a cultural perspective of risk regard the perception of risk and the response to risk as being influenced by the extent of social participation and group membership (Oltedal et al. 2004). Thus, different groups in society may hold different views of risk and these views in turn can impact upon behaviour (Jones 2012).

Moscovici (1984, 1988, 2001) states that groups hold shared beliefs that can act as a framework for evaluation and interpretation of information. The process of interaction and communication amongst group members results in shared understanding and consensus in views that are defined as social representations. These social representations may in turn influence individual mental models (Breakwell 2001). Unravelling these representations can provide an insight into psychological factors legitimizing knowledge (Howarth 2006). By identifying the knowledge beliefs and attitudes associated with risk, it is possible to gain an insight into the way in which risk is viewed. This insight can illuminate the meaning of risk,
identify gaps in knowledge and erroneous beliefs in both ‘lay’ and ‘expert’ views of risk (Breakwell 2000; Morgan, et al. 2001). As advocated by Bostrom (2008), an understanding of the way in which individuals and groups conceptualise risks can inform risk management strategies including the communication of risk. Given this, in this thesis, it is proposed that when developing intervention strategies designed to influence risk knowledge, attitudes and ultimately behaviour, there is a need to be mindful of the knowledge base associated with risk activities, the beliefs associated with the activity and the significance of the activities to participants.

**Research Strategy Aim**

This study focuses upon voluntary risk taking in outdoor adventure activities and uses kayaking in the sea environment as the activity for investigation.

The aim of the study is:-

“Using participant centred methods, generate recommendations to inform the development of safety initiatives and incident prevention strategies associated with an outdoor adventure activity.”

To achieve this aim, it is argued that there is a need to explore the meaning of risk to the individual, the motivations for participation, the perception of health impacts and cause, factors influencing the perception of risk and risk mitigation strategies and associated underpinning rationale. The epistemological framework for the study is based upon the belief that peoples’ knowledge, views, experience and interpretation of information
provides valuable data that supports the understanding of the meaning of behaviour and the factors influencing the direction of behaviour. The research focuses upon the perspective of participants with emphasis being placed upon lived experience of risk and the meaning of risk to individuals. Conceptually, this approach can be seen to be linked to the phenomenological view of knowledge.

The questions acting as a focus for this research are:–

A. What are the perceived and directly experienced health impacts amongst people using kayaks in the sea environment?

B. What are the perceived causes of health impacts?

C. What risk mitigation strategies are adopted and how do these relate to current guidance?

D. What differences exist between categories of participants in relation to perceived health impacts, their cause and mitigation strategies adopted?

E. What factors influence the motivation to engage with risk?

F. What factors influence the perception of and response to risk?

G. What factors influence individual risk management strategies?

H. What steps would participants advocate to promote safety and minimise the likelihood of incidents?

To examine these questions, a number of objectives have been set these include:–

1. A literature review of the health impacts of kayaking and the associated causal factors.

3. A literature review focusing upon the motivations to engage with risk in outdoor adventure activities and factors influencing the perception of and response to risk.

4. Development and administration of a questionnaire to identify the perception and experience of health impacts and associated causal factors resulting from kayaking in the sea environment.

5. Direct observation of the adoption of personal protective equipment.

6. Development and administration of a questionnaire to determine self reported safety behaviour in relation to activity planning, practices and the adoption of safety equipment.

7. Conduct interviews with activity participants to explore:
   - the meaning of risk to individuals
   - the motivation to engage with risk
   - the factors influencing the perception and response to risks
   - views relating to the steps that could be taken to enhance safety amongst those paddling kayaks in the sea

**Methodological Framework**

Both qualitative and quantitative approaches to the generation of data have strengths and weaknesses. A mixed methods research paradigm (Johnson and Onwueguzie 2004; Johnson et al. 2007) utilising quantitative and qualitative methods, was adopted to make use of the "complementary strengths" of each approach whilst having "non-overlapping weaknesses" to limit bias resulting from restricting the study to one data generation tool and data source.
A sequential approach to data collection was employed whereby data analysis was undertaken before all data was collected (Onwuegbuzie and Leech 2004, Onwuegbuzie and Collins 2007). The sequencing involved three quantitative studies followed by a qualitative study. The quantitative studies were designed to identify phenomena; the qualitative study was conducted to aid the interpretation of findings through the exploration of experience and meaning, examination of the rational for observed and reported behaviour and the determination of participants’ views on action that could be taken in response to issues identified in the quantitative studies (for further discussion of approaches to the sequencing of studies in the Mixed Methods methodology see, Creswell 2002, Onwuegbuzie and Leech 2004, Onwuegbuzie and Leech 2006, Ivankova et al. 2006, Creswell et al. 2012).

Quantitative methods were used to determine the frequency of respondents holding particular views and reporting and displaying behaviours. These methods were used inductively to identify trends and differences between categories. A qualitative methodology was utilised as a means of investigating and explaining phenomena identified through the social surveys and observation. Interviews were used to explore why there may be differences between groups, why particular views were held, factors influencing behaviour, the meaning of risk and participation to those engaged in kayaking in the sea and participants’ views on steps that could be taken to reduce the likelihood of incidents.

The use of quantitative and qualitative methodologies enabled both methodological triangulation and triangulation via data source (see Patton 2002; Johnson et.al. 2007).
Non-probabilistic sampling techniques were used in the identification of participants for the study, therefore, it cannot be assumed that the study group is representative of the wider population. Given this, direct claims can only relate to particular participants. However, a focus on the individual and small groups can help provide an insight into their world and behaviour. This in turn can help identify deficiencies in claims relating to the population as a whole. By linking information generated by engaging with individuals and small groups with other forms of knowledge, there is scope for theoretical generalisation (Smith et al. 2009).

**Research Strategy**
The research strategy was split into 5 phases.

**Phase** This component of the research was designed to identify those issues to be explored as part of the data gathering activities and to provide a framework against which findings of the studies could be evaluated. The literature review acted not just as an introduction to issues but also as a key component of the research methodology by supporting the generation of and providing evidence for the validity of the issues and themes investigated in the surveys and interviews. The review of literature focused upon:-

- **The nature and cause of injuries and medical conditions** The information gathered in this section of the literature review utilised a range of sources including materials published by search and rescue organisations with responsibility for safety in the sea, governing bodies, and peer-reviewed research published in medical and sports science journals (see Chapter 3 and 4)

- **Current safety guidance.** The literature presented in relation to safety guidance made use of Government public information literature and information produced by
search and rescue organisations, governing body guidance, recommendations from commercial organisations and best practice advocated in special interest literature associated with the activity. The documentation tended to be drawn from the UK, United States of America, Canada, Australia and New Zealand (see Chapter 5).

- The meaning of risk in society, how this relates to voluntary risk taking in outdoor adventure activities and factors influencing the perception of and response to risk.

This section of the literature review used peer-reviewed journals and texts that examined risk from a number of perspectives; this included sociological and psychological frameworks but also perspectives drawn from literature relating to outdoor adventure (see Chapter 8).

Research into factors influencing the perception and response to risk tends to fall into two broad epistemological frameworks; these being the realist framework linked with the cognitive science perspective and the other being the constructionist framework linked to the socio-cultural perspective (Tulloch 1999). The realist framework considers risks as pre-existing and subject to measurement and people's response to these ‘objective facts’ are assessed. The cognitive science perspective focuses upon the identification of the social and psychological factors influencing the perception of risk and the response to risk. A range of cognitive factors are identified to explain variation between people (Renn 1998). Variation in the perception of risk tends to be at the individualistic level. The constructionist position holds that what is understood to be risk is a product of ways of seeing things that have developed as result of history, culture, relationships and institutions. Such factors structure knowledge and influence practices (Tulloch 1999). In such a way, the context within which people live, can prime the way in which risks are regarded (Douglas 1992). The socio-cultural
framework tends to consider issues such as risk as a concept constructed by society, the role of risk in society and the individual and cultural meaning of risk. Whilst the realist and constructionist approaches represent different frameworks, there is a point at which there is an overlap in concepts. For example "familiarity" and "dread" have been identified within the psychometric perspective of risk (Slovic 1987). However familiarity with hazards and the fear of hazards may be culturally determined. Both these frameworks were considered in the review of literature looking at the meaning of risk and factors influencing the perception and response to risk. Phase One of the research addresses objectives 1, 2 and 3.

**Phase Two**

This entailed an exploration of participants’ experience and perception of injuries and medical conditions and perceived causality. This phase of the research took the form of a quantitative study based upon the distribution of 400 questionnaires to people using kayaks in the sea (see Chapter 6). This phase addresses research questions A, B and D and objective 4.

**Phase Three**

This phase was designed to assess the frequency of wearing of helmets and personal flotation devices amongst those people using kayaks in the sea environment. This involved the direct observation of 357 kayakers (see Chapter 7). This phase addresses research question C and D and objective 5.
**Phase Four**

This phase of the research investigated activity planning, safety equipment carried and perceptions of the likelihood of needing to use equipment. Three hundred and seventy questionnaires were distributed to people who kayak in the sea environment (see Chapter 7). This study addressed research questions C and D and objective 5.

**Phase Five**

This component of the research was based upon semi-structured interviews and examined the meaning of risk to individuals and motivation for participation, factors influencing the perception and response to risk and participants’ views on steps that could be taken to reduce the likelihood of incidents (see Chapter 9) Phase Five addressed research questions E, F, G and H and objective 7.

Findings from these five phases were assessed and the emerging themes were utilised to support the development of recommendations that could inform safety initiatives and incident prevention strategies (see Chapter 10).
**Summary of the Research Strategy**

The sequence of the research strategy is summarized below:-

1. *Review of literature focusing upon injuries and health impacts amongst those kayaking in the sea environment*
2. *Review of literature relating to causality of Incidents*
3. *Review of guidance on recommended safety practices*
4. *Review of the literature relating to the meaning of risk and factors influencing the perception of risk*
5. *Establishment of participants’ experience and perception of health impacts and associated cause*
6. *Determination of participant safety behaviour, including the use of equipment, reported activity planning, practices and safety equipment carried*
7. *Identification of factors influencing the perception and response to risk and associated risk management strategies*
8. *The identification of issues to be considered in the development of safety initiatives and incident prevention strategies*
Chapter 2

The Nature of Kayaking

Introduction

Kayaking involves the self propulsion of a vessel by the use of a paddle with a blade at each end (Hutchinson 1994). For forward and backward movement, the ends of the paddle are alternatively placed on either side of the boat and drawn through the water. Paddlers (the term used in the activity to describe participants) tend to sit in or on the boat with their legs and feet extended in front of them. Kayaks are either ‘closed cockpit’ with a deck (the paddler wears a spray deck to prevent the ingress of water into the cockpit) or open in the form of a ‘sit-on’ kayak. Kayaks tend to seat one or two people (doubles) however the majority of boats carry a single paddler. A major difference between a canoe and a kayak relates to paddling style; canoes are propelled by the use of a single bladed paddle. Within the literature, the term canoeing is sometimes used as a generic term covering both the use of a canoe and a kayak, at other times the term canoeing and kayaking are used separately and refers to boats of different design and style of propulsion.

The vessels used vary greatly in design characteristics and performance and are operated in different environments and conditions (BCU 2002).
**Participation in Kayaking**

Based upon a sample of approximately 12,000 respondents over the age of 16, it has been estimated that in the UK in 2011, 1,211,631 people canoed or kayaked, of these, 781,454 were male and 430,170 were female. Twenty-five percent of those using canoes or kayaks are regarded as being members of clubs linked to the activity. Canoes and kayaks were reported as being the most common boat owned in the UK and canoeing was by far the single most popular boating activity. The responses indicated that the majority of those using canoes or kayaks undertook the activity between one and five times a year and the highest participation rates were in Wales and the South West of England. Activities were reported as taking place during all seasons. It has been estimated that 2,446,395 paddling events occurred during the summer and this dropped to 890,702 events in the winter. It has been estimated that 42% of canoeing and kayaking activity takes place at the coast (British Marine Federation 2012).

Kayaking is also a popular recreational activity in a number of other Western industrialised countries. Using a sample of 41,500 individuals and households, The Outdoor Foundation (2009) estimated, that in the USA in 2008, 6,240,000 participated in recreational kayaking, 1,780,000 in sea kayaking/touring and 1,242,000 in white water kayaking. The American Canoe Association (ACA) (2003) reported there has been an “explosive” demand for inexpensive and easily accessible recreational kayaks. It has been estimated that in New Zealand, 4.3% of women and 8.3% of men participated in canoeing or kayaking in the year 2007/8. The study was based upon a sample of 4,443 respondents; of these, 19.1% had received training in the past 12 months and 9.7% were members of a club or canoeing/
kayaking centre. Unlike the USA, the participation reports from the UK and New Zealand did not differentiate participation rates between canoes and kayaks and did not provide information on participation rates according to environment. The UK report interchanged the terms “canoe and kayak” and the generic term canoe. Given these data, it is not possible to give an accurate indication of kayaking participation rates in the UK.

**The Design of Kayaks**

The main types of kayaks used in the sea environment include;

- **Sea kayaks** are usually between 4.5m to 5.2m long and 0.5m to 0.6m wide. They are designed for speed and distance, with the ability to track in a straight line. Sea kayaks often have large carrying capacity and therefore can be used for expeditions and camping trips.
Playboats tend to be short (usually between 1.8m and 2.1m long) with flat hulls that have angled edges; they are often low volume at the front and rear of the boat. The short size and hull characteristics enable the boats to be very manoeuvrable and suitable for the performance of acrobatic manoeuvres such as cartwheels and loops.
• **General purpose (Gp)** kayaks are designed to be used in a variety of conditions. They are longer than playboats with more volume and less extreme hull design. They tend to be between 2.6m to 3m long. Often such boats are regarded as introductory kayaks.
- **Surf kayaks** are specialist boats designed for surfing waves. They will have long flat planning hulls fitted with fins. Surf kayaks tend to be longer than playboats ranging from about 2m to 2.75 m in length. The design of the hull has similarities to surfboards.
• **Sit-on kayaks** have a double hulled construction. They vary greatly in their design. Many tend to be wide for stability. The size of the kayaks varies from approximately 2.4m to about 4.6m. Increasingly these boats are being promoted for angling purposes.

*Plate 8. Single seat sit-on kayak*

The method of buoyancy varies according to design. For example, playboats and general purpose kayaks utilise airbags, sea kayaks will often have watertight bulkheads; sit-on kayaks usually have double skin hulls with inherent buoyancy.
**Kayaking Activities and Environments**

Conditions encountered may vary from those similar to sheltered inland waterways through to storm seas and conditions akin to white water rivers. Additionally, there are factors specific to the sea such as moving waves, tidal races and rips and overfalls. Conditions are influenced by a range of environmental factors including atmospheric, hydrological and geological variables. The intensity of participation can extend from gentle activities through to life threatening situations at the extreme edge of skilled performance.

Kayaking in coastal waters can take a variety of forms with a range of common and differing demands and associated risks. Activities can involve:

- Surfing waves
- Coastal touring and exploration
- Rock hopping where swell and reflected waves are used to propel kayaks over obstacles
- Playboating and freestyle involving the performance of acrobatic manoeuvres
- Sea kayaking in specialized boats. Sea kayaking can range from placid water touring through to the crossing of seas and oceans in large swells

The nature and extent of equipment carried differs according to the nature of activity. For example, in competitive kayak surfing, there can be a minimalist approach to equipment with the paddler utilising little more than the boat and paddle; this contrasts with
expedition sea kayaking where equipment is carried to enable self-sufficiency over an extended period.

*Plate 9 Typical equipment for a half day sea kayak trip*

Whilst there are common features to kayaking, the activity is also very diverse in terms of the environments encountered, the equipment used and the skills and planning required to undertake activities.

**Environmental Hazards**

The sea is a dynamic environment. Wind, tides, swell, temperature and geological features interact and change the nature of conditions. On their own, the individual variables can present challenges, in combination, challenges can become pronounced (Broze 1997). Ramsay Sound off the coast of North Pembrokeshire, demonstrates the dynamic nature of conditions. The direction of flow of the tidal stream in the Sound changes very quickly from
North to South. Between the changes of direction is “slack water”. The speed of the water can accelerate from a near standstill to over 15 knots in narrow channels (Krawiecki and Biggs 2005). Combine this with wind from the opposite direction; conditions can very quickly become extreme with the generation of standing waves that are described locally as being of up to 3 meters in height (see Pembrokeshire Coast National Park Literature). Close to the shore, the coastal topography combined with incoming waves and tides can result in localised tidal rips which can push a kayak or capsized paddler out to sea. These rips may not be apparent until the person is caught in them. Tidal streams hitting headlands or underwater obstacles can result in confused waters and overfalls. Compounding these hazards is the effect of temperature. The UK waters tend to range from 5°C to 17°C according to the time of year; at these temperatures, without appropriate clothing or rescue, immersion can lead to hypothermia and death.

Lull (2008) suggests that there can be a misperception of kayaking in the sea and it can be presented as an idyllic activity in calm conditions, appropriate to those with limited skills. Whilst kayaking in the sea can be a benign activity, he points out that conditions can rapidly change and for safe paddling there is a need for competency in a range of conditions. Lull regards the level of risk when kayaking in the sea as being a function of skill and the conditions encountered. Hutchinson (1994) draws attention to three broad levels of competency in kayaking, these being novice, intermediate and advanced. He feels that the ability to manage conditions varies between these categories and this should determine the nature of conditions they choose to face.
**Summary**

From this brief introduction, it can be seen that kayaking in the sea includes a range of activities, using different types of boats, undertaken in varying environments and conditions and requiring different skills and equipment. Given this, the knowledge, skills and action required to support safe practices may vary amongst paddlers.
Chapter 3

Injuries, Medical Conditions and Fatalities Associated with Kayaking in the Sea

Introduction

Whilst physical activity can produce health benefits (Warburton et al. 2006a; Warburton et al. 2006b), participation can also bring the risk of injury (Plugge et al. 2002; Gabbe et al. 2005). The nature of the negative health impacts associated with kayaking, vary in frequency and significance. At one end of the spectrum are cuts abrasions and bruises; at the other end of the spectrum are fatalities.

The American Canoe Association (ACA) (2004) report that there were in the region of 156 kayak fatalities in the USA between 1996 and 2002. Sea kayaks as a specific type of vessel, accounted for 5% of these fatalities. The American Canoe Association place these statistics in the context of 9.6 million Americans paddling kayaks in 2003. The US Coastguard reported that in 2010, there were 52 deaths associated with paddling kayaks. These data did not indicate the environment in which the deaths occurred. Forty-two of the fatalities were the result of drowning. Twenty-four of the people who drowned were not wearing a personal flotation device (US Coastguard 2011).

In 2007 there were 6 fatalities amongst those kayaking in UK coastal waters (Maritime and Coastguard Agency 2008). In 2010 there were nine Kayak/canoe fatalities recorded by the UK Maritime and Coastguard Agency (Young 2011). Two of these fatalities occurred on inland waters. The Maritime and Coast Guard Agency, 2010 Canoe and Kayak Incident
Annual Report, states “Considering the total number of incidents throughout the year and the increasing number of paddling sport participants, there are very few fatalities related to canoeing or kayaking incidents.” The reporting framework for the Maritime and Coastguard Agency does not differentiate between kayaks and canoes and includes paddle boarders. Based upon the UK Water Incident Database (WAID), the UK National Water Safety Forum reports that in 2011 there were 17 fatalities attributed to manually powered boats used in the sea, coastal waters and harbours (NWSF 2012). The National Water Safety Forum report does not provide details of the nature of the boats; therefore, it is not possible to determine how many of the fatalities were associated with kayaks. Whilst there are data relating to fatalities, actual injury rates are difficult to ascertain, as many incidents are likely to be unrecorded. For example, in the United States, the boating injury reporting requirements, only focus upon incidents where medical care beyond first aid is required (US Coastguard 2011).

Whilst recognising that death can be a consequence of water based incidents, Chalmers and Morrison (2003) are of the view that the incidence of injuries in aquatic sporting and recreational activities is low.

The number of studies focusing specifically on injuries while kayaking in the sea environment appears to be limited. Research has been published that assesses the health impacts experienced by white water river paddlers, recreational paddlers, long-distance paddlers, and participants in competitive activities. Aspects of these studies are of relevance to kayaking in the sea, as many of the performance demands of activities (i.e. paddling and
An Overview of Injuries and Medical Conditions Amongst Kayakers

Weiss (1991) reviewed a range of factors that are associated with injury in white water sport. Whilst the emphasis of the review was upon river environments and covered rafting as well as kayaking, a number of issues discussed are of relevance to kayaking in the sea. Abrasions, blisters, minor lacerations and contusions were seen to be frequent occurrences. Ear infections were also noted as being common amongst paddlers. Serious head injury with the loss of consciousness was regarded as being rare. Tendonitis and synovitis of the wrist was seen to be linked with the repetitive nature of the paddling action. Injuries resulting from being “speared” by another kayak were identified as a risk specifically associated with surfing sea waves. Anterior shoulder dislocation was cited as the orthopaedic injury most often associated with kayaking. The action involved in performing the ‘high brace’ support stroke was seen to increase the likelihood of this condition. Sunburn and eye damage as a result of exposure to ultra violet radiation from the sun and reflected off the water was regarded as an issue. Entrapment of a paddler was regarded as the most common cause of death in the river environment. The significance of this factor may be less in sea conditions. Weiss proposed that a number of injuries may occur when participants are out of the water and may stem from trips and falls when carrying boats or strains when lifting and loading heavy equipment.
Fewtrell et al. (1992 and 1994) examined the health effects of water quality on the health of participants in water based activities. The incidence of gastrointestinal and upper respiratory symptoms amongst those engaged in white water and slalom kayaking was significantly higher amongst respondents paddling in waters with high enterovirus concentrations and moderate faecal coliform concentrations, compared with respondents paddling in water free from enteroviruses and with low levels of faecal coliforms. They concluded that kayaking in poor quality water leads to measurable amounts of illness.

Fiore (2003) identifies 4 main categories of injury associated with white water paddling: 1) trauma from striking an object; 2) traumatic stress from the interaction of paddlers’ positioning and equipment and force of the water; 3) overuse injuries and 4) submersion and environmental injuries. Fiore notes that death is relatively rare in white water sports. Fiore suggests that fatalities commonly fall into two categories, first inexperienced participants in situations above their capabilities and secondly highly skilled paddlers attempting extremely dangerous white water.

Kizer (1987) investigated the nature and frequency of injuries associated with river based white water kayaking. The analysis was based upon 211 responses to a questionnaire. Participants ranged in age and experience. Injuries linked to submersion, overuse syndromes, musculoskeletal or integumentary trauma were the most common reported medical problems. Twelve percent of the respondents stated that they had experienced near drowning. The study was not able to verify the medical significance of the experience. Blisters were seen to be the most common reported medical condition (65%), followed by
muscle sprains (45%), low back strains (31%) and sprains and tendinitis (28%). Dislocated shoulders were seen to be the most frequent serious orthopaedic injury (4%). Fractures (including digits (n=6), ankle (n=2), ribs (n=2) femur (n=1) and vertebrae (n=2) were reported by 7% of the respondents. Kizer concludes “Overall the findings of this survey suggest that white water kayaking causes relatively few life-threatening or major injuries.” Kizer notes that the findings may be skewed as a result of the injury experiences of very active kayakers.

Fiore and Houston (2001) undertook a retrospective study of injuries reported by 392 white water kayakers. Two hundred and nineteen of these respondents reported 282 injury events. The majority of injuries were seen to occur whilst the kayaker was still in the boat (87%), eight percent occurred when the kayaker was swimming as a result of having to come out of the boat, a further 5% occurred whilst carrying the boat. The number of days spent kayaking in a season and the skill level of the kayaker were linked to the likelihood of injury. The frequency of reported injury was seen to be higher amongst novice and expert kayakers. Differences in the nature of injury were noted when comparing novice and more skilled paddlers. Novice paddlers had higher levels of impact injuries, expert paddlers suffered more overuse injuries. Impact with an object in the river was the most common mechanism of injury (40%), this was followed by traumatic stress (25%) and over use (25%). Common types of injury reported were abrasions (25%), tendinitis (25%), contusion (22%) and dislocation (17%). The upper extremity and in particular the shoulder, was the most commonly injured part of the body. Fiore and Houston reported that most injuries were not due to kayakers using rivers beyond their skill level. They suggest that experienced paddlers
were being injured in less demanding conditions. Fiore and Houston conclude that efforts to
ensure kayakers stay within their skill level would not be effective in lowering injury rates.

Murray and Young (2003) conducted a study into injuries sustained in recreational canoeing
and kayaking. Thirty percent of the 421 respondents were engaged in kayak touring.
Seventy four of the 421 respondents reported having experienced injuries. The most
common injuries were lacerations, tendonitis and sprains.

Moore et al. (2010) report that amongst a sample of 611 white water kayakers, the
prevalence of exostoses of the external auditory canal was 79%. Those paddlers whose
activities involved repeated submersion showed higher levels of occlusion. Cooper et al.
(2010) found that in a sample of 90 kayakers, 69.5% displayed external auditory canal
exostoses. This compared with a prevalence of 1.7% amongst the control group. The
severity of the condition was seen to be significantly associated with duration and frequency
of kayaking.

Schoen and Stano (2000) conducted a retrospective, questionnaire based study of hard shell
white water canoe and kayak paddlers’ chronic and acute injuries. The study was based
upon 319 respondents. The majority of the respondents (63%) stated that they exclusively
used kayaks. Ninety percent of the respondents reported some use of kayaks Injuries were
seen to rise with increased exposure. The most common minor injuries reported were
blisters. Direct trauma (including laceration, contusion and abrasion) was the most common
acute injury (40%). Sprains and strain accounted for 26% of the acute injuries. Fracture
represented 9% of acute injuries. Dislocations accounted for 6% of acute injuries and all occurred at the shoulder/arm. Non blister injuries were seen to be most common in the shoulder/arm this was followed by the wrist/hand. Shoulder/arm injuries were seen to be common with a relatively high incidence of medical attention. Whilst back injuries were not as common as some other conditions, their effects on paddling lasting more than two years was seen to be greater. Schoen and Stano suggest that a rise in chronic back/chest/hip problems may be linked to increased playboat activity. Schoen and Stano draw attention to a number of limitations to the study. These include the exclusion of drowning and near drowning events, the sample possibly not being representative and memory and recall bias. They conclude that, medical attention is common and the duration and effect of injuries on paddling is significant. Furthermore, they suggest factors such as gender, craft and style of paddling may have an influence upon injury patterns and this could be illuminated by large-scale prospective studies.

Diafas et al. (2010) investigated injuries amongst white water canoe and kayak paddlers. Based upon the responses of 319 paddlers, they concluded that the shoulders, wrist and hand were the most common parts of the body injured. Sprains were the most common acute injury; this was followed by lacerations and contusions. Tendonitis was reported as the most common chronic injury. Injuries resulting from portage were reported as being common.

variety of styles of boats including sea kayaks, sit-on kayaks and canoes (it is not clear whether "canoe" was used as a term to describe a river kayak or an open boat paddled with a single paddle). Whilst the author recognised that there were potential reporting biases in relation to the data collection methods, the findings represent one of the few studies specifically focusing upon kayaking activities in the sea. A range of medical problems were described, of these hypothermia (16 cases) was the most common; the second most common conditions related to sprains (six cases). Other conditions included head injury, seasickness, abrasion and asthma. Fourteen fatalities were reported; of these nine were as a result of drowning.

**Injuries Associated with Competitive Kayaking**

The following studies tend to focus upon injuries amongst competitive kayakers. Whilst competitive kayakers may not be representative of the wider paddling population, the nature of the injuries experienced may be indicative of conditions that may develop as a result of intensive activity or over a longer time amongst paddlers. Another point to note is that competitive paddlers may be coached in appropriate technique and are conditioned to the demands of paddling; this may militate against injuries.

Based upon a sample of 52 long distance kayak marathon paddlers, each with over seven years of participation in kayak events, Hagman *et al.* (2004) investigated the prevalence of soft and hard tissue injuries in the shoulder. They concluded that overuse injuries to the shoulders of marathon kayakers is common. They also noted that the presence of
acromioclavicular hypertrophy was common amongst the sample and this was probably due to carrying a kayak or a previous injury.

Berglund and Mckenzie (1994) define the most common musculoskeletal injuries associated with competitive canoeing and Kayaking as follows:

- Shoulder- Impingement Syndrome, bicipital tendonitis, glenohumeral dislocations/subluxations
- Forearm- Tenosynovitis of wrist extensor tendons, flexor tendinitis, carpal tunnel syndrome, forearm compartment syndrome
- Back- Thoracic and lumbar muscle strain, lumbar disc herniation
- Pelvic- Ischial bursitis, hamstring tendonitis, sciatic nerve compression
- Miscellaneous- peripatellar bursitis, finger contusions, finger and heel calluses

They point out that the aquatic environment poses the risk of drowning and additionally, cold water immersion can lead to hyperventilation bronchospasm and cardiac arrest.

Other potential problems associated with environmental conditions are seen to include hypothermia, hyperthermia, sunburn, melanoma and the development of pterygium extending over the conjunctiva.

du Toit, et al. (1999) investigated the incidence and cause of tenosynovitis of the wrist extensors amongst long distance competition paddlers. Based upon interviews with 510 competitors, they concluded that tenosynovitis is a common injury and was reported by 23% of the sample. It was proposed that paddling in rough water increased the likelihood of
injury. To maintain balance in such conditions may have required the adoption of a paddling style that exerted additional strain on the wrist.

Carmont et al. (2004) undertook a retrospective study into injuries sustained during marathon kayaking. Of the 103 competitors who responded to a postal questionnaire, 46% reported injuries to the wrist, 21% reported shoulder injuries and 19% reported injuries to the back. Forty-three percent of respondents indicated that they had suffered from tenosynovitis and 16% had suffered from sciatica. They concluded that overuse injuries were common amongst marathon kayak racers.

Whilst the subjects in the Hagman et al., du Toit et al. and Carmont et al. studies cannot be regarded as typical of paddlers in general, the demands of their activities may provide an insight into conditions that could develop as a result of repetitive paddling behaviour over time and distance.

Krupnick et al. (1998) conducted a cross sectional retrospective study of injuries sustained by athletes competing in the US Olympic canoe and kayak white water qualifying races. A postal questionnaire was distributed to 275 paddlers. Fifty-four questionnaires were completed. Most medical illnesses were described as minor. More serious conditions were noted and these included sinusitis, pneumonia and persistent diarrhoea. Traumatic injuries were the most common condition. One hundred and sixty-seven injuries were reported. Of these, the shoulder was the most frequent site of injury, the next frequent site of injury was the foot, with fracture being the most common injury type. Sprains were the most common
types of injury. Fifteen percent of the upper extremity injuries were considered severe and involved dislocation or fracture. Of the 271 injuries reported, 53 were classified as severe. Traumatic injuries included 13 that required surgical intervention, 10 shoulder dislocations, 8 fractures, 11 cases of hypothermia, 2 cases of frost bite and 8 drownings or near drownings. Krupnick et al. state that injury risk was 1.12 injuries per hour, per year racing, 0.1 injuries per hour, per year for training and 0.04 injuries per hour, per year for recreational paddling. The study concludes that the low risk of general recreational paddling is contrasted by the injury levels of higher intensity racing. Unfortunately in determining level of risk, the study focuses on frequency and not severity. Furthermore, it is not clear in what situation the life threatening events occurred.

Kameyama et al. (1999) conducted a two part study into medical conditions associated with canoeing/kayaking. The first part of the study was based upon responses to a questionnaire from 417 members of the Japan Canoe Association (JAC). The questionnaire focused upon orthopaedic problems, as a result of this, the findings of the study cannot be regarded as representing the full range of injuries and medical conditions encountered by participants. Amongst the 324 kayakers in the study, low back injury was reported by 22.8 % of the respondents and shoulder injury by 19% of the respondents. Ten fractures were reported amongst the 417 respondents, these data are not subdivided according to discipline. The second part of the study was based upon a medical examination of 63 top-level competitive canoeists. Canoeing was seen to involve the disciplines of kayaking, Canadian canoeing and slalom using a single paddle. The examination of the 63 canoeists, identified lower back problems in 52.3% of the cases. Kameyama et al. suggest that this may be a result of stress
exerted on the lower back. The paper did not indicate whether there was a difference in the pattern of back problems amongst the three styles of competitive paddling. Shoulder problems were noted in 9 of the 63 canoeists, this was seen to be more prevalent amongst Canadian style canoeists. This suggests that the injuries resulting from paddling kayaks and canoes differ.

**Evaluation of Studies**

Whilst these studies can provide important information on the nature, frequency and severity of health impacts, there are difficulties in extrapolating findings to particular activities, types of boats and environments. Studies based upon competitive activities are more prolific than those linked to non-competitive activities; the demands of competitive and non-competitive kayaking may differ. Many of the studies did not differentiate between kayaks and canoes; these boats require different paddling techniques. Whilst some studies identify health issues related to specific types of kayaks, many of the studies did not identify the type of boat that paddlers were using. Other studies did not consider the age of participants, gender, their skill level and frequency, duration and number of years paddling, therefore it is not possible to determine the influence of these factors on health. The studies extend back to the early 1980s, since that time, there have been changes in the design of boats and the nature of activities. These changes may have an impact upon injuries and medical conditions experienced. In addition to this, the demographic profile of paddlers may have changed over the years. A number of the studies focused upon specific medical conditions, whilst this can provide a useful insight into injuries, the studies need to be considered in the context of a broad range of health impacts. As is the case with many
retrospective studies respondents may have been subject to recall bias. Sampling bias was noted in studies for example a number of the studies operated through social networks; members of these networks may not be representative of the wider paddling population. Finally, the studies reviewed tended to focus upon negative health impacts: the physical exercise associated kayaking may be beneficial to health.

Research related to environments other than the sea may provide insight into injuries linked to the general demands of paddling. The literature identifies both acute and chronic conditions and these conditions vary in their seriousness and significance to long term health. Some of the most common injuries reported include muscle pain, sprains, overuse syndromes, lacerations, abrasions and contusions. The most common injury sites appear to be the upper limbs and back. The literature indicates that whilst fatalities can be a consequence of kayaking incidents, death is relatively rare. The review of the studies in this chapter suggest that variables such as exposure, experience of participants, the nature of boats used and the type of activity undertaken may influence the experience of health impacts. Few published studies appear to take account of such an array of factors. This suggests the need for greater segmentation within studies to allow consideration of the impact of variables. The number of studies focusing specifically on injuries and health impacts whilst kayaking in the sea appears to be limited and as such there appears to be a gap in the literature.

As discussed earlier, beliefs can act as a framework for the evaluation and interpretation of information (see Moscovici 1984, 1988, 2001) and shared understanding can influence
mental models (see Brakewell 2001). In turn, understanding how risk is conceptualised can inform risk management strategies (Bostrom 2008). Given this, it is proposed that to inform intervention strategies targeted at reducing injuries and medical conditions, there is a need for specific investigations into health impacts amongst those paddling kayaks in the sea environment and that such studies should take account of variation in paddler characteristics and demands associated with different styles of boats and activities.
Chapter 4

The Causes of Incidents and Health Impacts Amongst Those Kayaking in the Sea

Introduction

The events at Lyme Bay in March 1993 where four school children died, highlighted how kayaking in a sea environment can result in tragic losses. (Adventure Activities Licensing Authority 2012; Woolven et al. 2007). This example demonstrates how a range of factors, including the skill of the participants, the fitting out of the kayaks, the changing sea environment, the safety and distress equipment carried, decision-making and the emergency response, can interact to result in serious outcomes.

Hogan (2002) argues that dangers in outdoor activities can arise from three sources, environmental, human and equipment factors. Cassel and Congiu (2005), concur with this view and propose that based upon evidence from Australia and the United States, human factors make the greatest contribution to fatal submersion incidents (60% to 63%). Lull (2008) recommends that there is a need to assess and manage risk with reference to one’s ability. In this context, he highlights that an experienced paddler in storm conditions may be assuming less risk than a novice paddler in calm and sheltered waters. The American Canoe Association states that “The absence of skill, experience and sound judgement creates a greater likelihood of errors, while at the same time leaving absolutely no margins for error.” The American Canoe Association point out that adventure is about managing risk and the key to this is knowledge and skill.
**Incidents in the UK**

Analysis of 2002 canoe and kayak incidents falling within the remit of UK Maritime and Coastguard Agency, indicates that there were 91 reported incidents and one fatality which subsequently proved to be a hoax (Young 2011). The UK Maritime Rescue Coordination Centres reported 456 canoe and kayak related incidents in 2010 (Young 2011). Of these, 41% were categorised as rescues (this included both self rescue by paddlers and situations requiring external rescue). There were nine fatalities and this accounted for 2% of incidents (two of these fatalities occurred on inland waters). As highlighted in the Maritime and Coastguard Agency 2010 Canoe and Kayak Incident Annual Report (Young 2011), the current incident recording system does not differentiate between canoes and kayaks and does not distinguish between different types of kayak (e.g. sit-on or closed cockpit). The RNLI (2012) feels that there has been an increase in the number of incidents they have had to deal with involving canoes and kayaks. The involvement of rescue services is one indicator of incidents. However, it is likely that those using kayaks in the sea environment may be experiencing injuries and other health impacts and the recording of these occurrences is not necessarily reflected in centralised incident statistics.

**The Cause of Incidents and Negative Health Impacts**

The review of the literature into health impacts associated with kayaking identifies the following causal factors:-

- **Immersion** (Kizer 1987; Berglund and Mckenzie 1994; Hagman *et al.* 2004; Cooper *et al.* 2010)


- **Other paddlers** (Weiss 1991)


- **Impact** (Fiore and Houston 2001; Fiore 2003)

- **Levels of experience and skill** (Fiore and Houston 2001; Fiore 2003; CDC 2008; American Canoe Association 2003)

- **Lifting and carrying equipment** (Weiss 1991; Fiore and Houston 2001; Diafas *et al.* 2010)

- **Levels of exposure** (Schoen and Stano 2000; Moore *et al.* 2010; Cooper *et al.* 2010)

- **Type of activity** (Weiss 1991)

The American Canoe Association suggest that the simplicity of the design of kayaks can be misinterpreted as indication that they are easy to operate and inherently safe. Broze (2001) indicates that incidents are often linked to a chain of events and a range of contributing factors. Factors in this chain include winds and/or rough conditions causing the initial capsize, a failure to rescue due to lack of practice, insufficient rescue equipment, separation from the kayak or paddles and the boat not having sufficient flotation. The situation is compounded by the individual being on their own, not carrying equipment to alert others or
the whole group not being able to look after others. Murray and Young (2003) in their study of injuries amongst people involved in recreational canoeing and kayaking, noted that a number of participants did not practice safe paddling and this included not carrying safety equipment (45%), paddling alone (42%) and not using a personal flotation device (PFD) (25%). Plyler (2006) proposes that different environments present different risks, for example the primary cause of fatalities in white water conditions was seen to be entrapment by ‘strainers’, obstacles or hydraulics; whereas weather conditions were regarded as being the primary cause in sea kayaking. Lull (2008) and Transport Canada (2007) also highlight the different environments pose different risks.

Factors associated with fatalities have been investigated in a number of countries. Based upon a review of paddle sports (canoeing, kayaking and rafting) fatalities in Maine between 2000 and 2007 (CDC 2008), fatalities were seen to be associated with inexperience, environmental conditions, alcohol use and not using personal flotation devices. Based upon the review of 2010 UK incidents, Young (2011) indicates that of the seven fatalities that occurred in the sea environment, two were described as being linked to adverse weather or tidal conditions, one incident was related to alcohol, the circumstances of the other deaths was uncertain. The American Canoe Association (2003) analysed all reported canoe and kayak related fatalities occurring between 1996 and 2000. Of the 95 fatalities reported during this period, the majority (75%), were classified as “capsizes” by the US Coast Guard. Based upon the analysis, the American Canoe Association proposed that operator inexperience or “inattention” and hazardous water or weather on their own or combined with other factors, were the major causes of fatalities. Based upon a review of narrative
descriptions of fatal incidents, the American Canoe Association suggest that paddler perceptions of risk and the skills required is an issue of concern. The narratives were seen to indicate that victims had limited skills and failed to perform basic safety precautions.

From an evaluation of sea kayaking incidents in New Zealand, Bailey (2010) identified a range of contributory causes, these included:

- Poor judgement
- Inadequate skills for conditions
- Capsize
- Lack of signalling device
- Adverse weather and sea state
- Unsuitable boat
- Inappropriate clothes
- Ignoring weather conditions
- Lack of personal flotation device
- Collision with powered vessels
- Becoming separated from the kayak
- Hypothermia as both a contributing factor and a medical problem

The Royal Society for the Prevention of Accidents (RoSPA) has emphasised the dangers of UK coastal waters. The waters are often cold, deep and have strong currents, therefore in the case of immersion, survival time can be very limited (RoSPA 2004). The American Canoe
Association (ACA 2004) point out that due to the nature of canoes and kayaks, paddlers are more likely to end up in the water than other types of boat users. Cassel and Congiu (2005) cite the unsuitability of particular boats in certain environments as being linked to incidents. Broze (2001) states that hypothermia following a capsize and unsuccessful rescue, is the most likely cause of a fatality when sea kayaking. The American Canoe Association (2003) supports this view and states that hypothermia is a risk that could result in death among paddlers. They report that just over half of fatalities for which temperature was known, occurred in water less than 65 degrees Fahrenheit (18.3°C).

The likelihood of finding oneself in the water indicates the importance of wearing a personal flotation device. The US Coast Guard BARD database (ACA 2003) indicated that in 44% of 99 kayak fatalities, personal flotation devices were not worn. The American Canoe Association have noted that there is some evidence in the US Coast Guard data, that PFD usage increases with risk factors associated with higher probability of capsize. The American Canoe Association interprets this as suggesting that among paddlers who died, PFD use was influenced by the perceived risk of an incident. Those individuals who died and who were wearing PFDs tended to be more experienced and more likely to be paddling on rough water than those who died and were not wearing PFDs. The American Canoe Association stress the need to gather data on non-fatal as well as fatal incidents when assessing the importance of PFDs to safety. Quan et al. (1988) suggest that PFD wearing amongst kayakers in the USA is higher than in other categories of small boat users. In their observational study of 4181 boat users, 25% wore a PFD. Seventy-eight percent of those observed in kayaks wore a PFD, this compared to 19% of those in motorboats. The differing patterns of use
observed between kayakers and motor boaters were regarded as reflecting differing knowledge and/or attitudes including perceived risk.

**Summary**

This review indicates that the causes and severity of incidents are often attributable to a number of factors. These factors include the abilities and skills of individuals, decision-making processes, environments entered and conditions experienced, the demands associated with paddling action and equipment worn and carried. These factors may combine to increase the likelihood of an incident that could result in injury or death. The ability to manage an incident may in turn have an impact upon the outcome of that incident. The information reviewed in this chapter has been drawn from studies in a number of countries. It is noted that the significance of causal factors may vary between countries and reflect differences in practices and norms and the nature of environments encountered. Other than the study by Bailey (2010), the literature reviewed did not specifically focus upon paddling in the sea environment. Furthermore, evaluation of ‘cause’ in relation to variables linked to participant characteristics, the type of kayak used and activities engaged in, was not consistent in the literature presented in this chapter. The ‘causes’ presented tended to be based upon formally recorded incidents; this may not necessarily represent actual experience or the perception of ‘cause’ amongst paddlers. It would appear that there is scope for the literature to make greater use of the knowledge, understanding and experience of those directly engaged with the activity. Given these points, it is proposed that there is a need to build upon current research and investigate the perceived cause of health impacts amongst those paddling kayaks in the sea environment and consider the
influence of variables such as paddler characteristics, type of boat used and activities undertaken.
Chapter 5

Managing the Risks

Introduction

A wide range of groups including search and rescue organisations, accident prevention bodies, governing bodies, commercial organisations and activity participants, have identified causal factors and risk mitigation strategies for incidents. In some instances, risk mitigation strategies are underpinned by legal requirements (e.g. the mandatory carrying of personal flotation devices in the United States of America and Canada), in other instances, the advice takes the form of recommendations to support decision making. Broze (1997) argues that safety is a personal issue and individuals decide the level of risk that is acceptable to them and what steps have to be taken to deal with risk. He proposes that given this variability, decisions based upon an understanding of hazards may be more appropriate than rules and regulations. Lull (2008) states "The most important, yet hardest tool to acquire for safe kayaking is good judgement". He goes on to say that there is a close relationship between experience and judgement. To enhance experience and skill, he advocates incrementally facing challenge and having contingency plans in place for when things do go wrong. He emphasises that carrying safety equipment and knowing how to use it is part of the approach to safety, however it is pointless if basic skills have not been mastered. The following sections provide examples of safety guidance.
**Guidance from UK National Water Safety Organisations**

The UK government, via on-line information sources, provides generic safety advice for water sports and coastal activities (direct.gov.uk 2012). This advice recommends undertaking training, checking tides and weather, wearing a personal flotation device, carrying communication equipment, leaving details of activities with someone on shore and not drinking alcohol. Guidance is also provided in relation to identifying different types of waves, currents and tidal rips.

The UK Royal National Lifeboat Institution (RNLI) reports that they have seen a significant increase in canoeing and kayaking incidents within their remit of operation (RNLI 2012). They report that whilst many participants are well trained and carry appropriate equipment, the wide availability of low-cost boats has resulted in people with limited experience undertaking activities in the sea. To reduce the likelihood of incidents, they recommend a series of tips. These include the development of skills to use equipment and self rescue, ensuring equipment is ready for use, the wearing of a buoyancy aid and suitable clothing, carrying signalling equipment, checking weather and tidal conditions, paddling in a group, telling someone on land where you are going and when undertaking a journey notifying the coastguard. They highlight how different conditions and boats and activities require different considerations. They advocate that those paddling in the surf should always wear a helmet and recognise that uncontrolled kayaks pose a risk to others. For those paddling beyond sheltered waters, they emphasise the need for greater self-sufficiency and to carry equipment such as spare paddles, paddle leash, flares, torch, bailing equipment, VHF radio and mobile phone, watch, compass, GPS, towline, knife, spare clothes, emergency shelter
and a map or chart. They advise those using sit-on kayaks for fishing not to overload boats, to make sure equipment is appropriately stowed when surfing or landing and not to use anchors in areas where there are currents as a capsize could result in them being separated from the boat. In the case of finding oneself in difficulty, they recommend calling for help and only leaving the boat as a last resort.

Based upon a review of UK incidents, Young (2011) proposes a number of issues that require attention, these include:-

- whether canoes and kayaks should be hired out during poor conditions.
- having an identifier on the craft so that rescue services can take steps to contact an owner and determine whether they are in difficulty.
- leaving details of activities on vehicles so that rescue services know where to look if people are overdue. Additionally it is suggested that for longer trips, the coastguard is informed of trip plans.
- encouraging those who are kayak fishing to carry a VHF radio or an emergency positioning indicating radio beacon (EPIRB), to report into the local Coastguard Maritime Rescue Co-ordination Centre and to wear a personal flotation device.

**Transport Canada Guidance**

Transport Canada has published generic safe boating guidance and guidance specifically targeted at those who participate in a sea kayaking (Transport Canada 2005, 2009). They highlight how conditions can change quickly. Incidents are primarily seen as being linked to
two causes: lack of knowledge of the terrain and sport and poor judgement. The Sea Kayaking Guide aims to sensitise paddlers to risks and emphasises the need for paddlers to develop skills and knowledge. Canadian legislation requires those using vessels under 6m to wear a personal flotation device, carry a throw line or throw bags, a bailer, sound signalling device, navigation lights and have a paddle. In addition to this, boats over 6m must carry a waterproof flashlight and flares. As well as the mandatory equipment, the following equipment is stated as being essential:- spray deck, paddle float, spare paddle, chart or map, chart ruler and a first aid kit. Recommended equipment includes a marine compass, depending on location a mobile phone, a VHF radio or an EPIRB, GPS and smoke flares. The value of appropriate clothing (and spare dry clothing) is also emphasised. The guide discusses the need for basic techniques and the benefits of undertaking training. It stresses the need to be able to get in and out of a kayak in an emergency situation and in particular, the importance of using a paddle float to aid self rescue.

The Canadian government identifies a number of "dangers inherent to the sport" these include:-

- coastline typography
- the marine environment including cold water, tides and currents and wind
- maritime traffic
- communication challenges in remote areas
- weather conditions

It is advocated that these factors should be considered when planning activities. To support the assessment of risk, the safety guidelines identify challenges presented by different
geographical zones. These zones vary in relation to a number of factors such as the size of the body of water, water temperatures, speed of currents, height of tides and the availability of shelter. These challenges are often compounded by weather conditions and a degree of isolation.

Careful planning and preparation is emphasised as being essential for safe kayaking; key components of this are seen to include assessing the ability of the least able member of the group against likely conditions and using information sources such as charts, maps and tide tables.

**Maritime New Zealand Guidance**
Maritime New Zealand (2009) has developed a strategy to promote canoe and kayak safety. Elements of this strategy include enhancing the skills and knowledge of activity providers, encouraging the use of safety equipment and the development of enhanced skills and knowledge amongst novice and intermediate paddlers via formal training. Maritime New Zealand has developed an online interactive training module on kayak safety (Coastguard Boating Education 2009). The module includes topics relating to weather forecasts, provisions that should be taken on a trip, appropriate clothing, the purchase of personal flotation devices, personal responsibilities for checking equipment, visibility, action to be taken in the event of capsize and safety equipment to carry. The module identifies essential equipment as being sunscreen, first aid kit, survival bag, tow rope, torch and a hot drink. The module indicates that often there is limited carrying capacity in a boat and that for benign conditions, other equipment whilst desirable is not necessary. Specialist equipment
is seen to be appropriate for more challenging conditions. The module concludes with a series of top tips, these include:

- the "skipper" has a legal responsibility to comply with the rules
- take a personal flotation device
- take two waterproof means of communication
- get a marine weather forecast
- don't carry a lot of alcohol
- take a training course
- make sure the drain plug is in the kayak and the kayak is not overloaded
- have correct clothing and safety equipment- be prepared for the unexpected
- in the case of capsize, stay with the kayak and retain a hold of the paddle
- watch where you're going and make sure others can see you

Guidance from Groups and Organizations Linked to Kayaking

National Governing bodies for paddle sport have developed initiatives to promote paddler safety. Such organisations have established a range of paddling skills awards and coaching awards. In addition to this, they have developed generic and discipline specific safety guidance for paddlers.

The New Zealand Kiwi Association of Sea Kayakers (KASK) proposes a series of basic recommendations for safe sea kayaking (KASK 2004). These recommendations give guidance on the outfitting of kayaks and equipment that should be carried. Equipment includes spare
paddles, bilge pump, repair kit, water and a map. The paddler is advised to always wear a personal flotation device, a towline and a spray deck which is seen to be essential. Clothing which reflects conditions is advocated. The paddler is also advised to carry signal devices such as flares and VHF radio or a mobile phone. In addition to equipment, paddlers are seen to need appropriate skills, knowledge and experience. Membership of a club or kayak network is seen to support this. Skills are regarded as requiring practice particularly in relation to controlling the boat and self rescue. The checking of conditions is stressed as something that should take place prior to getting on the water. The Coastguard and other paddlers are suggested as groups that could provide information on local conditions. The use of charts, maps and tide tables are seen to be important for trip planning. The value of leaving trip plans with someone on shore is highlighted. Paddling in a group that looks after each other is seen to be good practice and activities are recommended as needing to take account of the slowest member of the group. Their advice stresses that serious incidents have been a result of paddlers being caught out by severe weather changes and therefore there is a need to note and act on weather forecasts prior to launching. A critical factor in accidents was seen to be not carrying equipment to call for rescue and not providing information to people on land who could report that the paddler was overdue.

The governing body for canoeing and kayaking in Australia has developed safety guidelines for the minimum standards for the conduct for non-competitive canoeing and kayaking activities (Australian Canoeing 2008). The guidelines indicate issues that should be considered by those leading activities. Leaders of groups are expected to develop emergency management plans and to leave the details of trips with a responsible person or
authority. Leaders are seen to be responsible for researching likely conditions and hazards and ensuring that participants have the appropriate knowledge, ability and equipment to undertake activities. It is expected that those leading groups, have an appropriate level of competency and qualifications. The boats used are required to be appropriate to the nature of activities, expected conditions and abilities of participants. The carrying of bailing equipment is seen to be important for those using sea kayaks. Those leading groups should have a "bombproof" means of recovering from capsize. The carrying of spare paddles and equipment to prevent the loss of paddles is seen to be important for those paddling in the sea environment. All participants are expected to wear personal flotation devices and to wear helmets when surfing or paddling amongst rocks and in caves. Where appropriate, it is recommended that maps, charts, compasses, GPS equipment, signalling devices (e.g. flares) and communication equipment (e.g. a VHF radio) is carried. Leaders are expected to carry a tow line and repair kits. For individual paddlers, Australian Canoeing has developed a safety code. This code stresses the need to be realistic about one's ability, the value of developing skills, particularly through clubs and training programs, the need to recognise the impact of environmental conditions, and the importance of self rescue skills. For those kayaking in the sea, it is recommended that they appraise weather conditions and recognise that they can change rapidly. Additionally, it is expected that they develop a sound knowledge of the effects of tides. The importance of practicing a roll as a means of self rescue in event of capsize is highlighted.

The American Canoe Association advocates that paddlers require basic safety knowledge to enable the identification of hazards and individual limitations, the assessment of risk and
the exercise of good judgement (ACA 2003). To support this, The American Canoe Association has produced generic "top 10 safety tips" for people involved in paddle sport (ACA Top 10 Safety Tips accessed 11/01/12). These tips cover topics such as training, wearing lifejackets, cold water safety, rules of the road, safety checks, best practices, ethics and conduct, know your limits, river rescue, and trip preparation and planning. Many of these tips are supported by education resources.

A range of leaflets advocating good practice have been produced by The American Canoe Association. Within this advice, The American Canoe Association indicates that people should expect to capsize and this is often "part of the fun". As a result of this, the wearing of a personal flotation device is seen to be of high importance. For those involved in coastal touring, it is stated that there is a need to be able to self rescue, identify the hazards associated with tidal currents, surf and other traffic, maintain contact with other members of the paddling group and leave details of trips with others onshore. Planning is seen to underpin safe practice and this includes the determination of a route and the assessment of weather and local conditions. They recommend that in addition to a PFD clothing suitable for immersion is worn. The carrying of equipment such as a paddle float or other self rescue equipment, navigation aids, a signalling mirror and a tow line is recommended. As a general guide, paddlers are advised to avoid extreme weather and water conditions, however, it is recognised that skilled paddlers with appropriate equipment, can safely manage some extreme conditions. Other advice provided includes not paddling alone, recognising one's abilities, not entering conditions exceeding skill level, monitoring changing weather conditions, recognise the effects of dehydration, being aware of others in the group who
may be having difficulties and adjust activities accordingly, having proficient paddling skills and rescue techniques and the ability to cope with emergencies (ACA Best Practice for Paddlers and Paddle Sport Programs, ACA Practice Ethics and Conduct, ACA Know Your Limits: accessed 11/01/12).

The American Canoe Association has produced a safety Checklist for paddlers (ACA Paddlers Safety Checklist, accessed 11/1/12). Items included on the checklist are below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Checklist</th>
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</thead>
<tbody>
<tr>
<td>Be a swimmer</td>
<td>Have a bilge pump and/or bailer</td>
</tr>
<tr>
<td>File a float plan</td>
<td>Self-rescue devices (paddle float/sling/tow rope)</td>
</tr>
<tr>
<td>Wear your lifejacket</td>
<td>Sunscreen</td>
</tr>
<tr>
<td>Assess your boat’s flotation needs</td>
<td>Drinking water &amp; snacks</td>
</tr>
<tr>
<td>Carry a spare paddle</td>
<td>Light/signal (for low light conditions)</td>
</tr>
<tr>
<td>Always dress for the unexpected flip</td>
<td>Wear proper footwear</td>
</tr>
<tr>
<td>Wear a hat or helmet</td>
<td>UV eye protection</td>
</tr>
<tr>
<td>Carry a compass and chart or map</td>
<td>Dry bag with extra clothing</td>
</tr>
<tr>
<td>Carry a whistle or sound signalling device</td>
<td>Wear appropriate clothing</td>
</tr>
<tr>
<td>Carry throw bags and other rescue gear</td>
<td>First aid kit with matches</td>
</tr>
<tr>
<td>Carry a “river” knife</td>
<td>Small repair kit with duct tape</td>
</tr>
<tr>
<td>VHF radio and GPS</td>
<td></td>
</tr>
</tbody>
</table>

The UK stance as advocated by the British Canoe Union (BCU) appears to base its strategy on enhancing the skill base of coaches and paddlers through a wide range of structured training programmes and qualifications. In addition to emphasising technical paddling and safety skills, the ability to assess risks in a dynamic environment is highlighted as a priority (BCU 2002). The BCU handbook discusses the balance between excitement and enjoyment, the practicalities of paddling and the safety requirements. An example of this is in the chapter dealing with clothing and equipment. The chapter opens with the following statement:-
“Skill, knowledge and judgement make paddle sport the exciting creature it is. If our bodies are overloaded with kit, then performance will be affected. It is important to ask the question, ‘Do I really need that piece of kit, or is it surplus to the requirements of the paddle sport activity I am doing and, in fact, a hindrance?’

The BCU recognises that different aspects of kayaking present differing demands. They outline safety equipment that may be utilised. These include:-

<table>
<thead>
<tr>
<th></th>
<th>Whistle</th>
<th>Helmets</th>
<th>Spray deck</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knife</td>
<td>Lights</td>
<td>VHF radio or mobile phone</td>
<td>Emergency shelter</td>
</tr>
<tr>
<td>First aid kit</td>
<td>Flares</td>
<td>Spare paddle</td>
<td>Appropriate clothing</td>
</tr>
<tr>
<td>Repair kit</td>
<td>Throw line</td>
<td>Towing system</td>
<td>Buoyancy aids</td>
</tr>
</tbody>
</table>

For safe paddling, the BCU draws attention to the need to take account of environmental factors, the design characteristics of boats and the abilities of participants. The chapter in the BCU Handbook dealing with safety and leadership opens by saying “Guidelines are…. for the blind obedience of fools and the guidance of the wise”. The introduction goes on to state that with experience, we learn when it is safe or necessary to ignore them. Novices are advised to adhere to the following guidance:-

- Don’t paddle alone
- Wear a buoyancy aid
- If head injuries are a significant risk, wear a helmet
- Let someone know what your plans are
- Check weather forecasts, and if appropriate, water levels or tides
- Stay flexible: be prepared to change your plans
- Be a team player, put the best interests of the group first
The BCU (2002) regard risk assessment as the process of identifying hazards, calculating the risk and omitting or reducing the risk to acceptable levels. They see a role for generic risk assessments as a means of formalising thinking and providing consistency. They are seen as being useful for the inexperienced in managing the unexpected and offer core principles that can be adapted. The BCU feel that generic risk assessments should be complimented by a dynamic approach to risk management, based upon the monitoring and assessment of risk in a rapidly changing environment. The BCU advocates the ‘safe person concept’. They argue that as it is not always possible or desirable to eliminate risk from the environment, the alternative strategy is to direct efforts into making the person safe. The BCU handbook tends not to be prescriptive, instead it present a range of practices and equipment that may be considered to aid the management of risk in a range of environments, activities and when using different styles of boats. There is a contrast in the position outlined in the American Canoe Association document Critical Judgement and the BCU Handbook in relation to the wearing of personal flotation devices. The American Canoe Association states that “The most important and basic rule of paddling is: wear a lifejacket (PFD)!”. The BCU acknowledges that in some aspect of the sport such as surf kayaking, the decision whether to wear a buoyancy aid is a polarised one. There are seen to be advantages and disadvantages depending upon experience, conditions, craft and the role within a group. The BCU takes a similar stance in relation to the wearing of helmets. They point out that on sunny days and beach breaks, helmets are not always worn, however, in other conditions, “it would be foolhardy not to wear one”.

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In specialist literature analysing sea kayak incidents and the lessons learnt, Broze (1997) advocates that sea kayaking is a safe activity for those who have learned appropriate skills and understand potential hazards. He suggests a range of steps that can enhance paddling safety, these include:

- **Be prepared** including appropriate skills and knowledge, the development of emergency plans, being aware of factors that can influence decision-making and ensuring that there is appropriate flotation for both oneself and the kayak.
- **Paddle in groups** to provide safety backup and having protocols within the group for managing decision-making and incidents.
- **Know your equipment** and ensure that equipment is in a serviceable condition and that it can be used in an emergency situation.
- **Improve skills** including paddling skills and rescue skills.
- **Use safety equipment.** This includes a personal flotation device, spray deck, flotation for the kayak, a bailing device, towline, spare paddles, compass and chart, clothing and shelter for warmth, a first aid and repair kit, location equipment such as flares, signalling equipment such as a VHF radio and self rescue devices such as a paddle float.
- **Beware of hypothermia**
- **Know weather conditions** including the effect of wind and waves
- **Avoid surf and the associated hazards**
- **Understand tides and tidal hazards:** Action recommended includes the use of tidal information and charts, recognising the impact of currents on paddling, being aware of the interaction of currents and wind on sea conditions and the interaction of
currents with obstacles and how this can produce a range of conditions including tidal rips, waves, eddies, whirlpools and overfalls.

A number of commercial organisations have produced safety guidance. Of particular note is Mariner Kayaks Owner’s Manual on Sea Kayak Safety. The manual provides detailed advice relating to many aspects of paddling. The manual emphasises the need to be aware of potential hazards such as weather and sea conditions and to compare these with the abilities of the group and the capacity to deal with error. Avoiding and treating hypothermia is seen to be a priority (Broze 2001).

**Summary**
The steps outlined to improve safety whilst paddling vary from mandatory requirements, prescriptive lists of equipment through to recommendations to support individual assessments of risk against one's level of ability. Differences are apparent in the recommendations from different countries; this may reflect cultural factors and differing environmental demands. Common themes emerging from a review of safety guidance include:

- the need to develop appropriate skills and knowledge to appraise risk and to paddle the kayak and perform self rescue
- the appraisal of environmental conditions and the use of information sources to aid decision making
- the wearing of personal flotation devices and clothing appropriate to conditions
- paddling with colleagues
- notifying others of planned activities
- the carrying of equipment to aid navigation
- the carrying of equipment to support the management of an incident, this includes signalling devices, communication equipment, towing equipment and equipment to aid self rescue and prevent hypothermia

The detail of guidance and the emphasis within guidance varies. Specialist literature targeted at sea kayaking as a distinct discipline is often detailed and provides advice on predicting, preparing for and managing risks when they occur. This information may not necessarily be accessed by those not immersed in the activity. Within the broader literature, there is recognition of variation in the action that is required to manage risk; however, it would appear that in many cases, there is an emphasis upon universal as opposed to contextual guidance and a prescriptive approach to equipment that should be carried and planning undertaken. Whilst equipment may be advocated, this does not necessarily mean participants have the ability to use it or that it would be effective in particular situations (for example a mobile phone or VHF radio cannot always be relied upon to summon help). The need to match ability with the demands of activities and environments are discussed, however, in the general guidance, the factors that should be assessed are often described in broad terms and the interaction and relative importance of factors is not always highlighted. Particularly in relation to generic guidance, the emphasis is upon avoiding situations as opposed to steps that should be taken to support the seeking out of challenge or action that should be taken when finding oneself in adverse situation.
Much of the literature emphasises physical risks and the need for appropriate skills; less attention is paid to the factors influencing the decision to engage with a risk. It would appear that the focus of guidance is upon the prevention of incidents that require rescue or result in serious outcomes such as a fatality as opposed to less serious injuries and the development of chronic conditions. Literature produced by governing bodies and kayaking interest groups discusses the importance of good technique as a means of preventing injury, however, such information receives little attention in the literature produced by generic water safety organizations. Activities such as lifting and carrying boats and slips, trips and falls present the risk of injury: the direction of safety advice seems to be orientated towards activities on the water as opposed to associated activities off the water.

Literature is readily available providing advice in relation to safety practices whilst paddling in the sea environment. Reviews of incidents (for example see Broze and Gronseth 1997; ACA 2003; Woolven et al. 2007) have provided descriptions of scenarios where deficiencies in safety practices have led to losses. At present, there appears to be a gap in the literature relating to safety planning undertaken by participants and reported and observed safety practices (note an observational study into the wearing of PFDs has been undertaken by Quan et al. 1998). These are issues that have received little attention in peer reviewed literature.

The review of the literature in relation to health impacts amongst those engaged in kayaking suggests that variables such as paddler characteristics, the type of boat and the type of activity may influence experience of injuries and medical conditions. The review of literature
relating to managing the risks also highlights that in addition to activity planning and the carrying of appropriate equipment, factors such as the skill and experience of paddlers, environmental conditions, the nature of activities and the ability to summons support are factors that should be considered in risk mitigation strategies. Given this, it is advocated that there is a need for further research into safety practices and this should be undertaken with reference to specific paddler characteristics and reflecting the context of participation.
Chapter 6

Investigation into the Experience and Perception of Health Impacts and Associated Causes Attributed to Kayaking in the Sea

Introduction

The review of the literature indicates that whilst fatalities can be a consequence of paddling kayaks in the sea, occurrence is infrequent. A number of studies have been conducted into health impacts associated with kayaking on inland waters whilst paddlers have been undertaken competitive and non-competitive activities; aspects of the studies may shed light on injuries in sea conditions. Many studies do not differentiate between type of boat or style of kayak used by paddlers. The number of studies focusing specifically on injuries and medical conditions experienced by those kayaking in the sea appears to be limited.

A range of acute and chronic conditions have been identified among those paddling kayaks. These include abrasions, contusions and cuts, injuries linked to repetitive strain, dislocations of the shoulder, external auditory canal exostoses and conditions linked to water quality. A variety of causes have been identified associated with these conditions, these include paddling action, immersion, impacts, and activities out of the water such as trips and falls and the carrying of boats. Such causes could be regarded as being the end of a causal chain. A number of organisations with an interest in water safety suggest issues such as inexperience and poor judgement as being the primary cause of incidents that lead to health impacts.
It would appear that at present, there is a gap in the research focusing specifically on participants’ experience and perceived health impacts associated with kayaking in the sea. Perceptions of likelihood, severity and susceptibility to health impacts and knowledge and attitudes relating to cause may influence health protective behaviour (Janz and Becker 1984; Brewer et al. 2007). Investigation into participants’ perceptions of the health impacts and associated cause may identify information that could support the development of safety initiatives.

**Aim and Objectives**

The aim of this study is to identify kayakers’ experience of injuries and medical conditions, the perception of health impacts encountered by the wider group kayaking in the sea and to determine the perception of the causes of health impacts.

To achieve the above aim, the following objectives have been set:-

- Develop and pilot a questionnaire designed to gather data relating to the;
  - direct experience of injuries and medical conditions amongst those using kayaks in the sea
  - perception of health impacts affecting the wider group
  - perceptions of the cause of health impacts
- Develop a sampling method and recruit potential respondents
- Administer the questionnaire
- Analyse data and determine the nature of and variation in response
- Evaluate findings in relation to the published literature
In addition to the above aim, the results of this study were fed into the qualitative phase of the research and supported the development of themes for discussion with individuals who had experience of paddling kayaks in the sea. The qualitative study is presented in Chapter 10.

**Methodology**

A questionnaire was designed to gather information related to kayakers’ experience and perception of the frequency, nature and cause of injuries and medical conditions associated with paddling in the sea environment (see Appendix I).

The review of literature identified that there are health impacts associated with kayaking and that cause is linked to a number of factors. Those using kayaks vary in knowledge and skill and use a range of different boats for a variety of activities and in different conditions (BCU 2002). The design characteristics of boats, combined with the requirements of paddling in differing environments and performing particular activities, can influence the likelihood of injury (BCU 2002). Given this, and to determine whether there is variation between groups, the questionnaire focused upon the following factors:-

- Individual characteristics of paddlers including age, gender, experience, and qualifications
- The nature of paddling activities including the type of boat, type of activity, frequency and duration of activity and the number of years paddling
- Injuries and medical conditions personally experienced
- Perceived most likely health impact amongst paddlers
- Perceived most common injured part of the body
- Perception of the frequency and seriousness of injuries
- Estimates of the number of annual fatalities
- Perceived most likely cause of health impacts amongst paddlers

Causal factors considered in the study tended to be related to environmental conditions and behaviours associated with kayaking; this followed the themes in the literature evaluating injuries and medical conditions amongst kayak paddlers. Decision-making processes that could lead to incidents resulting in health impacts were not focused upon in this study. The decision was taken to consider such factors as part of the qualitative phase of the research.

A questionnaire utilising a range of open and closed questions was piloted using a group of 15 novice kayakers at the end of a 10 day training program, four experienced kayak club members and five professional kayak instructors. The respondent's paddled a range of styles of kayaks including general purpose boats, playboats, sea kayaks and sit-on kayaks.

Open questions can provide rich information and are less likely to channel responses, however, their use can often increase the length of time taken to complete questionnaires. In this phase of the research, the priority was for basic information on frequency, with the view to informing the detailed qualitative analysis in subsequent phases. Given this, the decision was made to mainly use closed questions. Many of the closed questions required categorical judgements whereby respondents indicated which one of a number of response options was the most applicable. These response options were based upon the review of
the literature and open questions in the pilot study. The category "other" was included on a number of questions in case the response options were not exhaustive and as a means of limiting the effect of options acting as triggers to responses. It was recognised that the use of the term "other" would not necessarily counter bias associated with providing response options, as respondents may tend to restrict their choice to the options explicitly offered (Krosnick and Presser 2010).Whilst the provision of response options can be criticised, they can act as a counter to the effect of recall bias by encouraging respondents to consider a wider array of factors. A number of open questions were asked and acted as a check on the responses to closed questions. These open questions appeared in the questionnaire before the closed questions. So for example, an open question was asked whereby respondents were required to identify the most common health impact they had personally experienced; later in the questionnaire they were asked to identify, from a list of options, what they thought was the most likely health impact amongst the wider group paddling kayaks in the sea. The responses to these open questions were subsequently grouped together and coded. The final version of the questionnaire took approximately 5 -10 min to complete.

Whilst estimates have been made as to the number of people who kayak in the UK (RYA 2011), there is limited data on the number of people who kayak in the sea environment. Furthermore, data do not exist in relation to the number of people using particular types of boats, the activities undertaken and the environments encountered. Given this, it was felt that population parameters were not clear and therefore presented barriers to representative sampling. As probabilistic sampling was not feasible, a non-random approach to sampling was adopted to enhance the inclusion of respondents with appropriate
characteristics and direct experience of paddling in the sea environment. The purposive sampling (see Onwuegbuzie and Collins 2007) was based upon the literature review that indicated that kayaks vary in design and use, therefore it was deemed necessary to identify respondents paddling different styles of kayaks and undertaking different activities.

Participant recruitment was based upon a "targeted" sampling strategy (see Watters and Biernacki 1989) that utilised a range of approaches including, location sampling where the target population is geographically concentrated (see Heckathorn 2002, Kalton 2001) and chain referral/snowball sampling where population members are known to each other and initial contacts can support the recruitment of others to the study (see Biernacki and Waldorf 1981). These potentially non-representative approaches may impact upon the generalisability of the findings, however, such approaches support access to groups and the generation of information that can facilitate understanding of processes (Faugier and Sargeant 1996; Onwuegbuzie and Collins 2007). Location sampling was based upon local knowledge and observation of coastal launch sites that were frequently used by paddlers. Chain referral/snowball sampling involved asking initial recruits if they had colleagues who paddled and if so, inviting them to pass on questionnaires. This approach can introduce bias as there may be over representation of respondents who are members of formal social groups and recruitment of respondents via individuals with extensive social affiliations. To partially address this and to preserve the diversity of the sample, chain referral was limited to one "wave" from each initial contact (Heckathorn 2002).

Whilst the examination of perceived health impacts and associated causation could have taken place through networks associated with medical treatment, it was felt that this would
have introduced additional bias as those seeking medical care may differ from those who do not (Watters and Biernacki 1989).

The utilisation of complimentary approaches to sampling was seen to support recruitment of respondents; however, the non-probabilistic nature of sample selection may represent a limitation to the representativeness of the findings. The sampling frame was not predetermined as would be the case in probability sampling. Instead, the distribution of questionnaires ended after approximately one year when saturation was deemed to have occurred as a number of respondents, when approached, indicated that they had completed and returned a questionnaire the previous year.

Paddlers of a wide range of style of kayak were targeted, the main criteria being that the boat be propelled by a double ended paddle. Boats included surf kayaks, playboats, general purpose kayaks, sea kayaks and sit-on kayaks. Typically, potential participants were approached individually and in person when they were seen with a kayak, for example, loading and unloading boats, resting on shore or staying at a campsite close to a launch site. Children under the age of 16 were not targeted in the study. Four hundred questionnaires with accompanying ‘Freepost’ envelopes and informed consent forms were handed out.

To enhance the response rate, the participants were informed that the research was being undertaken by an active kayaker who was a member of a local kayak club. Administration of the questionnaires was based upon informed consent. Participants were informed that their responses would be anonymous and the purpose of the study was to investigate aspects of
paddling safety in the sea and experiences of injuries. Participants were informed that they had the right to withdraw from the study at any stage and that consent would be inferred from completion and return of a questionnaire.

Questionnaire distribution took place over a one year period at weekends and during school holidays at a range of launch sites in the Welsh coastal county of Pembrokeshire. Pembrokeshire was chosen as it is regarded as one of the primary coastal kayaking areas in the UK. Launch sites visited included beaches, harbours and estuaries. The conditions encountered in this small geographic area are very varied ranging from holiday beaches and sheltered waters to internationally known tidal races and overfalls and exposed sea crossings. In addition to this, UK participants at the Anglesey Sea Kayak Symposium in North Wales were invited to participate in the study.

Analysis of data was performed using SPSS version 19. The Fisher’s Exact Test was utilized as a test for independence between categorical variables. The use of multiple tests can inflate the type 1 error rate. To counter this, a Bonferroni correction was applied in cases where multiple tests were performed on data sets. Thus, assuming a critical value of 0.05 for significance, this was then divided by the number of tests performed (Field 2005).
Results

Of the four hundred questionnaires distributed, one hundred and seventy-eight completed questionnaires were returned. Of these, 5 were excluded from analysis as the respondents were under 16 years of age. In a number of cases, respondents omitted to answer questions; this resulted in a number of missing values. Consequently, frequencies in tables do not always equal the sample size.

The ages of the respondents ranged from 16 to 69, the mean age of the sample was 37 years.

Paddling behaviour and paddler characteristics

The majority of the respondents reported that their main activity was ‘surfing’ (n=64). This was followed by ‘coastal touring’ (n=53) and ‘recreational paddling’ (n=31). These three categories accounted for 85% of the responses. A range of boats were used for these activities (Fig. 1). ‘Sea kayaks’, ‘playboats’, ‘general purpose’ kayaks and ‘sit-on’ kayaks accounted for 88% of the kayaks paddled. ‘Surfing’ was the main activity amongst those who used ‘playboats’. Those using ‘general purpose’ kayaks were split between the activities of ‘surfing’, ‘recreational paddling’ and ‘coastal touring’. ‘Sit-on’ kayak paddlers were mainly involved in ‘coastal touring’ and ‘recreational paddling’ The main activity amongst those who used ‘sea kayaks’ was ‘coastal touring’.
Most of the respondents \( (n=125) \) stated that their paddling activity did not exceed half a day. The most common reported length of paddling activity was between two and two and a half hours \( (n=56) \). Seven of the respondents reported multi day activity. The duration of activities varied according to the type of boat used and the activity undertaken. Sixty-four percent of those using ‘sea kayaks’ reported that typically, the duration of activities was over 4 hours. This contrasted with 19% of those using ‘general purpose’ kayaks, 30% of those using ‘playboats’ and 15% paddling ‘sit-on’ kayaks. Thirty-nine percent of the forty-six respondents who said their main activity was ‘coastal touring’ reported that activities tended to be over 4 hours long. This contrasts with 12% of the sixty respondents whose main activity was ‘surfing’. The number of times paddling a year, varied greatly amongst participants. Fifty-five of the respondents reported paddling 20 or more times a year. Twenty eight respondents reported that they paddled ten to twenty times a year, 36 stated
they paddled 5 to 10 times a year. Forty-six respondents reported paddling 1 to 5 times a year, 6 respondents reported they paddled less than once a year.

The number of years that participants had been involved in paddling in the sea was wide-ranging. Twenty-four percent of the respondents stated that they had been paddling in the sea more than 10 years, 48% stated they had been paddling between one and five years and 17% had been paddling for less than one year. Differences in the number of years paddling appeared to be linked to both type of boat used and activity. For example, 48% of those using sit-on kayaks had less than two years experience, whereas, 77% of those paddling ‘sea kayaks,’ had over five years experience. Eighty-six percent of those involved in ‘recreational paddling’ had been paddling for less than five years, this compares with 65% for ‘surfing’ and 53% for ‘coastal touring’.

Table 6.1. Kayak used for main activity/kayaking ability in the sea crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Kayaking ability in the sea</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beginner</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Sea kayak</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>General purpose</td>
<td>16</td>
<td>23</td>
</tr>
<tr>
<td>Playboat</td>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>Sit-on</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Surf</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>102</td>
</tr>
</tbody>
</table>

The majority of the respondents described their ability as ‘intermediate’ (n=102), forty described themselves as ‘beginner’ and twenty-three regarded themselves as being ‘expert’. A larger proportion of respondents who used ‘sit-on’ kayaks and ‘general purpose’ kayaks regarded themselves as ‘beginners’ when compared to those using ‘sea kayaks’ and
‘playboats’. The majority of respondents who defined themselves as ‘expert’ used ‘sea kayaks’ or ‘playboats’ (see Table 6.1).

Those paddling different types of boats reported different levels of qualification. Eighty-one percent of those using ‘sit-on kayaks’ and 41% of those using ‘general-purpose’ kayaks did not hold qualifications; this contrasts with 19% of those using ‘playboats’ and 23% of those using ‘sea kayaks’ reporting not holding qualifications. This may reflect that many of those using sit-on kayaks and general purpose kayaks are new to the activity compared to those using sea kayaks and playboats. The level of qualification also varied according to type of boat. Approximately 48% of those paddling ‘sea kayaks’ and 40% of those paddling ‘playboats,’ held coaching qualifications. This contrasted with 4% of those using ‘sit-on’ kayaks and 13% of those using ‘general purpose’ kayaks.

Compared to those paddling ‘sit-on’ and ‘general purpose’ kayaks, a larger proportion of those using ‘sea kayaks’ and ‘playboats’:-

- reported having paddled in the sea for more years
- regarded themselves as experts
- reported holding kayaking qualifications
**Perception of health impacts affecting the wider group kayaking in the sea**

Participants were asked questions relating to what they thought were the most common injuries and medical conditions amongst those who kayak in the sea (Table 6.2). ‘Sprains and pulled muscles’ and ‘cuts and abrasions’ were quoted as the most common health impacts. These were followed by a range of factors including ‘painful or stiff back’, ‘sunburn’, ‘painful joints or tendons’, ‘blisters’ and ‘bruises’. The remaining factors combined accounted for 8% of the responses.

**Table 6.2.** Perceived most common health impact amongst the wider kayaking group

<table>
<thead>
<tr>
<th>Health impact</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>sprains and pulled muscles</td>
<td>34</td>
</tr>
<tr>
<td>cuts and abrasions</td>
<td>33</td>
</tr>
<tr>
<td>painful or stiff back</td>
<td>21</td>
</tr>
<tr>
<td>sunburn</td>
<td>20</td>
</tr>
<tr>
<td>blisters</td>
<td>19</td>
</tr>
<tr>
<td>painful joints or tendons</td>
<td>19</td>
</tr>
<tr>
<td>bruises</td>
<td>12</td>
</tr>
<tr>
<td>hypothermia</td>
<td>5</td>
</tr>
<tr>
<td>near drowning</td>
<td>3</td>
</tr>
<tr>
<td>dislocation</td>
<td>2</td>
</tr>
<tr>
<td>concussion</td>
<td>1</td>
</tr>
<tr>
<td>upset stomach</td>
<td>1</td>
</tr>
<tr>
<td>other</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>171</strong></td>
</tr>
</tbody>
</table>

Further analysis was conducted to determine variation according to categories of activity (see Table 6.3).
Table 6.3. Perceived most common health impact amongst the wider kayaking group/ activity crosstabulation

<table>
<thead>
<tr>
<th>Health impact</th>
<th>Expedition</th>
<th>Coastal touring</th>
<th>Rock hopping</th>
<th>Playboating</th>
<th>Recreational paddling</th>
<th>Surfing</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>cuts and abrasions</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>bruises</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>blisters</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>10</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>painful joints or tendons</td>
<td>3</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>sprains and pulled muscles</td>
<td>0</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>14</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>dislocation</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>concussion</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>hypothermia</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>near drowning</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>sunburn</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>8</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>painful or stiff back</td>
<td>0</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>upset stomach</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>other</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>52</td>
<td>4</td>
<td>6</td>
<td>31</td>
<td>64</td>
<td>3</td>
<td>165</td>
</tr>
</tbody>
</table>

The rank order of the health impacts was seen to vary according to activity. Three Fisher’s Exact Tests were performed on this data set: applying the Bonferroni correction, the critical value for significance was assumed as 0.016. A statistically significant higher proportion of those whose main activity was ‘surfing’ identified ‘bruises’ as the most common health impact when compared to the responses in a combined category of the other activities (Fisher's Exact Test p=0.014, two sided). A higher proportion of those engaged in ‘coastal touring’ identified ‘hypothermia’ as the most common health impact: compared to the responses in a combined category of the other activities, this finding is not regarded as statistically significant (Fisher's Exact Test p=0.035, two sided). Whilst only a small group, five of the six people whose main activity was ‘playboating,’ identified ‘cuts and abrasions’ as the most common health impact. Compared to the responses in a combined category of other activities, there is a statistically significant difference (Fisher's Exact Test p=0.001, two sided).
Crosstabulating perceived most common injury with kayak (Table 6.4), indicates that there are similarities in response to factors such as ‘cuts and abrasions’ and ‘painful and stiff back’. However, a statistically significant larger proportion of those using ‘sea kayaks’ identified ‘painful joints and tendons’ as the most common health impact compared to the responses of the users of other categories of boat combined (Fisher’s Exact Test p= 0.001, two sided).

Table 6.4. Perceived most common health impact amongst the wider kayaking group/kayak used for main activity crosstabulation

<table>
<thead>
<tr>
<th>Health impact</th>
<th>Kayak used for main activity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sea kayak</td>
<td></td>
</tr>
<tr>
<td>cuts and abrasions</td>
<td>7</td>
<td>32</td>
</tr>
<tr>
<td>bruises</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>blisters</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>painful joints or tendons</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>sprains and pulled muscles</td>
<td>4</td>
<td>34</td>
</tr>
<tr>
<td>dislocation</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>concussion</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>hypothermia</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>near drowning</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>sunburn</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>painful or stiff back</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>upset stomach</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>other</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>167</td>
</tr>
</tbody>
</table>

The ‘back’ was identified as the single ‘most commonly injured part of the body’, accounting for 19% of the responses; this was followed by ‘hands’ (13%), ‘shoulders’ (12%), and the ‘head’ (11%). Individual sites on the upper limbs combined with ‘upper limbs multiple site’ accounted for 48% of the responses (Table 6.5).
No statistically significant differences in response between categories were noted when comparing perceived most common health impact according to self reported ability, duration of activities or number of years kayaking in the sea. A crosstabulation of perceived most common health impact according to frequency of paddling was performed. ‘Painful or stiff back’ was identified as the most common health impact by 7% of those paddling 1-10 times a year and 22% of those paddling more than 10 times a year; this difference was statistically significant (Fisher’s Exact Test $p=0.035$, two sided).

Table 6.5. Perceived most commonly injured part of the body amongst the wider kayaking group

<table>
<thead>
<tr>
<th>Most commonly injured part of the body</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>back</td>
<td>31</td>
</tr>
<tr>
<td>hand</td>
<td>22</td>
</tr>
<tr>
<td>shoulder</td>
<td>20</td>
</tr>
<tr>
<td>head</td>
<td>18</td>
</tr>
<tr>
<td>upper limb multiple site</td>
<td>17</td>
</tr>
<tr>
<td>back and other site</td>
<td>16</td>
</tr>
<tr>
<td>arms</td>
<td>12</td>
</tr>
<tr>
<td>other</td>
<td>13</td>
</tr>
<tr>
<td>wrist</td>
<td>8</td>
</tr>
<tr>
<td>other multiple site</td>
<td>5</td>
</tr>
<tr>
<td>chest</td>
<td>1</td>
</tr>
<tr>
<td>neck</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
</tr>
</tbody>
</table>

Differences were observed between categories when crosstabulating the perceived most commonly injured part of the body amongst the wider kayaking group, with kayak used (Table 6.6). Two Fisher’s Exact Tests were performed on this data set: applying the Bonferroni correction, the critical value for significance was assumed as 0.025. A statistically significant higher proportion of those using ‘sit-on’ kayaks identified the ‘head’ as being the ‘most commonly injured part of the body’ when compared to the responses of the users of
other styles of kayaks as a combined group (Fisher's Exact Test p=0.000, two sided). A similar pattern was noted in relation to those using ‘sea kayaks’ identifying the ‘wrist’ as being the most commonly injured part of the body when compared to the responses of the users of other styles of kayaks as a combined group (Fisher's Exact Test p=0.003, two sided).

Table 6.6. Perceived most commonly injured part of the body amongst the wider kayaking group/kayak used crosstabulation

<table>
<thead>
<tr>
<th>Most commonly injured part of the body</th>
<th>Sea kayak</th>
<th>General purpose</th>
<th>Playboat</th>
<th>Sit-on</th>
<th>Surf kayak</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>hand</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>wrist</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>arms</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>shoulder</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>back</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>head</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>neck</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>upper limb multiple site</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>back and other site</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>other multiple site</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>other multiple site</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>37</td>
<td>41</td>
<td>26</td>
<td>11</td>
<td>6</td>
<td>160</td>
</tr>
</tbody>
</table>

Crosstabulating activities with the perceived most commonly injured part of the body amongst the wider kayaking group, demonstrates differences in the response patterns (Table 6.7). For example, amongst those engaged in ‘surfing’, the ‘hand’ followed by the ‘shoulder’ were the most frequently identified ‘most commonly injured parts of the body’. This contrasts with the category ‘recreational paddling’ where the ‘back’ followed by ‘head’ was cited as the ‘most commonly injured parts of the body’.
Table 6.7. Perceived most commonly injured part of the body amongst the wider kayaking group/activity crosstabulation

<table>
<thead>
<tr>
<th>Most commonly injured part of the body</th>
<th>Activity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expedition</td>
<td>Coastal touring</td>
</tr>
<tr>
<td>hand</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>wrist</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>arms</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>shoulder</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>back</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>head</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>neck</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>other</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>upper limb multiple site</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>back and other site</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>other multiple site</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>50</td>
</tr>
</tbody>
</table>

The majority of respondents (n=141) regarded most health impacts associated with kayaking in the sea ‘as not serious’, of this group, 101 also regarded the occurrence as being ‘uncommon’ (Table 6.8).

Of the twenty-five respondents who regarded most health impacts as ‘serious’, a minority (n=3) regarded the occurrence as ‘common’.

Table 6.8. Perception of seriousness of injuries/frequency of occurrence crosstabulation

<table>
<thead>
<tr>
<th>Seriousness of injuries</th>
<th>Injuries and conditions seen as common/uncommon</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Common</td>
<td>Uncommon</td>
</tr>
<tr>
<td>serious</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>not serious</td>
<td>40</td>
<td>101</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>123</td>
</tr>
</tbody>
</table>
The experience of injuries and medical conditions

Approximately 35% (n=60) of the respondents indicated that they had received injuries or developed medical conditions as a result of kayaking in the sea (Table 6.9). Of these sixty respondents, 21 stated that they had received medical treatment. Seven respondents stated that their injuries or conditions resulted in time off work, college or school; three respondents stated that they had resulted in a change in lifestyle. Twenty-seven of the respondents indicated that injuries or medical conditions had resulted in them taking time off kayaking. Four respondents regarded their health impacts as serious. Twenty-three respondents who had received injuries or developed medical conditions said that the nature of their injuries or medical conditions had changed with experience. In twenty of these cases, the change was positive. Ten people reported that this was a result of improved paddling technique or the use of different paddles. Other factors identified included the use of earplugs, nose clips, sun block, better control of the kayak and improved lifting technique. Three people identified that the change was negative; one person reported that their condition had deteriorated, one reported sore wrists and a third person reported increased injuries as a result of engaging with more challenging conditions.

Table 6.9. Kayak used/experienced injuries or medical conditions from kayaking in the sea crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Experienced injuries or medical conditions from kayaking in the sea</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Sea kayak</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>General purpose</td>
<td>13</td>
<td>25</td>
</tr>
<tr>
<td>Playboat</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Sit-on</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Surf</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>103</td>
</tr>
</tbody>
</table>
The proportion of those using ‘sit-on’ kayaks experiencing health impacts was lower than those using other categories of boats. This may reflect differences in the characteristics of the boat and paddlers, nature of activity or lower levels of exposure as the number of years of participation of this group tended to be relatively low.

Conditions associated with ‘joints and tendons and muscles’ were the most common identified health impact. This accounted for approximately 36.5% of the responses. The categories ‘cuts and abrasions’, ‘bruises’ and ‘cuts and bruises' when combined, accounted for approximately 19% of the responses (see Fig. 2).

![Figure 2. Most Common Injury or Condition Personally Encountered](image-url)
When considering seriousness of health impacts, ‘joints and tendons and muscles’ was seen to be the major issue and was cited by 30% of those who had received injuries or developed medical conditions (Table 6.10).

Table 6.10. The most serious health impact experienced

<table>
<thead>
<tr>
<th>Health impact</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>joints and tendons and muscles</td>
<td>17</td>
</tr>
<tr>
<td>other</td>
<td>6</td>
</tr>
<tr>
<td>bruises</td>
<td>6</td>
</tr>
<tr>
<td>cuts and abrasions</td>
<td>5</td>
</tr>
<tr>
<td>multiple factor</td>
<td>4</td>
</tr>
<tr>
<td>shoulder dislocation</td>
<td>4</td>
</tr>
<tr>
<td>back strain/pain</td>
<td>3</td>
</tr>
<tr>
<td>impact on head</td>
<td>3</td>
</tr>
<tr>
<td>neck injury</td>
<td>3</td>
</tr>
<tr>
<td>surfers ear</td>
<td>2</td>
</tr>
<tr>
<td>ear infection</td>
<td>2</td>
</tr>
<tr>
<td>cuts and bruises</td>
<td>1</td>
</tr>
<tr>
<td>blisters</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57</strong></td>
</tr>
</tbody>
</table>

Due to the small number of cases, there is a need for caution when subdividing data relating to health impacts encountered. Whilst mindful of this, a number of issues are noted that suggest different injury patterns (Table 6.11). Two Fisher’s Exact Tests were performed on this data set: applying the Bonferroni correction, the critical value for significance was assumed as 0.025. A statistically significant higher proportion of those who paddled ‘sea kayaks’, identified problems with ‘joints and tendons and muscles’ as the most common health impact when compared to those who paddled other types of boats as a combined a group (Fisher's Exact Test p=0.011, two sided).
Whilst only a small group, three out of the five people using ‘sit-on’ kayaks identified ‘impact to the head’ as the most common injury; this was not identified by the users of other categories of kayak. This difference in response when compared to the other types of boat as a combined category was statistically significant (Fisher's Exact Test p=0.000, two sided).

Table 6.11. Kayak used/most common health impact experienced crosstabulation

<table>
<thead>
<tr>
<th>Most common health impact experienced</th>
<th>kayak used</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sea kayak</td>
<td>General Purpose</td>
</tr>
<tr>
<td>joints and tendons and muscles</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>cuts and abrasions</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>impact to head</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>back strain/pain</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>bruises</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>blisters</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>ear infection</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>neck injury</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>cuts and bruises</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>multiple factor</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>surfers ear</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>other</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

Differences were observed, according to type of boat used, in relation to what was regarded as the most serious injury or medical condition encountered (Table 6.12). Three Fisher’s Exact tests were performed on this data set: applying the Bonferroni correction, the critical value for significance was assumed as 0.016. A higher proportion of those using ‘playboats’ identified cuts, abrasions and bruises as being the most serious health impact experienced compared to the responses in a combined category of the users of other types of boats (Fisher's Exact Test p=0.043, two sided) however, this difference is not regarded as statistically significant. A statistically significantly higher proportion of those using sea kayaks identified problems with joints and tendons as being the most serious health impact...
experienced (Fisher’s Exact Test p= 0.016, two sided) and a statistically significant higher proportion of those using ‘sit-on’ kayaks identified impacts to the head as being the most serious health impact experienced (Fisher’s Exact Test p= 0.012, two sided).

Table 6.12. Kayak used for main activity/most serious health impact experienced crosstabulation

<table>
<thead>
<tr>
<th>Most serious health impact experienced</th>
<th>Kayak used</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sea kayak</td>
<td>General purpose</td>
</tr>
<tr>
<td>shoulder dislocation</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>joints and tendons</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>cuts and abrasions</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>impact on head</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>back strain/pain</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>bruises</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>blisters</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>ear infection</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>neck injury</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>cuts and bruises</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>multiple factor</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>surfers ear</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>other</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>8</strong></td>
</tr>
</tbody>
</table>

Positive health effects

Ninety-six percent of the respondents (n=166) stated that they thought that there were positive health effects associated with kayaking in the sea. Of these, 46% felt that the benefits were both physical and psychological, as one respondent stated “Good all round exercise…. sharpens your senses and good for the soul!”

Fatalities

Participants were asked to estimate how many fatalities occurred a year in the UK, amongst those paddling kayaks in the sea. Seventy-seven percent of the respondents provided a
realistic answer of between 1-10 fatalities. Thirteen percent thought there were no fatalities and 9% overestimated the number of fatalities.

**Perceived most likely cause of health impacts**

Figure 3. Perceived Most likely Cause of Health Impacts

‘Lifting and carrying’ and ‘impact with rocks and beach’ were identified as the most likely causes of health impacts (Fig 3). These factors accounted for 23% and 22% of the responses respectively.

A significantly higher proportion of those who had been paddling for less than two years reported ‘hit by the kayak’ as being the most likely cause of health impacts compared to those who had paddled for more than two years (Fisher’s Exact Test p=0.001, two sided).
The salience of the factors appears to vary according to participants' perception of their ability (Table 6.13). For example, 'paddling and controlling the kayak' and being 'hit by the kayak' were identified by a number of 'beginner' and 'intermediate' paddlers but not 'experts'. The difference in responses between 'beginners' and 'experts' in relation to 'lifting and carrying' was statistically significant (Fisher's Exact Test $p=0.017$, two sided).

<table>
<thead>
<tr>
<th>Most likely cause of health impacts</th>
<th>Kayaking ability in the sea</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beginner</td>
<td>Intermediate</td>
</tr>
<tr>
<td>other paddlers</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>launching and landing</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>capsize</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>impact with rocks and beach</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>immersion</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>hit by the kayak</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>lifting and carrying</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>paddling and controlling kayak</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>wave impact</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>cold</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>heat</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>other</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>98</td>
</tr>
</tbody>
</table>

Table 6.13: Perceived most likely cause of injuries and conditions/kayaking ability in the sea crosstabulation

The three main activity groups were 'coastal touring', 'recreational paddling' and 'surf'. Within these groups, once again, 'impact with rocks and beach' and 'lifting and carrying' were seen to be main causal categories for health impacts (see Table 6.14). Three Fisher's Exact Tests were performed on this data set: applying the Bonferroni correction, the critical value for significance was assumed as 0.016. A higher proportion of those whose main activity was 'coastal touring' cited 'lifting and carrying' as the most likely cause of health impacts compared to the responses in a combined group representing the other two major categories of activity (Fisher's Exact Test $p=0.027$, two sided); this difference, following the Bonferroni correction, is not regarded as statistically significant. A statistically significant
higher proportion of those whose main activity was ‘expedition’ paddling identified ‘paddling and controlling the kayak’ as the most likely cause of health impacts when compared to responses in a combined category of all the other activities (Fisher’s Exact Test p=0.01, two sided). Three of the four people whose main activity was ‘rock hopping’ identified ‘impacts with rocks and beach’ as the most likely cause of health impacts. Compared to the responses in a combined group of the other activities, the difference in the level of response amongst those involved in ‘rock hopping’ following the Bonferroni correction was not regarded as statistically significant (Fisher’s Exact Test p=0.042, two sided).

Table 6.14. Main kayaking activity/most likely cause of health impacts Crosstabulation

<table>
<thead>
<tr>
<th>Most likely cause of health impacts</th>
<th>Main kayaking activity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expedition</td>
<td>Coastal touring</td>
</tr>
<tr>
<td>other paddlers</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>launching and landing</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>capsize</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>impact with rocks and beach</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>immersion</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>hit by the kayak</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>lifting and carrying</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>paddling and controlling kayak</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>wave impact</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>cold</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>heat</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>other</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>50</td>
</tr>
</tbody>
</table>

The salience of factors appears to vary according to type of boat used (Tables 6.15). Three Fisher’s Exact Tests were performed on this data set: applying the Bonferroni correction, the
critical value for significance was assumed as 0.016. Compared to other categories combined, a statistically significant higher proportion of those using ‘sea kayaks’, identified ‘lifting and carrying’ as being the most likely cause of health impacts (Fisher’s Exact Test p=0.000, two sided). Being ‘hit by the kayak,’ was the most frequently cited causal factor by those using ‘sit-on’ kayaks; the difference in response, compared to a combined category of the other types of boats, was statistically significant (Fisher’s Exact Test p=0.000, two sided). Whilst ‘other paddlers’ was seen to be an issue amongst those using ‘general purpose’ kayaks and ‘playboats’, this category was not identified by those using ‘sea kayaks’, ‘sit-on’ kayaks or ‘surf kayaks’. The proportion of those who used ‘playboats’ who identified ‘other paddlers’ as the most likely cause of health impacts was statistically significantly higher when compared to responses of a combined category of the other types of kayak (Fisher’s Exact Test p=0.002, two sided).

Table 6.15. Kayak used/perceived most likely cause of health impacts crosstabulation

<table>
<thead>
<tr>
<th>Most likely cause of health impacts</th>
<th>Kayak used</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sea kayak</td>
<td>General purpose</td>
<td>Playboat</td>
<td>Sit-on</td>
<td>Surf</td>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>other paddlers</td>
<td>0</td>
<td>5</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>launching and landing</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>4</td>
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<tr>
<td>capsize</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>impact with rocks and beach</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td></td>
<td>37</td>
</tr>
<tr>
<td>immersion</td>
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<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>hit by the kayak</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>lifting and carrying</td>
<td>19</td>
<td>5</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>paddling and controlling kayak</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>wave impact</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>cold</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>heat</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>other</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>37</td>
<td>38</td>
<td>27</td>
<td>13</td>
<td>7</td>
<td></td>
<td>161</td>
</tr>
</tbody>
</table>
Experience of injuries and medical conditions and the perception of causation

Approximately 35% (n=60) of the respondents indicated that they had received injuries or developed medical conditions as a result of kayaking in the sea. ‘Lifting and carrying’ and ‘impact with rocks and beach’ were the most frequently causes by both those who had and those who had not experienced health impacts. Eighteen percent of those experiencing injuries or medical conditions, identified ‘other paddlers’ as the most likely cause of health impacts. This contrasts with 3% of those who had not experienced injuries or medical conditions. This difference is statistically significant (Fisher’s Exact Test p=0.025, two sided).

Perception of the cause of health impacts varied amongst those who had experienced health impacts, according to the type of boat used (see Table 6.16). Amongst those who had experienced injuries or medical conditions, a statistically significant higher proportion of those who used ‘playboats’ identified other paddlers as being the most likely cause of health impacts when compared to a combined category of the other types of boats (Fisher’s Exact Test p=0.008, two sided).

Table 6.16. Experienced health impacts from kayaking in the sea/most likely cause of injuries and conditions/kayak used for main activity crosstabulation

<table>
<thead>
<tr>
<th>Most likely cause of health impacts</th>
<th>kayak used</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sea kayak</td>
<td>General Purpose</td>
<td>Playboat</td>
<td>Sit-on</td>
<td>Surf</td>
<td>Other</td>
</tr>
<tr>
<td>other paddlers</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>launching and landing</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>capsize</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>impact with rocks and beach</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Immersion</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>hit by the kayak</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>lifting and carrying</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>paddling and controlling kayak</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>wave impact</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>cold</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>heat</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>10</td>
<td>17</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>
Discussion

Introduction

The results indicate that a variety of styles of boats are used by paddlers and the boats are used for a range of activities. The duration and frequency of activities varies amongst paddlers. Some activities may be short and intense, whilst other activities may place demands upon individuals similar to those encountered in long distance and endurance kayak events. Respondents varied greatly in terms of their self-reported ability, qualifications and number of years paddling. Those using ‘sit-on’ kayaks and ‘general purpose’ kayaks, tended to report that they were of a lower ability, less qualified and had been paddling for fewer years than those using ‘sea kayaks’ or ‘playboats’.

It appears that a number of these factors influence the direct experience of health impacts, the perception of the nature and likelihood of injuries and medical conditions and associated causes. Differences in the responses between categories of paddlers may be attributable to variation in exposure, demands of activities, demands of particular types of boats and the skill level of paddlers. Differences in injury pattern linked to such variables have also been identified in other studies (Weiss 1991; Fiore and Houston 2001; Schoen and Stano 2002; More et al. 2010; Cooper et al. 2010). This study identified that the type of boat used and the activities engaged with, appear to be key factors accounting for differences in responses in relation to health impacts and cause.
The perception and experience of health impacts

The literature identifies a range of commonly reported injuries and medical conditions. These include muscle pain and sprains, overuse syndromes, lacerations, abrasions and contusions (Kizer 1987; Weiss 1991; Schoen and Stano 2000; Fiore and Houston 2001; Murry and Young 2003; Diafas et al. 2010). The findings of this study broadly supports the literature. However, conditions such as dislocations (Kizer 1987; Weiss 1991; Krupnick et al. 1998; Schoen and Stano 2000; Fiore and Houston 2001) and stomach upsets (Fewterell 1994) which are cited as conditions experienced in river paddling, were not identified as common health impacts amongst those paddling in the sea. Differences in the nature of activities and environmental conditions experienced in the river and sea environment may present different risks. In this study, sunburn was frequently cited as a common health impact. Sunburn has been identified as a health impact by Weiss (1991) and Berglund and McKenzie (1994), however, this issue did not receive much attention in the literature. The majority of studies into health impacts whilst kayaking are based upon river environments, the likelihood of experiencing sunburn may be greater in the sea environment.

Statistically significant differences in response were not noted when comparing perceived most common injury or medical condition amongst the wider kayaking group or most common injury or medical condition personally experienced according to self-reported ability. This finding differs to that of Fiore and Houston (2001) who noted differences in the nature of injury between novice and expert paddlers. Statistically significant differences were not noted in responses according to duration of activities and the number of years
kayaking in the sea. Fiore and Houston (2001) reported that the number of days spent kayaking in a season, were linked to the likelihood of injury.

A statistically significant larger proportion of those paddling 10 or more times a year, compared to those who paddled less than 10 times a year, reported ‘painful or stiff back’ as the most common health impact amongst the wider kayaking group. Statistically significant differences were not noted in relation to the most common injury or medical condition personally experienced according to the frequency of paddling. The difference in response may have been influenced by the requirement to comment on the wider group as opposed to one's own experience and possibly reflects commonly held beliefs about the nature of injuries in kayaking. It is not clear from the data whether exposure has an impact upon the perception or experience of health impacts.

The majority of respondents reported that they had not received injuries or developed medical conditions as a result of kayaking in the sea. This supports the view of Chalmers and Morrison (2003) who proposed that the incidence of injuries in water related sporting and recreational activities was low. Most respondents regarded injuries and medical conditions as uncommon and not serious. This view was also reflected by those who had experienced injuries and medical conditions. Whilst this supports the findings of previous studies that indicate the majority of injuries in kayaking are not serious (Kizer 1987; Krupnick and Cox 1998), positive affective responses to kayaking may be influencing participant’s views of the risks associated with the activity. Losses and potential losses may have been downplayed to enable justification for continued participation.
The most common perceived injury sites appear to be the upper limbs and joints and the back. These findings are consistent with the literature. The head was also frequently cited as a commonly injured part of the body; this tends not to be the case in the broader literature. This may reflect differences in environmental conditions and the type of boat used when comparing the findings of this study with those focusing upon river environments. The back was identified as the most common part of the body injured. Injuries linked to the back may stem from both paddling activities and lifting and carrying (Hagman et al. 2004).

Sixty of the respondents had received injuries or developed medical conditions as result of paddling kayaks in the sea. These health impacts had resulted in 45% of this group having to take time of kayaking. Seven of the respondents indicated that the health impacts had resulted in them taking time off work, college or school. Despite of these outcomes, only four respondents regarded the health impacts as serious. Respondents described action taken in response to injuries and this included the modification of technique. Of those who had experienced health impacts, approximately 37% cited problems with ‘joints tendons and muscles’ and 19% cited ‘cuts, abrasions and bruises’ as being the most common injury or medical conditions. These response patterns are similar to the perception of the most common injury or medical condition amongst the wider group. The mechanism, through which individual experience and the perception of the health impacts affecting the wider group come to be similar, may be an area for further research.

Statistically significant differences were noted in relation to perceived most common injuries and medical conditions and injury sites amongst the wider group according to type
of boat used and activity. This supports the view of Schoen and Stano (2000) that the levels and nature of reported injury are linked to activities and the types of boat paddled. Factors influencing injury can be illustrated by suggesting why only 2% of those using ‘playboats,’ compared to 35% of those using ‘sit-on’ kayaks, identified the ‘head’ as being the most common part of the body injured. This difference could be due to a range of variables including skill level, experience, the use of protective helmets and differences in the dynamics of capsize of a ‘sit-on’ and a closed cockpit boat. Hence, individual characteristics, levels of exposure, boat specific characteristics, norms and practices associated with activities and the specific demands of activities may be intertwined in such a way as to lead to differing experiences and perception of health impacts.

In the UK in 2010 there were seven kayak/canoe fatalities in coastal waters (Young 2011). The majority of the respondents were able to provide a relatively accurate indication of the numbers of fatalities amongst those paddling in the sea environment. Their perception appears to support the view that there are few fatalities amongst those kayaking in the sea (Young 2010).

Most studies of injuries and medical conditions in kayaking tend to focus on negative outcomes. In this study, participants were asked if they thought there were positive health effects associated with kayaking. Ninety-six percent of the respondents gave a positive response to this question and reported both physiological and psychological benefits. The responses may represent and reinforce commitment to the activity and may enable
acceptance of the possibility of injury. At both the individual and societal level, there may be value in evaluating and comparing the health losses and gains associated with the activity.

**Perception of cause of health impacts**

A range of factors were perceived as being the most likely cause of injuries or medical conditions. Differences in response were noted according to the type of boat used, activities undertaken, the number of years paddling and self-reported ability.

‘Lifting and carrying’ and ‘impact with rocks and the beach’ were seen to be the two most likely causal factors of negative health impacts. The profile that lifting and carrying received as a cause of injuries and medical conditions indicates that there could be value in encouraging the adoption of appropriate manual handling techniques and the consideration of injury prevention strategies focusing upon activities both on and off the water.

Differences were noted in perceived cause of health impacts according to the activity undertaken; this may reflect different demands associated with the activities. ‘Paddling and controlling the kayak’ appears to be more of an issue amongst those whose main activity was ‘expedition’, compared to those involved in ‘coastal touring’. It is likely that both groups are using sea kayaks for the activity. The difference could represent the loads carried in the boats. Being ‘hit by the kayak’ was seen to be less likely amongst those undertaking ‘coastal touring’ compared to those involved in the other two main categories of activity (‘recreational paddling’ and ‘surfing’). Exposure to breaking waves and the possibility of
capsize may be higher when engaged in ‘recreational paddling’ or ‘surfing’; this in turn may result in increased likelihood of being hit by one's kayak.

Differences were also noted in relation to the type of boat paddled. ‘Lifting and carrying’ was cited as the most likely cause of injury and medical conditions by almost half of those who used ‘sea kayaks’ for their main activity. This is likely to be a reflection of the size and weight of the boats. Being ‘hit by the kayak’ was more likely to be cited by those using ‘sit-on’ kayaks than those using other types of kayak. This may be indicative of differences in the capsize dynamics of ‘sit-on’ kayaks compared to other styles of boats. A statistically significant difference was noted in the proportion of those using ‘playboats’ citing ‘other paddlers’ as a causal factor, when compared to the responses in a combined group of the users of other types of kayaks. This may be related to whether activities are undertaken individually or in groups and the specific demands of activities.

Fiore and Huston (2001), propose that there are differences in frequency and nature of injuries according to experience. Whilst this study did not find differences in response according to self-reported ability and perceived most likely health impact and direct experience of health impact, differences were noted in relation to self-reported ability and perceived cause. ‘Paddling and controlling the kayak’ was seen to be an issue for those who defined themselves as ‘beginners’ and ‘intermediate’ paddlers but not so for ‘experts’. Whilst those with experience are likely to have developed the skills to appropriately paddle and control their kayak, to admit that this was not the case, may be socially undesirable and this could influence their response.
The differences reported between categories may be a result of interrelated factors. For example, differences were reported in relation to ‘lifting and carrying’ being perceived as a causal factor according to whether respondents defined themselves ‘expert’ or a ‘beginner’ and also according to whether they used a ‘sea kayak’ or ‘sit-on’ kayak. The Results indicate that those who define themselves as ‘experts’ are more likely to paddled ‘sea kayaks’ than those using ‘sit-on’ kayaks; those using ‘sit-on’ kayaks are more likely to define themselves as ‘beginners’. The manual handling requirements of a sea kayak may be different to those required for lifting and carrying a sit-on kayak.

The literature indicates that overuse injuries that are often chronic in nature, are common amongst kayakers. However, in this study, many of the causes were seen to be linked to acute events. It may be the case that the availability heuristics are greater for acute injuries than chronic conditions and this is influencing the perception of causes of health impacts. This in turn, may influence individual prevention strategies with the focus being placed upon immediate as opposed to chronic conditions.

Those who had directly experienced health impacts were more likely to cite ‘other paddlers’ as a cause of injuries and medical conditions than those who had not experienced health impacts as a result of their kayaking in the sea. This suggests that the perception of the significance of the cause of some health impacts may not be fully recognised by paddlers.
Evaluation of the study

When considering causality, the study focused upon health impacts. A health impact could be regarded as an end point of a chain of causality and the result of an incident. It could be argued, that this study focused upon actions directly preceding the loss, as opposed to the factors that led to an incident. The response categories tended to be drawn from the literature linked to injuries and medical conditions. The literature relating to incidents tends to have a different emphasis and focuses on different aspects of the causal chain. Based on this literature, alternative or additional categories such as ‘poor judgement’, ‘lack of skills’, ‘limited knowledge’ and ‘poor environmental conditions’ could have been developed. This may have provided an alternative insight into the perception of causality. There may be value in conducting additional studies to focus upon the cause of incidents, of which health impacts, may be one of a number of outcomes.

The sub-dividing of data according to activity, boat used and those who had encountered health impacts, reduced the number of cases in categories and limited statistical analysis. The significance of differences in response patterns was determined by using the Fisher’s Exact Test. The repeated use of this test increased the likelihood of returning a statistically significant result by chance. In view of this, whilst it is acceptable to assume that there are statistically significant differences between broad categories of variables, caution needs to be taken in relation to assuming differences between individual factors. To reduce the likelihood of type I errors, the statistical significance of differences between individual activities and individual styles of boats was not determined. Typically, where differences were observed between responses categories, an individual category was compared with a
combined category. For example where the ‘head’ was seen to be a commonly injured part of the body amongst those using ‘sit-on’ kayaks, the frequency of response was compared to the responses of the combined group representing all other kayaks. Whilst justifiable in terms of reducing type 1 errors, a number of differences in response may have been masked. For example, in relation to being ‘hit by the kayak’ there was not a statistically significant difference between the category ‘recreational paddling’ and a combined category of the other two main activities; there was a statistically significant difference between ‘recreational paddling’ and ‘coastal touring’. A more in-depth examination of differences in health impacts and causation associated with particular boats and particular activities could be an extension of this exploratory study.

Recall bias may have influenced responses with either recent or personally significant events which are not necessarily representative, coming more easily to mind. Additionally, certain health impacts may be regarded as so regular and minor, they are not reported. The data presented do not provide detailed information on frequency of occurrence or whether injuries and medical conditions are acute or chronic in onset. These issues could be addressed by the use of diaries to record incidents and health impacts.

The literature exploring the health impacts associated with kayaking tends to focus upon physical harm. None of the studies reviewed discussed the psychological aspects of being involved in incidents and the experience of loss. These studies guided the inclusion of items in closed questions. As result of this, the questions may have resulted in responses biased towards physical as opposed to psychological impacts.
Positive affective responses to kayaking may be influencing participants’ views of the risks associated with the activity. Losses and potential losses may be downplayed to enable the justification of continued participation. Furthermore, some who had encountered problems may have left the activity and so serious incidents may be under reported.

The number of years of paddling varied according to activity and boat used. Differences in response between categories may reflect levels of exposure and the age profile of respondents and aspects of the aging process. Additionally, a timeframe was not set when asking participants if they had experienced health impacts. This may have distorted findings; some respondents may have been relating experiences over a very long paddling career, whilst others, new to the activity, may be commented on recent occurrences.

Type of boat and type of activity were variables considered. A further variable that could have been evaluated was the nature of the environments entered. The nature and prevalence of injuries encountered paddling close to the coast may be different to those paddling out at sea. The significance of causal factors and resulting risk mitigation strategies may also vary according to environment.

It is not possible to accurately determine the size of the population kayaking in the sea, therefore there is need for caution when considering the representativeness of the sample. This may have been further compromised by a sampling bias. Sampling tended to be at weekends and holiday periods, therefore, people who paddle during the working week may be under represented. The distribution of questionnaires at a sea kayak symposium may
have resulted in the over inclusion of experienced and committed sea kayak paddlers. Furthermore, asking participants to pass questionnaires to colleagues would have resulted in over representation from groups with social networks. This weakness could have been limited by allowing for only one referral from an initial contact. The use of snowball sampling combined with the difficulty associated with contacting respondents who may as a part of a holiday, only have been in the locality for a short time, resulted in ‘non responders’ not being followed up. This is recognised as a potential sampling bias.

Respondents could be using a range of boats and engaging in a variety of activities in the sea and other environments. Wider kayaking activities may influence experience and perception of injuries and medical conditions and associated cause, in the sea environment.

There may be a tendency for respondents to down play causal factors that indicate limited personal ability and so attribute cause to external factors. Given this, independent analysis of incidents may provide additional information that could provide an insight into causality.

Whilst the study considers the perception of cause, it does not investigate strategies adopted to manage risk. These risk management strategies may influence the experience of risk and in turn the perception of the most likely cause of injuries and health impacts.

The interaction of variables makes it difficult to determine the nature of causal relationships. For example, there is a link between activity, type of boat, experience and
qualifications and so it is difficult to tease out the relative contribution of factors to the perception of health impacts and their cause.

**Conclusion**

Whilst the majority of respondents indicated that they had not received injuries or developed medical conditions as a result of kayaking in the sea, those health impacts identified, reflect the findings of research focusing upon other aspects of kayaking. Most respondents regarded injuries and medical conditions as uncommon and not serious and reported positive health effects from kayaking. The type of boat used and the activities undertaken appeared to be factors associated with differences in response in relation to health impacts personally experienced, the perception of health impacts affecting the wider kayaking group and perceptions of the causes of health impacts.

Within the sample, there were a range of commonly perceived causal factors resulting in injuries and medical conditions. There were also statistically significant differences in perception according to the type of boat used, activity undertaken, experience and direct encounters with health impacts. A range of factors associated with being on the water were regarded as causes of injuries and medical conditions, however, in addition, lifting and carrying (which often takes place before and after paddling) was cited as a key cause of health impacts.

Even though there may be common demands placed upon paddlers using a variety of boats and participating in differing activities, it cannot be assumed that they are a homogenous
group. People who kayak in the sea differ in terms of age, activity, boat use, experience, skill level, duration and frequency of participation, and environments encountered. The significance and nature of injuries and medical conditions and the associated causal factors may vary according to these characteristics.

Further in-depth analysis of differences between groups in relation to their experience and perception of the nature and cause of injuries and medical conditions, combined with epidemiological studies exploring the nature and frequency of health impacts, may identify issues that could inform prevention strategies. It is proposed that the recognition that there is variation between those who kayak in the sea, combined with the utilisation of the experience of those undertaking the activity, and evidence from studies into injury patterns can support the development of appropriately targeted and relevant injury prevention campaigns.

This study indicates that amongst those using kayaks in the sea, there are differences in the experience and views relating to the nature, occurrence and cause of health impacts associated with the activity. The qualitative phase of the research, as outlined in Chapter 10, explores possible reasons for these differences and the implications for the promotion of safety. Issues identified in this quantitative study are utilised in the development of themes to guide interviews.
Chapter 7

Investigation into Safety Practices Amongst Those Paddling Kayaks in the Sea

Introduction

A range of organisations, individuals and groups have developed safety guidance for those kayaking in the sea. This guidance is often based upon the analysis of incidents and the experience of paddlers and reflects current thinking in relation to best practice. The guidance tends to focus upon the need for appropriate skills and knowledge, the matching of skills and knowledge against the demands of activities, activity planning, rescue skills, group support, the assessment of environmental conditions, the wearing of safety equipment and the carrying of equipment to aid the management of incidents. In some cases the guidance is generic, in other instance it differentiates between activities and environments and abilities of participants.

The RNLI (2012) distinguishes between the safety practices associated with different activities in different conditions. They have also identified that there is variation in the level of training and equipment carried by those undertaking activities in the sea. In the UK, unlike countries such as United States of America and Canada, the utilisation of safety equipment such as a personal flotation device, a throw line, bailing equipment and sound signalling device is discretionary. Thus in many cases, safety behaviour is very much linked to personal decision making. At present there does not seem to be literature focusing upon the safety practices and activity planning amongst those kayaking in the sea. The
identification of this behaviour may provide a picture of current practice, variation between groups and indicate issues that may require attention as part of incident prevention strategies.

**Aim**

This study aims to identify, amongst those paddling kayaks in the sea, the information utilised as part of activity planning, safety practices and the safety equipment carried.

To achieve this aim the following objectives were set:

- Develop and pilot a questionnaire designed to gather data relating to the:
  - factors considered when planning activities
  - safety equipment carried or worn
  - the nature of activities
- Develop a sampling method and recruit potential respondents
- Administer the questionnaire
- Observe the level of use of personal flotation devices and helmets
- Analyse data and determine the nature of and variation in response and observed behaviour
- Evaluate findings in relation to the published literature

As was the case with the first quantitative study, the results of this study were fed into the qualitative phase of the research. As described in Chapter 10, individuals who had experience of paddling kayaks in the sea were invited to provide, based upon their knowledge, beliefs and experience, an insight into the findings.
Methodology

A questionnaire was developed to investigate respondents reported behaviour in relation to their safety practices and activity planning (see Appendix II). This quantitative study was designed to provide information on how many people performed particular actions and carried particular items of equipment. A more in-depth evaluation of the rationale behind these practices was to be undertaken at a later date and as part of the qualitative phase of the research. In general, the format of the questionnaire and the sampling strategy followed the approaches previously described in the perception of health impact and causation study. As in the previous study, the majority of questions were closed and participants were required to indicate which one of a number of response options was most applicable. An open question was asked which requested those who had been involved in an incident that required the calling of emergency services, to describe that incident.

As indicated in the review of literature, aspects of safety guidance vary according to type of activity and boat used. The health impact and causation study also highlighted that there were differences in the perception of health impacts and cause according to activity and boat. The study also pointed to differences in response according to the characteristics of respondents. Given this, the safety practices questionnaire required respondents to indicate the type of boat they used, the nature and frequency of activities, the environment they mainly paddled in, qualifications held, training undertaken, club and association affiliation and self assessed ability. The thinking behind this was linked to the view that knowledge, beliefs and attitudes associated with these factors may influence behavioural intentions (Azjen 2012). Based upon current safety guidance drawn from governing bodies, sea
kayaking literature and water safety groups in the UK, North America, Australia and New Zealand, a range of questions were developed to determine respondent’s reported safety behaviour, these focused upon:

- safety equipment carried
- safety equipment worn
- environmental conditions considered when planning activities
- whether paddling was an individual activity or occurred in groups
- notifying others of trip plans

In addition to these questions, respondents were asked to comment on how likely they thought it was that they would need their safety equipment and if they had been involved in incidents that required assistance from rescue services. The questionnaire took approximately 10 to 15 minutes to complete.

As the format of the questionnaire had been piloted in the previous study, the pilot of this study focused more upon the comprehension of questions. The questionnaire was piloted using four participants. One of the respondents in the pilot phase paddled both sea kayaks and playboats and was also an inshore lifeboat man. A further participant paddled a sea kayak and had been involved in an incident that required the support of rescue services. The third respondent paddled a sit-on kayak. The final respondent mainly paddled on rivers and occasionally used a general-purpose boat in the sea. No alterations were made to the questionnaire following the pilot phase.
As discussed in the study into health impacts and cause, population parameters for those kayaking in the sea are not clear. As in the previous study, the key elements of the sampling strategy were non-probabilistic sampling which was purposive in nature and recruited participants through location and chain referral/snowball sampling. Once again Pembrokeshire was used as the study location and questionnaire distribution took place over a one-year period predominantly at weekends and during school holidays. Unlike the initial study, questionnaires were not distributed at the Anglesey Sea Kayaking Symposium.

Social desirability in responses was seen to be a potential bias in this study. Krosnick and Presser (2010), state that the need to provide one's name can increase the effect of social desirability. For this reason, subjects were not asked to sign a consent form and consent was inferred by completion of the questionnaire. To limit the impact of social desirability, it was explained to respondents that there was not necessarily a correct answer and that practices were likely to vary according to type of boat, activity and environments entered.

Potential participants were usually approached individually and in person when they were seen with a kayak. They were offered questionnaires with accompanying freepost envelopes and invited to take additional copies for colleagues who paddled in the sea. Administration of the questionnaires was based upon informed consent. Potential interviewees were informed that the questionnaire focused upon safety practices, the questionnaire was anonymous and they had the right to withdraw at any time. Once again, it was emphasised that the study was being undertaken by an active kayaker who paddled in the locality. Three hundred and seventy questionnaires were distributed. Distribution of questionnaires
stopped when saturation was seen to occur and potential participants started to indicate that they had been approached the previous year. Contact details were not obtained from potential respondents; furthermore, it was anticipated that a number of people approached were visitors to the area; consequently, non-responders were not followed up. This may have introduced a sampling bias.

As a means of triangulating findings of reported behaviour, a second aspect of the study involved the determination of the levels of those wearing helmets and personal flotation devices (PFD) in naturally occurring situations via direct observation (Wilkinson 2000). Paddling activity in the locality was observed either from the shore or from a kayak at sea. The type of boat used and whether PFDs and helmets were worn or carried was noted on an observation record sheet. There was no interaction between the observer and the observed. Observations were undertaken around the coast of Pembrokeshire during weekends and holiday periods over a one year period. A total of 357 paddlers were observed.

Analysis of data was performed using SPSS version 19. The Fisher’s Exact Test was utilized as a test for independence between categorical variables. To reduce the likelihood of type one errors, a Bonferroni correction was applied in cases where multiple tests were performed on data sets (Field 2005).
Results

Introduction

Three hundred and seventy questionnaires were distributed at launch sites, of these 154 were returned. Four questionnaires were excluded; one questionnaire had been submitted by a respondent under the age of 16, a substantial number of questions had not been completed in three questionnaires. In a number of cases, respondents omitted to answer questions; this resulted in a number of missing values. Consequently, frequencies in tables do not always equal the sample size.

Respondents were asked to indicate, both the type of boat they used and the nature of their activities. In relation to activities, one of the response categories provided was ‘recreational paddling’. This response category was subsequently perceived to be too broad as it could include all non-competitive paddling. For this reason, the category of activity was not considered as a factor in the analysis of data. In hindsight, it would have been a long more appropriate to determine participants’ activity through the use of an open question. Those reporting paddling ‘sea kayaks’, ‘general purpose’(gp) kayaks, ‘playboats’ and ‘sit-on kayaks’ for their main activity in the sea, accounted for 90% of the respondents. Given this, analysis of data according to boat type, tends to focus upon these four main groups.

Paddling activity and environments entered

The frequency of paddling varied amongst respondents. The most common frequency of paddling indicated was 1 to 5 times a year; this accounted for 28% of the responses. Approximately 67% of the respondents reported paddling between 1-20 times a year. Ten percent of the respondents reported that they paddled over 50 times a year. It would
appear that some respondents are engaged in paddling numerous times a week. The proportion of those using ‘sea kayaks’ and ‘playboats’ who reported paddling more than 50 times a year, was greater than those using ‘sit-on’ kayaks and ‘general purpose’ kayaks. Approximately 31% of respondents reported paddling during the winter months (Fig. 4). The time of year paddling activities took place, varied according to the type of boat used. Compared to respondents from a combined category of ‘playboat’, ‘sea kayak’ and ‘general purpose’ kayak paddlers, a statistically significant smaller proportion of those who used ‘sit-on’ kayaks reported paddling during the winter (Fisher’s Exact Test p=0.000, two sided).

Fig 4: Kayak used for main activity/winter paddling crosstabulation

Respondents were asked to indicate where most of their kayaking took place. Variation was noted in relation to the type of boat that was used for respondents’ main activity. Those using ‘playboats’, were the only category where rivers were identified as the main paddling environment. Those using ‘sea kayaks’, ‘general purpose’ kayaks and ‘sit-on’ kayaks mainly paddled in the sea. The difference in response between those using ‘sea kayaks’, ‘general
purpose’ kayaks and ‘sit-on’ kayaks as a combined group, compared with those using ‘playboats’, was statistically significant (Fisher’s Exact Test $p=0.000$, two sided).

The type of conditions respondents reported paddling in varied (Table 7.1). Those using ‘sit-on’ kayaks did not indicate that they paddled in ‘demanding’ conditions. In addition to this, compared to ‘sea kayaks’, ‘playboats’ and ‘general purpose’ kayaks as a combined group, a statistically significant higher proportion of those using ‘sit-on’ kayaks, reported paddling in ‘straight forward’ conditions (Fisher’s Exact Test $p=0.000$, two sided).

Table 7.1. Kayak used for main activity/paddling conditions crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Paddling conditions</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Straight forward</td>
<td>Intermediate</td>
<td>Demanding</td>
<td></td>
</tr>
<tr>
<td>Sea kayak</td>
<td>10</td>
<td>19</td>
<td>8</td>
<td>37</td>
</tr>
<tr>
<td>General purpose</td>
<td>13</td>
<td>17</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Playboat</td>
<td>3</td>
<td>13</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>Sit-on</td>
<td>22</td>
<td>10</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>Surf</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Touring</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>62</td>
<td>23</td>
<td>139</td>
</tr>
</tbody>
</table>

The majority of respondents (n=135) indicated that they mainly paddled with other people; 13 respondents (9%) said that they mainly paddled on their own, 47 (31%) reported paddling with one other person and 88 respondents (59%) paddled in groups of three or more.

When asked where activities took place in relation to land, ‘an easy swim’ was the most frequently indicated response category (Table 7.2). A statistically significant higher
proportion of those using 'sea kayaks' reported that their activities took place 'probably further than they could swim' from land compared to the respondents in a combined category of 'playboat', 'general purpose' kayak and 'sit-on kayak' (Fisher's Exact Test \( p=0.000 \), two sided).

**Table 7.2. Kayak used for main activity/distance to land crosstabulation**

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Distance to land</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea kayak</td>
<td>easy wade 2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>easy swim 6</td>
<td></td>
</tr>
<tr>
<td>General purpose</td>
<td>hard swim 16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>probably further than can swim 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 39</td>
<td></td>
</tr>
<tr>
<td>Playboat</td>
<td>easy wade 4</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>easy swim 23</td>
<td></td>
</tr>
<tr>
<td>Surf</td>
<td>hard swim 1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>probably further than can swim 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>69</td>
</tr>
</tbody>
</table>

**Paddler characteristics**

There was variation in reported membership of kayak clubs and associations according to the type of boat used (Table 7.3). Whilst the majority of those using ‘sea kayaks’ and ‘general-purpose’ kayaks and all those paddling ‘playboats’, had or were members of kayak clubs or associations, none of those using ‘sit-on’ kayaks reported past or present membership. When combining ‘sea kayaks’, ‘general purpose kayaks’ and ‘playboats’ and comparing that category with ‘sit-on’ kayaks, a statistically significant difference was observed in relation to membership (Fisher’s Exact Test \( p=0.000 \), two sided).
Table 7.3. Club or association membership/kayak used for main activity crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Club or association membership</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>member</td>
<td>not a member</td>
</tr>
<tr>
<td>Sea kayak</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>General purpose</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>Playboat</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Sit-on</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Surf</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Touring</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>53</td>
</tr>
</tbody>
</table>

Self rated ability was seen to vary across categories (Table 7.4). Two Fisher’s Exact Tests were performed on this data set: applying the Bonferroni correction, the critical value for significance was assumed as 0.025. A statistically significantly higher proportion of those using ‘sit-on’ kayaks defined themselves as ‘beginners’ compared to a combined category of ‘playboats’, ‘sea kayaks’ and ‘general-purpose’ kayaks (Fisher’s Exact Test $p=0.002$, 2 sided). A higher proportion of those using ‘sea kayaks’, defined themselves as ‘experts’ compared to those using ‘sit-on’ and ‘general purpose’ Kayaks; following the application of the Bonferroni correction, this difference was not seen to be statistically significant (Fisher’s Exact Test $p=0.041$, two sided).

Table 7.4. Kayak used for main activity/ kayaking ability crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Kayaking ability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beginner</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Sea kayak</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>General purpose</td>
<td>7</td>
<td>27</td>
</tr>
<tr>
<td>Playboat</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Sit-on</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Surf</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Touring</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>89</td>
</tr>
</tbody>
</table>
**Qualifications and training**

Approximately forty-seven percent of respondents did not hold kayak qualifications. The percentage of respondents not holding qualifications, varied according to the type of boat used (Table 7.5). Eighty-eight percent of those using ‘sit-on’ kayaks did not hold qualifications, this compared with 45% for ‘general purpose’ kayak paddlers, 36% for ‘sea kayak’ paddlers and 17% for ‘playboat’ paddlers. When combining the responses of those using ‘playboats’, ‘sea kayaks’ and ‘general purpose’ kayaks, and comparing them with the responses of those using ‘sit-on’ kayaks, a statistically significant difference was noted (Fisher's Exact Test p=0.000, two sided).

The holding of qualifications was seen to be associated with whether or not respondents had or were members of kayak clubs or associations. Twenty-three percent of those who had been or were members of clubs, did not hold qualifications. This contrasts with eighty-nine percent of those who were not or had not been members of clubs or associations not holding qualifications; this difference between categories was statistically significant (Fisher’s Exact Test p=0.000, two sided).

**Table 7.5.** Kayak used for main activity/holding of kayaking qualifications crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Holds qualifications</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Sea kayak</td>
<td>15</td>
<td>26</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>General purpose</td>
<td>17</td>
<td>20</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Playboat</td>
<td>4</td>
<td>19</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Sit on</td>
<td>30</td>
<td>4</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Surf</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Touring</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>77</td>
<td>147</td>
<td></td>
</tr>
</tbody>
</table>
Compared to respondents paddling other types of boats, those paddling ‘sit-on’ kayaks reported lower levels of having attended training (Table 7.6). When combining the responses of those using ‘playboats’, ‘sea kayaks’ and ‘general purpose’ kayaks and comparing them with the responses of those using ‘sit-on’ kayaks, a statistically significant difference was noted (Fisher’s Exact Test \( p=0.003 \), two sided). Those paddling ‘sea kayaks’, reported the highest level of undertaking training.

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Attended training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Sea kayak</td>
<td>27</td>
</tr>
<tr>
<td>General purpose</td>
<td>17</td>
</tr>
<tr>
<td>Playboat</td>
<td>12</td>
</tr>
<tr>
<td>Sit-on</td>
<td>9</td>
</tr>
<tr>
<td>Surf</td>
<td>5</td>
</tr>
<tr>
<td>Touring</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
</tr>
</tbody>
</table>

**Self rescue**

The majority of respondents using ‘sea kayaks’, ‘general purpose’ kayaks, ‘playboats’ and ‘surf’ kayaks, reported that they could roll a kayak in sea conditions. All but one of the respondents who paddled ‘playboats,’ reported being able to roll a kayak. The reported ability to roll a kayak in sea conditions was statistically significantly higher amongst those using ‘playboats’, than amongst a combined group of those using ‘sea kayaks’, ‘general purpose’ and ‘sit-on’ kayaks (Fisher’s Exact Test \( p=0.000 \), two sided). Fourteen of the 146 who responded to the question, said that they were unable to perform a self rescue. Of those who could not perform a self rescue, none reported that they ‘mainly paddle on their
The majority of respondents did not carry paddle floats. Of the five people who carried paddle floats, four paddled ‘sea kayaks’ and one paddled a ‘sit-on’ kayak.

Responses indicated that the majority of kayaks were either designed with inherent buoyancy such as bulkheads or a double skin, or had air bags fitted. Seven respondents, whose boats would not typically have bulkheads or double skin construction, did not report having air bags fitted.

**Activity planning**

A number of response options for activity planning were presented. Each response option was coded as a separate question; however, to limit the occurrence of type 1 errors, the responses are treated as one data set and a Bonferroni correction applied. The Fisher’s Exact Test was performed three times on the data, hence, the critical value for significance is assumed to be 0.0166. The majority of respondents reported that they checked forecasts for ‘wind direction and/or force’ (87%), ‘high and low tide’ (87%) and ‘wave conditions’ (85%). Over 80% of the respondents indicated that they did not check nautical charts and pilots. Nineteen of the 41 respondents using ‘sea kayaks’, reported using ‘nautical charts and pilots’ (Table 7.7). This was a substantially higher proportion when compared with responses from a combined category of ‘sit-on’ kayaks, ‘playboats’ and ‘general purpose’ kayaks. This difference was statistically significant (Fisher’s Exact Test $p=0.001$, two sided).
Table 7.7. Kayak used for main activity/check charts and pilots crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Check charts and pilots</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Sea kayak</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>General purpose</td>
<td>4</td>
<td>33</td>
</tr>
<tr>
<td>Playboat</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Sit-on</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Surf</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Touring</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>121</td>
</tr>
</tbody>
</table>

A similar finding was found in relation to the ‘checking of positions of tidal streams’ (Table 7.8). Whilst 45% of the total number of respondents said that they ‘checked the position of tidal streams’, 75% of those using ‘sea kayaks’ reported that they undertook this activity. The difference in response between those using ‘sea kayaks’ and other 3 main categories of boat combined, was statistically significant (Fisher's Exact Test p=0.000, two sided). A minority of respondents reported that they usually check the ‘positions of tidal races and/or overfalls’ (38%). The determination of such information varied according to type of boat used; 63% of those using ‘sea kayaks’ reported checking on the position of these features. This contrasts with 13% of those using ‘sit-on’ kayaks. The difference in responses was statistically significant when comparing ‘sea kayaks’ with a combined category of ‘sit-on’ kayaks and ‘playboats’ and ‘general purpose’ kayaks (Fisher's Exact Test p=0.000, two sided). Over 70% of the respondents checked visibility and over 70% did not check water temperature. There were no statistically significant differences between categories of boats in relation to these two factors.
Table 7.8. Kayak used for main activity/check position of tidal streams crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Check position of tidal streams</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
</tr>
<tr>
<td>Sea kayak</td>
<td>31</td>
<td>10</td>
<td>41</td>
</tr>
<tr>
<td>General purpose</td>
<td>12</td>
<td>25</td>
<td>37</td>
</tr>
<tr>
<td>Playboat</td>
<td>8</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Sit on</td>
<td>9</td>
<td>25</td>
<td>34</td>
</tr>
<tr>
<td>Surf</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Touring</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>80</td>
<td>147</td>
</tr>
</tbody>
</table>

**Equipment Carried**

The frequency of carrying particular types of equipment varied amongst respondents. Whilst each item of equipment was coded as an individual question, to err on the side of caution, equipment according to type of boat was regarded as a single data set. Given this, as the Fisher’s Exact Test was applied 11 times, following the Bonferroni correction, the critical value for significance was assumed as 0.0045.

Over 70% of the respondents reported that they did not carry a compass. When analysing these data according to type of boat used, it was seen that 65% of those using ‘sea kayaks’ and none of those using ‘playboats’ reported that they carried a compass. Compared with other three main categories of boats combined, a statistically higher proportion of those using ‘sea kayak’ reported carrying a compass (Fisher’s Exact Test $p=0.000$, two sided). Approximately 94% of the respondents stated that they did not carry GPS equipment. Of the nine people who carried GPS, eight paddled ‘sea kayaks’.
The carrying of a repair kit varied according to type of kayak. The carrying of a repair kit was higher amongst those using ‘sea kayaks’ for their main activities. Over 50% of this category of respondent carried repair kits. This difference is statistically significant when comparing ‘sea kayaks’ with a combined category of ‘sit-on’ kayaks, ‘playboats’ and ‘general purpose’ kayaks (Fisher’s Exact Test $p=0.000$, two sided).

Fifty-eight percent of the respondents reported carrying tow lines. The reported carrying of tow lines was higher amongst those using ‘sea kayaks’ for their main activity (over 80%). Compared with the responses from a combined category of ‘playboats’, ‘general purpose’ kayaks, and ‘sit-on’ kayaks, this difference is statistically significant (Fisher’s Exact Test $p=0.001$, two sided).

Thirty-two percent of the respondents reported carrying throw bags. Twelve percent of those using ‘sit-on’ kayaks carried a throw bag, this compared with 46% of those using ‘sea kayaks’. A smaller proportion of those using ‘sit-on kayaks’ reported carrying throw bags, when compared to the responses of those from a combined category of ‘sea kayaks’, ‘playboats’ and ‘general purpose’ kayaks (Fisher’s Exact Test $p=0.009$, two sided), following the Bonferroni correction, this difference is not regarded as statistically significant.

Respondents were asked to indicate whether they carried equipment for signalling or communication in case of an emergency. Just over half of the respondents reported carrying a whistle. Seventy-two of the 150 respondents carried mobile phones. Of this group, 13 also carried VHF radios. One respondent carried a VHF radio but not a mobile phone. Eleven of
those carrying VHF radios paddled ‘sea kayaks’. A statistically significant higher proportion of those using ‘sea kayaks’ carried mobile phones and VHF radios compared to the users of the 3 other main categories of boats combined (Fisher’s Exact Test $p=0.000$, two sided).

The majority of respondents reported that they did not carry ‘flares or signal smoke’. Approximately 24% of the respondents indicated that they carried ‘flares or signal smoke’. The frequency of carrying such equipment varied according to type of boat used. For example, over 54% of those using ‘sea kayaks’ and 32% of those using ‘general purpose’ kayaks reported that they carried flares or smoke signals; none of the respondents using ‘sit-on’ kayaks or ‘playboats’ reported carrying this equipment. The percentage of respondents reporting carrying ‘flares or signal smoke’ also varied according to the type of conditions activities took place in. Fifty-three percent of those reporting paddling in ‘demanding’ conditions, 28% of those paddling in ‘intermediate’ conditions and 11% of those reporting paddling in ‘straight forward’ conditions stated that they carried ‘flares or signal smoke’.

Distance paddled from land also appeared to be associated with the carrying of ‘flares and signal smoke’. Eleven percent of those who paddled either an ‘easy wade’ or an easy swim’ from land carried this equipment; 40% of those who paddled either ‘a hard swim’ or ‘probably further than they could swim’ away from land carried equipment. The proportion of those who carried ‘flares or signal smoke’ was significantly higher amongst those who paddled ‘probably further than they could swim’ from land, compared to the responses’ in a combined category covering those who paddled their kayak an ‘easy wade’, an ‘easy swim’ or ‘a hard swim’ to land (Fisher’s Exact Test $p=0.000$, two sided). Thirty-one of the 79 with qualifications carried ‘flares or smoke’; 5 of the 71 without qualifications carried ‘flares or
This difference is statistically significant (Fisher’s Exact Test \( p=0.000 \), two sided). The proportion of paddlers carrying ‘flares or signal smoke varies’ according to reported ability. Eleven percent of ‘beginners’, 21% of ‘intermediate’ and 50% of ‘experts’ stated that they carried ‘flares or smoke’.

The carrying of flares or signal smoke varied according to a number of factors. The reported carrying of this equipment was higher amongst respondents;

- undertaking activities further from land
- reporting entering more demanding conditions
- with higher self reported ability
- holding qualifications
- paddling ‘sea kayaks’

Sixty of the 150 respondents reported carrying first aid kits (Table 7.9). The proportion of respondents who carried first aid kits amongst those who paddled ‘sea kayaks’, was statistically higher than in a combined category of those who paddled ‘playboats’, ‘general purpose’ kayaks and ‘sit-on’ kayaks (Fisher’s Exact Test \( p=0.000 \), two sided). Proportionately less respondents who paddled ‘sit-on’ kayaks carried first aid kits when compared with respondents in a combined category of ‘sea kayaks’, ‘general purpose’ kayaks and ‘playboats’. This difference was statistically significant (Fisher’s Exact Test \( p=0.000 \), two sided).
### Table 7.9. Kayak used for main activity /First aid kit crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>First aid kit</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Sea kayak</td>
<td>29</td>
<td>12</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>General purpose</td>
<td>16</td>
<td>21</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Playboat</td>
<td>7</td>
<td>16</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Sit-on</td>
<td>2</td>
<td>32</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Surf</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Touring</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>89</td>
<td>147</td>
<td></td>
</tr>
</tbody>
</table>

Whilst the majority of respondents did not carry spare paddles, there was variation according to the type of boat used. Twenty four percent of those using ‘general purpose’ kayaks and 61% of those using ‘sea kayaks’, reported carrying spare paddles. No respondents using ‘sit-on’ kayaks or ‘playboats’ reported carrying spare paddles.

Thirty-one respondents reported carrying emergency shelters. Forty-one percent of those using ‘sea kayaks’, 21% using ‘general purpose’ kayaks and 17% using ‘playboats’ reported carrying emergency shelters. A statistically significant difference in the reported carrying of emergency shelters was observed when comparing those using ‘sea kayaks’ with a combined category of those using ‘playboats’, ‘general purpose’ and ‘sit-on’ Kayaks (Fisher’s Exact Test p=0.000, two sided). No respondent using a ‘sit-on’ kayak’ reported carrying an emergency shelter. The reported carrying of emergency shelters was not statistically significantly higher amongst those respondents who reported kayaking during the winter (Fisher's Exact Test p=0.01, two sided).
‘Sit-on’ kayaks are typically designed to be self draining therefore the carrying of bailing equipment would not be expected. Seventy-nine percent of those using ‘sea kayaks’, 16% of those using ‘general purpose’ kayaks and none of those using ‘playboats’, reported carrying bailing equipment. The difference between those using ‘sea kayaks’ and those using ‘general purpose’ or ‘playboats’ is statistically significant (Fishers Exact Test p=0.000, 2 sided).

The proportion of respondents who stated they carried ‘spare clothes’ and ‘food and drink’ was higher amongst those paddling ‘sea kayaks’, compared to the responses of those in a combined category of ‘playboats’, ‘general purpose’ kayaks and ‘sit-on’ kayaks. These differences were statistically significant (Fisher Exact Test p=0.000, 2 sided).

The majority of respondents (79%) reported that it would be either ‘unlikely’ or ‘very unlikely’ that they would need their safety equipment. The perceived likelihood of needing safety equipment varied according to the conditions respondents reported paddling in. A statistically significant smaller proportion of those who said they paddled in ‘straight forward’ conditions, reported that they thought it was ‘likely’ or ‘very likely’ they would need their safety equipment when compared to those paddling in either ‘intermediate’ or ‘demanding’ conditions (Fisher’s Exact Test p=0.015, two sided). Approximately 71% of the respondents stated that they left details of their plans with someone on the shore. With regards to leaving information of plans, there does not appear to be statistically significant differences according to boat type, experience, distance of activities from shore or how demanding are the conditions.
**The wearing of safety equipment**

As was the case with the carrying of safety equipment, whilst each item of safety equipment worn was coded as an individual question, to err on the side of caution, equipment according to type of boat was regarded as a single data set. Given this, as the Fisher’s Exact Test was applied 2 times, following the Bonferroni correction, the critical value for significance was assumed as 0.025.

Only two of the respondents reported that they did not wear personal flotiation devices; one used a ‘sit-on’ kayak the other a ‘surf’ kayak. Two respondents reported that they did not wear equipment such as a ‘dry suit’, ‘wetsuit’ or ‘cag or other wind proof jacket’.

The majority (67%) of the respondents reported that they wore helmets (Table 7.10). Over ninety-five percent of those paddling ‘playboats’ and approximately 81% of those using ‘general purpose’ kayaks reported wearing helmets. The reported wearing of helmets was higher amongst those using ‘playboats’ and ‘general purpose’ kayaks, compared to those using ‘sit-on’ kayaks (39%) and ‘sea kayaks’ (56%). The difference between the responses of those using ‘playboats’ and the responses of a combined group of those using ‘sit-on’ kayaks ‘sea kayaks’ and ‘general purpose’ kayaks is statistically significant (Fisher’s Exact Test p=0.001, two sided). A statistically significant smaller proportion of those using ‘sit-on’ kayaks reported wearing helmets compared with those in a combined category of ‘playboats’, ‘sea kayaks’ and ‘general purpose’ kayaks (Fisher’s Exact Test p=0.002, two sided).
Table 7.10. Kayak used for main activity/do you wear a helmet crosstabulation

<table>
<thead>
<tr>
<th>Kayak used for main activity</th>
<th>Do you wear a helmet</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Sea kayak</td>
<td>23</td>
<td>18</td>
<td>41</td>
</tr>
<tr>
<td>General purpose</td>
<td>30</td>
<td>7</td>
<td>37</td>
</tr>
<tr>
<td>Playboat</td>
<td>22</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Sit-on</td>
<td>13</td>
<td>20</td>
<td>33</td>
</tr>
<tr>
<td>Surf</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Touring</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>48</td>
<td>146</td>
</tr>
</tbody>
</table>

**Observation of personal flotation device (PFD) and helmet usage**

Over a period of one year, 357 paddlers were observed undertaking activities in the sea (Table 7.11). Ninety-three percent of those observed wore a PFD. The proportion of those using sit-on kayaks observed wearing a personal flotation device was lower than that observed amongst the users of other categories of boats. This difference was statistically significant when comparing sit-on kayaks with sea kayaks, playboats and general purpose kayaks as a combined category (Fisher's Exact Test $p=0.000$, two sided).

A statistically significantly higher proportion of those using playboats wore helmets compared to a combined group of those using sea kayaks, sit-on kayaks and general purpose kayaks (Fisher’s Exact Test $p=0.000$, two sided).
Table 7.11. Personal flotation device and helmet usage according to type of kayak

<table>
<thead>
<tr>
<th>Kayak</th>
<th>Total Number observed</th>
<th>Number observed wearing PFD</th>
<th>Number observed wearing Helmet</th>
</tr>
</thead>
<tbody>
<tr>
<td>General purpose</td>
<td>134</td>
<td>131</td>
<td>65</td>
</tr>
<tr>
<td>Sit-on</td>
<td>97</td>
<td>78</td>
<td>21</td>
</tr>
<tr>
<td>Playboat</td>
<td>66</td>
<td>63</td>
<td>53</td>
</tr>
<tr>
<td>Sea kayak</td>
<td>56</td>
<td>56</td>
<td>18</td>
</tr>
<tr>
<td>Surf kayak</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>357</td>
<td>332</td>
<td>159</td>
</tr>
</tbody>
</table>

Calls to emergency services

Seven cases of emergency services being called in relation to kayaking activities were reported. Two of these cases were false alarm calls from the public. Members of the public had assumed that the paddlers were encountering difficulties when in fact they were deliberately engaged in activities. One precautionary call had been made to the emergency services when a paddler decided to leave the main group and contact was lost with them. The emergency services were not required or dispatched. In one case, a member of a group suffered a fatal heart attack and the police, Coastguard and lifeboat services were dispatched. In one case a paddler became disorientated and was towed to shore by other members of the group. An ambulance was called to provide assistance. One experienced paddler reported that the emergency services had been called a few times during their 30 years of activity. This tended to occur when members of a group had become fatigued. They reported that now they only paddle with people they know very well. Details of the incident were not provided by one respondent.
**Discussion**

**Introduction**

The results indicate diversity amongst those paddling kayaks in the sea in relation to both paddling activities and personal characteristics. Respondents were seen to vary in their self-reported ability, the undertaking of training and the holding of qualifications. The respondents differed in the number of times they paddled a year, the seasons that they paddled in, the distance from shore activities took place and the perceived demands of the conditions they encountered. Many of these differences appear to be associated with the type of boat used. Differences were also noted between categories of respondents in relation to activity planning and the carrying of safety equipment.

**Review of findings**

The interaction of personal characteristics with the demands of activities is likely to result in exposure to different risks and level of risk; this suggests that there may be a need to target incident prevention strategies towards specific groups undertaking particular activities in different environments. The literature supports the view that there is a need to reflect differing demands and risks associated with activities. Lull (2008) identifies that different sea kayaking domains present different challenges and these challenges require different skills, planning considerations and that some boats are more suited to those domains than others. He goes on to discuss how, assuming appropriate equipment is being used, skill level and environment are the major determinants of the level of risk. Organisations such as the RNLI (2012) and the British Canoe Union (2002) indicate that different activities in different environments require different equipment and practices. Where variation was noted in the
safety practices of respondents, it may reflect appropriate response to anticipated risk. For example, the equipment, planning and skills required by a person using a sea kayak in demanding conditions in the winter, at a considerable distance from shore, are likely to be different from a person using a sit-on kayak in straightforward conditions close to the beach, in the summer. However, even though the person using a sea kayak may be in extreme conditions and the person using a sit-on kayak may be in benign conditions, variation in paddlers’ skill and knowledge and experience may influence the likelihood of an incident. A key consideration is the validity of an individual’s assessment of risk and the risk management options in the context of their capabilities.

A consistent theme in the literature relating to safety practices and kayaking is the need for training. Organisations such as the British Canoe Union, Maritime New Zealand, the New Zealand Kiwi Association of Sea Kayakers and The American Canoe Association, advocate formal training. Clubs and associations are highlighted as bodies through which one can obtain appropriate skills and knowledge. The number of respondents who indicated that they had undertaken formal training was seen to vary according to type of boat. Those using ‘sit-on’ kayaks were less likely to hold formal qualifications compared to those using ‘general purpose’ kayaks, ‘sea kayaks’ and ‘playboats’. Additionally, those who were or had been members of clubs or associations were far more likely to hold qualifications than those who had not been members. The availability of low-cost boats, as identified by the RNLI (2012), may have resulted in a change in the way in which people have entered kayaking. The findings in relation to training, qualifications and club membership highlight the complexity of factors linked to safety practices. For example, comparing those who use
closed cockpit kayaks with those used ‘sit-on’ kayaks, a number of statistically significant differences in response were identified. Those using ‘sit-on’ kayaks were less likely to hold qualifications and to be members of clubs. Those using closed cockpit kayaks were less likely to define themselves as ‘beginners’ and less likely to respond that their paddling took place in ‘straightforward conditions’. A number of reasons could be proposed to account for the differences. Differences in training and club membership could be linked to the need to develop skills to enter more challenging environments. The membership of clubs may result in the socialisation into a culture where there are opportunities for training and qualifications and their pursuit is a norm. The membership of a club may provide opportunities for support to enter more challenging conditions. A further factor could be linked to identification with the activity; those using ‘sit-on’ kayaks may be participating in ‘casual leisure’ whereas those using closed cockpit kayaks, may be embarking on ‘serious leisure’ (Stebbins 2007) and a ‘lifestyle sport’ (Wheaton 2004). Club membership and the pursuit of skills may be constituent of ‘serious leisure’ and ‘lifestyle sport’. Thus the motivation, need and opportunities to develop skills and knowledge may vary amongst paddlers.

Those using ‘sea kayaks’ were more likely than other groups to indicate that their activities took place at distance from land ‘further than they could swim’. The majority of the users of other types of boats suggested that they paddled their boats either an ‘easy swim’ or an ‘easy wade’ from the shore. This difference in view may account for variation in safety equipment carried. The distance from shore may have an impact upon the perceived need for self reliance. This point has been raised in safety guidance by the RNLI (2012), who
advocate that those paddling beyond sheltered waters should carry equipment such as spare paddles, signal devices and navigation aids. However, a number of risks are present in environments close to land and are linked to increased likelihood of impact with beach and rocks, surf and tidal rips and tidal streams. Proximity to the shore may be giving an inappropriate impression of safety and ease of returning to land in the case of an incident. Swimming in sea conditions, particularly in the presence of waves and rips and undertows, can prove difficult (Lull 2008). There may be value in assessing participants’ perception of hazards close to shore and the ease of returning to shore against the realities of swimming to shore. This could provide information that could support personal risk assessments.

Kayaks are used in a range of different environments including the sea and inland waters. The significance of hazards in the river environment and the sea environment vary. For example, entrapment by physical obstacles may be more an issue in rivers than the sea; the effect of wind may be more significant at sea. The risk management strategies and expected practices associated with these environments may vary. Given this, respondents were asked to indicate in which environment most of their kayaking takes place. A statistically significant higher proportion of those using ‘playboats’, reported that rivers were their main environment. The experience they have acquired in such environments and the accepted norms associated with paddling rivers could be influencing safety practices in the sea. Whereas both those using ‘playboats’ and those using ‘sea kayaks’ had a similar profile in relation to qualifications, club membership, experience and how demanding they regarded their paddling conditions, there were differences between responses in relation to the wearing of helmets. Whilst it is recognised that the activities undertaken by those using
'playboats’ and ‘sea kayaks’ may differ, the reported variation in the wearing of helmets may be partially accounted for by helmets being regarded as essential river paddling equipment and a social norm, whereas the wearing of helmets in a sea kayak is only advocated for certain conditions. The RNLI (2012) has stressed the importance of wearing helmets whilst paddling in the surf zone. Many activities take place specifically in the surf zone and Lull (2008) points out that even those involved in coastal trips, will often pass through the surf zone. Whilst there is a possibility of experiencing impacts to the head whilst kayaking, the adoption of helmets amongst a number of groups of paddlers is not as widespread as amongst those paddling ‘playboats’.

The need to be able to self rescue is identified as a primary skill by governing bodies, safety organisations and paddler groups. In this study, approximately 90% of the respondents stated that they could self rescue. Of these, the majority of those using ‘sea kayaks’, ‘general purpose’ kayaks and ‘playboats’ stated that they could roll a kayak in sea conditions. Fourteen respondents stated that they could not self rescue; however, they tended to paddle in the presence of others. The ability to roll a kayak was by far, lower amongst those using ‘sit-on’ kayaks. However, this may reflect the design characteristics of the boats which are inherently buoyant and often harder to roll than closed cockpit boats. With such boats, climbing back on to the boat in the case of capsize is seen to be the usual means of self rescue. It would appear that self rescue is an issue that has been addressed by paddlers in the UK. A statistically higher proportion of those using ‘playboats’, reported that they could roll a kayak in sea conditions, when compared with the responses of the users of other boats. This may be linked to the nature of activities, for example, a roll and
components of a roll, form part of a number of dynamic playboat manoeuvres and are not necessarily used just as a means of self rescue. The use of paddle floats to aid self rescue is recommended in both the United States and Canada. Very few of the respondents reported carrying a paddle float. Compared to these two countries, in the UK, the ability to roll a kayak or paddling with others who are able to facilitate recovery and re-entry, may be more common. Alternatively, the use of paddle floats may not be receiving the same level of promotion as in other countries.

In line with the recommendations of organisations promoting safety whilst kayaking in the sea, the majority of respondents reported that they check forecasts for ‘wind direction and/or force’, ‘high and low tide’ and ‘wave conditions’ and left details of their paddling plans with others on shore. The undertaking of more detailed assessment of information varied amongst paddlers. Those using ‘sea kayaks’ indicated that they were more likely to use ‘nautical charts and pilots’ and check the ‘tidal streams’, the ‘position of tidal races and/or overfalls’. This may represent differences in the types of activities undertaken by the users of different types of boats. Those using ‘sea kayaks’ may be participating in activities which require assessment of such conditions. Additionally, part of the attraction of using a ‘sea kayak’ may be to deliberately engage with the demands associated with tidal conditions. Those using ‘sea kayaks’ were more likely to report that they carried ‘compasses’, ‘repair kits’, ‘GPS’ equipment, ‘flares or signal smoke’, ‘VHF radios’, ‘spare cloths’, ‘emergency shelters’, ‘food’ and ‘drink’, compared to other paddlers. Sea kayaks, by the nature of their design, are able to cover long distances quicker than the other types of boats. This could result in them being more isolated from help. Sea kayaks may also be used
for activities that extend over many hours or even days. The differences in the reported carrying of equipment between those using ‘sea kayaks’ and other groups of paddlers, may reflect the perceived need for self-sufficiency in activities. In addition to this, ‘sea kayaks’ have a higher carrying capacity than other styles of boats; thus, in other boats there are physical limitations on what can be stowed. The reported additional equipment carried and planning activities undertaken are in line with guidance targeted specifically at those using sea kayaks. What may be observed, is acceptance of practices which are reinforced through discipline related literature and training and are regarded as norms by those paddling sea kayaks.

Forty-eight percent of respondents reported that they carried ‘mobile phones’. For those close to shore and undertaking activities at busy beaches, a mobile phone may not be as important as it is for people away from the shore and out of view. Within the locality of the study, there are often difficulties in obtaining mobile phone signals; therefore, ability to use equipment may be limited. Given this, if paddlers feel that they are entering conditions that require equipment to summons help, a mobile phone may need to be supplemented by a VHF radio and/or flares and signal smoke. Only 13 respondents stated that they carried a VHF radio. Whilst mobile phones are now commonly carried, a VHF radio may be regarded as specialist equipment and the requirements of the qualification for their legal use, may inhibit people from carrying the equipment. None of the paddlers using ‘sit-on’ kayaks or ‘playboats’ reported carrying ‘flares or signal smoke’. The carrying of ‘flares or signal smoke’ was seen to be higher amongst those entering more demanding conditions, those who were more highly qualified and of higher self reported ability. Is not clear whether the carrying of
flares or signal smoke is the result of the nature of the conditions entered or whether the
value of such signalling equipment is more recognised by those with higher skill and
knowledge.

The reported carrying of bailing equipment was common amongst those using ‘sea kayaks’;
those using ‘playboats’ and ‘sit-on’ kayaks did not report carrying such equipment. In the
case of ‘sit-on’ kayaks, they are usually designed to be self bailing and their doubles skin
construction provides buoyancy. Sea kayaks are usually fitted with bulkheads that limit the
amount of water entering the kayak in a capsize. This design feature enables many sea
kayaks to retain a degree of stability and manoeuvrability before they have been drained of
water. These characteristics often make it feasible to empty a sea kayak with bailing
equipment. Playboats do not usually have bulkheads and buoyancy is provided via airbags.
Playboats can become unsteady when filled with water; the emptying of the boat often
requires assistance from a colleague lifting the boat out of the water. Thus, bailing
equipment may not be the most efficient means of recovery for a playboat. In addition to
this, the use of equipment such as bilge pumps for river orientated kayaks is not usually
promoted in kayaking literature; amongst sea kayakers it is often presented as standard
equipment.

The use of paddle leashes whilst paddling in the sea, is advocated by both the RNLI and
Australian Canoeing. Fifty-six percent of the ‘sit-on kayak’ paddlers and 49% of those using
‘sea kayaks’ reported using paddle leashes. None of those paddling ‘playboat’ reported the
use of paddle leashes. Once again, this may reflect different paddling environments. In river
environments, entrapment as result of equipment snagging on obstacles such as branches, is regarded as a major hazard, therefore, the use of paddle leashes is not a common practice. The norms associated with the river environment may be followed when those using playboats, paddle in the sea.

The need to wear a personal flotation device and appropriate clothing for activities is strongly emphasised in safety guidance. Only two respondents reported that they did not wear a personal flotation device. Direct observation indicated that 93% of paddlers wore a personal flotation device. The observed use was less amongst those paddling sit-on kayaks (80%). It may be the case that some of those observed using ‘sit-on’ kayaks, were paddling in shallow water close to the beach. If they were swimming in the same location, they would not be expected to be wearing a personal flotation device; this may have influenced their decision. In other countries such as Canada and the United States of America, the carrying of personal flotation devices (not necessarily the wearing of such equipment), is a legal requirement. In the UK and without an enforcement regime, the majority of respondents utilised personal flotation devices. The reasons for this widespread adoption, warrants further investigation. It may be the case that previous awareness raising campaigns have had an impact on the perception of the value of flotation devices, additionally, the social norms associated with kayaking may reinforce the use of buoyancy aids. It is interesting to note that the guidance from the British Canoe Union in relation to personal flotation devices whilst kayak surfing, recognises that for some, not to wear a buoyancy aid is an appropriate decision.
The risks associated with cold water immersion and the dangers of hypothermia as a result of exposure to environmental conditions, are frequently cited in kayaking safety advice (Broze and Gronseth 1997; BCU 2002; Lull 2008). The need for appropriate clothing is stressed within safety guidance (Transport Canada 2009; RNLI 2012). Only two respondents indicated that they did not wear a wetsuit, dry suit or other windproof jacket.

The majority of respondents reported that it would be either ‘unlikely’ or ‘very unlikely’ that they would need their safety equipment. Whilst in general there appears to be the perception that safety equipment is unlikely to be needed, many still appear to choose to carry equipment with them. The identification of the factors influencing this decision may shed light on issues that could be used to inform safety initiatives. Compared to those paddling in ‘intermediate’ and ‘demanding’ conditions, a statistically significant higher proportion of those who reported paddling in ‘straightforward’ conditions, stated that they thought it would be ‘unlikely’ or ‘very unlikely’ that they would need safety equipment. Statistically significant differences in the perceived likelihood of requiring safety equipment were not observed according to self reported ability. This may be interpreted in a number of ways. Respondents may be participating in activities and entering conditions commensurate with their abilities and therefore experiencing the same level of risk (see Lull 2008) or alternatively, there may be misperceptions of the likelihood of requiring equipment. The perceived likelihood of requiring safety equipment may also vary according to group membership. For example, an expert paddler leading a group of beginners may regard it more likely that they would require safety equipment to support others compared with undertaking activities with an experienced group. Factors influencing the perception of the
likelihood of needing safety equipment and how this influences the adoption of equipment could be the focus of further investigation.

Seven cases were reported where emergency services had been called in relation to respondents’ kayaking activities; of these, two were false alarms. The cases identified tended to be linked to issues related to the health and fitness of paddlers. The incidents described did not discuss adverse environmental conditions. This suggests the need to recognise that incidents do not only occur in challenging conditions and that the capabilities and limitations of participants are important factors to be considered when assessing risk.

**Evaluation of the study**

As was the case in the study into the experience and perception of health impacts and associated cause, the sample may not be representative of the wider population and subject to a sampling bias related to the distribution of questionnaires predominantly at weekends and holiday periods and not following up ‘non responders’. The use of snowball sampling may also have resulted in over representation of respondents from social networks. Whilst the findings may be indicative of behaviours, they cannot necessarily be generalised to the wider population.

To minimize the inflation of type I errors, response categories were combined. This may have masked a number of effects. A statistically significant difference in the reported carrying of emergency shelters was observed when comparing those using ‘sea kayaks’ with a combined category of those using ‘playboats’, ‘general purpose’ and ‘sea kayaks’ (Fisher’s
Exact Test \( p=0.000 \), two sided. Whilst not reported in this study, the differences between those using ‘sea kayaks’ and those using ‘general purpose’ kayaks and the difference between those using ‘general purpose’ kayaks and those using ‘playboats’ was not statistically significant. None of those using ‘sit-on’ kayaks carried emergency shelters; this is likely to have skewed the results. A similar effect may have occurred where the combining of categories masked differences between individual variables. This study was predominantly designed to identify broad themes to inform the qualitative phase of the research; specific hypothesis testing was not a priority. A further study using a smaller range of variables could be undertaken to explore differences between individual categories.

Social desirability may have influenced the response of participants. This is perhaps evidenced by the discrepancy in reported and observed level of use of personal flotation devices by those using sit-on kayaks. A check on the impact of social desirability could have included triangulation through the auditing of equipment carried by paddlers at launch sites.

Responses may have reflected general behaviour; questions could have been asked relating to planning that had been undertaken for a specific activity (e.g. the assessment of environmental conditions and the actual equipment carried). This may have provided an insight into practices and variation according to situation.

The use of closed questions in the questionnaire may have provided response options which would not normally be considered by respondents. The study would have been usefully
backed up by open questions or interviews that encouraged participants to outline the steps that they take prior to paddling and any safety practices they follow. The determination of such information may have provided a more detailed insight into behaviour in specific circumstances.

Within paddle sport literature, ‘sea kayaks’ and ‘playboats’ are linked to particular disciplines and the boats are seen to have particular design characteristics. Paddlers who are not aligned to the culture of kayaking or aware of the different disciplines, may be confusing sit-on kayaks which may be used for ‘play’ with playboats, additionally one of the major manufacturers of ‘sit-on’ kayaks is "Ocean Kayaks". This name may be confused with the terms ‘sea kayak’. This may have resulted in a number of respondents inappropriately categorising their boat in the questionnaire. If this were the case, the re-allocation of these paddlers to other categories may have resulted in greater polarisation of the results. This issue could have been resolved by including photographs of the different types of boats within the questionnaire and asking which image was most like the kayak they paddled.

The response options in the questionnaire for activities undertaken required refinement. It may have been more appropriate for participants to describe their paddling activities via an open question and this to be subsequently coded. Further attention could have been given in the questionnaire to the planning and equipment associated with different paddling domains (Lull 2008).
Conclusion

The results indicate that many of the safety practices advocated in the literature are adopted by those paddling kayaks in the sea environment.

Those paddling kayaks vary in relation to a range of factors including personal characteristics, environments entered, issues considered when planning activities and equipment carried. Differences in safety practices were noted according to factors such as self rated ability, type of boat paddled, environments entered and time of year paddling. From the analysis of the results, it is not possible to determine the nature of the relationship between these factors and behaviour. For example, whether experience and training and qualifications led to changes in safety practices or whether, as knowledge and skill increases, activities are embarked upon that require different approaches to safety, cannot be ascertained. Differences in reported and observed safety practices do not necessarily indicate deficiencies in behaviour; the variation may reflect the demands of different activities in varying conditions. These data suggest that generic guidance is not necessarily adhered to by all. It is recommended that there is a need to evaluate the rationale behind safety decisions and to consider priorities for safety for particular groups undertaking particular activities in certain environments. On the basis of this, there may be scope to refine generic safety guidance to reflect particular circumstances. An evaluation of factors influencing risk decisions is presented in Chapter 10 of this Thesis.
Chapter 8

The Meaning and Perception of Risk

**Risk and Society**

Technical definitions of risk tend to be based around the elements of the likelihood of events occurring and the magnitude of those events (Royal Society 1992). Within everyday lay language, calculable probability is not seen to be of such significance; risk is regarded as more the potential for harm or losses (Lupton 1999). Lupton and Tulloch (2002b) argue that in both psychometric and sociological literature focusing on risk, there is a tendency to describe subjects’ risk aversion and risk taking behaviour as being a product of ignorance and irrationality and that people live in fear of risk. However, the positive elements associated with encounters with risk have been identified in a wide range of activities including mountaineering, mountain biking, surfing, skydiving and motorcycling (McIntyre 1992; Celsi et al. 1993; Ewart 1994; Rutter et al. 1998; Stranger 1999; Le Breton 2000; Delle Fave et al. 2003; Creyer et al. 2003; Lester 2004; Schneider et al. 2007; Murphy and Patterson 2011). Themes in the literature relating to the motives for voluntary risk taking include self-development, freedom, a sense of power, control, thrill, affirmation of the Self, challenge, escape, the fulfilment of social needs, self-empowerment, improved status and contact with a ‘higher power’. Lyng (2005) proposes a primary reason for engaging with voluntary risk, even where there appears to be no material value for doing so, is that "it's fun".
Analysis of the motives for engaging with risk often describes risk as being instrumental in the achievement of other goals, as Pomfret suggests (2011) “risk is an inevitable component of adventure which needs to be overcome, yet it forms only a secondary element of the experience”.

Lyng (2005) notes a paradox in Western industrialized society where there is an emphasis upon the regulation, reduction and control of risk at an institutional level, whereas at the same time, many people seek out risk. He regards risk taking as a means of escaping from the routine of contemporary life and as an expression of resistance to constraint in society; it provides opportunities for the development and expression of skills, experience of sensation, enables feelings of self-determination and control and supports group cohesion. Lyng argues that a risk taking ethic has developed in Western society and this ethic has cultural significance (Lyng 2005). This ethic has partly developed as result of the presentation and marketing of high risk lifestyles and subcultures.

Lupton and Tulloch (2002 b) describe voluntary risk taking as choosing to engage with risk knowing that the activity is to an extent risky. This is differentiated from situations where activities are deemed as risky by a culture but not perceived as such by participants, situations where participants view risk as being unacceptably high but unavoidable or situations where participants are unaware of the risk at that particular time.
The Nature of Participation

Wheaton (2004) proposes that whereas in the past, personal identity may have been linked to factors such as work, ethnicity and religion, new frameworks for social identity have emerged. What she describes as "lifestyle sports" are seen to be associated with definitions of self and a reflection of a particular lifestyle and linked to a subculture. A range of outdoor activities are regarded as “lifestyle sports”. For some, participation may be occasional for example whilst on holiday; for others the activity is part of who they are. Participation may extend into outdoor adventure which includes voluntary engagement in uncertain and emotionally intense activity, requiring skill, competence and motivation (Holyfield et al. 2005). Stebbins (2007) distinguishes between ‘Serious Leisure’ and ‘Casual Leisure’. ‘Serious Leisure’ is seen to involve the systematic pursuit of activities which are substantial and fulfilling. “Serious Leisure” can become central to life activities and can be regarded as a leisure career involving the acquisition and expression of specialist knowledge and skills; this in turn can lead to a leisure related identity (Anderson and Taylor 2010). This contrasts with ‘Casual leisure’ which is regarded as less substantial and requires little or no specialist skills to enjoy. In addition to forming part of one's identity, action such as engagement in leisure activities, enable individuals to make decisions about who they want to be and can act as a means of displaying a constructed self-image to others (Reith 2005). Palmer (2004) describes how participation can vary greatly from "weekend warriors" with little training, skills and infrequent exposure to activities, through to "hard-core practitioners" who have assimilated the technical skills and identity associated with activities.

Individual Differences in Risk Taking Propensity

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Lyng (1990) proposes that there are two analytical frameworks relating to risk taking and thrill seeking behaviour. He describes these as the personality predisposition model and the intrinsic motivation model. Ewart (1994) proposes that research into recreation and motives to engage with risk generally involve two approaches these being linked to either personality predisposition or goal directed behaviour. The personality based approach talks in terms of for example, “Venturesomness” and “Sensation Seeking” (Eysenk and Eysenk 1978; Zuckerman 1979, 1994). These traits are regarded as influencing behavioural preferences for risky outcomes (Mishra and Lalumière 2011) and predisposing individuals to be drawn towards high risk activities (Roberti 2004). These traits may be linked to biological determinants (Roberti 2004; Cesarini et al. 2009). Zuckerman (2000, 2004) describes the existence of a general personality trait of ‘Sensation Seeking’ and that a sub category of this is ‘Thrill and Adventure Seeking’. He argues that risk taking is not the main reason for sensation seeking behaviour; it is a price that some will pay to satisfy a need.

Miessel and Potgieter (2003) point to athletes involved in high risk sports expressing a need for stimulation, change and creativity. Goma-i-Freixanet (1991) investigated the relationship between personality type and participation in high risk physical sports. Goma-i-Freixanet proposed that subjects engaged with high risk sports had elevated extraversion, had the characteristics of emotional stability and conformity to social norms and were thrill, adventure and experience seeking and this was achieved through socialized means. Goma-i-Freixanet draws attention to the distinction between the two personality traits of ‘Impulsiveness’ and ‘Venturesomeness’ as described by Eysenck and Eysenck (1978). The impulsive characteristic is linked to not planning and lack of consideration of consequences;
the venturesome characteristic is linked to thrill, adventure and risk taking, however, the encounter is more likely to be rational. Goma-i-Freixanet suggests that the impulsive characteristic can result in individuals not appropriately perceiving risk and hence risky situations are not avoided. Chang et al. (2011) suggest that personality traits associated with sensation seeking, can result in behaviour directed towards seeking out thrill and variation in the perception of outcome can be linked to variation in personality. Based upon a review of literature, Roberti (2004) suggests that sensation seeking did not necessarily result in high risk behaviour but that engagement with risk is a means of achieving desired levels of arousal. Given this, he proposes that there is scope to substitute high risk activities by promoting equally stimulating lower risk activities.

Goma-i-Freixanet (2004) and Furnham (2004) indicate that the ‘sensation seeking’ trait influences participation in leisure and sporting activities. Following a review of literature on the influences of psychological factors on sports injuries, Junge (2000) concluded “a personality profile typical of the “injury prone athlete” does not exist.” However, she goes on to state that several studies have identified a certain readiness to take risk on the part of injured athletes.

The intrinsic motivation model regards risk taking as being linked to a range of physiological, psychological and neurological factors that are seen to be associated with personality characteristics that impact upon risk taking behaviour (Stelmack 2004; Angleitiner et al. 2004; Netter 2004). Stelmack (2004) points to two interpretations of the behaviour of high sensation seekers, one is that there is a drive for optimal levels of arousal; the other is that
they are able to tolerate high levels of stimulation, therefore do so. Lyng (1990) suggests that risk taking may be necessary for the wellbeing of some people. Lyng (2008) is critical of the existence of a risk taking personality trait and feels that this does not account for differences between cultures and the increase in voluntary risk taking during the latter part of the 20th century. Given this, he feels that there is a need to pay greater attention to the socio-historic factors that influence risk taking behaviour.

**Risk and Adventure**

Celsi et al. (1993) suggest that specialization of roles in Western Culture has led to a lack of definitive outcomes, sense of role in cause and effect relationships, loss of autonomy and distance from the outcomes of efforts. This in turn is seen to impact on sense of self and sense of self-efficacy. They regard leisure activities as providing scope for compensation for these circumstances. In situations of constraint and over regulation, people may seek uncertainty of outcome, challenge and variety through engagement with recreational activities (Csikszentmihalyi and Csikszentmihalyi 1988).

Lupton and Tulloch (2002b) suggest that motivations for voluntary risk taking include the conquest of fear, the display of courage, excitement and thrills, self-actualisation, the confirmation of gender attributes or as a means of challenging gender stereotypes. In such a way, risk taking may be seen as a means of achieving a range of outcomes valued by the individual. Lupton and Tulloch propose three ‘discourses’ to describe the pleasures and benefits of voluntary risk taking. The first discourse relates to self-improvement through extending the Self through expanding experience and self-realization. The second discourse
relates to emotional engagement where the individual experiences heightened emotional intensity that allows them to leave behind the mundane and normal experiences. The third discourse, ‘Control’, involves pushing oneself and conquering oneself so providing opportunities to exhibit courage, the mastering of fear and demonstration of self-worth.

The ‘Control’ discourse is reflected in the concept of ‘Edgework’ described by Lyng (1990). ‘Edgework’ is characterised by skilled performance at the boundary of success and failure, involving control in situations that could fall apart; this is seen to require mental toughness and not succumbing to fear. Lyng points out that individuals accomplished in one type of ‘Edgework’, may test out other forms of ‘Edgework’. Hence the drive may not be the mastery of the specific activity but mastery of the Self and Self reconstruction. Participation in an activity and the encounter with risk may be the means to an end. These ‘Edgeworkers’ are not seen to be typically interested in thrill seeking or gambling, as this involves placing one’s self in situations they cannot control. Lyng states “What they seek is the chance to exercise skill in negotiating a challenge rather than turn their fate over to the roll of a dice.”

Lyng (2008) advocates that Edgework may be more appropriately described as "a general theory of uncertainty seeking" rather than a "theory of risk seeking". Lyng suggests that this uncertainty may be manufactured by the individual through the pursuit of high risk activities.

Facing and surviving challenge may enhance perception of being able to meet challenge in general (Lyng 1990). In situations where people feel threatened by forces beyond their
control, they may actually seek out experiences that are even more threatening to their survival but at the same time providing opportunities to reassert control (Lyng 1990).

Celsi et al. (1993) suggest that a range of inter related normative, self-efficacy and hedonic motives influence initial and continued participation in high risk recreational activities. Whilst to the outsider, risk may be regarded as the motivating factor, to the actual participant, the taking of risk may be instrumental in the achievement of other desired outcomes.

Mortlock (1984) describes how the perception of what is ‘adventure’ varies from person to person and the subjective nature of experience is related to the demands and individual ability. Mortlock proposes a number adventure stages varying in intensity. Stage one is described as ‘Play’ where activities are below the person’s ability. ‘Adventure’ acts as the second stage. In this stage, the participant is using their ability but is in control of the situation. The third stage is seen to be ‘Frontier Adventure’ where a person is operating close to the edge of their ability and may be experiencing fear of physical harm or physical or psychological stress. The person is not sure whether they can overcome the situation and they are on a "knife edge" between success and failure. This stage is linked to ‘peak experience’ and Mortlock believes that success can lead to profound feelings of satisfaction or elation. The final stage is viewed as being ‘Misadventure’ where the person finds themselves facing challenge beyond their ability and control. The result can be serious physical or psychological harm.
Csikszentmihalyi and Csikszentmihalyi (1988) have described the state of “Flow” where the participant perceives a merging of the Self and the activity as one, this can be cathartic, satisfying and exhilarating and produces a "natural high". Flow represents total involvement with the merging of time and provides a sense of self and self-efficacy. Lyng (1990) has described similar experiences for ‘Edgeworkers’ operating at the limits of performance; the perceptual field is reported as becoming highly focused: background factors recede from view and narrows to those factors essential to success at the edge. Csikszentmihalyi and Csikszentmihalyi suggest experience of these states is a powerful intrinsic motivator that drives the individual to strive for repeat experience. Flow is regarded as being more likely to occur when the individual is mentally and physically challenged and pushed to their limits without being overwhelmed, thus there is a fine balance between the individual’s abilities and the demands of the situation. Celsi et al. (1993) describe how the degree of tension produced by the situation is a critical factor. Participants are involved in managing the level of uncertainty so as to test ability levels; a level of tension is sought that falls short of sustained anxiety, thus optimal level of tension may vary from individual to individual and is linked to level of ability. As mastery of an activity is obtained, there may be a drive towards experiencing new situations as a means of maintain the optimal level of tension and challenge.

Celsi et al. (1993) propose that the enjoyment associated with various components of an activity may alter over time and be associated with levels of experience and expertise. Activities that initially produced fear, thrill and excitement may with increased experience and skill, lose their effect (Holyfield 1999). Over time, other elements of the experience may
become salient and an individual’s interpretations of the situation may change (Celsi et al. 1993). Robinson (2004) suggests that what society may regard as an extreme activity, the participant may regard as mundane. To move beyond this, there is a need to undertake more extreme activities and higher risk. Robinson argues that with increased responsibility and age, priorities in relation to the mundane and extreme shift.

**Motivations for Participation**

A range of studies have been conducted looking at the motivations and experience of engaging in risk in a variety of outdoor adventure activities. Within an adventure activity, there may be a number of disciplines with their own ethos and identity. For example, Booth (2004) distinguishes between ‘Soul’ and ‘Competition’ surfing and the cultures associated between ‘long board’ and ‘short board ‘users. Lewis (2004) distinguishes between ‘adventure climbing’ and ‘sports climbing’. In ‘sports climbing’, adoption of protection technology is seen to support a focus on technical aspects of the climb and mitigation of risk in the case of a fall. In ‘adventure climbing’, there is less protection and the activity is regarded as less predictable and with less definite outcomes. Advocates of these different activities may have different perceptions of the benefits of the disciplines and hold different motives for participation.

O’Connell (2010) evaluated the motivation to sea kayak. He cites a variety of motivations for participation and these were seen to vary according to age and gender. Males were regarded as being more motivated by using equipment, taking risks and teaching and leading others than females. Females were more motivated by creativity and enjoying
nature than males. Younger paddlers were more motivated by achievement/stimulation and escaping personal and social pressure, than older respondents.

Pomfret (2011) evaluated the motives for participation in mountaineering tourism. He found that those who engaged with guided climbing, did not describe themselves as risk takers; in some circumstances they saw themselves as risk adverse. The participants recognised that risk was present in their activities and that there was a need to minimise risk through the development of skills, training and preparation. Decisions to participate in activities were seen to be linked to an analysis of risk. Pomfret proposes that engagement with ‘serious leisure’ reflects identity and lifestyle. Factors such as the desire for skill enhancement and acquisition of experience were seen to be key motives for participation. Wellbeing and stress reduction was cited as positive outcomes associated with climbing.

A number of studies have been conducted evaluating the concept of risk in relation to participation in ‘high risk’ or extreme activities. Miesel and Potgieter (2003) evaluated the experience of fear amongst high level athletes involved in dangerous sports. Twenty-six meaning clusters were identified, many of which reflected states referred to in ‘Flow’ and ‘Edgework’. Clusters included sensation of flow of movement, altered sense of time, alteration in visual and auditory sensation, total absorption in the activity, feelings of euphoria and personal growth.

Miesel and Potgieter suggest that there may be a link between peak experience and perceived danger. They propose that the perspective of fear of high risk athletes may be
different to that of moderate risk sports. The high risk participants were regarded as expressing denial of danger. They speculate that this may not necessarily be a failure to recognise danger but instead a coping strategy that allows for continued participation. If fear is overwhelming, it may inhibit the experience of peak experience.

Based upon interviews with participants in extreme sports, Brymer (2010) proposes that those undertaking activities often have realistic acceptance of the possibility of injury or death; however, they put this in the context of everyday life, where activities such as driving, can lead to fatalities. To prevent negative outcomes, there is emphasis upon planning, preparation and the development of appropriate skills and mental and physical capacity. The drive for participation was not adrenaline, thrills, risk or danger but often "a deep sense of relaxation and mental and emotional clarity".

Focusing on mountain biking, Creyer et al. (2003) investigated participation in risky recreational activities. They suggest that risk propensity should be viewed as something that is acquired, rather than an innate characteristic. Key findings were:-

- As experience increases, perceived risks with the activity diminish and affective outcome expectancies become increasingly positive
- As experience increases, many participants engage in increasingly dangerous behaviours
- The normalisation of risk is one of the consequences of increasingly positive outcome expectancies and a decrease in risk perception
• Positive affective outcome expectancies, lower perceived risks; a greater propensity for risk were associated with a greater likelihood of participation in risky activity
• There are mediating effects between risk propensity and the perception of risk and risk propensity may be context specific

Ewart (1994) examined the motivations for participation in high altitude mountaineering. Ewart proposes that factors such as Exhilaration/Excitement, Social Aspects, Image, Aspects of Climbing and Catharsis/Escape are important motivating variables. Risk taking itself was not seen to be of high motivational importance to either novice, intermediate or highly experienced mountaineers and was not the reason for participation. This suggests that the engagement with risk was instrumental in the achievement of other goals and not a goal in its own right. The salience of the various factors as motivators was seen to vary with the mountaineering experience of respondents. Ewart proposes that as risk is not a primary reason for participation, activities such as high altitude mountaineering should not be described as risk recreation and that they are more appropriately described as adventure or challenge recreation. He notes that if excitement and challenge are motivational factors, steps to safeguard the participant may inhibit the very reason for participation. Buckley (2012) concurs with the view of Ewart that engagement with risk is instrumental. He regards engagement with risk as providing opportunities to experience “rush”. Rush is not seen to be guaranteed, however, it is addictive and a motivator for adventure activities.

McIntyre’s (1992) examination of motives or reasons for participation in rock climbing identified; recognition, creativity, physical setting, challenge, escape and control as factors
that accounted for 70% of the variance in climbing motivation. Robinson (2004) described how outdoor adventure activities such as climbing and mountaineering contribute to identity, enable escape from the mundane, the facing of challenge and the building of confidence and self-esteem. Participants in her study discussed how there is a competitive element in activities; this competition is not necessarily against others but against oneself or the situation.

Delle Fave et al. (2003) in a study of climbers on a Himalayan expedition, found that the opportunity to experience ‘Flow’ can motivate climbers to engage in risky activities and that risk itself was encountered as a means of achieving goals. Thus the motivation to undertake the activity and possibly encounter life threatening risks, could be part of the search for a rewarding experience. The authors report that challenge is a goal and that challenge is related to perceived personal capabilities. Optimal experience was seen to be a balance between high challenge and high experience. They argue that accident prevention strategies should focus upon the matching of skills with challenge and not just the elimination of risk as this would negate reasons for participation. Such an approach is seen to preserve the essence of the experience and provide opportunities for optimal experience (Delle Fave et al. 2003).

Stranger (1999) examined risk taking in Australian surfing. He argues that in addition to the cathartic effect of risk engagement, account should also be taken of the experience of the thrill of participation. To continue to experience high levels of thrill, surfers reported that there is a need to search for greater challenges. His stance identifies a distinction between
risk and thrill. The search for thrill can be important to participants’ orientation to risk and he maintains that the thrill is inherent to the experience of transcendence and this is associated with feelings of ecstasy, oneness with the environment, loss of self in the environment and intense awareness of the moment. Stranger states that typically, surfers do not consciously strive to increase levels of risk; the risk taking is a by-product of the pursuit of thrill. This view differs from that proposed by Creyer et al. (2003) in their study of participation in mountain biking. In their study, it was proposed that in high risk leisure activities, risk is not a means to an end but an end in itself.

Stranger describes the experiences of the “union between the individual and the wave” and how images of the sublime can act upon the surfers desire to override concerns for personal safety. Stranger argues that the desire does not prevent the awareness of the risk, the risk only becomes an issue when the “terrible nature of the sublime subjugates desire”. Risk is described as an effective catalyst for reaching transcendent states. The aestheticised perception of risk is seen to be part of the culture associated with surfing. Lifestyle groups are seen to form around the activities and experiences associated with surfing and cultural significance may be attached to participation and the pursuit of thrill. Using the example of white water kayaking, Whitney (2007) proposes that engagement with the environment and the associated danger can be regarded as "sacred" and for some, the activity can constitute a "lived religion".

Based upon a review of 150 years of mountaineering literature, Lester (2004) proposes a number of reoccurring themes that may provide an insight into the motivations for engaging
in risky activities that are deeper than purely the pursuit of risk for its own sake. These themes include:

- A sense of freedom which can include escape from tedious environments and social conventions. One of the freedoms described is freedom from fear; interaction with fear inducing situations may be used as a way of overcoming fear
- A sense of power energy and vitality
- Contact with a better self
- Assertion of Self by demonstrating individuality and ability to assert oneself and not purely be at the will of other forces
- Conquest of Self through self-control and self-discipline
- Escape from the Self; at one level this can be escape from day to day worries and self doubt, at another level it could be a transcendental experience
- Contact with a higher power and an awareness of a higher reality
- Unity resulting in a feeling of wholeness and sense of integration of the Self and diminished sense of fragmentation

The literature indicates that engagement with risk can support the pursuit of a wide range of desired outcomes. These outcomes can range from affirmation of the Self, social identity, through to the experiencing of particular emotional states. The nature of engagement with risk may vary as a means of achieving these outcomes. For example, the intensity of experience may be manipulated to enhance feelings of thrill, excitement and challenge. Importantly, it would appear that risk is not necessary a motivator; it is something that
through engagement, is instrumental in the achievement of other goals. Given this, the eradication of risk may inhibit the pursuit of valued goals.

**Extending the Boundaries of Performance**

Efficacy motives can be linked to the desire to develop skills and this in turn leads to self-satisfaction and enhanced status (Celsi et al. 1993). As a consequence, achievement itself may become a motivating factor. Lyng (1990) describes how in ‘Edgework’ technical, physical and mental limits are pursued to test oneself against the boundaries. This testing of the boundaries can lead to the pushing out of the boundaries. Thus the edge may be regarded as fluid. Engagement with the edge can be desired, fulfils needs and provides opportunities for development and expression of skills. Not all participants in risky activities are ‘Edgeworkers’ and the ‘Edge’ cannot be identified as being at a particular point, as it represents an interaction of the individual, the act and the context within which it occurs.

Lyng indicates that the sensations and emotions associated with ‘Edgework’ encourage participants to get as close to the ‘Edge’ as possible without actually overstepping it. This encounter with the ‘Edge’ may involve the artificial increasing of risk. Participants may deliberately strive to maintain risk and uncertainty in choosing not to adopt safety technology as it can change the nature of the activity (Lewis 2004).

**Risk, Control and the Edge of Performance**

Ajzen (1991) states that people’s behaviour is influenced by their confidence in their ability. Self-efficacy beliefs are seen to influence choice of activity, preparation and effort expended
during performance. Behavioural achievement is seen to be linked to motivation (intention) and ability (behavioural control).

Lyng (1990) describes how the drive to operate at performance limits and the development of the necessary skills are seen as important by participants, to the level of being a preoccupation and acting as a basis of a social hierarchy. With mastery, ones and others expectations may increase so producing a drive towards meeting further challenges.

Through careful and detailed planning and safety precautions, steps are taken to manage controllable risks; this in turn allows high levels of focus upon less predictable variables. Perceived ability to manage unplanned events is a key distinction between experienced and inexperienced participants (Celsi et al. 1993). Planning allows for encounters with a more extreme edge. Robinson (2004) recognises that risks may be taken to enable the development of a high level of performance, however, minimising and controlling risk enables continued participation. Control is seen to be a key element; high risk performers may seek out controllable risks whilst avoiding random or non-controllable risks (Lyng 1990).

A key issue in relation to this Edgework is the perception of the context of the activity and ones abilities and at what point the decision is made to back off. Celsi et al. (1993) argue that this edge is “relative to individual’s subjective perception of their ability and confidence level.” In the case of experienced performers, the encounter with risk is regarded as a conscious decision making process where risks are calculated. Brymer (2010) indicated that
control is an important factor for those operating at the edge of performance in extreme activities. Uncertainty and moving beyond the point at which control could be exerted is avoided. To succeed, there is a need for a high level of preparation and if they felt they were not in control, they would not undertake the activity.

Natalier (2001) noted similar responses from motorcyclists. She reports that once engaged in riding, motorcyclists may lose awareness of risk as a general concept; their analysis of various hazards is not solely for the purpose of the minimization of risk, but as a means of aspiring to the ideal riding experience. The calculation of risk is seen to take place with particular reference to one’s own experience and is situation specific.

Ajzen (1991) points out that perceived behavioural control may not be realistic when a person has relatively little information about the behaviour, when requirements or available resources have changed or when new and unfamiliar elements have entered into the situation. Lyng (1990) indicates that the illusion of control is seen to be more likely to occur amongst participants with less experience who have not encountered the full array of possibilities and therefore may be caught out by the severity of conditions. He also suggests that highly skilled participants operating at the extreme edge of performance can come to believe that they control outcomes when in reality, success may be to a large extent chance determined. He proposes that males and young people in general are particularly susceptible to this illusion and so extreme activity may appear less threatening. Belief in one’s ability may enable the individual to maintain control of themselves in the face of chaos; this may result in success and so perpetuates the illusion. As suggested by Lois (2008)
confidence may enhance performance and past performance enhances confidence. Lyng proposes that such people are averse to gambling, as gambling is chance determined and not able to provide the illusion of control.

When things do go wrong, cognitive processes may occur which help justify continued participation. Celsi et al. (1993) suggest that causality of negative outcomes is attributed to the person when it happens to others and to external factors when it happens to one’s self. Lyng (1990) suggests that when things go wrong, others do not regard the risks as not being controllable; the situation is interpreted as not all participants have the innate survival capacity or “the right stuff”. Thus, even in the light of high incident rates, participants may not regard the activity as dangerous; the interpretation is that when things go wrong, it was because the individual did not have the required abilities. This evaluation can enable continued participation following incidents. Laurendeau (2006) supports this position and argues that perceiving that it is possible to control the environment can provide justification for engaging with hazardous activities. When a particular position cannot be supported, notions such as fate can be invoked to sustain a sense of control and therefore justification for continuation in participation (Lois 2005). Natalier (2001) provides a different insight. With regards to motorcyclists, she points out that those involved in accidents will at times attribute the outcome to their own failure to manage the situation. By doing so, this reinforces the view that such incidents are not inevitable and can be managed. This subsequently provides justification for continued participation as “the possibility of control and immunity from further accidents is reinstated.” External causality of accidents to others is recognised, as is the concept of fate. However, these are regarded as rare and unlikely to
impact on oneself. Natalier states that control, technique and practical experience have a neutralizing effect on the risk of an accident. Experience increases the possibility of the individual being able to control risk and this in turn reduces the hazardous nature of the activity.

It would appear that for some people, there is a desire to extend their level of performance to the edge of ability. The extending of boundaries of performance can provide opportunities for self development, expression of skills and a heightened sense of reality. The ‘edge’ may be linked to personal abilities, environments encountered and belief in one's capabilities. To be able to control oneself and the situation is regarded as being fundamental to operation at this dividing line between success and failure. When things do go wrong, processes may be invoked whereby information is re-evaluated to justify continued participation.

**The Perception of Risk**

To an individual undertaking an activity, the intent and behaviour may be rational. To the observer, unaware of the cognitive processes and the context of the behaviour, the behaviour may appear irresponsible or irrational. Aronson (1999) has put forward the view that “People who do crazy things are not necessarily crazy”. To the observer, encounters with extreme situations may be regarded as self-destructive; in contrast, Lyng (1990) proposes that to the participant, the encounter is rational and therapeutic and only dangerous to those who do not possess the appropriate survival skills. Ferrell (2005) also argues that non-initiates may regard those engaging with risk at the boundary of successful
performance, as irresponsible and out-of-control, intent on their own destruction. Those engaged in the activities may regard themselves as pursuing self actualization and escape from overregulation.

Understanding the participant’s perspective is a key component to prevention strategies. For example, not using protective equipment may be a rational response based upon direct experience of the impact upon performance, with the benefits of using the equipment being seen as being outweighed by the disadvantages (Taylor et al. 2005).

Sjoberg et al. (2004) regard risk perception as being associated with the subjective assessment of probability of an occurrence and the evaluation of consequences. The perception of risk is described as being present at both an individual and societal level. Views of risk may be influenced by a number of psychological, social, institutional and cultural factors (Slovic 2000a). A range of qualitative factors influencing the perception of risk have been identified. These factors include controllability, immediacy of effect, knowledge about the risk, perception of costs and benefits, voluntariness, familiarity and dread (Fischoff et al. 1978; Royal Society 1992). Renn (1998) has identified factors that he describes as acting as intuitive biases in the perception of risk. These include the mental availability of events, the significance of the information to the individual, events experienced in person and whether or not information supports or goes against belief systems and the subsequent avoidance of cognitive dissonance. The perception of risk may lead to undue confidence or risks being misjudged (Slovic 1987). Additionally, feelings towards particular stimuli or risks can guide information processing and judgement (Zajonc 1980; Alhakami and Slovic, 1994; Finucane et al. 2000; Slovic et al. 2004).
Plural rationalities

Slovic (2000a) argues that biases in judgements of risk are evident in both lay and expert assessments. He notes that disagreement concerning risk may persist. Strong initial views may be resistant to change as they mediate the interpretation of subsequent information. Information that supports a view may be accepted whilst contrary information may be rejected. In such a way, cognitive processes are acting as a filter and a framework for the interpretation of information. Slovic (2000a) states “Risk assessment is inherently subjective and represents a blending of science and judgement with important psychological, social, cultural and political factors.” Brewer et al. (2007) mirroring core concepts of the Health Beliefs Model (Janz and Becker 1984), distinguish between three dimensions of risk perception:

- Perceived likelihood- the probability of being harmed by a hazard
- Perceived susceptibility – an individual’s vulnerability to a hazard
- Perceived severity – the degree of harm a hazard would cause

In addition to this, they highlight that there may be perceived risks associated with taking protective action; this may be evaluated against perceptions of risk of not taking preventative action and perceived effectiveness of preventative action. Using this model, the perception of risk may be based upon a range of permutations derived from these dimensions and this could lead to variations between individuals and groups. Joffe (2003) is critical of models of risk that present perception of risk as often erroneous and deficient information processing at the individual level. Differing views of risk may be based upon
rational but alternative assessments. The view of risk developed becomes reality to the individual. Moscovici (2001) argues that through everyday experience, people develop common sense understanding and this understanding informs decisions. This understanding is not necessarily in conflict with scientific knowledge; scientific knowledge may over time become the new "commonsense". He proposes that lay people are intuitive scientists and often "commonsense" views and "know-how" are shared within social groupings. Howarth (2006) in a discussion of social representation theory, proposes that in learning about the world within which we live, people assimilate representations of that world and these are interpreted to integrate with knowledge and experience; these social representations come to be reality to the individual. These representations are regarded as influencing actions and providing justification for actions. She proposes our knowledge is subject to this process and this can result in competition between different groups’ claims of reality.

Natalier (2001) highlights how the culture associated with an activity can provide a framework through which risk is viewed. She argues that lived experience and acquired knowledge and associated culturally based assumptions, can result in responses to risk that differ from those determined by socially defined expert systems. Views of risk produced by expert systems may be marginalized or not seen to be applicable or being blanket responses that do not account for specific circumstances.

The reporting of risk

Research associated with risk often focuses upon it as something to be minimized, however, in the context of risky recreation, it is something that is legitimised as a form of self-
expression and is pursued (Creyer et al. 2003). The media, in the form of television, videos and publications can play a role in framing the perceptions of activities and presenting images that influence identity and consumption of activities (Wheaton 2004; Beal and Wilson 2004; Kusz 2004). The focus in the media upon adventure and extreme sports has resulted in them becoming incorporated into popular culture; images of risk taking are presented in the context of excitement and thrills and exhilaration. Personality characteristics associated with adventure sports are amplified and lifestyles are presented whereby dangerous behaviour has "high cool factor" (Palmer 2004). Palmer (2004) suggests that the mainstream presentation of high risk activities give the impression that anyone can participate and there is an illusion that expertise is not required and things do not go wrong.

Creyer et al. (2003) describe how magazines are targeted towards consumers’ interests in risky pursuits and these help generate and maintain enthusiasm for the activities. In such a way, possibilities that may not have been previously considered, including high risk sport, become behavioural guides. Bandura (2001) proposes that symbolic environments such as the mass media influence the social construction of reality and this can result in the presentation of a wide range of images including actions and attitudes that act as cognitive and behavioural templates and prompt behaviour.

Events that jump to mind are rated as more likely than events less mentally available (Renn 1998). The reporting of risk by institutions such as the mass media and social groups can result in the social amplification of risk; not reporting on risk can lead to risk attenuation.
(Kaspererson et al. 1988; Kaspererson et al. 2003). Hence, the reporting or non-reporting of risk, may influence the perception of risk. For example, media coverage of dramatic incidents may give the impression of high levels of occurrence that are not borne out by statistical evidence. Less dramatic yet high frequency occurrences may not stimulate media interest, this in turn may lead to an underestimation of risk by participants.

The mass media is seen to play a role in framing individual and cultural perceptions of risk. It is argued that representations of risk taking can act as behavioural templates. Furthermore, both the reporting and non-reporting incidents are proposed as having an impact upon perception of the likelihood of occurrence.

**Outcome expectancies**

Weinstein (1993) states that common to a number of theories of health protective behaviour, is the assumption that the anticipation of a negative health outcome and the desire to avoid or mitigate the outcome, produces motivation for self-protection. The models are seen to concur in the view that the motivation to act is mediated by beliefs concerning the likelihood of occurrence and the expectation that action can reduce the likelihood or severity of harm. His evaluation indicates a cost benefit analysis in relation to risk reduction. Factors considered include time, effort, inconvenience, financial costs and positive aspects of the risk behaviour. Benthin et al. (1995) noted that participants in risky behaviours, were more likely than non-participants to associate the behaviour with positive outcomes and positive concepts. It has been suggested that the outcome expectancy about
the relationship between behaviour and perceived outcomes are acquired either through direct or vicarious experience with risk (Benthin et al. 1995).

In risk taking situations, the perceived benefits of not taking precautions may outweigh the costs associated with preventing or mitigating low frequency occurrences. Each time an incident does not occur, the avoidance of the inconvenience and discomfort of preventative and precautionary action may reinforce behaviour. Thus, incident free activities may result in a failure to take preventative action (Slovic, et al. 1978). Slovic, et al. (1978) argue that the voluntary use of safety equipment depends upon personal perception of being involved in an accident.

*Risk acclimatisation*

Celsi et al. (1993) propose that over time, risk becomes normalised and participants learn to accept risk, as a high risk identity is developed. Anxiety associated with the stages of the activity is seen to vary with experience. They propose that as experience increases, concerns over potential negative consequences decreases. As risk acculturation occurs, the risky activity becomes more enjoyable. Whilst anxiety may vary with experience and an individual may become desensitized to a situation, Lyng (1990) suggests that the stereotype of risk takers as being fearless is erroneous. Their understanding of a situation, their perception of the risks and their ability to manage fear and risk may be very different to those not operating at the bounds of performance; this does not mean that fear is not experienced.
Variation in response to situations according to experience is illustrated in Holyfield’s (1999) investigation into the emotional components of novice’s consumption of adventure experiences. Holyfield describes the fear, emotions and physical impact of the experience of falling out of a white water raft and being caught in a hydraulic. An experienced rafter reviewing the description of the incident commented on how those with experience are often unaware of or have forgotten how situations appear to those with limited experience. Lull (2008) described how kayaking in rough seas was intimidating when he was a novice. A year later, the same activity in even rougher conditions was “fun and exhilarating”. These scenarios highlight the presence of differential perception of risk. What may appear exciting and extreme to the novice, may be regarded as mundane and routine to the experienced participant.

Risk Compensation/Risk Homeostasis

The Risk Compensation Model/Risk Homeostasis Theory (Wilde 2002; Adams 1995, 2012) proposes that everyone has a propensity to take risk and this varies between people. The way in which we learn to assess risk is based upon our evaluation of outcomes, our own experience or our knowledge of the experiences of others. Wilde argues that optimal risk taking results in the greatest net benefit. Sub optimal risk taking occurs when there is under or over estimation of the danger associated with an activity, resulting in either too much or too little risk being taken given the net benefits. Wilde argues that there is no behaviour without some risk, therefore the challenge is to optimise rather than eliminate risk. This optimal level of risk, which results in the greatest benefits, is described as the target level. Wilde holds that the following four factors determine the target level of risk;
• The expected benefits of risky behaviour
• The expected costs of risky behaviour
• The expected benefits of comparatively cautious behaviour
• The expected costs of comparatively cautious behaviour

This model holds that perceived risk is compared to target risk and adjustments are made accordingly. As individuals’ behaviour towards risk is adapted in accordance to the perception of risk, in a perceived high risk situation, greater precaution may be taken than in a low perceived risk situation. The net result is that actual risk occurrence is predicted to remain relatively constant. An individual’s actions can impact upon the level of loss; level of loss influences the perception of risk and the perception of risk influences subsequent decision making. Thus a dynamic and circular process is in operation. Wilde argues that this results in a homeostatic mechanism whereby there is ongoing adjustment to maintain equilibrium; there may be fluctuations however, this is averaged over time unless there is a redefinition of the target level of risk. Wilde cites the example of attempts to improve driving skills through advanced driving courses not leading to greater road safety. Whilst skills may be enhanced by such training, so is confidence. Confidence may increase at a greater rate than skills, resulting in overconfidence and a reduced level of perceived risk, which in turn leads to less cautious driving. Another example is provided by Morrongiello and Major (2002) who investigated the Risk Compensation Theory in relation to parents judgement about children’s risk taking during play under safety gear and no safety gear conditions. Parents reported they would allow greater risk taking by their children in the safety gear situation; children more experienced with the activities were allowed greater risk taking and those parents who had greater belief in the effectiveness of safety
equipment, showed greater risk compensation. Perception that protective action can reduce the likelihood of the realisation of risk may result in increased risk behaviour. Cassell et al. (2006) illustrate this with the example of condom use and HIV and AIDS. They suggest that the use of condoms reduces perceived risk and may result in increased participation in high risk behaviours.

Wilde is of the belief that law enforcement activities and safety technology does not necessarily lead to an overall reduction in death rate. Accidents may move from one location to another (accident migration) or their cause changes (accident metamorphosis). Wilde holds that major and long lasting reductions in death and injury rates can be obtained by interventions that lower the target level of risk. Hedlund (2000) points out that the Risk Compensation Model/Risk Homeostasis Theory, challenges the foundations of injury prevention strategies as it takes the stance that the only effective safety measures are those that alter desired risk level. Consequently, to modify the environment or regulate behaviour without altering target risk, is seen to be of limited value.

In his appraisal of the Risk Compensation Model/Risk Homeostasis Theory, Hedlund points out that risk compensation occurs in some situations, however, evidence shows that safety law and regulation is not necessarily counter balanced by compensating behaviour. The issue is not whether compensation occurs, but predicting when and by how much is it likely to occur. For example, adoption of personal protective equipment may not necessarily result in risk compensation as those adopting equipment may be demonstrating a risk reduction orientation. Scott et al. (2007) in a study of helmet use in Alpine skiing and
snowboarding, found no evidence to support the risk compensation hypothesis. They found that helmet use was associated with less risky behaviour, lower speeds and less challenge and not more risky behaviour.

Robertson and Pless (2002) are critical of the Risk Homeostasis Theory. They question the notion that people have a constant point of acceptable risk, pay sufficient attention to risk or have the knowledge or ability to constantly adjust their behaviour to achieve risk homeostasis. They argue that the model can be used to justify inaction in relation to safety measures and this goes against evidence that indicates that the introduction of safety measures can lead to a reduction in injury.

**Optimism bias and the experience of risk**

An ‘optimism bias’ may exist in relation to the perception of risk. Individuals may perceive that the level of risk is lower for them than it is for others in the same situation (Rutter et al. 1998). Weinstein (1989) points out that ‘optimistic biases’ exist for a wide range of health and safety risks and that these biases are strong for hazards that are regarded as personally controllable, rated as low probability and with which people have little personal experience. Additionally, Weinstein suggests that biases are likely to be large when people believe that signs of vulnerability will appear early and therefore, the absence of signs of vulnerability is interpreted as them being exempt from future risk. Halpern-Felsher et al. (2001) suggest that if an individual engages in risk behaviour and does not encounter a negative consequence, they perceive the behaviour/outcome link as lower than non engagers.
Rutter et al. (1998) undertook a survey of 723 motorcyclists’ perception of risk, their behaviour on roads and accident history. It was found that the group as a whole showed unrealistic optimism and on average, individuals felt that they were at less risk than other motorcyclists of being involved in an accident or needing hospital treatment in the next year. Relative realism was displayed by young and inexperienced riders and riders who reported risky behaviours on the road. These groups saw themselves to be at more risk than other motorcyclists. There was some evidence of a de-biasing effect as a result of personal history. Rutter et al. noted that perceptions of risk predicted subsequent behaviour, however, this tended to be in the direction of precaution abandonment and not precaution taking.

Weinstein regards the existence of optimism bias as being a block to attempts to reduce risk taking behaviour; the bias can exists as a result of cognitive construction, whereby, knowledge is modified to support “self serving predictions”. For example, Seifert (quoted by Coffey 2003) is of the view that in relation to mountaineering and expeditions, participants recognise that terrible things can happen to people. These events are seen to be due to bad luck or mistakes and will not happen to them.

Lyng (1990) proposes that those with less experience, who have not encountered the full array of possibilities, may have the illusion that they are in control and therefore can be caught out by the severity of conditions. Schneider et al. (2007) argue that confidence in one’s self can influence decisions to engage with risk and success in past situations can result in relative comfort with risk. Optimism about successful behaviour may encourage
action, which in turn leads to success. Belief in one’s ability may enable the individual to maintain control of themselves in the face of chaos; this may result in success and so perpetuates the illusion of control (Lyng 1990).

The role of social influence and the impact of the group and peers

The work of Deutsch and Gerard (1955), Asch (1956) and Milgram 1974) have stimulated research into the ways in which individuals and others influence behaviour. In a review of literature on social influence, Cialdini and Goldstein (2004) propose that individuals’ susceptibility to outside influence are linked to the desire to develop accurate perceptions of reality and react accordingly, to develop and maintain social relationships and to maintain a favourable self-concept. The influence of others on the judgements of the individual has been described as being as a result of two processes. Normative social influence is regarded as an influence to conform to the expectations of others and secure social approval whereas informational social influence involves utilising the judgements of others to determine reality in situations of uncertainty (Deutsch and Gerard 1955; Cialdini and Goldstein 2004).

Gardner and Steinberg (2005) propose that individuals may be more likely to take risks and evaluate risk taking more positively, when with peers. Adolescents are described as being more susceptible to this effect than adults. Gardner and Monahan (2007) state that resistance to peer influence increases between the ages of 14 and 18; however, there is little evidence for an increase in resistance between the ages of 18 and 30. Factors such as gender, ethnicity and social class have been linked with the propensity to succumb to and resist peer influence (Gardner and Steinberg 2005; Gardner and Monahan 2007).
Bandura (2001, 2004, 2011) argues that people operate within socio-structural influences and that people are both products and producers of such social systems. Behaviour is seen as a result of both personal and vicarious experience and personal judgements are often verified against what others are seen to believe. Beliefs about what others think of one's behavioural intentions are a fundamental component of the Theory of Reasoned Action. In the Theory, subjective norms are proposed as influencing the manifestation of behaviour (Ajzen 2002, 2011).

Membership of cultural and social networks and groups are important in the construction and meaning of risk and the mediation of knowledge about risk (Lupton and Tulloch 2002b). Scherer and Cho (2003) argue that the relational links between individuals and the associated social networks and systems, influence individual perceptions and result in groups of likeminded individuals. These social units are seen to structure knowledge attitudes and behaviour. Bandura’s Social Learning Theory and Social Cognitive Theory (2001, 2004, 2011) are underpinned by the concept of humans having the capacity for observational learning which enables dissemination of knowledge and skills through observing models. Thus, the behaviour, beliefs and attitudes of others can have a major impact upon individuals. Perception of reality can be based upon vicarious experiences associated with what they "see, hear, and read" (Bandura 2001). Pomfret (2011) suggests that such a process operates in relation to lifestyle choice and the development of the identity of the Self involved in “serious leisure activities".
Social approval is seen to be a determinant of whether modelled behaviour is expressed. Thus, the group of salient others can have a role in influencing individual behaviour by both presenting behaviour options and through the reinforcement of behaviour via social approval (Bandura 2011; Ajzen 2011). Celsi et al. (1993) indicate that factors such as a desire to comply with encouragement or norm imposition may influence risk behaviours. In their study of a ‘high risk’ activity, initial participation was often seen to be linked to the influence of others; perception of one’s experience and competence influenced inclusion in activities.

In relation to those operating at the extreme level of performance, Lyng (1990) states that injury and death due to poor planning and lack of standard safety precautions is not viewed well. Credentials as a participant may not be based upon “daring or risk taking actions” but by demonstrating competence in the control and management of risk (West and Allin 2010). This may result in social pressure to adhere to what may be collectively regarded as good practice. This is an example of the positive impact of social pressure on safety behaviour. Conversely, Taylor et al. (2005) indicate that social pressure and issues of image can act as barriers to the use of protective equipment.

Rutter et al. (1998) describe how as time passes, there is conformity to the norm of risk and the increase in risky behaviour is a way of expressing that norm. Celsi et al. (1993) suggest that “group polarization” may occur whereby a moderate attitude shifts to a more polarised attitude in the presence of others. In Celsi et al.’s study, the motivating power of compliance was seen to diminish over time and shifts to identification with the subculture and eventually leading to the group experience becoming an end in itself. Through the use of specific language, acceptance of norms and attitudes and cultural beliefs, initiates
become socialised to a particular view of risk associated with the activity. Thus, high risk activities that may initially be regarded as extreme, come to be viewed as the norm. This process can result in individuals becoming socialized into a risk culture and this can result in movement from a low level of risk engagement to a higher level of risk engagement (Schneider et al. 2007).

A sense of community and camaraderie can occur where individuals have a common bond of experience. Encounters with risk and losses associated with such encounters can become an important aspect of activities and bind people to the culture associated with the activity (Celsi et al. 1993; Albert 1999). Albert (1999) draws attention to the existence of subcultures associated with particular sporting activities and proposes that these cultures support specific responses to physical risk and injury. He describes how the perception of risk and occurrence of injury associated with an activity, can be constructed through the language of the sport, the nature of communication, the response to incidents and through verbal and written stories. He outlines how the relating of stories influences the perception of risk and the occurrence of injury so that they are constructed as everyday expected elements of the activity. Through such mechanisms, participants come to view risk as a salient part of the activity and conversational practices normalize its occurrence and so diffusing it as a deterrent to continued participation. These processes may contribute to risk taking being valued. These mechanisms and processes play a role in bonding the participant to the activity and emphasizing what it means to be involved in the sport. The potentially threatening character of danger is neutralised and the significance of losses downplayed. Malcolm (2006) proposes that socialisation processes may result the establishment of
norms where pain and injuries are dealt with by "shaking them off" and "tuffing them out". Over time, injuries are normalised and continuation in an activity following injury or pain may be a means of maintaining one's sense of Self and commitment; this can result in camaraderie and enhanced social status.

Injury and losses can be a way of demonstrating commitment to the sport and act as a rite of passage and affirms membership. For example, Webster (quoted by Coffey 2003) states “No one wants to get badly frost bitten, but to mountaineers it’s a badge of honour.” Albert suggests that what may be perceived as a lack of concern of others to a participant’s injury, may actually be a re-affirmation by the group of the injured persons status as a participant who will get back into the sport as soon as possible.

Joffe (2003) argues that perception takes place “though a lens of existing, often socially shared representations”. A key motivation underpinning these representations, is the protection of ‘in group’ and self-identity. Joffe holds that elements of group attachment and the experiences of their in-group and selves, influence people’s view of risks. These elements do not distort real risk; they are the reality to those looking at the risk. In such a way, different groups may have different representations of risk that tie in with the identities that need protection. To each group, their perspective on risk appears rational. Natalier (2001) highlights how the culture associated with an activity provides a framework through which risk is viewed. Processes such as training, formal teaching, informal storytelling, reinforcement through the social world of the activity and direct experience, support the development of particular knowledge relating to and attitudes towards risk.
This can result in divergences between the views of participants and those of socially defined expert groups.

The literature suggests that engagement with risk can be a means of fulfilling social needs. Encounters with risk and associated losses can bond people together and provide shared experience. Through socialisation processes, risk can become an accepted component of an activity and losses may not necessarily result in withdrawal from the activity; losses can demonstrate commitment and be subject to social approval. Risk taking may become part of the identity of the individual and the group and the value placed upon risk may be at variance with other groups. Group norms and the social acceptability of behaviour may act as powerful determinants of risk taking behaviour.

**Attitudes, affect and the perception of risk**

Ajzen (1991, 2002, 2011, 2012) proposes that behaviour is reasoned or planned and beliefs and attitudes are key elements in determining behavioural intentions. Attitudes are regarded as a latent predisposition to respond in a favourable or unfavourable way towards the psychological object; this is based upon cognitive and affective evaluations of the object (Fishbein and Ajzen 2011). Attitudes can act as a framework through which information is evaluated, for example, Siegrist et al. (2008) suggest that people's confidence in studies of risk assessment are influenced by prior attitudes. Festinger and Carlsmith (1959) indicated that when cognitions are inconsistent, dissonance is experienced and this can result in the drive to reduce dissonance, this can occur through changing cognition. The attitude towards a behaviour is seen to be influenced by beliefs about the consequences of a behaviour, the
positive and negative evaluations of that outcome and whether it is believed that performing the behaviour will lead to the outcome (subjective probability) (Cooper 2012). Sjoberg (2001) suggests that whilst attitudes are often described as being a function of beliefs and values, the opposite direction of influence may occur; attitudes can influence beliefs and values.

Fishbein and Ajzen (2011) suggest that there is not a clear distinction between attitudes and affect. Zajonc (1980) proposes that affect (a feeling state or evaluation of a quality associated with the object of attention) guides information processing and therefore has an impact upon judgement. Keer et al. (2010) believe that affective evaluation should be regarded as direct determinants of intention. The general emotional response to an object or issue is regarded as guiding the perception of risk (Slovic 2010b). This can lead to an inverse relationship between perceived risk and perceived benefit. The model of affect heuristic, proposes that for activities we like, benefit is judged to be high and risk low; for activities that are disliked, the opposite is the case (Alhakami and Slovic, 1994; Finucane et al. 2000; Slovic et al. 2004). This is seen to be a result of a “...tendency toward affectively consistent judgements” (Finucane et al. 2000). The avoidance of cognitive dissonance may result in probabilities being downplayed or ignored (Renn 1998).

Attitudes towards a particular risk may impact upon the interpretation of information associated with that risk. For example, White et al. (2003) found that prior attitudes had a moderating effect on trust placed on risk messages and participants had a greater confidence in messages that linked to their prior attitudes. They propose that these findings
may be important in explaining risk attenuation. If risks are not perceived as being risky in the first place, risk messages may be trusted less as they are not consistent with prior attitudes. This work reinforces the view that our attitudes act as a framework for the interpretation of information related to risk.

Slovic (2010a) argues that an experiential system of negative and positive feelings towards an object or situation play a major role in risk decisions and these decisions are not based upon numerical calculations. This concept is defined as “risk as feeling” as opposed to “deliberate, mechanistic strategies for processing information”. Slovic (2001) proposes that fun and excitement may draw a person into a behaviour with little conscious thought of the risks. Evaluation of the risks occurs after initiating behaviour and upon gaining what to them may be new information about health impacts. Slovic (1997) proposes that emotional responses to risk interact with reason based analysis and this occurs in both lay and expert assessments. The interaction of these frameworks for the assessment of risk is seen often to be complimentary and the experiential/affect-based system enables the rapid assessment of risk in complex and uncertain environments (Slovic 2004). The feelings towards a stimulus provide an overall impression that can act as a mental short cut or affect heuristic (Slovic 2005). Rhodes and Pivik (2011) support the view that the dual process approach to decision making occurs in relation to risk behaviours. The dual processes are linked to affective responses and "rational decision". They propose that affective responses and risk perception are variables independent of each other and each is predictive of risky behaviour. This differs from the stance of Slovic (2010b) where the perception of risk is seen to be influenced by affect.
Evaluation of Risk Research

The literature reviewed in this chapter demonstrates the diversity of research into the perception and response to risk. At one end of the spectrum, literature discusses the societal construction of risk, how macro-social processes such as the uncertainties of late modernity and the breaking down of traditional norms and values impacts upon the individual (for example, Lyng 1990; Celsie et al. 1993; Lupton 1999). In the middle ground, research has focused upon the nature of specific risks and how characteristics of the risk influence individuals’ perception (for example, see Slovic 1987), risk perception as a decision making process (for example, the application of the Health Beliefs Model and the Theory of Planned Behaviour to health risks) and the exploration of individual lived experience. At the other end of the spectrum, research has considered the influence of personality characteristics and biological determinants upon individual risk propensity (for example, Eysenck and Eysenck 1978; Zuckerman; 1979; Angleitner et al. 2004).

Taylor–Gooby (2004) proposes that a number of approaches based upon different ontological positions seek to provide an insight into risk and the perception of risk. These approaches are underpinned by different research methodologies. The psychometric tradition is seen to be associated with quantitative methods and a positivist stance. The socio-cultural viewpoint of risk is seen to be associated with a constructionivist stance and research methods are targeted at exploring peoples’ understanding of issues. The psychometric approach is regarded as being associated with the view that risk is objective and the focus of investigation is to determine how risks come to be represented in
perceptions via cognitive maps. The socio-cultural perspective tends to focus upon factors which lead to the construction of risk in society and norms and values. Within the psychometric, cognitive science position, risks are regarded as pre-existing and can be identified through measurement; from this standpoint, risk research focuses upon the identification of risks and identifying the cognitive factors that lead individuals to subjectively respond to these objective facts (for example availability heuristics, personal significance and familiarity). The socio-cultural perspective is seen to be associated with a relativist approach. The degree of association with the relativist approach varies within the literature. Some aspects of research has been described as weak social constructionivism where risk is regarded as objective and independent of social context but perceived and responded to as result of social, cultural and political processes (Zinn 2004; Zinn 2006). Other research is described as strong relativist, where risk is regarded as purely a constructed concept (Lupton 1999). Whether a strong or weak realist position, proponents emphasise that to understand the meaning of risk and response to risk, it should be considered within the context of factors such as individual experience, social interaction, structural frameworks and socialisation. A consequence of this is that what constitutes a risk and how that risk is responded to, can vary between people form different contexts. Zinn (2006) argues that the strengths of these sociological evaluations of risk is that they illuminate the complex and changing nature of risk, provide detailed descriptions of the meaning and motives linked to risk and demonstrate variation.

Lupton (1999) draws attention to epistemological uncertainty within the cognitive science approach to the investigation of risk. She highlights how research utilises subjective
interpretation of individuals’ response to risk within a realist framework. Zinn (2004) regards this as a fundamental criticism of the psychometric position in that objective risk descriptions are in themselves, constructions linked to a range of biases and serve a purpose in a social context. Thus, from a constructionivist viewpoint, differential views of risk represent different knowledge systems (e.g. lay knowledge and scientific knowledge), without one being superior to the other (Zinn 2004) and each reflecting the context within which activity occurs (Wynne 1996). Lupton points out that whilst some researchers work form a platform of risks being regarded as ‘real’ and ‘correct’, others regard actual risk only being able to be interpreted as perceptions. She points out that these views are at times confusing and interchanged within the literature.

A major criticism of aspects of the cognitive science approach to the exploration of risk is that it reduces meaning and behaviour to the individual level and does not account for symbolic meanings emanating from the social world. Perception is described in terms of the functioning of the senses without due consideration of the influence of "cultural conceptual categories", societal frameworks and relationships upon the mediation of judgements and thus oversimplifies processes (Lupton 1999) and the complexity of experience and response to risk (Tulloch and Lupton 2006). However, Bohlom (1998) argues that there is increased recognition in the cognitive science literature that risk perception does not occur in a social vacuum but is influenced by social context and world view (for example, see Slovic 2000b). Such a development can be regarded as a merging of both psychometric and the sociological perspectives (Marris et al. accessed 12/6/13). However, Sjoberg et al. (2004) maintains that early studies that do not consider such factors, remain influential. The work
of Kaspersion et al. (2003) transcends both the psychometric and the socio-cultural view of risk. Their construct of the social amplification of risk, describes how social processes transform risk messages and that cognitive heuristics (which are considered in the psychometric research tradition) influence individual perceptions of risk. These processes "ripple out" and have an impact both the individual and societal levels. Whilst, it is interesting that cognitive and social perspectives have been included in the model, it has been criticised for oversimplifying complex interrelations and power relations between various stakeholders (e.g. individuals and the media) (Murdock et al. 2003).

Taylor-Gooby (2004) questions whether generic explanations of the perception and response to risk can be developed or whether explanations should be context specific. Zinn (2006) proposes that there are no general but only "situational and case related solutions for risk problems" therefore, risks have to be managed and assessed on a case-by-case basis. Lupton (1999) and Tulloch and Lupton (2006) are critical of approaches that generate generalised models of the Self which do not provide an appropriate account of how individuals respond to risks in different ways. Sjoberg (2000) argues that there is a difference between personal risk and general risk and many investigating risk perception do not account for perceived personal risks. He regards this as significant methodological weakness.

Sjoberg (2000) is critical of the analytical methods used to determine factors used to explain variance in the perception of risk. He advocates that when determining factors, raw data, not means should be used as “the analysis of behaviour should not be of average behaviour
but of the ratings that people actually give” as the use of aggregate data may mask the range of opinions expressed by individuals in a sample.

Many of the criticisms of the constructionivist view of risk can be seen to be linked to epistemological frameworks and associated research methodologies. However, these criticisms may reflect an ontological bias towards the realist view. Qualitative approaches are frequently used to investigate ‘lived experience and meaning’. Such methods have been criticised as the knowledge produced is linked to the individual and their context and so has limited scope for generalisation to other people and differing settings (Taylor-Gooby 2004). As a consequence of this, critics argue that this makes it difficult to make quantitative predictions and test hypotheses and theories (Johnson and Onwuegbuzie 2004). Whilst this lack of generalisability is a criticism, it may also reflect that perception of risk is very much linked to the individual and not necessarily subject to extrapolation. A further criticism of quantitative methods used in constructionivist exploration of risk is linked to the extent to which the researcher’s personal biases can influence results and the interpretation of findings (Johnson and Onwuegbuzie 2004).

Attempts have been made to develop social theories of the perception of risk. Oltedal et al. (2004) describe how socially orientated theories such as Cultural Theory have a view of risk perception that consider factors such as personality, needs or properties of risk objects as not being core to perceptions of risk. Risk perception is regarded as a social constructed phenomena linked to cultural adherence and social learning. This may result in the impact of salient determinants of risk perception being downplayed. Oltedal et al. (2004) suggest that
the lack of explanatory power of the theoretical framework associated with Cultural Theory may be result of people being “so different that a general theory is not sufficient.” Sjoberg (2000) proposes that there is little empirical evidence for the Cultural Theory and states that the Theory is the example of the "persuasive power of speculation".

Whilst there is extensive research in this field and determinants of the perception and response to risk have been identified, the relative strength of these determinants, the effect of their interaction and their ability to predict behaviour is not clear. Sjoberg (2000) proposes that current explanations of risk perception are limited and unable to fully account for variation and have limited predictive power. It would appear that at present, there is not an all-encompassing theoretical framework to explain processes by which risk is perceived and how perception relates to response. This may be a reflection of the complexity and interaction of individual and social processes (Taylor-Gooby 2004). Research from a range of fields have usefully identified a number of factors that influence the perception of risk: Zinn (2006) is of the view that there is little theoretical integration or discussion between those advocating different approaches. Given the current level of understanding of the processes influencing the perception of risk, it would appear that research can illuminate why people respond in certain ways but not necessarily how they will respond in particular circumstances. This suggests that this is still an emerging area of investigation and what at present may be regarded as competing explanations, may actually be complimentary findings that have yet to be integrated.
The literature reviewed in this chapter has been drawn from research embedded in different ontological positions and utilising different epistemological frameworks. The research sheds light on factors and processes that influence both the perception and response to risk. In Chapter 9, aspects of this literature has been utilised to support the development of themes to investigate the meaning and perception of risk and associated risk management strategies. As advocated by Johnson and Onwuegbuzie (2004) a pragmatic approach to the dualism debated by ontological purists has been adopted and concepts derived from both realist and social constructionivist stances have been utilised.

**Summary**

This chapter explored the concept and the meaning of risk and factors influencing the perception and response to risk. Literature considered has been drawn from both cognitive science and constructionivist frameworks. The literature indicates that risk is not necessarily something that is avoided but is something that can be instrumental in the achievement of a wide range of valued outcomes. Risk taking itself may be something that is valued and encouraged by cultural norms, is represented in the media and reinforced by the membership of subgroups. Engagement with risk can act as a means of escaping from everyday experience but also as a means of binding oneself to cultural institutions. Over time, engagement with risk can become normalised and individuals may become acclimatised to risk and so risk no longer becomes a deterrent to participation. The affective and cognitive evaluations of risk can influence attitudes towards risk. These attitudes can act as a filter for information relating to risk. As such, information that goes against attitudes and beliefs may be downplayed or discredited. The propensity to engage with risk
appears to vary between people and this may be linked to biological processes and personality traits. The actual engagement with risk may be mediated by a range of factors including ability, anticipated outcomes and subjective norms. Where steps are taken to reduce levels of risk, individuals may compensate with behaviour that leads to reinstatement of their original target levels of risk; when this occurs and by how much is not clear. Whilst people may recognise that there can be significant losses as result of encounters with risk, individuals may have unrealistic perceptions of their own ability to manage risk and vulnerability to risk; this may impact upon individual risk management strategies.

Individuals may be motivated to operate at the edge of ability and success can stimulate a drive to meet further challenge. Moving beyond this edge can result in the loss of control and this is something that is avoided and associated with negative feelings. To maintain control, participants in adventure activities strive to develop skills and expertise.

A variety of factors account for differential perceptions of risk. These different perceptions may result in variation in the assessment and response to risk. These plural rationalities may be reflections of cultural biases and defendable when evaluated from the perspective of different individuals and groups. The following chapter explores the meaning of risk to those kayaking in the sea and considers the role of socio-psychological factors discussed in this review, upon the perception and response to risk.
Chapter 9

An Investigation into the Meaning and Perception of Risk and Associated Risk Management Strategies.

Methodological Framework

Introduction

The first quantitative study in this research strategy highlighted a number of directly experienced injuries and medical conditions and perceived health impacts affecting the wider kayaking group. Whilst a range of negative impacts were cited, in general, responses indicated that these were regarded as usually not serious or common. Kayaking in the sea was also seen to result in positive health impacts. Respondents identified a number of causal factors for these health impacts. Differences were observed in response according to a range of variables such as the type of boat used, activity undertaken and self-reported ability. The second quantitative study explored reported safety practices including planning and the carrying of safety equipment. Once again, differences were observed according to categories of participants. These studies did not provide an insight into why these differences are present and why, given the recognition amongst participants that negative health impacts can be a consequence of kayaking in the sea, they still choose to participate.

The review of the literature dealing with cause of incidents and mitigation strategies emphasizes the importance of judgement and decision-making. The review of the literature associated with the meaning of risk and the perception of risk indicates that a range of
factors can influence the way in which risk is viewed and engagement with risk can be instrumental in the achievement of desired outcomes; this in turn can impact on risk decisions and risk taking behaviour. Through an exploration of lived experience, consideration of the knowledge, beliefs and significance of activities to individuals and the review of socio-psychological factors influencing the perception and response to risk, it is proposed that an insight can be gained into the frameworks that influence the evaluation and responses to risk. An appreciation of these frameworks and learning from the experiences of those engaged in the activity are seen as providing opportunities to generate information to inform safety initiatives and incident prevention strategies.

Aim and objectives

This qualitative study aims to explore factors influencing the perception and response to risk and associated individual risk management strategies with the view to identifying issues to be considered in the development of safety initiatives and incident prevention strategies.

The following objectives were established to support the achievement of the study aim:-

- Utilising the findings of the quantitative studies and issues identified via the review of literature, develop a framework for semi structured interviews.
- Recruit interviewees with varying levels of engagement in kayaking in the sea environment.
- Conduct interviews with a view to gathering data in relation to;-
  - the motivations for participation and the meaning of risk to the individual
  - socio- psychological factors influencing the perception and response to risk
factors perceived as accounting for variation in the experience of health impacts, the profile of kayakers and the perception and response to risk
- factors considered to be sound practice to promote safety and reduce the likelihood of incidents
- Transcribe and analyze data and identify themes and issues to form the basis of recommendations related to promoting safety to support those kayaking in the sea environment.

Methodology

The methodology was designed to support an understanding of interviewees’ experience, their perceptions of events and associated meaning and interpretations (see Mason 1996; Lyons 2000; Malterud 2001; Smith and Osborne 2003). As such, the findings are not intended to be representative of others, support probabilistic claims or to test hypotheses (see Smith and Osborne 2003), but to provide insights into factors that exist within the broader population that may be influencing the perception and response to risk. Given this, the focus was upon meaning and understanding as opposed to recording frequencies of occurrence of themes.

Interviewers’ prior knowledge, experience and behaviour can influence the nature and the direction of interviews, additionally, analysis and interpretation of data is often not purely inductive but influenced by theoretical frameworks (Malterud 2001; Yardley 2008). The interviewer’s conceptual frameworks underpinning the direction of investigation and the nature of analysis are likely to have been shaped by a number of factors. These included
their background in social psychology, their belief in the value of phenomenology, research activities linked to the perception of risk, and safety practices and their experience as a regular sea kayaker and kayak surfer and participant in other outdoor adventure activities. In addition to this, they had been present at a number of incidents where rescue services had been called.

**Interview structure and themes**

A semi structured interview style was adopted based upon a thematic approach, utilising a bank of general marker or prompt questions (Mason 1996). A semi structured approach enabled, as result of interviewees’ response, the elaboration of initial questions to support a more detailed consideration of issues (Roulston 2010). The *a priori* themes for the interviews were developed based upon the initial literature review and the two quantitative studies. These themes are overtly stated to illustrate the conceptual framework behind questions and to provide transparency in relation to possible framing effects and associated bias (Braun and Clarke 2006).

The interview themes were as follows:-

- General information relating to activity, type of boat, experience and qualifications
- Motivation for participation including the attraction of kayaking and costs and benefits associated with the activity
- The meaning of risk, the rationale for engaging with risk and emotional responses associated with risk
- Factors influencing the perception of risk including:-
- group processes and subjective norms
- the impact of affect
- risk acclimatisation, desensitisation, normalisation
- optimism bias
- reversibility and seriousness
- efficacy
- cost benefit analysis
- personal experience
- socialisation

- Exploration of views on differences between categories of users in relation to their perception of medical impacts, the causes of incidents and reported safety practices
- Examination of factors influencing risk management strategies
- Recommendations to improve their paddling safety

**Sampling**

The sample was not intended to be random or representative of the wider group (Lyons 2000). In particular, the interviewees were identified on the basis of the perception of the insight they could provide in relation to the area of study (Mays and Pope 1995; Smith *et al.* 2009). The interviewees represented themselves in terms of their own subjective views and experiences; in addition to this, it was anticipated that they would be able to provide information linked to the nature of their activities and the type of boat they used and the social context of the activity.
Whilst a small number of interviewees were identified, their recruitment was based upon a predetermined framework. The two quantitative studies identified that the variation in response was linked to factors such as type of boat, type of activity and self-reported ability. Thus, based upon this, a stratified, purposeful sampling strategy was adopted (Marshall 1996). The sample size was determined to enable depth of engagement but also support the examination of divergence and convergence between interviewees (Smith and Osborn 2003). Each of the interviewees was chosen based upon the interviewer’s knowledge of their kayaking activity. Contextual information relating to the interviewees is presented to support determination of the validity of information generated (Malterud 2001).

**The Sea Kayaker**

This interviewee was in their early 50s and male. After many years of outdoor adventure activities including climbing and transatlantic yachting, he had come to kayaking relatively recently. He reported starting to kayak in the past five or six years and was a member of a kayaking club. His paddling activities took place throughout the year and on average once a week. Since starting to kayak, he had undertaken training and was now held a British Canoe Union qualification which validated his ability to lead groups in intermediate conditions. He had undertaken a number of expeditions and had paddled his kayak from Wales across the Irish Sea to Ireland. Most of this paddling was undertaken with others. Although he defined himself as being of "medium" experience, his paddling activities often took place in very challenging conditions. When first starting out kayaking, he had been involved in an incident that required support from the emergency rescue services. The interviewer was present at
this incident and played a role in the rescue. Since this incident, the interviewee and interviewer had paddled together on many occasions.

**The Sit-on Kayaker**

This interviewee was male and in his late 50s. He reported that he had been paddling kayaks for eight or nine years and his paddling mainly took place in the sea. He reported that his paddling tended to be in summer months and in a year, he would use his kayak 10 or 12 times. He had not pursued qualifications and had undertaken one short training course. He regarded himself as an intermediate level paddler. Most of his paddling took place on his own and close to shore. Whilst the interviewer was acquainted with the interviewee in a professional capacity, they had not paddled together.

**The Intermediate Paddler**

This kayaker was female and in her early 50s. She had been paddling for approximately 10 years. She was not a member of a kayak club but paddled with a group of friends. Most of this time she had used a sit-on kayak; in the past two years she had purchased a closed cockpit kayak. The sit-on kayak was still regularly paddled. Her paddling involved surfing close to the shore and coastal trips with friends. She did not hold formal kayaking qualifications but had attended a short course on rescue techniques. She described herself as a “fair weather paddler” and as she tended to paddle once a week for 10 or 12 weeks during the summer months. She viewed her ability as being between beginner and intermediate. The interviewee had known the interviewer through professional links for
many years and had paddled with the interviewer on approximately 4 occasions during the past five years.

The Local Beach Lifeguard

This interviewee was male and 19 years old. He had grown up close to the sea. From a young age he had been introduced to kayaking and surfing. He had paddled kayaks for approximately 10 years and used both sea kayaks and playboats. He had been a member of a kayaking club for a number of years and had undertaken formal kayaking qualifications. His highest kayaking qualification was related to kayak surfing and was a British Canoe Union discipline specific qualification demonstrating competency. On completing his ‘A levels’, he had worked as a lifeguard at the major holiday beaches in North Pembrokeshire. The interviewer had been a member of the same kayak club as the interviewee and had paddled with him and his father on a number of occasions.

The Sit-on Kayaker and Surfer

This male interviewee was in his mid-30s. Kayaking in the sea was an activity undertaken whilst on holiday and with the family. He had started paddling kayaks approximately 10 years ago and had some experience on lakes and rivers. The interviewee was involved in a range of outdoor adventure activities including climbing and mountain biking. Most of their activity in the sea focused upon surfing a surfboard and they defined themselves as a surfer and not a kayaker. The interviewer and interviewee had not undertaken kayaking together; there was social interaction prior to the interviews and this stemmed from a common interest in surfing and mountain biking and being employed by the same organisation.
The Experienced River Kayaker and Coach

This male interviewee was in his mid-thirties and had been paddling kayaks predominantly on rivers, for over 20 years. As their family responsibilities had increased, their paddling frequency had fallen. The paddler was currently a coach in a local kayak club. In the past he had led expeditions to both Himalayan and South American rivers. Whilst he had paddled in the sea, this was not a major aspect of his paddling activity. When he was younger, he had undertaken a number of formal qualifications but these had lapsed. He is currently pursuing a British Canoe Union river kayaking coaching award. The interviewee defined themselves as experienced. The interviewer had paddled with the interviewee approximately 10 years ago when they were members of the same kayaking club. At that time, the interviewee had coached the interviewer.

The Male and Female Beginners

Both these participants were in their early 20s and were pursuing a sports related degree. As part of that degree, they were undertaking a module linked to outdoor adventure. A component of this module required them to participate in an outdoor adventure activity. They had chosen to focus on kayaking and this involved four days training in a swimming pool, a one day introduction to paddling in the sea, followed by four days paddling playboats around the coast of Pembrokeshire. During the four days paddling, they experienced a number of conditions, environments and activities. The interviewer had supported them during their initial swimming pool training and accompanied them for one day in Pembrokeshire. The female paddler had not previously paddled a kayak. The male paddler had experience of paddling his father’s sit-on kayak whilst on holiday.
All the potential interviewees approached agreed to participate in the study. Six of the interviewees had kayaked with the interviewer. There were social bonds with all the interviewees. The Experienced River Kayaker and Coach had acted as a coach to the interviewer, the Sea Kayaker was a close kayaking colleague and the Intermediate Paddler had undertaken a number of trips with the interviewer. Both the Beginners had been supported in their training by the interviewer and the Local Beach Lifeguard and the interviewer were at one stage members of the same kayaking club. Both the Sit-on Kayaker and the Sit-on Kayaker and Surfer, were known to the interviewer through workplace connections. These bonds and shared experience are recognised as influencing the social dynamics of the interview and impacting upon the nature of the interaction and interpretation of the exchange. The relationships are likely to have played a role in the co-construction of data (Roulston 2010). Whilst a sample size of approximately 8 was determined (Smith et al. 2009), a flexible approach to sample size was adopted whereby sampling would cease when data saturation occurred (Marshall 1996). The transcription of each interview before the commencement of the next interview was used as a means of determining data saturation and supporting the point at which interviewee recruitment would end.

**Data gathering and analysis**

A semi-structured approach to interviewing was adopted to enable the probing of emerging issues and consideration of issues of importance to the interviewees. Furthermore, flexibility in the interviews supported interviewees to raise issues that had not been identified by the interviewer. Thus the respondents acted as "experiential experts" (Smith
and Osborne 2003). To aid the flow of interviews, a pool of possible questions was developed. The sequencing of questions moved between those which were factual or descriptive to others which were analytical or evaluative. The interviews were conducted with the interviewer taking an active and reflexive stance. This necessitated a flexible, as opposed to a linear scheduling of themes.

The broad structure of the interview, the themes guiding the direction of the interview, interview style and effectiveness of the interview recording equipment were piloted with the Sea Kayaker. Prior to the interview, the rational for the research and the role of the interview was explained to the Sea Kayaker. Following the interview, a forty-five minute debriefing session was held with the interviewee to discuss their experience of the session. The interviewee felt that they had been able to express their views and the questions were regarded as acceptable and of relevance to the stated purpose of the interview. The data generated in this interview was included in the overall analysis.

It was felt important that a rapport was established with the interviewees and for the interviewer to be perceived as understanding the context of their experience. To support this, the interviewer presented themselves as a person active and committed to kayaking in the sea environment. The existence of a social relationship and shared experience was also regarded as facilitating discussion and the exploration of issues. It is advocated that an intimate understanding of the research setting supports sensitivity to the language associated with the activity and contextual meaning (Mays and Pope 1995). It is recognised
that these factors may have influenced the nature of responses and in particular, interviewees may have wished to present a favourable image.

The interviews took place at a venue convenient to the interviewees. The nature and purpose of the study was explained to interviewees and how their specific background and experience could contribute to understanding. The broad themes for discussion were outlined. It was pointed out that there were not necessarily right or wrong answers but what was important was their view. The interviewees were informed that whilst the interviews would be recorded and transcribed, they would not be identified in the research. It was explained that they could withdraw from the study at any point without penalty. It was also explained that the findings could be used to inform safety initiatives. Following this briefing, informed consent was inferred by the agreement to participate in the interview. Interviews typically lasted between 50 min and one hour. The interviews with the two beginners were shorter and took approximately 20 minutes. Shared experience enabled the interviewer to draw the interviewee’s attention to specific events to help them explore a number of themes.

The interviews were recorded and transcribed. The transcription excluded utterances. Contextual information was not added to the transcription, however, as the interviewer also acted as the transcriber, it was possible to account for visually displayed non-verbal aspects of communication in the interviews when attributing meaning to statements. Whilst the interpretation of this aspect of non-verbal communication cannot be independently verified, recordings of interviews are archived to enable independent assessment of the
context of verbal responses. The transcription of interviews allowed for decontextualised records of the interview process that could be subject to independent verification and analysis (Mays and Pope 1995).

The analysis and transcription of the interviews being undertaken by one person enhanced immersion in the data (Braun and Clarke 2006), however, it is recognised that this in itself may result in a lack of independence between the activities and maintenance of preconceptions.

Analysis of the data involved the review of responses to questions. This included a summary of the view expressed and information provided, a reflection on how this fitted in with the *a priori* themes and a statement of themes and sub themes that appeared to be emerging as result of the analyst’s interpretation of responses. Notes were annotated next to statements in the transcripts. Where meaning was not clear, original recordings of interviews were listened to again. With each subsequent transcript, previously identified themes were considered when categorising responses. Following this initial review, familiarity with the dataset allowed for a comparison between the responses of interviewees and concurrence and divergences in responses to be noted. The implications to the development of safety initiatives were highlighted.

Evidence derived from the interviews supporting themes and a description of interviewees’ responses was collated and presented as the initial analysis. This document was used to support the reappraisal of themes to ensure internal homogeneity and external
heterogeneity (Patton 1990 cited by Braun and Clarke 2006). Through this exercise, it became apparent that a number of predetermined themes such as the impact of affect, seriousness and reversibility and personal efficacy were not focused upon in-depth in interviewee’s responses and there was limited data to support them. Other issues such as the impact of age, proximity to the shore and competing with oneself and others received considerable attention. On the basis of the review, overlapping themes and sub themes were combined, new themes presented and other themes either removed or assimilated into other headings; this was undertaken to ensure coherence within themes and distinctions between themes.

Both an *a priori* and an emergent approach were used to identify themes in the responses of interviewees. The *a priori* themes included:

- The motives for participation
- The attraction and meaning of risk, including:
  - the nature of risk
  - the motives for risk taking
  - the transition between thrill and excitement and fear and anxiety
- Factors influencing the perception of risk including:
  - subjective norm
  - the impact of the presence of others
  - risk acclimatisation and differentiation
  - optimism bias
  - risk homeostasis
• personal experience

• The acquisition of knowledge and behaviour

• Perception of the likelihood of being involved in an incident

• Nature of and variation in safety practices and perceived causes of health impacts including;
  – variation between types of user
  – variation according to type of boat and activity

• Steps to improve safety

The themes grounded in the data and emerging inductively as a result of analysis and interpretation of the data included;-

• Desired outcomes including;
  – challenge and pushing oneself
  – thrill and adventure
  – the desire for encounters with the environment
  – kayaking as a social activity
  – physical and mental wellbeing associated with kayaking
  – the impact of age on the propensity to engage with risk
  – the impact of having responsibility for others on behaviour
  – proximity to shore and the perception of risk
  – presenting a favourable image and the influence on behaviour
  – the mediation of social pressure
  – the modelling of behaviour
– competing with oneself and others
– the reintroduction of thrill as a result of risk acclimatisation

Ideally, at this stage, it would have been appropriate to initiate independent analysis of the interviews and the identification of themes. This would have acted as a check on reliability and as a measure to account for bias in the interpretation of interviews. Such an approach recognises the existence of alternative interpretive stances.

The presentation of the data generated was both literal and interpretive. The interpretive aspects of the analysis involved linking statements made by the interviewees with the themes identified (Aronson 1994). Extracts of the responses of interviewees are presented in the findings to illustrate the themes and as evidence of the views expressed.

A number of questions required interviewees to explain the behaviour of others. Other aspects required them to consider their own motives and experience. Thus a double hermeneutic was taking place as the researcher was trying to interpret the participants’ interpretation. Whilst providing insight, such an approach is limited by what the respondent is willing to say, and the bias introduced by the interpretation by the researcher (Smith et al. 2009). There may have been differences between the interpretation of respondents and the interpretation of the researcher (Smith and Osborne 2003); to ensure that participants’ views had been authentically represented (see Fossey et al. 2002), meetings were established with two of the interviewees and a summary of the analysis of the transcripts was read back to 2 of the interviewees (Mays and Pope 1995: Roulston 2010).
Interviewees were asked whether this summary included a reflection of their views and comments and whether they believed other views and comments presented were likely to be representative of the views of others. The Sea Kayaker and the Sit-on Kayaker and Surfer were recruited to participate on these meetings. They were chosen as they were regarded as representing contrasting levels of immersion in the activity. As a test of validity and to determine whether data corresponded with the social context in which they were derived (Fossey et al. 2002), the interviewees were asked whether the findings presented were logical based upon the questions asked and the responses provided. Both interviewees felt that the summary was an appropriate account of discussion and interpretation was logical. Validity could have been further enhanced by conducting a focus group, drawing upon participants engaged with kayaking in the sea and encouraging them to consider whether the findings reflected their experience and the understanding of the experiences of others.

Key limitations in this study are seen to be linked to the following:

- Lack of independence between the identification of themes to guide interviews, the interviews and the analysis and interpretation of data
- The influence of the social relationship between the interviewer and the interviewees in the generation of data
- The identification and recruitment of interviewees via the interviewers social networks
- The framing effect of the interviewers experience, beliefs and attitudes on the generation and interpretation of data
It is also recognized that the views expressed by the eight interviewees cannot reflect the full array of perspectives. However, their views and experiences do provide a legitimate insight into processes that can influence responses to risk.
Interviews Results and Discussion

Introduction

The following section presents an analysis of the data generated via the interviews. Verbatim quotes are presented to illustrate and provide evidence for the issues raised. The themes discussed are evaluated with reference to the broader literature and where appropriate, cross referenced to the findings of the quantitative studies looking at health impacts and cause and safety practices.

The attraction of kayaking and the meaning of risk

Desired outcomes and benefits

Kayaking in the sea environment was seen to fulfil a number of desired outcomes. Respondents talked about seeking out different experiences at different times. On some occasions, peace and tranquillity were the valued outcomes but at other times, respondents deliberately looked for thrill and excitement. Kayaking was regarded as an activity that encompassed a variety of forms varying in the level of demands placed upon participants.

The Intermediate Paddler explained "What’s so great about kayaking is you can go out in different conditions and you will have a completely different experience…sometimes I just want to go out and have the quietness and peacefulness, tranquillity and relax and other times you need just that bit of adrenaline rush, so it’s about being able to do both with one sport."

Kayaking was seen as a means of being in close contact with the environment. The Sea Kayaker described how it was possible to gain access to places inaccessible to a sailing boat
and paddling a kayak provided a direct experience of being in the sea as opposed to floating on it. The Sit-on Kayaker regarded encounters with the environment as being his primary motivation for paddling “Well it's the environment isn't it, it’s being there you know. You sit on the beach and then you kayak out from the beach and you look back at the beach and you sit there and you're tired and you've pushed yourself quite hard, then you turn around and put your feet over the side on a warm evening and it’s perfection, the smells, the movement, the sound.” A similar view was expressed by the Intermediate Paddler “I love being out in the open air, I love the peacefulness of it, especially when you're out at sea, you've got all the scenery, you have the seabirds, I love all that especially if it is calm. Just paddling along, you can’t beat it because it is so peaceful. It’s just a fantastic experience.”

Whilst the aesthetic value of participation was described, for many of the respondents, the themes of thrill, excitement and challenge were more frequently cited as motives for participation; this is illustrated by the Local Beach Lifeguard who stated “I can’t last very long in flat water although it's all very beautiful and interesting, I prefer a bit more wild seas”.

A number of benefits of kayaking were described, these included experiencing the beauty of the coast, encounters with nature, enhancing physical health and mental well being, the fulfilment of needs for excitement, exercise, coping with stress, stepping away from or compensating for everyday aspects of life, relaxation, social contact, the facing of challenge, opportunities for the application of skills and self development. The diversity of positive benefits described reflects many of the motives for engagement in outdoor adventure activities quoted in the literature. The significance of factors appears to vary amongst
paddlers, for example, some wished to avoid challenging conditions, for others this was the primary motivation for participation.

**The sea and risk**

Respondents recognised that there were risks associated with the activity. However, this was put in the context of everyday life. Brymer (2010) reported a similar finding in relation to participants in extreme sport. The point was made that risk is everywhere and that everyday activities such as driving can result in injury or death. The Sea Kayaker stated “everybody takes risks don’t they, you take risks when you cross the road, you take risks when you drive a car. You weigh them up….but you are taking a risk….there is a risk involved in everything isn’t there.” This suggests that people are constantly encountering risk and voluntary risk taking is regarded as containing and element of cost benefit analysis. The view was expressed that risk could not always be avoided and attempts to do so would limit engagement with new situations; the Female Beginner stated “You got to take life in-it (sic), because otherwise you will never try anything if you are always going to be scared.” In relation to the carrying of equipment to deal with incidents, the Sit-on Kayaker talked about how he felt it was not feasible or appropriate to prepare for every eventuality "I think there's a limit,...life is not without risk.” The Male Beginner described how one of the benefits of encountering risk was the development of skills to enable you to deal with future situations “If you purposively (sic) avoid risks, when you do encounter one, you will not be able to deal with it.” These views concur with the statements of the Chief Executive of the UK Health and Safety Executive (see Gill 2010) where risk is seen to be a part of everyday
life, something that often cannot be avoided and engagement with risk can result in benefits such as the capacity to manage risk.

The Local Beach Lifeguard felt that benefits were accrued by taking risks "With fear and risk is fun and excitement, as well it brings that element of achievement in there as well. If you get some challenging stuff and you cope with it and you get out alive, you get some achievement." Concurring with the findings of Lupton and Tulloch (2002b), risk was not seen as a negative concept and its eradication was not necessarily desired. The Intermediate Paddler felt that the unpredictability of conditions was one of the attractions of paddling in the sea "it is an environment that is out of your control, that's part of the excitement." Lyng (1990) suggests that facing and surviving such conditions can act as a way of enhancing an individual’s perception of being able to meet challenge in general and reasserting a sense of control and self efficacy.

The desire to engage with risk and what was regarded as a risk varied. For example, tidal races and overfalls were avoided by the Sit-on Kayaker, whereas others deliberately sought out rough conditions. The Sea Kayaker felt that different people have different thresholds for risk and therefore what one would regard as risk, another would not; this was seen to account for differences in the way in which people felt in a particular situation. Whilst a number of studies have indicated that the differences between individuals may be linked to biological predisposition and personality type (Eysenk and Eysenk 1978; Goma-i-Freixanet 1991; Zuckerman 2000, 2004; Roberti 2004; Stelmack 2004; Angleitiner 2004; Netter 2004; Chang, Chen and Yeh 2011; Mishra and Lalumière 2011), the Sea Kayaker felt differences
were a function of the person and the situation and their ability. He explained how risk is not an objective measure applicable to all, but is an interaction between the person and the situation "risk is very difficult to evaluate because it is related to your ability at something". This supports the view of Mortlock (1984) whereby it is seen that perceptions of what constitutes adventure varies from person to person and experiences are related to demands and ability. The Sea Kayaker described both risk predisposition and ability as influencing behaviour. Thus, personality traits predisposing an individual to engage with risk may be mediated by an evaluation of risk against ability. This view is supported by Delle Fave et al. (2003) who propose that challenge is related to perceived personal capabilities and by Celsi et al.’s argument that perception of the edge of successful performance is linked to an individual’s confidence and subjective evaluation of ability.

Interviewees discussed a number of risks linked with kayaking in the sea. There was the recognition of losses which could vary from "being struck, to being dead" (Sit-on Kayaker and Surfer). However, in general, paddlers regarded the activity as relatively safe, particularly when compared to other activities such as driving. The Experienced River Paddler and Coach felt that as kayaking gained in popularity, there may be an increase in the number of fatalities. The general assessment of losses associated with kayaking reflected the literature which indicates that whilst fatalities can be a consequence of incidents, they tend to be infrequent and the incidence of injuries is relatively low (Morrison 2003; Young 2010).
Safety guidance from around the world emphasises the significance of environmental conditions, the way in which sea conditions can rapidly change and the need for appropriate planning, skills and equipment. Respondents’ representations of paddling in the sea reflected the stances of organisations promoting safety amongst those kayaking in the sea. The recognition of the potential of losses was seen to stimulate risk management strategies and with appropriate skills and planning, the activity was perceived as being relatively safe. The perception that action can be taken to respond to risk and limit its impact may provide justification for engagement. Lyng (1990) described how success not purely being due to chance, is an important element in the decision to undertake activities. The sea was regarded as a dynamic environment where conditions could rapidly change. The Sit-on Kayaker felt that people see the sea as “a dangerous thing to get into” and as a result, treated it with respect and this was reflected in safety practices.

A range of specific risks were identified, these included mists descending and resulting in disorientation, impacts with rocks, waves and other paddlers, dangers associated with large swells and being caught in strong currents. One theme emerging was the power of the sea and how conditions could rapidly change. The Male Beginner commented on the sea after just finishing a day’s paddling "It's a lot stronger than you might perceive it to be. Until you are hit by a big wave or the force of big swell, you don't really know it until it hits you and wow! ....the rip today, if you get stuck in one of them and you are trying to get out of it, you get so tired you might actually have to be rescued by the Coastguard or something." The Intermediate Paddler related her experiences of being caught in rapidly changing conditions "In a matter of seconds the conditions had changed and it only was a matter of seconds....I
remember thinking in my mind, oh my God, I want to go home now. I remember that really vividly, I just want to be at home now, I don’t want to be here anymore.” She went on to describe how she attempted to fight the conditions and how she believed that she was going to capsize and hit her unprotected head. “But all is well and I am still here but I did have nightmares for probably the next couple of weeks. I would wake up in the middle of the night and jumping as you do, thinking oh God I could have, I could have drowned.” The Sea Kayaker felt that many situations could be dealt with by paddlers, other situations were regarded as very difficult to cope with and could end up as an incident. He explained how what may start out as a small occurrence, could lead to a significant incident "A small thing leads onto another small thing and becomes a slightly bigger thing that gets involved with another small incident that becomes an even bigger incident, eventually it overtakes the situation.”

The interviewees highlighted a broad range of risks associated with paddling kayaks in the sea and the potential for losses was recognised. Fatalities were regarded as being uncommon and the activity as being relatively safe. Many of the risks associated with paddling in the sea environment were regarded as manageable by the adoption of good safety practices. It was explained that risk is present in many aspects of life and their kayaking activity was evaluated against general risk. Engaging with risk was seen to provide a range of benefits one of which was the development of a general ability of risk management. The perception that losses were uncommon, the activity resulted in a range of benefits and that risks can be managed, may provide justification for continued participation.
**Thrill and excitement**

Interviewees discussed how kayaking provided opportunities for thrill and excitement. The desire to seek out these experiences was described as an inbuilt characteristic of many people and fulfilled a need. This thrill and excitement was cited as a way of transcending the routine nature of everyday life. Whilst some people were seen to wish to avoid thrill and excitement, others deliberately manipulated activities to enable the experience of thrill and excitement. Thrill and excitement, for many, resulted in positive feelings. The motives described for encountering thrill and adventure supports Ewart’s (1994) assessment of the general themes in research into risk and recreation motivations. These themes are regarded as the motives associated with personality predispositions and motives associated with goal directed behaviour.

The Male Beginner reported that “I'm always seeking thrills in everything I do; I'm always looking for a bit of a buzz.” The Experienced River Paddler and Coach described how, particularly when he was younger, thrill was a primary motivator. Thrill was encountered by facing challenge. Succeeding in the face of challenging conditions was seen to be satisfying. The Intermediate Paddler described how she sought out activities that provided excitement, “I think quite a few of the activities I like to embark on,...you are actually looking for something that has a little bit of excitement or stress to your life, it's positive stress not negative stress and I think for that reason I do actually go out and look for that.” The Sit-on Kayaker and Surfer described how he undertook activities that were a major source of "adrenaline". The Sit-on Kayaker describe the positive feelings he had when riding a wave “it's an adrenaline rush isn't it. I've had a bit of an adrenaline rush coming in on the back of a
wave and it's a lovely feeling, it's heck of a feeling”. Buckley (2012) regards engagement with risk as been instrumental in achieving "rush" and "rush" can be an addictive motivator. The Intermediate Paddler felt that this seeking out of thrill and excitement was inherent in some people, something they needed in their life. She felt that her day-to-day work experience was generally "fairly comfortable" and that there was a need for an element of stress that kept her "on the edge". This supports Lupton and Tulloch’s (2002b) and Robinson’s (2004) view that heightened experience and adventure activity allows the individual the opportunity to leave behind the mundane and normal experiences. The Intermediate Paddler stated "I do actually know I do go out and actively seek certain excitement or activities that are a little bit more daring than others; I don't know why, I just think it's something inbuilt in me.” The perspective provided by the Intermediate Paddler suggests an interaction of personal characteristics and the desire to transcend aspects of everyday life as influencing the decision to engage with risk, adventure and challenge. Even though thrill and excitement was often highlighted as part of the attraction of kayaking, at times peace and tranquillity were a desired outcome. Not all respondents regarded the need to seek out thrill and adventure as being a personal characteristic. For example the Sit-on Kayaker described himself as risk adverse and would actively avoid more difficult environments. He stated "I'm a somewhat risk adverse person,…I realise life is a pretty fragile thing. I don't think you would go out of your way to take risks….I think it's probably a feature of me, I'm a reasonably risk adverse person."

Celsi et al. (1993) propose that there can be a drive towards maintaining an optimal level of tension and challenge, and the desire to encounter the edge of performance can result in
action where risk is artificially increased (Lyng 1990). As respondents had become more comfortable with conditions, there appeared to be a tendency to take action to reintroduce excitement. The Sit-on Kayaker and Surfer reported that there was a need to "push further to get the level of excitement and thrill". To maintain the experience of excitement and thrill, he would deliberately enter less familiar environments. The Local Beach Lifeguard indicated that as his ability had increased, as a means of increasing or maintaining the intensity of experience, he no longer followed certain safety practices. As an example, he explained he did not wear a buoyancy aid or helmet when surfing a kayak and reported that this increased his vulnerability and so "makes it more fun".

Interviewees talked about how fear could enhance the intensity of experience. The Local Beach Lifeguard surfed both surfboards and kayaks. He talked about 6 foot waves being head height on a surfboard and how you could let go of the board, whereas "in a kayak you are strapped in and it can be double overhead when you sit down and that makes it even more exciting and scary in the same sort of conditions but at the same time a lot more fun". He went on to describe situations where he had been caught in big waves that have 'dumped' on him and pinned him upside down; he regarded such experiences in a positive way "but I think once you've conquered that sort of level of experience, you still get scared but it's even more of an achievement at the end". He felt that conquering fear was one of his motives. Lester (2004) describes how facing fear inducing situations can be used as a way of overcoming and freeing oneself from fear. The Male Beginner also described being frightened but then succeeding resulting in positive feelings "I was shitting myself but then I got out and I thought wo wo wo and said woow...... it’s that adrenaline rush if you challenge
yourself hard and in dangerous situations." Other examples were given of where activities were reported as exciting shifting into terrifying. Experiencing such situations, whilst at the time produced anxiety, their successful completion was regarded as enjoyable. The literature describes how conquering fear can be linked to definitions of self worth (Lupton and Tulloch 2000b) and the ability to overcome fear is regarded as a key aspect of control (Lyng 1990); fear inducing situations may be entered as a means of overcoming fear (Lester 2004). The Male Beginner indicated that thrill and excitement was a motivator; the decision to engage with activities was linked to an assessment of their abilities and an assessment of the likelihood of success "I seek a bit of danger but I've still got a bit of sense, I will know in myself and my capabilities if that is the right thing to do or not or if the conditions are too rough.....I will only attempt something if I know there is a possibility of me succeeding." The discussion of wishing to face challenge and experience thrill and excitement, yet at the same time assessing risk and taking steps to militate against risk, reflects rationality underpinning decisions to engage with activities. This is suggestive of Eysenck and Eysenk’s (1978) description of ‘Venturesomeness’, as opposed to ‘Impulsiveness’. It is not clear whether this approach to decision making is a personality trait or a result of socialisation into the norms associated with the activity, furthermore, both the push to engage with more intense experiences or the decision to hold back, may be linked to a personal target level of risk (Adams 2012).

Events were described where the positive feelings associated with thrill and excitement transformed into anxiety or fear. This transition was described as subtle and the division between these elements very small; as stated by the Sea Kayaker, "you tip the see saw over
the balance point very easily.” Participants talked about a comfort zone or a boundary point and how moving out of this comfort zone or crossing the boundary, led to this transition in feeling. The Sit-on Kayaker and Surfer explained this as “a boundary, a level that you hit. I think you look for excitement you look for the thrill of the thing but I think if you get too close to the boundary, to the edge of experience….it goes beyond excitement and then you become anxious about it, you don’t want to drown but you know you are in a lot of water.” The Local Beach Lifeguard indicated that this transition can occur quickly ”I think you can be out for ages and suddenly get a spill on a wave or something and it can snap just like that and suddenly you feel out of your depth”. He went on to describe how this is more likely to occur when operating at the edge of one’s ability ”you can be so far on the edge, it just takes one little wrong turn and you feel uncomfortable.” These representations are aligned with Lyng’s (1990) discussion of the ‘Edge’ and ‘Edgework’ and the fine dividing line between successful performance and chaos. A similar account is provided in Mortlock’s (1984) description of “Frontier adventure” where the individual is operating on a knife edge between ”success and failure”. In both Lyng’s and Mortlock’s accounts, there is a desire to operate at these bounds of performance and success is associated with a range of highly valued outcomes.

The movement from positive to negative feelings was regarded as being linked to control over the situation. The Intermediate Paddler stated ”I suppose it’s when you are no longer in control of the situation, when you know there isn’t anything you can do to get yourself out of a situation.” The Sit-on Kayaker and Surfer also considered it to be linked to ”When it gets to the point where I feel I don’t have any control.” The Male Beginner felt that “As long as you
are slightly in control, that's when you've got that buzz, as soon as you lose that control and you perceive yourself not being able to cope in that situation completely, that's when I think it becomes scarier. Where you haven't got control and you actually think you can't get out of it without messing up or hurting, that's when it becomes scary I think." The Female Beginner reported that not having confidence in one's ability in a situation contributes to the transition between states “When you don't have confidence in yourself it becomes frightening, you lose confidence in your ability.” The Experienced River Paddler and Coach provided an example of operating at the edge of ability then finding themselves in a situation where “I was completely out of control, I was fighting to stay upright. I felt very helpless; I knew I was out of my depth”. In this situation, not being in control was regarded as a factor leading to the transition from thrill and excitement to an uncomfortable feeling. He described other situations where this transition was as a result of not being able to judge conditions and not being able to determine the appropriate course of action. Brymer (2010) and Lyng (1990) describe avoidance of situations where there is a loss of control. Stranger (1999) indicates that situations may be encountered where the individual becomes overwhelmed by the environment and what may have been pleasurable turns into a fear evoking situation; Brymer 2010 sees fear as something that can inhibit peak experience.

An alternative perspective was provided by the Sea Kayaker. He stated that he did not feel anxiety in difficult situations but more an acceptance of what might happen. He went on to describe a life threatening experience when climbing "I got in an avalanche a few years ago ice climbing and you resign yourself to the fact that that might be the end of it because it is completely beyond your control.”
The desire to encounter thrill and excitement appeared to vary amongst respondents. Interviewees indicated that they felt that this was linked to personal characteristics. Encounters with thrill and excitement were described as arousing and success in activities was seen as satisfying. Such encounters provided stimulation and intensity of experience that may have been missing from other aspects of life. Activities at the edge of performance capabilities were seen to provide opportunities to test oneself; part of this testing may involve conquering fear. The desire to encounter thrill and excitement does not seem to be without limit. Whilst intensity of experience may be increased to produce desired outcomes, participants talked about the point beyond which they would not extend. Interviewees talked about a comfort zone of performance. Desired experiences such as challenge, thrill and excitement were often linked to approaching the upper limits of this comfort zone. This can place the paddler at the dividing line between successful and unsuccessful performance. Stepping beyond this boundary may lead to anxiety. No longer being in control of the situation was described as a key determinant of feelings of anxiety.

**Challenge and pushing oneself**

Challenging and pushing oneself was a theme raised by interviewees. The Male Beginner, the Sea Kayaker, the Sit-on Kayaker and Surfer and the Local Beach Lifeguard described continually seeking out higher levels of challenge. The Sea Kayaker felt that if people successfully engaged with challenge they "pushed the bar a little bit higher than they did last time". The motivation to face challenge was described as being linked to a number of factors; these included personal characteristics, opportunities for personal development and the attainment of higher levels of operation, competing with oneself and the feeling of
satisfaction resulting from a sense of achievement. The feelings associated with facing challenge were described as positive. When asked how he felt about himself after undertaking challenge, The Local Beach Lifeguard stated that successfully dealing with challenging conditions gave a sense of achievement and built up confidence. The Intermediate Paddler related how success resulted in feelings of elation and a sense of achievement. The Female Beginner described the feeling after successfully facing challenge as "good, it's really good, it's a good feeling".

Respondents discussed a personal characteristic which was related to pushing oneself and deliberately engaging with challenging conditions. Lupton and Tulloch (2002b) regards this pushing oneself as providing opportunities for mastering oneself and demonstrating self worth, expanding experience, extending the Self and self-realisation. The Male Beginner saw themselves “never been like a bystander really ever, I've always wanted to get involved, there is no point just sitting there if you've got the opportunity. I think a lot of people, like myself included, you push yourself.” The Sit-on Kayaker and Surfer also indicated that pushing themselves was part of their personality and seeing others undertaking challenge was a motivator. Linked to this characteristic, interviewees indicated an element of competitiveness. The competition was not necessarily with others but competing against oneself. The Male Beginner described how this can result in persevering when developing a new skill. The Sit-on Kayaker and Surfer stated “you also enter a competition with yourself”. This view was also expressed by the Local Beach Lifeguard who felt “you sort of almost compete with yourself to see what conditions you can get out in”. This competition with oneself may be related to the conquering of oneself as described by Lupton and Tulloch.
The Intermediate Paddler described how "It's about competing against conditions that you are in and thinking I'm going to get through this and I'm going to do it and it's a personal challenge as well which is important as I keep liking to push myself". These findings concur with those of Robinson (2004) where they report that competing with oneself and competing with the situation is evident amongst high level climbers.

Opportunities for personal development were highlighted as a motive for facing challenge. Lyng (1990) describes performance at the interface between control and chaos (Edgework) and the testing of this boundary can result in extending the boundary. The Sea Kayaker explained how they would "push it at all times" and the motivation for doing this was to develop and improve skills; this required them to "push it beyond what you did the last time". The Male Beginner said that facing challenge was rewarding and provided the opportunity to learn and apply new skills. Lyng (1990) and Hutchinson (1994) both note that challenge can provide opportunities for the expression of skills. The Female Beginner felt that the challenge in kayaking was both mental and physical. "I do like challenge it's nice to have something that pushes you harder". She went on to explain how challenge supports personal development and learning about oneself and others "It builds your character and shows you what type of person you are and what type of person your friends are, you learn a lot about people." Facing challenge was seen to provide a sense of achievement, enhancement of esteem and the building of confidence. These elements have been described in the literature associated engaging with risk and challenge (Lyng 1990; Celsie et al. 1993; Lupton and Tulloch 2002b; Lester 2004).
The Intermediate Paddler described a trip where she was the least experienced paddler and on a less seaworthy boat, with a group of men with military backgrounds. She reported a great sense of achievement in having kept up with the men and succeeding in physically demanding activity “once it had finished, it was wow, this is great, I've done it, I've achieved it and I'm on a sit-on with all these Army type blokes.” The Male Beginner stated the challenge was the most enjoyable aspect of the activity "going between the rocks with the waves, doing a bit of surfing and things, where you actually have to use your skills is a lot more fun". When asked how he felt after facing challenge and succeeding, he stated “You feel happy, you get a buzz.” This respondent talked about how succeeding in challenge leads to seeking out a further challenge "Each one you conquer, you look at slightly harder ones to do after that as your confidence is building." Celsi et al. (1993) propose that efficacy motives result in a desire to develop skills and the development of these skills leads to feelings of self satisfaction and enhanced status, as such, achievement can act as a motivator. Stranger (1999) noted in his study of surfers, there is a need to seek out higher levels of challenge to maintain thrill and excitement; Lyng (1990) proposes that overcoming a challenge can result in a desire for further challenge, thus, there may be a drive to maintain optimal level of challenge (Celsi et al. 1993) and this in turn can result in optimal experience (Delle Fave et al. 2003).

The Local Beach Lifeguard stated that successfully dealing with challenging conditions built up confidence to deal with conditions and this in turn allowed him to relax and enjoy himself more. Lyng (1990) proposes that a motive for facing challenge is the development of the ability to meet other challenge. Thus, part of the desire to encounter challenge may be
the testing and further development of skills to prepare for future situations. The 
encounters with challenge may enhance skills; this in turn may result in increased ability and 
the desire to meet a higher level of challenge.

The relationship between risk and challenge appears to be complex. The Sea Kayaker stated 
that the presence of risk was in itself a challenge. However, he felt that risk was not the 
reason for engagement; challenge was the reason and often there were risks associated 
with meeting that challenge. The encounters with risk may therefore be a means to an end. 
The instrumental nature of risk engagement is reflected in a variety of studies into outdoor 
adventure activities (Lyng 1990; Celsi et al. 1993; Ewart 1994; Stranger 1999; Roberti 2004; 
Buckley 2012). The separation between challenge and excitement and thrill as motivators is 
not clear. Thrill may relate to more immediate physiological and emotional responses and 
thrill, is achieved through facing challenge. Challenge whilst being a means of experiencing 
thrill, may also be related to longer term outcomes such as one's perception of self.

Respondents described a wish to face challenge and this challenge provided a range of 
positive outcomes. These included opportunities for personal development, application of 
skills, a sense of achievement, enhanced esteem, improved confidence and a greater 
understanding of one's self. Challenge was described as providing opportunities to compete 
with oneself and situations. Success was seen to be linked with a desire to face further 
challenge. The facing of challenge appears to be both a goal but also instrumental in the 
achievement of other outcomes.
Kayaking as a social activity

The literature describes how many leisure pursuits can be linked to social networks and participation enables membership of cultures associated with the activity (Celsi et al. 1993; Ewart 1994; Stranger 1999; Wheaton 2004; Booth 2004; Kusz 2004). A number of respondents provided a different insight to the social aspects of participation. The activity was seen as a means of drawing together important others in a common experience, hence participation was seen as supporting social interaction and reinforcing existing social groupings that existed independent of the activity. Kayaking was described as a social activity and in particular, those using sit-on kayaks, regarded it as something family and friends could do together. The Sit-on Kayaker said that one of the reasons he bought a kayak was to support family participation in a shared activity. The Sit-on Kayaker and Surfer regarded having a sit-on kayak as “a way of being in the sea with the kids and the family and friends and being able to do something together”. The Intermediate Paddler described kayaking as a social event whilst the Experienced River Paddler and Coach stated “friends, that’s what’s special about it”.

The Female Beginner reported that whilst kayaking contains individual elements, it also included interdependence between participants and teamwork “Although it’s an individual thing, you are working as a team together and you’ve got to try and help each other and I think that’s really good as well.” Ewart (1994) also described teamwork as being an important factor in his evaluation of the motives for participation in high altitude mountaineering. The helping of others to enjoy themselves and develop skills was described by the Experienced River Paddler and Coach as a “thrill” and produced “a huge sense of
satisfaction”. O’Connell (2010) notes, that teaching others was a motivator for participation amongst male sea kayakers.

Physical and mental wellbeing

The interviewees reported that kayaking provided them with a range of physical and psychological benefits. This concurs with the findings of the quantitative study into participants’ perceptions of the health impacts of kayaking (Powell 2009).

The activity was seen to provide an opportunity for exercise that was enjoyable. Physical demands appeared to be adaptable to individuals. Whilst some paddlers described physically pushing themselves, opportunities were available for more gentle exercise. The physical aspect of kayaking was linked to feelings of wellbeing and relaxation. The Local Beach Lifeguard described how after surfing his kayak "you just feel like you had a good time and a good work out as well." The Intermediate Paddler talked about how after paddling she would “come back and feel really happy and calm and tired, you know, contented tired”. The Sit-on Kayaker discussed how after paddling they “invariably feel, very, very tired afterwards but I always feel relaxed. I always enjoy it”. Feelings of wellbeing and relaxation and cathartic effects have been identified in the literature relating to outdoor adventure activities (Csikszentmihalyi and Csikszentmihalyi 1988; Stranger 1999; Brymer 2010; Pomfret 2011). The Intermediate Paddler described how kayaking helped her to relax and to cope with other aspects of her life. "It relaxes me without doubt. I can go away, I can paddle and you don’t have to think about anything else ....whilst you’re paddling along you are looking around, so it clears your mind of any rubbish and your work stuff that’s going on, which is
brilliant. On the other hand, if there is a work problem you've got, what I find is sometimes paddling does help you work out those problems.” The Experienced River Paddler and Coach provided a similar insight and discussed how when paddling, he became very focused and this helped him forget everything else. This focusing of attention and clearing of the mind is described by Csikszentmihalyi (1988), Lyng (1990) and Ewart (1994). The engagement with risk and adventure is presented in the literature as a means of escaping everyday aspects of life (McIntyre 1992; Lupton and Tulloch 2002b; Robinson 2004; Lester 2004).

The interviewees described how participation in kayaking provided both physical and psychological benefits. In addition to enabling opportunities for varying intensity of exercise, the activity was also described as supporting relaxation and coping with aspects of life.

**The acquisition of knowledge and behaviour**

The development of skills and knowledge and the adoption of behaviour appears to take place through a number of mechanisms. These mechanisms include repetition and practice of skills, formal training, guidance, direct experience, learning from peers, observation and assimilation of behaviour. This may occur within the framework of socialisation processes. Both the beginners interviewed demonstrated an understanding of the range of safety practices. This suggests that with appropriate tuition, information can be imparted in a relatively short space of time. However, the Sea Kayaker described how when starting a new activity, the learning curve is near vertical and gradually, over time, it becomes less steep and then plateaus.
The majority of interviewees indicated that they had undertaken training. The Sit-on Kayaker and the Intermediate Paddler had enrolled on short courses not linked to formal qualifications. For others (e.g. Local Beach Lifeguard, Sea Kayaker and the Experienced River Paddler and Coach), training consisted of the pursuit of formal qualifications with defined syllabi. For some (e.g. Experienced River Paddler and Coach and the Sea Kayaker), aspects of their learning had occurred through training and practice within a club environment. For others (e.g. the Sit-on Kayaker and Surfer), learning occurred from interaction with friends. The Experienced River Paddler and Coach felt that the process of teaching others had enhanced their own ability as a kayaker.

Observation was highlighted as one of the means of learning. Seeing others undertaking an activity was described by the Sit-on Kayaker and Surfer as a trigger to copy behaviour. The Male Beginner reported “if you’ve got someone who is experienced and has done it, you can replicate kind of what they have done and see how they did it and do it yourself.” The Sea Kayaker was of the view that “you can talk to people as much as you like but the only way they become more capable is to practice something.” This view was supported by the Sit-on Kayaker and Surfer who felt that learning occurred partly through “maybe doing it slightly wrong in the first place and realising that was not necessarily the right way to do what you just did”. The Intermediate Paddler described this process as “a case of experience and finding out different ways of doing things and just trying and testing”. The mechanisms described correspond with aspects of Bandura’s Social Cognitive Theory, including the role of behavioural templates that prompt behaviour and the replication of behaviour (Bandura
2011). Such an approach is argued as being a means by which skills and knowledge are disseminated.

Direct experience appears to have provided paddlers with opportunities for learning. Sometimes these experiences were linked to incidents. The Sit-on Kayaker discussed how finding himself in a situation in which he had difficulty coping, provided him with a more realistic assessment of their ability, increased awareness of the factors that should be considered when assessing risk and an enhanced understanding of environmental conditions. The Intermediate Paddler also explained how being in difficulties and being frightened had made her less likely to find herself in similar situations. She stressed she would now fully appraise conditions before embarking on activities “Once you had an experience like that, it does make you more cautious.”

The Sit-on Kayaker and Surfer suggested the adoption of certain behaviours was linked to socialisation processes. The socialisation was associated with the type of conditions people would be willing to encounter, beliefs about risk, beliefs about how others viewed behaviour and norms within the group. He felt that this contributed to differences in safety practices between categories of paddlers. The Experienced River Paddler and Coach raised a number of points that highlighted how people may become socialised into the wearing of safety equipment. These included wishing to present a favourable image, been instructed to wear certain equipment by more experienced paddlers and experienced paddlers making sure that they wear appropriate equipment when in the presence of less experienced paddlers, so reinforcing the appropriate modelling of behaviour. He indicated that through
such mechanisms “it is an accepted fact that you wear a buoyancy aid”. As Celsi et al. (1993) propose, this requires a desire to comply with norm imposition. An example of this was provided by the Sea Kayaker who indicated that new people joining a club “expect you to educate them in what is normal”; this suggests that for some, there is a willingness to be socialised into the norms associated with kayaking. He described how, as a result of this, if a novice did not have the correct equipment, he would advise them as to what was required. It would appear that these experienced paddlers recognise that they have a role in the socialisation of new paddlers into the activity. Socialisation processes associated with the assimilation into an activity, cultural norms and the construction of meaning have been described in a variety of studies (Albert 1999; Lupton and Tulloch 2002b; Creyer et al. 2003; Scherer and Cho 2003; Malcolm 2006). Membership of and acceptance into cultural groups associated with the activity may require the display of the accepted norms of groups (Wheaton 2004).

The accounts of respondents indicated that the learning of knowledge and skills and views of risk developed through a variety of mechanisms. These include observation, replication and trial and error. Descriptions were provided of ways in which people came to accept the norms and practices associated with kayaking through socialisation processes. It was proposed that in some cases, initiates both welcome and expect to be guided in relation to required behaviour and practices.
Differential perceptions of kayaks and users

Studies into diverse leisure pursuits such as surfing, skateboarding and climbing indicate that participants hold differential views of others and this is linked the nature of the activity undertaken, equipment used and commitment to the activity and associated lifestyle (Beal and Wilson 2004; Both 2004; Lewis 2004; Robinson 2004). These views may not be apparent to those outside of the activity. The responses of the interviewees indicated that there are differential views of both types of boats and the users of those boats.

Perceptions of kayaks

It appears that sit-on kayaks are viewed more as a recreational accessory, whereas closed cockpit kayaks are seen to be bought for more technical activities. The Sit-on Kayaker and Surfer felt that a sit-on kayak is seen as a “toy”; he explained “there’s the perception that the sit-on kayaks are for bumbling around on. You bumble rather than paddle, therefore, you stick close to the edge of the coast”. The paddlers of closed cockpit kayaks and sit-on kayaks highlighted the existence of a stereotype, whereby those who purchased and used sit-on kayaks were not defined as kayakers. The Local Beach Lifeguard expressed the view that “If you are in a sea kayak you are more of a serious paddler in outdoor adventure...sit-on tops seem to be more of a leisure thing or a beginner thing...It is almost like sit-on kayaks is a different sport, I don’t like to be associated with them.” The Intermediate Paddler regularly used a sit-on kayak and reported “there is this perception that it’s not really kayaking if you have a sit-on”. The Local Beach Lifeguard who both sea kayaked and surf kayaked, was of the opinion that beginners using sit-on kayaks gave more experienced kayakers a bad name.
and as a result, many people using surfboards felt that kayakers did not know anything about surfing.

The view was expressed that different styles of boats were purchased and used for different activities and for entering different conditions. For example, the Experienced River Paddler and Coach felt that sit-on kayaks were something bought for use close to the beach. The Intermediate Paddler emphasised that the challenges faced were “very different depending on what type of boat you’ve got, the type of conditions you go out in”. The differences in the type of activity and the conditions encountered were seen to result in variation in the level and nature of risk experienced. The Sea Kayaker was of the view that in general, sit-on kayaks were safe, as people tended to use buoyancy aids and the boats were used for either fishing or playing in the surf. He felt that those using sit-on kayaks were unlikely to be deliberately entering into tidal races. The risks that would be encountered were linked to paddling in the surf zone and amongst other people. Cassel and Congiu (2005) note the unsuitability of particular boats in certain environments; the responses of the interviewees suggest that usually, the environments entered were applicable to the boat. The issue may be more a case of the skills, knowledge and experience of paddlers and the ability to match these against the demands of activities and environments.

The Local Beach Lifeguard felt that activities undertaken by those using sea kayaks required more planning. The Intermediate Paddler felt that it was not necessarily the nature of the boat that increased risk; it was more a case of where the boat was used. As result of this, she felt that sea kayaks were more dangerous than sit-on kayaks, as those using sea kayaks
would enter more challenging environments. She did note that there was a particular risk of being hit on the head when capsizing using a sit-on kayak. This view corresponds with the findings of the study into perceived health impacts and cause.

The perceived difference in the demand of activities was described as accounting for variation in safety practices and the carrying of equipment. For example, the Local Beach Lifeguard explained that the challenges faced by sea kayakers paddling out at sea and away from help, were different to playboat paddlers close to land, surf and rocks. The Intermediate Paddler was of the opinion that these different challenges accounted for the wearing of protective helmets being more common amongst those using playboats compared to those using sea kayaks and the carrying of more safety equipment and more detailed activity planning amongst sea kayakers compared to other categories of boat and user. The Male Beginner felt that sit-on kayaks were more likely to be used for short trips and were not able to cope with difficult conditions and so would not be used in more challenging situations. As result of this, extensive safety equipment was not carried and detailed trip planning was not undertaken as it was perceived as not being needed.

The Sit-on Kayaker and Surfer noted that friends who used closed cockpit kayaks did not wear buoyancy aids whilst using his sit-on kayak. He suggested that this was because “A kayaker, somebody who has been in a playboat or sea kayak, will see a sit-on kayak as a bit of fun, something to do on a Sunday afternoon rather than-I don’t know-an expensive piece of kit. So they treat it accordingly and with maybe lesser respect.” He felt that these people would wear buoyancy aids if they were in their closed cockpit kayaks. This may reflect that
sit-on kayaks are not regarded as being the same as closed cockpit kayaks and therefore the usual social norms do not apply.

The need for differential approaches to the planning and performance of activities is discussed in safety guidance literature. The RNLI (2012) for example, advocate that those paddling away from the shore should be more self sufficient than those paddling close to beaches. The design characteristics of the boats may result in them being more suited to particular activities and environments. To partake in these activities and enter different environments may in turn require different skills, expertise and planning and the carrying of safety equipment.

Both the Intermediate Paddler and the Sit-on Kayaker felt more secure using sit on kayaks. They both felt that self rescues were easier when using a sit-on kayak compared to a closed cockpit kayak. In relation to a closed cockpit kayak, the Sit-on Kayaker explained “getting back in is horrendously complex and difficult and almost impossible for me to achieve. I would not be able to achieve it so I would never go kayaking with a spray deck type enclosed kayak unless I was with somebody else”. Both of these paddlers felt that there was a risk of being trapped upside down in a closed cockpit kayak. As result of concerns about entrapment and the perceived difficulty of self rescue in a closed cockpit kayak, the Intermediate Paddler reported that she was more willing to attempt difficult things in her sit-on kayak than her closed cockpit kayak. As result of this, she reported that the boat she used influenced the sort of activities she undertook. She was of the opinion that there were different risks associated with the kayaks and drowning was more likely if using a closed
cockpit boat, whereas, being hit on the head was more likely when using a sit-on kayak. The perceived relative safety of sit-on kayaks may result in them being attractive to casual users. The American Canoe Association (2012) indicates that the perception that boats are easy to use and safe, may lead people to believe they will not encounter problems.

**Perceived attributes of users of different types of kayak users**

Those using sit-on kayaks were regarded as likely to be less experienced and have lower skills and knowledge than those using closed cockpit kayaks. As result of this, they were seen to be more likely to be involved in incidents. The Sea Kayaker felt that people using sit-on kayaks had entered the sport in a different way to those using sea kayaks and playboats and may have purchased the boat from a local hardware shop and not a specialised dealer. The RNLI (2012) report that that the easy access to low cost boats has resulted in people with limited experience undertaking activities in the sea and this had increased the number of incidents requiring their support. Playboats and sea kayaks were seen to require a higher level of skill before a paddler could operate the boat. The Experienced River Paddler and Coach and the Sea Kayaker felt that those using sit-on kayaks had limited experience and training and were not aware of the dangers and safety practices. The Sit-on Kayaker also viewed sit-on kayaks as being for less skilled people, whereas, closed cockpit kayaks “involve people who know what they are doing more”.

The Sit-on Kayaker and Surfer suggested that lower levels of club membership and training amongst those using sit-on kayaks was linked to the boats not being perceived as technical equipment. The Experienced River Paddler and Coach saw those using closed cockpit kayaks
as having taken a "step up" and would probably want to join clubs and "learn the skills on how to paddle them properly". The differences in the levels of skill could be related to a number of factors. Certain activities may require a higher level of skill, training may be a social norm and a requirement of social integration, thirdly particular activities may be followed because they provide opportunities for skills development. These factors may be operating independently or in combination and the differences in knowledge and skills and experience may be linked to desired outcome from engaging in an activity.

Particular groups were seen to be more likely to be involved in incidents than others. The Local Beach Lifeguard regarded beginners using sit-on kayaks as a group posing a risk to others as they were likely to capsize in the surf zone, lose their kayak and it then be swept into swimmers. Holidaymakers and people hiring kayaks were regarded as a group likely to encounter problems as their skill and experience was limited. The Intermediate Paddler also felt younger people, trying to prove something to each other, for example, stag groups, would be more likely to encounter difficulties. The Sea Kayaker stated "People who are on holiday take ridiculously stupid risks, particularly in some activities because they feel under pressure for time. Unacceptable risks but they take risks because they are ignorant of the situation they are in." The Local Beach Lifeguard also felt that people on holiday were likely to get into difficulties "You get people who come from the city and stuff and come straight down the beach and think there are local beach lifeguards on the beach it is super safe and stuff. They go out but you would be surprised that people don't know anything about tides and don't know anything about currents and even winds on the beach in a kayak can affect you, you get the big sit-on tops that can be a slug to paddle and can be beaten by a strong
wind, particularly offshore, and again they don’t wear safety equipment and lose their paddle or something and find themselves stuck.” The Sit-on Kayaker and Surfer thought that those who hired a kayak for a short period were a group more likely to get into difficulties because they were probably less experienced. The Local Beach Lifeguard concurred with this view, he regarded inexperienced people hiring sit-on kayaks for the day as a particular problem and posed a risk to others as well as themselves as they frequently fell out of the sit-on kayak and these were then swept in on waves to the beaches where other people were in the water. Young (2011) has highlighted issues of safety related to the hiring of kayaks at beaches. She suggests that there is a need for consideration as to whether is permissible to hire out kayaks when conditions are poor.

The Sea Kayaker felt that people tended to get into difficulties when they had gone beyond their skill level. This view reflects an interaction between the individual, the activity and the environment. In relation to kayaking fatalities in white water conditions, Fiore (2003) states that incidents tend to be linked to either inexperienced paddlers undertaking activities beyond their capabilities or experienced paddlers entering dangerous conditions. An example of this was provided by the Sit-on Kayaker and Surfer who noted that those using playboats were probably experienced and therefore were more likely to engage with "more serious situations". He discussed how skilled paddlers with appropriate planning, defined contingency strategies and the right equipment, may be more likely to enter extreme conditions. This in turn was seen to increase the likelihood of them being involved in incidents. Those with limited ability may be more likely to encounter difficulties in relatively benign environments, while those with a high level of ability may also encounter problems
as they enter more difficult conditions. Following this line of reasoning, there may be situations where an inexperienced paddler in less challenging conditions, is exposed to a similar level of risk as an experienced paddler in challenging conditions. Thus the level of risk encountered can be a function of ability and environment. This point is highlighted by both the American Canoe Association (2003) and Lull (2008) who point out that those entering more challenging environments often have the required skills and have undertaken appropriate planning. The description of alterations to the nature of activities to reflect skills, aligns itself with the view of Adams (2012) where an increase in skill is seen to not necessarily result in a reduction in incidents, as the reduction in risk, as result of improved skills, is compensated by engagement with a higher level of risk. The experienced and inexperienced paddlers may both be seeking out the edge of performance (Lyng 1990) and this edge is seen to be associated with desirable outcomes. Operating at the limits of performance involves the interaction of individuals’ abilities and demands of the situation (Csikszentmihalyi and Csikszentmihalyi 1988). To reach the target level of risk, homeostasis mechanisms may be in operation (Wilde 2002; Adams 2012) resulting in both the inexperienced and experienced paddlers facing the same level of risk whilst operating in very different environments.

The discussion of the differences between types of users reflects both Wheaton’s (2004) description of those involved in “lifestyle sport” and Stebbins’(2007) distinction between "serious leisure" and "casual leisure". It would appear that some respondents regarded themselves as kayakers whilst others did not. In particular, those using sit-on kayaks were described as not really being kayakers. This may be indicative of difference between
kayaking as an occasional activity and kayaking as part of personal identity and membership of a cultural subgroup. Those using boats such as sea kayaks were regarded as having higher levels of skill and their activities requiring more planning. This may be an indicator of the difference between those who are committed to the activity and pursuing a leisure career (Stebbins 2007) and those who are participating in activities that require few specialist skills.

Interviewees emphasised that there are differences between different types of boats and different users. This in turn was related to the nature of activities undertaken. Certain activities were seen to require technical skills and knowledge; this could act as a motive for the pursuit of training and qualifications. The pursuit of training and qualifications may reflect immersion in the activity and be linked to a leisure related identity (Anderson and Taylor 2010). The conditions entered were also seen to vary and this impacted upon activity planning and safety equipment carried. The fact that users of particular boats may differ in ability and practices, does not necessarily mean that this is inconsistent with the activities undertaken and environments they are encountering. However, the practices of certain groups of paddler were seen to put them at more risk of an incident than others. The behaviour of people in the surf zone was suggested as putting others at risk of injury. Occasional paddlers were regarded as not being aware of the full array of risks; these were seen to be a group who would be more likely to find themselves in difficulties. At the other end of the spectrum, those people who were highly skilled and entering difficult situations, were also regarded as a group who may encounter difficulties. Given the variation highlighted by the interviewees, it is interesting to note that many of the documents
produced by national water safety organisations outlining incidents do not differentiate between kayaks and canoes or different types of kayaks.

**Age**

A number of respondents indicated that their perception of risk and the propensity to take risk had altered with age. This may be linked to a number of factors including reduced physical ability, less susceptibility to peer pressure, no longer feeling the need to prove oneself, increased experience and improved assessment of risk. Robinson (2004) describes this process and sees it as being linked to physical attributes restricting performance and a change in priorities linked to relationships, responsibilities and employment. The Intermediate Paddler reported “What I have noticed is as I’m getting older, I’m less likely to go for it than I would have done......perhaps its fight or flight mechanism and whether I know now that if I fight, I’m not likely to win as much as I used to, it may be an element of that....I mean the fight not in the terms of physical fight but clearly in terms of whether you face it or back off you know.”

The Intermediate Paddler and the Sit-on Kayaker both felt that as they had become older they were less susceptible to peer pressure. In addition to this, the Sit-on Kayaker felt that due to his age, people would not exert as much pressure on him as when he was younger, "I think I’m old enough to say no, I often use the excuse nowadays, ‘sorry I’m too old for that’. I think if I was younger, peer pressure would work much more effectively, and I am now of course well into my 50s so people tend to step back a bit."
The Experienced River Paddler and Coach reported how they did not seek out excitement in the same way as they did when they were younger, "if I think no I can't do it, then I won't do it, whereas before I would have tried to work out how I could do it". He felt that as he had become older and less fit, he was less agile.

The Sit-on Kayaker stated "As you get older, if anything you tend to judge risk better." He went on to say, "Generally speaking, people as they get older they tend to be more risk aware and more risk adverse don't they, there is less testosterone and things around and the thrills hurt more than they used to ....if you hurt yourself before and walked around with an arm in a plaster, it was like a tick box you needed in your life, now you think of the arthritis it's going to cause you in a few years time." The Intermediate Paddler explained “As I'm getting older I have to say that it scares me a bit more than when I was younger."

The Experienced River Paddler and Coach described how their approach to engaging with certain conditions had change, "I've done waterfalls and hard rapids in the past and gone back and not done them, I've looked at them and thought, how did I do that before. Maybe I feel I've not got the same ability I had before. I think a lot of it is up in the head as well. I don't need to prove myself maybe. Since I married, I've calmed down a bit." This suggests a number of factors including the perceived decline in ability, not needing to prove oneself, and a change in attitude towards risk. He felt that he now had additional responsibilities.

The reported changes in the perception of risk may be linked individually or in combination to a range of factors including physiological changes associated with the aging process,
social factors including increased responsibility, psychological factors linked to personal identity and susceptibility to peer pressure and revised assessments of risk based upon experience and knowledge.

**Group and social variables**

The presence of others was reported as influencing practices. The Sea Kayaker felt that engaging in outdoor adventure activities without the presence of others was potentially "exponentially increasing risk”. He went on to say “You are much safer in a group aren’t you as there is more than one person to combat the problem, but being in a group doesn’t mean you are going to have safer practices.” The Local Beach Lifeguard reported that surfing on their own felt different to surfing with others. On his own, at first he would feel fine, then feel vulnerable. The Male Beginner described how the group facilitated performance "you kind of lift each other's spirits" and how the group, by encouraging each other and group members wishing to copy behaviour, can increases willingness to engage with challenge. He reported that the presence of others "motivates you to get up and go”. The Local Beach Lifeguard indicated that paddling with a group that was skilled would “sort of push me into places that I probably wouldn't have gone into on my own”. The Sit-on Kayaker and Surfer indicated that social pressure may have positive outcomes as it can encourage one to operate at a higher level and support personal achievement “I wouldn't have climbed half the things I have climbed in life if I hadn't been pushed by the person I was climbing with to do it. I would've come down!” In many cases the presence of others was seen to facilitate performance through encouragement, and by providing safety backup.
Responsibility for others

Instead of the presence of a group increasing risk taking behaviour, a number of the respondents reported that having others with them, particularly if those others were less skilled, resulted in more cautious behaviour. The Sea Kayaker felt that the sort of environments he would enter when leading a group would be based upon the ability of the least able group member. The Intermediate Paddler discussed how she often felt responsible when paddling with a group of children and would not “put myself at risk then because I always think, if anybody else gets into trouble, I could be the one who has to help out, so I have to make sure that I’m okay.” The Male Sit-on Kayaker and Surfer described how they were more cautious with their paddling if they had their children with them and would avoid conditions that could result in the children becoming anxious. The Sit-on Kayaker also reported that if he had friends with him, he felt responsible for them and would take fewer risks.

The Experienced River Paddler and Coach explained that they modified their behaviour when leading a group of less experienced paddlers. When with a less experienced group, he tended to follow safety guidance and ensured that he wore recommended equipment. When paddling with experienced friends, he stated that he would be less likely to follow guidance. He indicated that adherence to good practice in the presence of less experienced paddlers was a conscious decision intended to reinforce safety messages.
It would appear that being responsible for others safety and perhaps perceiving that one has a role in helping less experienced participants develop appropriate behaviours, can have in mediating effect on one's own risk taking behaviour.

Confidence in the ability of others

Perceiving that other group members are competent may influence one's willingness to face challenge. The Male Beginner described how having other group members and leaders with them facilitated their performance "Having leaders there who are fully experienced and they can come and help you at any time is really encouraging as well." He added that the presence of others provided extra safety and so made it more likely that people would attempt more difficult activities. The Local Beach Lifeguard also felt that if he was with a group of paddlers more able than himself, he would be more willing to push the boundaries of his performance. Pomfret (2011) has described how people wishing to undertake activities or enhance skills by joining guided groups, place high importance on leaders ensuring the safety of experience. This control of the risk by others may enable the participant to extend their skills and experience.

The Sit-on Kayaker and Surfer described how surfing with confident people enhanced his performance. However, if he perceived that others were less confident than himself and he was the "primary person", his own confidence could waver. He felt that confidence was influenced by "who you are with".
The presence of experienced group members can facilitate the performance of those with less experience. This may take place through a number of processes including the modelling of behaviour, the perception of safety backup and support and encouragement and advice. As result of this, paddling with experienced group members may offer support to individual’s skills development.

**Competing with others and wishing to keep up with the group**

A drive to compete with or operate at the same level as others was identified. A number of respondents (for example the Male Beginner, Sit-on Kayaker and Surfer and the Intermediate Paddler) regarded being competitive as part of who they were. The Male Beginner illustrated this; “I'm competitive so you're competing against yourself and also like, if someone else does it, you are thinking I can do that, if he's done it I can do it.”

Competing with others may facilitate performance by encouraging activity at a level which would not normally be encountered. The Intermediate Paddler felt that “If you are with people who are more experienced, the competitive edge comes out because I have to keep up, which is good, that's good for me.” The Local Beach Lifeguard also indicated that he would push himself in the presence of others “I think there is the element of showing off, especially being out on the kayak and other people on surfboards and they are surfing these waves and having no trouble with it and you think, orrh these are big but you still have to push yourself.”
The Experienced River Paddler and Coach felt experienced group members may be exerting pressure on less experienced paddlers who feel they need to keep up with others in the group. As a group leader, he would often dissuade people from undertaken certain activities and tell them they were not up to it.

The benefits of competition were linked to positive feelings about oneself and the perception of enhanced credibility in the eyes of others. There may be a distinction between competing as a means of intrinsic rewards such as enhanced esteem and feelings of efficacy and competing as a means of influencing the perception that others have of the participant. As discussed by West and Allin (2010), demonstration of competency in the control and management of risk can enhance one's credentials as a participant. This in turn may enable access to desired outcomes such as acceptance into groups and activities. Unlike coercion, which can be regarded as a pressure external to the individual, in most examples, an internal pressure to undertake activities was described. The Sit-on Kayaker and Surfer indicated how coercion and competition can interact. He related how when he was with certain friends “we push each other to the point where it becomes a competition almost”. In this example, there is pressure from others to undertake activities and a pressure from oneself to compete with others. The only example of coercion came from the Sit-on Kayaker and Surfer. He felt that as a beginner, he had been coerced by friends into paddling a challenging river. The Female Beginner felt that she had not encountered coercion but regarded attempts by others to get her to undertake certain activities as encouragement. There may be a fine dividing line between coercion and encouragement which may be related to individual perceptions of motives and culture within the group.
The two women interviewed stated that wishing to operate at the same level as males exerted pressure on them to face challenge. The Female Beginner explained "because the boys do it you have to do it as well, you don't want to be seen as a weakling ". The Intermediate Paddler related how she and a female colleague found themselves in difficult and frightening conditions as a result of wishing to demonstrate to male companions what they could do. She described how part of the thinking behind the decision to undertake the activity was “the boys had never done this, you know we’ll do it show them we can do this”. The Sit-on Kayaker and Surfer explained that “In situations where someone is not too keen but the others are still confident, then you know, then you still save face and do it.” He indicated that he and his friends competing with each other could potentially result in them ending up in situations where things go wrong.

Participants discussed how there can be a desire to compete with others and this can be linked to personality. Whilst wishing to keep up may result in people pushing themselves beyond their capabilities and then finding themselves in difficulties, success was seen to be linked to enhanced self perception and enhanced credibility in the eyes of others. Competing with others was seen to be stimulus for improvements in ability.

The modelling of behaviour

Interviewees expressed the view that the behaviour of experienced paddlers was modelled by those with less experience. This could result in positive safety behaviour such as adherence to safety guidelines and adoption of safety equipment. The observation of behaviour could act as the stimulus to participation and the pursuit of additional skills and
knowledge to enable higher levels of performance. For example, the Female Beginner stated 
"Seeing the boys doing it and getting it makes me want to do it as well." However, the  
observation of behaviour could also act as a trigger to engaging in activities beyond  
individuals’ capability and without full understanding of the necessary skills and knowledge.

The Experienced River Paddler and Coach felt that the visibility of advanced and extreme  
performance could influence the perception of what was achievable "You can see the  
pictures and videos of people doing amazing stuff and they think it is easy". This statement  
(2004), Kusz (2004) and Palmer (2004) whereby images presented by the mass media can  
act as behavioural templates and may promote particular forms of risk taking behaviour.  
Palmer (2004) proposes that the presentation of high risk activities can give the impression  
that participation is achievable without conveying the level of expertise required for  
successful performance.

The Sit-on Kayaker and Surfer provided an example of observing others who were more  
experienced and concluding “that it didn't look that hard.” After attempting the activity he  
found “We spent more time swimming than surfing.” The Experienced River Paddler and  
Coach suggested that to a naive observer, the risks may not be apparent when watching a  
competent paddler performing well in difficult situations, "When someone makes something  
look easy, Joe Bloggs will think I can do that myself". He described a number of paddling  
experiences that indicated detailed planning and the assessment of risk which was  
undertaken in advance and during activities. Those observing the activity may not be aware
of such elements of the risk management strategy. A similar view was expressed by the Intermediate Paddler who stated, “I think is quite dangerous for inexperienced paddlers when they see people like myself going out and they think, oh if she can do it, I can do it because on the face of it, I don’t know what they see, this woman who is perhaps a middle-aged woman and if she can go out and do it, it must be quite easy and not really understanding what the conditions are and appreciating how quickly conditions can change.” The Local Beach Lifeguard talked about how given his ability, he did not always wear a buoyancy aid when surfing a kayak. He recognised that his behaviour may be observed and as a role model, others may think it was not necessary for them to wear a buoyancy aid. The Experienced River Paddler and Coach noted that his behaviour was observed and copied by less experienced paddlers and as a result, he modified his behaviour in the presence of a less experienced group to define good practice.

The positive effect of modelling behaviour was described in relation to the wearing of buoyancy aids. The Sit-on Kayaker and Surfer when asked why people wore buoyancy aids responded “I suppose because they see other people wearing them. If you haven’t got it and you see other people wearing it you think, especially if they look like they know more than you do, then you think, oo maybe you should get some of them…. you look at what the others are doing and you do the same.” This description supports the view that people operate within a social environment where behaviour is influenced by what others are seen to believe (Bandura 2011), subjective norms (Ajzen 2011) and the desire to conform to norms (Celsi et al. 1993).
The mediation of social pressure

Respondents indicated a number of means through which the presence of others could result in encounters with more challenging conditions. These included wishing to compete with others, modelling behaviour, coercion, wishing to present a favourable image and encouragement. However, situations were reported where people felt comfortable not undertaking the activities of others. This may be linked to a variety of reasons including the perception of one's own ability and the ability of others in the group, resistance to social pressure, the group’s accepted norms relating to the running of group activities and tolerance and support for those not wishing to engage in activities. Whilst the impact of higher ability participants on lower ability participants has been discussed, situations may also occur whereby lower ability participants hold back on certain activities but allow high ability participants to operate at the level they wish.

Both the Sea Kayaker and the Sit-on Kayaker indicated that they would resist pressure from others who encouraged them to undertake activities they perceived to be beyond their capabilities. The Sit-on Kayaker reported “I’m seen by a lot of other people as a person who will say no...I wouldn’t say I’m assertive, I know when I know I'm right you see what I mean and if I think a risk isn’t worth taking I won’t take it.” Older respondents reported that as they have aged, they have become less likely to succumb to pressure from others to undertake activities they were not happy with. The Intermediate Paddler felt that when she was younger, she was more susceptible to peer pressure and the need to prove herself “Being older, I don’t succumb to those sort of pressures as much, so it’s not so much, the peer thing, it is not that I’ve got something to prove......When I was younger, if somebody
was doing something and I thought I’m not quite up to their standard, I would have definitely had a go.”

Presenting a favourable image

The way in which an individual thought others perceived them was described as influencing behaviour. This related to the nature of activity undertaken and safety practices adopted. This corresponds with Ajzen’s description of subjective norms influencing behavioural intention (Ajzen 2011). Respondents talked in terms of wishing to present a favourable image, for example being able to cope with conditions and not being weak. The Experienced River Paddler and Coach felt that the presence of others exerted social pressure to push oneself as “you are less likely to want to be seen to be giving up on something”. The Sit-on Kayaker and Surfer commented that that “You don’t want them to think that you have a weakness in any way or be scared, so either you do it, or you admit that you are scared.” Engaging in activity can provide opportunities to state who you are; as Lupton and Tulloch (2002b) describe, voluntary risk taking provides opportunities to exhibit courage and demonstrate self worth. The Experienced River Paddler and Coach felt that for some, the image of being seen to be someone facing challenge was a primary motivation for engaging in activities. He also felt that image was a reason why some people went out and bought expensive safety equipment and often, they did not know how to use it. This could be related to the projection of image to others, demonstration of membership of social groups and as a means of creating and reinforcing self identity. Ewart (1994) has described the projection of an image as one of the motivations for participation in outdoor adventure activities. This image may demonstrate membership of the culture associated with a lifestyle.
sport (Wheaton 2004). These examples provided by the interviewees demonstrate how one feels they are viewed, may influence safety behaviour, particularly if there is a desire to conform to perceived social norms and present a favourable image.

The way in which an individual perceives others would view their behaviour (i.e. the subjective norm, see Ajzen 2012), may influence safety practices. Whilst the Sit-on Kayaker and Surfer recognised that they could be hit on the head by their kayak, they reported that they did not wear a helmet because they thought they “would get laughed at if I walked around the beach with the helmet on”. This reinforces the position of Taylor et al. (2005) who indicated that issues of image can act as a barrier to the adoption of protective equipment. The Local Beach Lifeguard reported that they did not wear a buoyancy aid when surfing a kayak. Whilst the wearing of a buoyancy aid may not have significantly impacted upon their paddling, the non-wearing of equipment may be a statement of their ability and associated with the presentation of image. This contrasts with a view expressed by interviewees where they believed not wearing safety equipment would be viewed negatively by peers. The Experienced River Paddler and Coach stated that, if you were seen not wearing a helmet and a buoyancy aid “you are looked down on, you are frowned upon”. The Intermediate Paddler believed her friends would have “a very dim view on it if I went out without a life jacket.” The Local Beach Lifeguard, when asked what people would think of him if he went out in a sea kayak or playboat without a buoyancy aid, responded that people who didn't know him and his capabilities would think ”you silly bugger”. Lyng (1990) has described how not taking appropriate safety precautions can be viewed in a poor light by others engaged in activities.
The Perception of the likelihood of being Involved in incidents

Respondents were asked whether they thought it was likely that they would find themselves in difficulties. A number of respondents, including those who had actually experienced difficulties, felt that it would be unlikely that they would encounter serious problems and require rescue. This response was linked to a number of factors including avoiding situations if there was doubt about conditions, the acquisition of knowledge through experience, an assessment of skill against the demands of the activities, recognition of one's limitations and capabilities, confidence in one's ability and the carrying of safety equipment. The interviewees describe how they assessed risk, planned for risk and took steps to militate against risk.

Descriptions were given where there would be an assessment of the situation and if appropriate, not undertaking activities. The Sit-on Kayaker who described themselves as risk adverse, reported that “I would avoid going out, if I was in any doubt about the situation.” The Sea Kayaker indicated that when leading a group, he based the decision as to whether to engage in activity upon an assessment of the capability of the least able group member.

Both the Local Beach Lifeguard and the Male Beginner felt that they would be unlikely to get into difficult situations because they recognised their limits. The Male Beginner reported “I seek a bit of danger but I’ve still got a bit of sense, I will know in myself and my capabilities if that is the right thing to do or not or if the conditions are too rough.” He went on to say ”I will only attempt something if I know there is a possibility of me succeeding.” The Local Beach Lifeguard whilst stating that he recognised the limits of his ability, also recognised
that it was possible to become overconfident and this in turn could lead to problems. These two respondents had very different levels of experience. The Male Beginner had very little experience therefore the assessment of risk may not take full account of possible eventualities. Whilst a novice’s assessment of risk and risk management strategies may be rational based upon the information they have and interpretation of situations, that information may not be complete and therefore decisions may be inappropriate.

The Male Sit-on Kayaker and Surfer was asked if he felt they had the skills to manage the situation if things went wrong, he replied, "Yes I think that I have skills to deal with the situation and to not panic and I hope I have the common sense to... at least stabilise the situation." The Local Beach Lifeguard was also confident in their ability to deal with difficult situations, "I'm always well aware of how to get out of situations if I have to and being a strong swimmer, I don't sort of get worried too much about getting out of the boat. If I do get trapped underwater, I do get used to calming myself." Whilst this could be regarded as optimism bias (Weinstein 1989), what they may be presenting is a true reflection of their ability based upon experience and skills. This confidence in ability may enable the respondent to deal with situations (Lyng 1990).

Both the Sit-on Kayaker and the Intermediate Paddler had found themselves in difficulties whilst kayaking. The Intermediate Paddler felt that finding herself in difficult and frightening conditions had resulted in her being less likely to get into difficulties in the future. As a result of her experience, she reported that the planning for activities was now more robust. The Intermediate Paddler, Sit-on Kayaker and the Experienced River Kayaker and Coach
reported a reduction in risk taking propensity as they had become older. They regarded this as reducing the likelihood of them being involved in difficulties in the future. Both the Intermediate Paddler and Sit-on Kayaker regarded younger people as a group likely to get into difficulties. These older respondents were able to relate fairly recent examples of incidents they had been involved in. This may suggest an element of optimism bias and not regarding themselves as being at risk when compared to others.

Whilst respondents indicated that they thought it would be unlikely that things would go seriously wrong for themselves in the future, they felt that this was not the case for others. The Sea Kayaker and the Experienced River Kayaker and Coach felt that inexperience amongst some paddlers could result in then encountering problems. The Intermediate Paddler thought that it was likely that she would have to help others who found themselves in difficulties. The Local Beach Lifeguard had particular concerns about people who were not aware of local risks. The Sit-on Kayaker felt that many people did not have appropriate skills of self rescue.

The view that things would be unlikely to go wrong for oneself but likely for others, is described as a typical response associated with optimism bias (Weinstein 1989). However, it is not clear whether this view expressed by interviewees, actually represents a judgement based upon the time and effort the respondents had invested in mitigating against risk in their activities. Weinstein notes, that optimism bias is higher where risks are regarded as being controllable. Those who have experience and a high level of skill may perceive that they have a high level of control. Furthermore, for those operating at the edge of
performance, the perception that things are unlikely to go wrong may be a coping strategy to enable continued participation (Miessel and Potgieter 2003). Halpern–Flesher et al. (2001) also indicate that those who have had behavioural experience of situations and had not experienced negative outcome, perceive the behaviour/outcome link as lower than those who have not had behavioural experience. Given these alternative interpretations there is a need for further investigation into what constitutes an accurate perception of the likelihood of occurrence and what is a function of optimism bias.

**Risk acclimatisation and risk differentiation**

It would appear that the way in which risks are perceived, changes over time and with experience. Interviewees talked about becoming used to conditions and this was linked to the level of exposure. The Male Beginner described how after just a few days of paddling, he became more used to the boat and able to feel what it was doing and respond appropriately. So actions which initially demanded concentration and conscience response became automatic. He reported how, within a short space of time, he became more confident and willing to face more challenging situations, “As you succeed challenging yourself in the harder kind of situations, each one you do, you build your confidence so throughout the day you get a bit more confident.” Thus, there may be a movement from coping to enjoyment. The Local Beach Lifeguard described how exposure to conditions and dealing with conditions boosted confidence and allowed him to relax and so encounters with challenging conditions became less stressful and more enjoyable. The Sea Kayaker felt that by increasing the level of challenge faced over time "your level of normal acceptable risk increases". Natalier (2001) suggests that calculations of risk take place with reference to
one’s own experience, thus variations in experience may account for variations in the perception of risk. The Sea Kayaker, Local Beach Lifeguard and the Experienced River Paddler and Coach gave examples of situations where they thought novice paddlers did not understand risks. In addition to this, it was viewed that experienced and inexperienced paddlers see risks in different ways.

The Sit-on Kayaker indicated that people can become used to conditions and the conditions that may have frightened them when they started, do not do so as experience increases. A similar view was described by the Sea Kayaker. He explained that someone new to an activity may be anxious; over time they would come to realise what initially frightened them was actually not a problem, “they only worry you because you are not familiar with it”. The local beach lifeguard reported how in the sea environment, he would often undertake action that increased the intensity of experience. In contrast he felt that in an unfamiliar environment such as rivers, he would wear full safety equipment. In an unfamiliar situation, it may be more difficult to determine the level of risk and match this against ability, therefore, precautionary action is taken. The Sit-on Kayaker and Surfer felt that as experience increases, people are less likely to feel anxious in situations and this can lead to complacency. Holyfield (1999) has indicated that the experience and emotional response of novices can be very different to experienced practitioners. What may induce fear in a novice, becomes the norm amongst those who regularly encounter particular situations. The Experienced River Paddler and Coach described how conditions that worried a novice paddler would be viewed as an opportunity for fun by an experienced paddler. What may be regarded as risk by some, will be seen as opportunity by others. The willingness to engage
with challenging situations may be linked to experience, development of skills, exposure and resulting changes in the way in which risk is perceived. Natalier (2001) and Stranger (1999) both highlight how the response to risk can be related to aspiring to ideal experience and this can override concerns for safety.

Experienced paddlers were regarded as being able to assess the totality of a situation and predict eventualities and so adjust behaviour accordingly. The Sit-on Kayaker was of the view that experienced paddlers “anticipate risks better, they know how to deal with them better and in some ways they can judge where’s the risk and how much risk”. This difference may be linked to those operating at the high level of performance having undertaken detailed planning and adopted safety precautions, so enabling a high level of focus upon less predictable variables (Lyng 1990). Celsie et al. (1993) argue that the perceived ability to manage and handle events distinguishes between experienced and inexperienced participants. Inexperienced paddlers were regarded as often having an inaccurate view of risk and this included not realising the existence of risk. Whilst working, the Local Beach Lifeguard observed beginners who were "terrified" and would not go in the water unless they had safety equipment; others would hire a kayak, not wear helmets supplied and leave their buoyancy aid on the beach, paddle out and then capsize. In each case, the paddlers were seen to be inappropriately assessing the level of risk. He felt that at times, beginners were overcautious.

The Intermediate Paddler described how the perception of risk changes with experience. She explained how an inexperienced paddler may not realise their lack of ability and so be
unconsciously incompetent and as experience increases, the paddler may become aware of their limitations and recognise their lack of ability; this was defined as consciously incompetent. She described how as experience builds, there is increased awareness of risk and one's abilities and limitations and this influenced the way in which risks are perceived. Thus as suggested by Lyng (1990) and Ajzen (1991), limited experience and knowledge may result in unrealistic perceptions of control.

The Sea Kayaker regarded two factors as accounting for the differences in perception of risk between experienced and less experienced paddlers. First, he felt that the development of skills and knowledge led to an improvement in the ability to assess risk. Secondly, familiarity with environments resulted in people feeling more comfortable in situations and worrying less. Thus, as described by Slovic (1997), the perception of risk may be linked to both cognitive assessments of the situation and affective responses.

The Sea Kayaker felt “Your ability to assess risk increases with the greater skill level but you cut the risks finer and finer.” This may support the ability to operate at the edge of performance. Lyng (1990) states that testing the boundaries leads to extending the boundaries, as a result, the perception of the boundary may change.

Respondents described processes that can account for different perceptions of risk associated with experience. Over time what initially requires conscious thought can become automatic behaviour, thus freeing the novice participant from having to think about basic actions and allowing them to focus upon different elements of the activity. As skills
develops, so can confidence, success can result in the further enhancement of confidence. Enhancement of skills and familiarity with conditions can allow the participant to relax and so activities become less stressful and more enjoyable. As the participant becomes acclimatised to conditions, the level of acceptable risk may increase. Conditions that may have been frightening become sources of fun and excitement. As skills and experience build, the perception of risk may become more refined enabling participants to focus upon salient factors and predict changing conditions and determine the appropriate action. Inexperienced paddlers may be inappropriately focusing on low level risks and failing to recognise the significance of other risks. Experienced paddlers may be able to differentiate between risks or have acquired skills to effectively manage risk, this in turn could result in them operating closer to the dividing line between successful and unsuccessful performance. Experienced paddlers may not recognise how worrying conditions are for people new to the activity.

**The Impact of safety support on paddling behaviour**

The presence of other competent paddlers was described as enhancing safety as well as supporting a higher level of operation. The Male Beginner stated that if others were present, he would be more likely to attempt more difficult activities because "if I messed up I could be rescued....you know there is help for you so it's worth giving it a go". He went on to state that feeling that no one could help him if things went wrong, would result in him holding back from attempting some situations. The Sea Kayaker felt that paddling in a group enhanced safety. The Sit-on Kayaker and Surfer said that "With a big group there is more support, there is the perception if something goes wrong it is less likely to end badly as if
you're on your own.” The Experienced River Paddler and Coach indicated that having others with you provided safety back up and so people may be willing to attempt more challenging conditions. The response of the Intermediate Paddler provided a different explanation for engaging in high risk activities in the presence of others who are deemed to be more experienced. She described how when she was the most experienced person, she felt a responsibility for others, so held back from engaging with risk. In the presence of experienced paddlers, she reported being released from a position of responsibility and so felt able to "enjoy the moment more because you don’t have to worry about other people". The presence of competent people in the group, may allow group members to concentrate on their own performance, without having to closely monitor others; this in turn could enable a higher level of performance.

The Local Beach Lifeguard and the Sea Kayaker felt that in remote parts of the world, there would be a tendency to be self-sufficient when paddling, as rescue from external bodies was not at hand. As part of their public education initiatives, Transport Canada (2007) emphasises that in some regions, a paddler may be isolated and that there is a need for them to be self-sufficient. The Local Beach Lifeguard was of the opinion that if people knew they could be rescued, they would be more willing to attempt difficult activities. The Sea Kayaker felt that the presence of such services and the likelihood of others being in the vicinity, resulted in people feeling more comfortable in the sea in the UK, compared to isolated regions. The Sit-on Kayaker also felt that the presence of external support could increase risk taking behaviour, "I imagine that if you’ve got-it, you feel you have more backup, it tends to make you possibly take more risks". Based upon his experience, the Local
Beach Lifeguard felt that on patrolled beaches, the public often had an inappropriate sense of security. He stated, “People seem to feel that they will come to no harm at all if they are on a lifeguard beach because there is always someone there. But if you have a beach like Newgale it is two odd miles long, we can’t look at the whole beach all the time, something can go unnoticed and something as small as somebody disappearing under a wave, we won’t see.” The discussion indicated that respondents felt that the perception of the feasibility of accessing external support in the case of difficulties, would influence and paddling behaviour. This was both in the direction of self-reliance where support was seen to be limited and reliance on external support where backup was seen to be present. Based upon the comments of the Local Beach Lifeguard, there may be a misperception about the ability of rescue services to monitor and respond to incidents. This may result in the individual feeling that responsibility for the management of risk shifts from them to external agencies. He cited the example of parents leaving their children unattended at the beach and assuming that their safety would be ensured by the lifeguards.

Whilst there was the recognition amongst respondents that rescue services could be called, there appeared to be a reluctance to do so. When asked if the presence of rescue services would influence the sort of conditions entered, the Sit-on Kayaker and Surfer replied “No, no because I don’t think I would ever put myself in a situation where I thought I have to rely on the rescue services, my ethos with surfing has always been, I only surf when I know I can rescue myself…..as long as I can swim in or know a way of getting out then that’s fine but I wouldn’t rely on anybody else.” The Sit-on Kayaker stated “I wouldn't phone an emergency service beforehand because I think it is an indulgence isn’t it. If you are doing something that
requires backup from the emergency services, you are probably doing something you shouldn't be doing." Embarrassment and concerns about what others thought was described as impacting upon risk taking behaviour that could result in the need to call for external support. The Local Beach Lifeguard stated, “I would sort of hang my head in shame” if he found himself in a situation where he had to call emergency services for help. The Intermediate Paddler explained that “The thought of the lifeboat is a deterrent because I wouldn't want it called out, I'd be horrified if I had to call the lifeboat out.....it would be so embarrassing.....also you think, god I put myself into this situation and somebody else could be out there in real trouble and need them and you could be diverting them.” The Experienced River Paddler and Coach did not feel that the presence of emergency services would encourage him to undertake a higher level of challenge, as he would be “very embarrassed to call the emergency services, putting myself into a situation where I need somebody else's help". These sentiments appear to reflect issues of esteem and concerns over social approval. As Lyng (1990) suggests, losses as result of poor planning and lack of safety precautions is viewed negatively by others.

A variety of views were expressed in relation to the impact of safety support on the willingness to attempt more challenging situations. A general trend was described whereby the presence of others or rescue services, could facilitate engagement with more challenging activities. This view provided support for the processes described in relation to Risk Compensation/Risk Homeostasis (Adams 2012; Wilde et al. 2002). However, when describing their own behaviour, respondents indicated that what others would think of them if they required external rescue, mediated risk taking behaviour. This position
supports Ajzen’s (2011) description of the impact of subjective norms on behavioural intentions. Stating that activities would be undertaken in which it was known that there was a high likelihood of requiring external rescue may be socially unacceptable and reflective of the participant not being able to appropriately plan and manage activities. An alternative interpretation was provided in relation to the way in which the presence of others could facilitate engagement with a higher level of challenge. Instead of compensating for risk, the presence of experienced others allowed for the diffusion of responsibility for looking after the group and so could release an individual to focus upon their own performance. Descriptions suggest that risk compensation is a process that can occur; as indicated by Hedlund (2000) it may be difficult to determine when and by how much it occurs, as it can be influenced by a wide range of situational and social variables.

**Injury and safety practices**

**The nature and cause of injuries**

A range of causes of injuries were identified by the interviewees. These included being hit by a kayak or hitting others with a kayak, lifting and carrying, cold water immersion, sunburn and wrenching of muscles and impacts with rocks. The causes of injuries described were linked to acute occurrences, as opposed to conditions that developed over time. This reflected the findings of the quantitative study into health impacts and associated cause. The literature into injuries and health impacts of kayaking identifies acute conditions; chronic conditions associated with overuse are also frequently reported. The limited profile of chronic conditions may be a result of acute injuries having more immediacy in one's memory. Other than the Sea Kayaker, the frequency and duration of paddling amongst the
interviewees may have been at a level of intensity that reduced the likelihood of overuse injuries. Whilst there were a number of common themes in relation to the causes of injury, variation was described that was linked to a range of factors including the type of boat and activity; this reflects the literature (Schoen and Stano 2000; Powell 2009). The Experienced River Paddler and Coach felt that differences in injuries between playboats, sit-on kayaks and sea kayaks were linked to the sort of activities undertaken “they are all very different disciplines”. For example, those using sit-on kayaks were described as often playing in the surf and therefore were regarded as being more likely to experience impacts to the head. The Local Beach Lifeguard explained that those using playboats were often performing dynamic moves which could result in twisting and wrenching the body. He felt there was a possibility of injury to shoulders whilst on the wave and this could cause problems when trying to exit the boat after capsize. Those using sea kayaks were often seen to be undertaking longer journeys away from the shore and so were facing other risks. The Sea Kayaker provided an example of this, "I think actually you are far more likely to succumb to hypothermia than drowning actually, I think that is probably your greatest danger in a sea kayak in the United Kingdom. If you go in the water your survival is far more governed by hypothermia than anything else probably."

The risk of being hit or hitting others was raised by interviewees. The RNLI (2012) draw attention to the dangers that an uncontrolled kayak in the surf zone can pose. The Experienced River Paddler and Coach thought that this was an issue when using a playboat in the surf zone. This view is in line with the findings of the study into health impacts and perceived cause; being hit by others was seen to be a more likely cause of injuries amongst
those using playboats than those using sit-on kayaks or sea kayaks. The Local Beach Lifeguard felt that collisions with other paddlers was a major cause of injuries amongst those surfing kayaks. The Sit-on Kayaker identified hitting others whilst using their sit-on kayak as a significant risk. The Sit-on Kayaker reported, “I don’t like coming in to a beach where the surf is heavy and there are lots of people around. You can’t control it, you have limited, very limited control”. As a result of the perceived limited manoeuvrability of some kayaks in the surf zone, a number of respondents indicated that they avoided using the boats when other people were around. The Sit-on Kayaker and Surfer reported, "We always make sure we are on a bit of beach where no one else is, as one thing we can’t do is control the kayak if we come out of it." The Local Beach Lifeguard described how often, inexperienced people using sit-on kayaks "can’t control it, if they start going to the side, they will just go bouncing along the way and hit people without meaning to”. In addition to this, he was of the opinion that at times, kayakers were inappropriately moving through swimmers and this increased the likelihood of incidents. The Sit-on Kayaker described an incident which could have resulted in a collision and injury to others in the water, "I was coming in quickly on the surf, an adult and a small child were walking towards me, they seemed to be oblivious to the fact that I was coming in at about, it seemed fast, about 15 miles an hour and I would have hit them especially the child. And I got really angry with them, totally oblivious to the fact that this kayak would have hurt them." This perhaps illustrates a lack of clarity in the understanding of the duty of care that should be extended to others. Whilst there is a published etiquette for surfing, which applies to both surf board riders and people surfing kayaks, the Local Beach Lifeguard felt that many people were not aware of the surf etiquette and this resulted in many arguments. In addition to risks posed
by other paddlers, all the interviewees who regularly used sit-on kayaks, identified being hit on the head by their own kayak whilst in the surf zone as an issue. This reflects the findings of the investigation into health impacts and cause, where impacts with the head were more likely to be identified by those using sit-on kayaks than those using other types of boats.

The Sea Kayaker felt that back injuries were the most common health impact and this was associated with lifting heavy loads. The Sit-on Kayaker noted that the boat he used was heavy and this presented him with problems when lifting it off his car. The Intermediate Paddler also reported lifting and carrying could result in injuries and this was more likely the heavier the boat. The Sea Kayaker felt that it was not necessarily the weight of the boat that was the issue, but lifting and carrying techniques. He explained that whilst sea kayaks were heavier than playboats, those using sea kayaks would often carry boats with a colleague and therefore did not necessarily experience higher levels of injury. The study into health impacts and cause identified lifting and carrying as the major cause of injuries or medical conditions. Those using sea kayaks were also more likely to describe it as the most likely cause of health impacts when compared to other boat users. A number of other published studies have identified lifting and carrying as being a causal factor in injuries (Weiss 1991; Fiore and Houston 2001; Diafas et al. 2010).

Human factors are often cited as significant contributors to incidents (Hogan 2002; ACA 2003; Casseland and Congiu 2005; CDC 2008; Bailey 2010). The Experienced River Paddler and Coach felt that a lack of knowledge and skills were the main cause of things going wrong. The Sea Kayaker was of the view that it was not necessarily the lack of knowledge
and skills *per se* that resulted in problems, but embarking on activities beyond the individual’s level of skill and knowledge. The Literature supports the view that incidents are often initiated by interaction between human factors and hazardous water or weather conditions (Broze 2001; ACA 2003; Lull 2008). Inappropriate decision-making was often described by interviewees as a starting point to a series of events that could lead to an incident or injury.

**Safety practices**

The interviewees outlined a number of safety practices and the rationale behind those practices. The nature and demands of activities, the conditions experienced and the physical characteristics of boats, were described as influencing decisions relating to safety practices. Respondents indicated that the variation in equipment and practice was often appropriate given the differences between activities and conditions. Concern was expressed by the Local Beach Lifeguard, the Intermediate Paddler, the Experienced River Paddler and Coach and the Sea Kayaker that certain groups were ignorant of the risks and therefore did not take appropriate precautions. However, the Sea Kayaker felt that "*a lot of people take notice of what is recommended,...people are far better educated nowadays than they used to be certainly, the internet and things have improved the situation.*" He felt that this increased awareness accounted for the high level of adoption of buoyancy aids.

Respondents often reported that they thought it was unlikely that they would need their safety equipment; it was carried in case things did go wrong. The Intermediate Paddler
described safety equipment as “*your insurance isn’t it really, it’s that mitigating against risk ....if things do happen, at least you are able to deal with it*”.

When the Sea Kayaker was asked why do people carry expensive safety equipment which they think is unlikely to be needed, he replied, “*It’s an insurance policy, well that is the reason for most safety equipment in fact, if you never use it you can argue it is irrelevant isn’t it. You may go through a whole lifetime not having to use it that is the best situation.*”

The Intermediate Paddler, the Experienced River Paddler and Coach and the Sea Kayaker indicated that safety equipment was often carried, not for one's own benefit but to aid others who found themselves in difficulties. There was the recognition that things could go wrong and that carrying safety equipment increased the likelihood of being able to manage situations. The American Canoe Association (2012) indicate that a capsize can be an expected part of activities and "part of the fun". What may be described as safety equipment may be equipment that is used as standard aids for engagement in activities. For example, in sea kayaking, a bilge pump and a tow line may be equipment that is used relatively frequently amongst paddlers pushing their level of performance. Thus the carrying of safety equipment may not be to cope with emergencies but as a means of dealing with common and expected occurrences. Other equipment such as VHF radios and flares may be carried in the event of what might be perceived as unlikely but serious occurrences that cannot be managed by the individual or the group.

The Experienced River Paddler and Coach had concerns about people who had expensive equipment but did not have good paddling skills. The Sea Kayaker explained that safety was
not just about the carrying of equipment but also required the rehearsal of skills to ensure safe passage. Aspects of image or complying with perceived social norms may be influencing the purchase and carrying of equipment (Wheaton 2004). Thus, such people may be presenting an image of a competent paddler or someone who enters environments that requires technical equipment, yet, this is not backed up by requisite skills.

**Variation in practices**

The reported safety practices and the equipment carried varied amongst the interviewees. For example the Sit-on Kayaker reported that they did not carry safety equipment beyond a buoyancy aid and wetsuit; others reported carrying equipment such as flares, mobile phones or VHF radios, tow lines, paddle leash and helmets. Variation was not necessarily regarded as a deficiency in behaviour but often as an appropriate assessment of risks. For example, both experienced paddlers used to exposed conditions and those who were less experienced and paddled close to shore, appeared to feel that not all recommended equipment should be carried at all times. Variation in the safety requirements according to activity and conditions have been identified by a number of organisations involved in safety and the sea (e.g. Transport Canada 2007; RNLI 2012). A key consideration is the adequacy of participants’ ability to assess risks and determine appropriate risk management strategies. For example it has been suggested that those with limited experience may be inappropriately assessing risk (Lyng 1990; Halpern-Felsher et.al. 2001).

It was viewed that those paddling away from the shore or in exposed conditions were in more need of additional equipment such as flares and VHF radios, compared to activities
undertaken close to the beach and in sheltered waters. It was also seen that the requirements of activity planning varied according to the nature of the environments encountered. For example, the need to account for and understand tidal flow was regarded by the Sea Kayaker as being more important when undertaking trips out at sea, compared to beach based activities. The Local Beach Lifeguard also felt that those using sea kayaks were more likely to appraise environmental conditions, partly because they were engaging with more challenging activities and orientated to adventure paddling. He felt that those using sit-on kayaks tended to be beginners, undertaking activities close to the shore and these activities often did not require in-depth analysis of weather patterns and tidal flows. He proposed that for many sit-on kayakers, the motivation for participation was about “a leisurely paddle with a couple of mates and a mess around in the sea.” For the Sea Kayaker, the motivation was seen to be the desire to enter difficult and challenging conditions and this stimulated the membership of clubs and the undertaking of training as a means of enhancing skills. Thus steps taken that could improve safety could be regarded as instrumental in enabling the undertaking of the activity. The Sea Kayaker felt that those engaged with sea kayaking had greater knowledge of the sea, training and experience; this combined with the nature of their activity, accounted for differences in safety behaviour. These statements reinforce the view that the safety requirements for different activities vary in relation to planning, equipment, skills and knowledge.

Respondents described how the carrying of certain equipment such as buoyancy aids, was common practice. The Sea Kayaker and the Intermediate Paddler indicated that if equipment was not seen to be required, there was a tendency to leave it behind. The Local
Beach Lifeguard described how, “when you start out you might load your boat to the max with equipment and go out on a flat glassy day and realise you’ve never needed all that stuff, so you might start thinking, to save time and bother, you just chuck in a pair of paddles”. The decision to leave certain equipment behind may be based upon appropriate assessment of risk. However, the Local Beach Lifeguard suggested “over time, having not needed safety equipment, it may be possible to become complacent”. Slovic has discussed how not experiencing incidents and avoiding the inconvenience of precautionary action can reinforce not taking preventive action (Slovic et al. 1978). Weinstein (1993) has also indicated that perceived susceptibility is also a key component in a number of models of health protective behaviour. If a participant, through experience, comes to believe that a negative outcome will not occur, vigilance in relation to the safety practices may decrease.

The Local Beach Lifeguard explained his rationale for carrying limited safety equipment with him when surfing a playboat. First, he felt it was not possible to stow a wide range of equipment in a small boat, secondly he felt that in a capsize, it was likely equipment would be washed out and thirdly, if he capsized it was likely that he and the boat would be pushed to shore. He contrasted this with activities involving distance and limited escape routes where he would carry communication equipment and flares. The Experienced River Paddler and Coach explained that they did not always follow safety guidance. This was linked to the view that the conditions entered did not necessarily warrant high levels of equipment and that current guidance on equipment that should be carried was excessive, “I think they have gone over the top with what they expect you to carry, it does make a boat quite heavy”. He reported that the levels of safety equipment he carried was higher when he had
responsibility for others; thus, the assessment of required equipment was based upon consideration of the environment and activity participants.

The Sea Kayaker also recognised that the equipment carrying capacity of playboats was much smaller than that of sea kayaks and therefore there was a physical limitation on what could be carried. The differences in approach to planning and the carrying of equipment was not necessarily seen as an example of one group being more conscientious than another but more a reflection of differences in the requirements of activities. The Intermediate Paddler emphasised the amount and nature of equipment carried, "depends on what you are doing....different conditions will require different things”.

The interviewees recognised that there was variation in safety practice; in many cases this was seen to be linked to the demands of activities. With experience, there may be a refinement in the equipment carried. This reflects the sentiments of the BCU (2002) who suggest that there should be a questioning as to whether, given a particular activity, equipment is actually required or could act as a hindrance. However, if incidents do not occur, the avoidance of inconvenience of undertaking certain safety practices may reinforce the abandonment of protective behaviour (Slovic, et al. 1978). A key consideration is the need to determine what is redundant and what is necessary to cope with uncommon but potentially serious situations.
Proximity

Staying close to the shore was one of the practices described to reduce risk. It would appear that paddling away from shore was perceived as introducing different risks and to manage these risks, required the carrying of additional safety equipment such as flares and VHF radios. The Sea Kayaker discussed the distinction between safety practices for inshore and offshore maritime activities and indicated that in a similar way, there are different risk management considerations for paddling close to and away from land. The Intermediate Paddler felt that the sort of equipment that should be carried on longer journeys or out at sea would be different to the equipment she would need for activity close to land. Being close to the beach was perceived as making activities relatively safe. The Sit-on Kayaker and Surfer stated, “I think as long as I’m in sight of a beach I’ll be fine, I don’t perceive there to be much of a risk.”

Both the Sit-on Kayaker and Surfer and the Sit-on Kayaker were of the opinion that as they paddled close to the shore, if they encountered difficulties, they would be pushed back to land. The Sit-on Kayaker and Surfer felt that if he capsized his sit-on kayak “the kayak is pushed into the shore and we swim in to the shore, because we have buoyancy jackets on it's not a problem. If we were out at sea for instance and something happens and I was out of my depth in terms of water depth, there wasn't anywhere obvious to escape to, then that would change my opinion of what was happening”. Proximity may provide a sense of security. However, particular risks are associated with activities undertaken closer to the shore, for example, interviewees described risks associated with collision in the surf zone. Activities close to land may also increase the likelihood of impacts with rocks and beach;
additionally, geological features associated with the coastline, can interact with tidal flows resulting in risks different to those further away from shore (Lull 2008). This was noted by the Sit-on Kayaker and Surfer who pointed out that there is still a need to recognise the presence of strong currents close to the shore.

The nature of risk was regarded as changing depending upon proximity to land. Reflecting the views of a number of organisations with responsibility for water safety, practices away from land were regarded as requiring a greater level of self sufficiency. Being close to land appeared to provide a sense of security. This may have been linked with perception of being more able to control the situation if things went wrong by being able to swim or be swept in to the shore. Whilst in many cases this may be feasible, local conditions such as tidal rips, undertows and breaking waves may present particular hazards, furthermore, temperature of the water could inhibit the ability to perform a self rescue. Broze (1997) feels that in water of about 10°C, a lone paddler capsizing less than half a mile away from shore and unable to get out of the water or attract attention, could find themselves in a serious situation that could result in a fatality.

The wearing of buoyancy aids

All the interviewees described using buoyancy aids. Some activities were described where a buoyancy aid was not deemed to be required. The Sit-on Kayaker reported that they “always wear a buoyancy aid, I always have a buoyancy aid, I never go out without a buoyancy aid, there is no excuse for not carrying a flotation device. You should never go out without a life jacket on.” The Sit-on Kayaker and Surfer also stated “We all wear buoyancy
aids and the kids have buoyancy aids if we go out, if friends come out on it with me, we all wear buoyancy aids." The use of a buoyancy aid was described as desirable, normal and accepted practice. The Intermediate Paddler felt that it would be stupid not to wear a buoyancy aid whilst paddling. The Female Beginner regarded a buoyancy aid as "an extra precaution really isn’t it, I wouldn’t have gone out without a lifejacket…..I would feel stupid if I didn’t have a lifejacket on, because even the leaders have got lifejackets on, you just know that if the worst comes to the worst and you do get out, it is a big help.” The Male Beginner emphasised that wearing a buoyancy aid was “common sense” as it would keep you afloat if you were in difficulties. In addition to this, he stated “It’s a bit of protection as well, if you hit rocks you have got like body armour almost”. The Experienced River Paddler and Coach also supported the view that a buoyancy aid acted as "body armour" when surfing with others. The Local Beach Lifeguard felt that a buoyancy aid was a "confidence booster" and wearing one gave beginners one less thing to worry about. The Sea Kayaker attributed the high level of use of buoyancy aids to publicity over the past 40 years and people realising that they cannot swim for long unaided.

The interviewees provided clear rationale for the wearing of buoyancy aids. However, the Local Beach Lifeguard indicated that at times, he did not wear a buoyancy aid. Given his ability in the sea, he felt that when surfing a kayak close to the beach, “it almost helps not to (wear a buoyancy aid) because you’ve got more freedom of movement and things and helps you swim. I know if I get trapped upside down I can get out of the boat, I will be more able to get back in without a buoyancy aid”. The Sit-on Kayaker and Surfer also reported that his friends, who were experienced kayakers, tended not to wear a buoyancy aid whilst using his
sit-on kayak close to the beach. The Local Beach Lifeguard indicated that if he was further away from shore and in challenging conditions, he would wear a buoyancy aid. The Local Beach Lifeguard’s decision as to whether to wear a buoyancy aid or not, appears to be linked to his assessments of risk and the costs and benefits of wearing the equipment. Factors described as influencing his decision include an assessment of ability, the nature of the conditions to be encountered, proximity to shore, the extent to which a buoyancy aid limits movement and enjoyment and the degree to which the buoyancy aid supports or inhibits self rescue. Whilst indicating that a buoyancy aid was not always required, he advocated that those who were not good swimmers should wear a buoyancy aid.

Buoyancy aids were regarded as a valuable piece of equipment and adoption was subject to social approval. Quan et al. (1988) report that the wearing of personal flotation devices amongst those kayaking, is higher than other categories of small boat users. This may reflect the perceived utility of the equipment and paddlers’ expectation to capsize. As pointed out in the American Canoe Association’s Top 10 Safety Tips, to capsize is something that should be expected and also "part of the fun".

The wearing of helmets

Respondents recognised that they could be hit on the head whilst kayaking; this was not necessarily translated into the use of protective helmets. The Intermediate Paddler described being hit on the head by her sit-on kayak and also been caught in difficult situations where she was worried about hitting her head on rocks, yet she continued not to wear a helmet. This respondent recognised that there was risk of head injury and
precautions could be taken to reduce the likelihood of injury. However, the wearing of safety equipment was perceived as detracting from enjoyment, “to me the enjoyment is about not having to have anything on my head with my arms free” (this referred to the sleeves of a wetsuit). The respondent confirmed that she did wear a helmet when cycling. The Sit-on Kayaker did not wear a helmet; he stated "it is something I am going to get because I have been hit and I know how much it hurts. A helmet is something that I have learnt that you need to use. I didn't think the helmet was important actually until I was hit by a kayak coming up behind me; it hurt”. The Local Beach Lifeguard also indicated that he was aware that there was potential for injury resulting from impacts to the head in the surf zone and that a helmet would protect against injury. Given this, he had difficulty explaining why people did not wear helmets when they did not detract from performing the activity. Using the example of surfing, he suggested it may be because they are not commonly used. Whilst recognising he could hit his head during surfing on a surfboard, the Sit-on Kayaker and Surfer confirmed that issues of image influenced the decision not to wear a helmet. This concern over image was used to explain why he was not using a helmet when paddling his sit-on kayak. In this case, the perception of image may be linked to their background in surfing where the wearing of helmets is not normal practice. The subjective norms influencing behaviour may have been drawn from their primary aquatic activity.

The quantitative study into reported safety behaviour and the observation of safety practices, identified that there were differences in the carrying and wearing of helmets between those using sea kayaks and those using playboats. The Local Beach Lifeguard, the Intermediate Paddler, the Experienced River Paddler and Coach, the Sea Kayaker and the
Male Sit-on Kayaker and Surfer all felt that differences in the adoption of helmets by those using sea kayaks and those using playboats was linked to the nature of activities and environments encountered. The Sit-on Kayaker and Surfer suggested the use of helmets by those who predominantly paddle in rivers, reflects the conditions they encounter in their primary activity and that an informal dress code of wearing helmets has developed. He proposed that when experienced river paddlers use their riverboats in the sea, they continue with their usual practices. He felt that those paddling sea kayaks, did not regard the hitting of the head as a major issue whilst out at sea and therefore tended not to wear helmets. The Experienced River Paddler and Coach also felt that those using playboats in the sea have come from a background of river playboating where wearing helmets is the norm. He perceived that their activities in the sea, posed a greater likelihood of impacts to the head, than those undertaking trips in sea kayaks. These two factors were seen to account for the differences in the use of helmets by those using sea kayaks and those using playboats. The Sea Kayaker concurred with this view and perceived that those using playboats were more used to situations where impacts with the head were likely. He advocated the use of helmets in outdoor adventure activities and this was based upon his experience as a climber and being injured whilst not wearing a helmet.

The Local Beach Lifeguard reported that they did not wear a helmet when surfing a kayak. The Experienced River Paddler and Coach also stated that whilst they would always wear a helmet when paddling on a river, they did not wear a helmet when surfing a kayak in the sea. He said that they would encourage others who were more likely to capsize and hit their
heads to wear a helmet. If with such people, he would wear a helmet to emphasise good practice.

There was acceptance of the likelihood of being hit on the head and that the use of a helmet could reduce injury. However, the reported behaviour and attitude towards helmets appears to be different to that related to the wearing of personal flotation devices. Whilst there seems to be both individual and social approval of use of personal flotation devices, this was not as apparent in relation to helmets. The attitude appears to be at odds with the findings of the study into health impacts and perceived cause where ‘impacts with rocks and beach’, was seen to be a major causal factor in injuries. Whether or not a helmet was worn was seen to be related to the activity and environments entered. The discussions did not highlight the influence of phase of activity upon the need to wear a helmet. The RNLI (2012) stress the importance of wearing a helmet whilst in the surf zone; even those undertaking activities in open water are likely pass through the surf zone when launching and landing. Norms associated with activities were described as influencing behaviour. A number of respondents regarded the wearing of helmets as being part of expected equipment used by river paddlers. These norms were seen to be expressed when they transferred their activity from rivers to the sea environment.

Checking sea and weather conditions

The power of the sea and the way in which conditions can change rapidly, were identified as both risks and attractions of kayaking in the sea environment. The Intermediate Paddler, Sit-on Kayaker, Sit-on Kayaker and Surfer and the Experienced River Paddler and Coach all
described situations where conditions in the sea had caused them problems. The Intermediate Paddler, after having been caught out by rapidly changing tidal flow, now ensured that she assessed tidal conditions before embarking on a trip. Interviewees emphasised the importance of taking account of sea and weather conditions when undertaking activities. The importance of checking on these conditions was seen to vary according to the nature of the activity. For example, being aware of tidal flows was seen to be of more relevance to those undertaking journeys out at sea compared to those surfing close to the beach. The Sit-on Kayaker and Surfer explained, “If you were out in a sea kayak and you are off to paddle a longer distance in an area that might be susceptible to currents and also you may want to use the currents to be able to paddle faster in one direction or to just time your route to ensure that you get in and out safely, whereas a sit-on kayak, you're more likely to stay close to rocks so you don't.” The Local Beach Lifeguard explained that those using sea kayaks need to know what conditions they would be facing and therefore check tides, charts and weather conditions. Those surfing close to the shore would be more interested in information on local surf conditions.

The Sit-on Kayaker and Surfer highlighted the impact of wind upon sit-on kayaks. Based upon his experience, he stressed that, “If wind is too strong offshore, no matter how much paddling you do, if you are tired you are not going to fight it.” The Local Beach Lifeguard was also able to relate incidents where people using sit-on kayaks, had found themselves in difficulties as result of the wind. The Sea Kayaker advocated closely monitoring weather reports and weather activity in the Atlantic as part of trip planning.
Both the Local Beach Lifeguard and the Sea Kayaker felt that some people were oblivious to the impact of tidal conditions. The Experienced River Paddler and Coach was concerned that people may buy equipment but lacked the appropriate knowledge in relation to conditions. He felt that many people were unaware of the presence and impact of currents and were unable to "read the water".

Interviewees stressed that environmental conditions could rapidly change. A number of the respondents related examples of them being caught out by conditions and finding themselves in difficulties. The need to check conditions was emphasised. These views correspond with key themes identified in the literature relating to safe paddling in the sea. An appreciation of the impact of environmental conditions and the need to plan activities accordingly, is frequently described as being fundamental to safety when kayaking in the sea (Broze 1997; Transport Canada 2007; Lull 2008; direct.gov.uk 2012).

**Factors militating against the adoption of safety practices**

During the interviews, a range of steps that are taken to manage risks were discussed. These included the wearing of personal protective equipment, the carrying of safety equipment, the assessment of environmental conditions and the matching of conditions to ability. A number of examples were provided whereby respondents did not necessarily follow recommended guidance. Justifications were provided for their actions. The interviewees were also able to provide a number of suggestions as to why safety practice was not adopted by others. The factors influencing decisions not to undertake safety practices are listed;
perceived ability making safety equipment redundant

safety equipment restricting the ability to self-rescue

safety equipment being regarded as limiting enjoyment of the activity

equipment restricting freedom of movement

activities not seen to be demanding and therefore equipment not seen to be required

moving away from certain safety practices to increase feelings of challenge and excitement

expense of equipment

assessing risk and determining that equipment will not be needed

assuming others will manage the situation

concerns over image

not perceiving or being aware of risk

physically not been able to fit equipment into smaller boats

not calling emergency support due to concerns over what others thought

not having to use equipment resulting in complacency

perceiving that guidance is too strict and not necessarily applicable to all paddlers

The Experienced River Paddler and Coach emphasised that safety guidance is "there as a guide, it's not a strict you will do this". He felt that the need to adhere to safety guidance very much depended upon the ability of participants. When with novice paddlers he insisted group members followed recommended safety practices; when paddling with experienced colleagues such practices were not always observed. Many of the reasons why interviewees
did not adhere to guidance, appear to be based upon rational analysis of risk. However, with some groups, there may be limited understanding of the activity and the interplay between skill and the demands of the activity. In this case, the assessment of risk may not be utilising relevant information. This supports the view of the BCU (2002) which suggests that guidelines should be adhered to by those with limited knowledge whilst being discretionary for those with appropriate skills, experience and knowledge.

**Steps to improve safety**

During the interviews, respondents highlighted a range of measures that they felt would enhance safety. These measures were based around the themes of education and skills development and activity planning. The Sea Kayaker emphasised that one of the basic steps to improve safety, was to use common sense.

**Education and skill development**

Training was seen to be one of the most important measures to improve safety amongst those kayaking in the sea. The Intermediate Paddler emphasised the need for skills to rescue oneself and others, for this reason she advocated training. The Sea Kayaker felt that training was the most important step to improve safety. He proposed that this did not necessarily have to be formal training courses endorsed by the governing body; it could be through a group of individuals who could impart knowledge to each other. The Experienced River Paddler and Coach’s main advice for safety was to listen and learn from others, he concluded "join the club, that’s probably the best thing, join the club, learn the basic skills and go out with experienced people". The Sit-on Kayaker suggested that everyone should
attend a training course on kayaking; he felt that enforcement of attendance was not appropriate or achievable. The Sit-on Kayaker and Surfer felt that sea kayaking and river kayaking in specialists boats, was not such an easily accessible activity and required tuition, as a result of this, within these disciplines, there are particular cultures with generally accepted and understood etiquette. He felt that this contrasted with sit-on kayaking where it was perceived that people would be less likely to undergo tuition; therefore there was a need to promote an understanding of appropriate etiquette amongst this group. Whilst the respondents stressed the need for appropriate training, they recognised that some groups may be reluctant to undertake training. The Sit-on Kayaker felt that those who were in the greatest need of training would often fall into this category. The identification of different levels of motivation to undertake training, reflects themes discussed in relation to distinctions between those engaged with ‘serious leisure’ and those engaged with ‘casual leisure’ (Stebbins 2007) and those who have become assimilated into ‘lifestyle sports’ (Wheaton 2004).

Planning and preparation

The need to plan activities and prepare for eventualities was stressed by interviewees. This was seen to be achievable through a number of steps including an assessment of conditions, the carrying of appropriate equipment, recognition of one's limits, the presence of others to provide safety support and leaving details of the proposed activities. The Intermediate Paddler, the Experienced River Paddler and Coach, the Sea Kayaker, the Sit-on Kayaker and the Male Beginner all described situations where they felt it was appropriate not to
undertake activities and to be willing to walk away. This was seen to be an important element of a risk management strategy.

The Male Beginner emphasised the importance of comprehensive planning, identifying potential risks, utilizing local knowledge, carrying safety equipment, ensuring the group is competent and undertaking the activity with experienced paddlers. To gauge anticipated conditions and to have appropriate equipment was seen to be of particular importance. The Local Beach Lifeguard emphasised the value of utilising local knowledge in the form of information posted at beaches and by asking lifeguards about local conditions and expected weather and swell. He recommended that people check forecasts for surf and weather and recognise that conditions vary from day to day. The Experienced River Paddler and Coach also emphasised the need to be aware of the local conditions and the value of utilising local knowledge. The Sea Kayaker stressed the importance of monitoring weather reports, appraising tidal conditions and noting the weather patterns which could impact on local conditions.

The importance of the presence of others was discussed by the Sea Kayaker, Experienced River Paddler and Coach, the Intermediate Paddler and the Sit-on Kayaker. The Intermediate Paddler stated “The advice I give would be, you should never kayak on your own, you should always go out with at least one other person.” The Experienced River Paddler and Coach felt it important that the group was large enough to deal with situations, safety equipment was present and the people knew how to use it. Both the Sit-on Kayaker and the Intermediate
Paddler felt that it was important to let someone on shore know what you are doing and when you were expected back.

The Local Beach Lifeguard emphasised the importance of having appropriate equipment for the activity. The Sit-on Kayaker recommended that paddlers wear a helmet and a personal flotation device. The Experienced River Paddler and Coach felt it was important that people were appropriately dressed for warmth and made use of buoyancy aids and helmets.

Drawing upon their experience and knowledge, the interviewees were able to propose a number of practical steps to enhance safety amongst those kayaking in the sea. The views expressed are in line with recommendations provided in specialist texts dealing with sea kayaking safety (for example see Broze and Gronseth 1997; Lull 2008).

**Overview of Findings**

Respondents outlined desired outcomes from kayaking in the sea. These ranged from relaxing encounters with the environment, through to experiences of thrill and excitement by facing demanding conditions. The reported benefits were multi-faceted, including physical, mental and social wellbeing and opportunities for self development. Whilst risks were identified with the activity, these were often placed in context of risk in everyday life. The propensity to encounter risk and to face challenge was described as varying from person to person and being associated with personal characteristics and needs and the desire for self development. A number of respondents stated that they undertook action to increase the intensity of experience and challenge as a means of maintaining the
achievement of desired outcomes. The way in which risk was perceived and the drive to engage with risk was reported as changing with age. Many activities resulted in positive feelings linked to thrill and excitement; some situations resulted in interviewees experiencing anxiety or fear. The transition between these emotional states was described as being linked to control of the situation. Loss of control was more likely when operating at the edge of performance.

The acquisition of skills and knowledge and the adoption of behaviour were explained as taking place through a variety of mechanisms including observing and modelling the behaviour of others, formal and informal tuition and trial and error. Processes were described whereby within certain groups, initiates were socialized into accepting the norms associated with the activity.

The way in which kayaks and users were perceived varied. The different types of kayaks were regarded as being appropriate for and used in different activities and environments. Sit-on kayaks were frequently described as being used for recreational activities close to the beach and being paddled by people with lower levels of skill and knowledge, when compared to those using playboats or sea kayaks. The view was expressed that those using sit-on kayaks were a different group to those using closed cockpit kayaks. Concern was expressed about people who hire sit-on kayaks for the day who may not have appropriate levels of ability and understanding of the sea conditions. Those with limited skill and knowledge were seen to be a group who may be more likely to find themselves in difficulties. Those paddlers with a high level of ability were also regarded as potentially
finding themselves in difficulties as they were more likely to deliberately enter challenging conditions. Thus, the likelihood of an incident was presented as being related to a combination of knowledge and skill level and demands of activities undertaken.

The presence of others was described as influencing performance and safety. Having others with you, particularly if they were viewed as competent, was seen to support the management of incidents. Being part of a group was also described as facilitating performance; this occurred through encouragement and also by pushing oneself to operate at the same level as others. Being responsible for the wellbeing of other group members was described as mediating the desire to encounter more challenging conditions. Being with a competent group of paddlers and not having a responsibility for others, was seen to provide opportunities for a person who usually leads a group, to engage with a higher level of risk.

A number of the interviewees felt that they had a personal characteristic which resulted in them competing against themselves and others. This was seen to encourage them to achieve higher levels of performance but also, potentially leading them into situations beyond their capability. Observing others perform an activity was seen to stimulate people wishing to emulate that behaviour. Concern was expressed that a novice observer may not recognise the complexity of behaviour and this could result in them engaging in activities beyond their ability. The observation and modelling of behaviour was also seen to have positive impacts, particularly in relation to the adoption of safety equipment such as personal flotation devices. Wishing to present a favourable image also influenced behaviour.
linked to conforming to the norms associated with safety behaviour. The embarrassment associated with what others would think as a result of calling for emergency services, was regarded as a deterrent to undertaking activities that were likely to require external rescue. Examples were also given where this desire to present a favourable image, could result in people undertaking activities beyond their ability.

Interviewees in general, felt that it would be unlikely that they would find themselves in serious situations that required rescue. This was as a result of them feeling that they assessed conditions and demands of activities against their ability and recognised their limitations. The way in which risks were perceived was reported as having changed over time and it was felt that inexperienced and experienced paddlers see risks in a different way. The development of skills and familiarity with situations were suggested as accounting for these differences. As paddlers had become more used to conditions, there appeared to be a tendency to seek out higher levels of challenge to maintain the same level of excitement and thrill. However, as discussed earlier, this was moderated by age.

The causes of injuries were seen to be associated with events such as being hit by or hitting others with a kayak, lifting and carrying, cold water immersion, sunburn, the wrenching of muscles and impacts with rocks. A lack of skills and knowledge commensurate with an activity was suggested as being a primary factor in incidents. Differences in injury patterns were regarded as being linked to the characteristics of particular boats and the demands of activities.
Variation in the safety practices and safety equipment carried was often seen to be justifiable by respondents when given the nature of activities undertaken. In particular, the activity planning requirements and safety equipment for activities undertaken further out at sea and in challenging conditions, were regarded as being different to those when paddling close to the shore, in benign conditions. The carrying capacity of different types of boats was also regarded as influencing the amount of equipment carried. The wearing of personal flotation devices was described as a socially approved norm. Examples were given by experienced paddlers where they felt it was acceptable not to wear a buoyancy aid. Whilst respondents thought it was unlikely they would need their safety equipment, it was carried in case of an incident and often to help others. It was recognised that if difficulties were not encountered and safety equipment was not required, a paddler could become complacent in relation to safety practices. In addition to this, a range of factors that could militate against the adoption of safety practices were identified.

The interviewees advocated education and skill development and planning and preparation as key measures to enhance safety amongst those kayaking in the sea environment. Opportunities for education and skills development were seen to be deliverable through both formal and informal mechanisms. It was accepted that certain groups may not wish to access training opportunities and therefore, there would be a need to consider alternative means of disseminating information relating to safety and paddling etiquette. The ability to assess anticipated conditions and to have appropriate skills and equipment was seen to be essential. A range of sources of information to aid planning were described.
The interviewees were able to provide an insight into the motivation and perceived benefits of kayaking in the sea. Their responses highlighted how the way in which people perceive and respond to risk, varies according to individual characteristics, experience and aspirations. A range of factors were described that suggested reasons for variation in safety practices. This variation was often justified as being appropriate to given activities. However, it was stressed that certain groups may be at higher risk of encountering difficulties due to a lack of knowledge. The importance of appropriate education and training and preparation and planning was stressed in relation to reducing the likelihood of incidents.

**Conclusion**

The review of the literature and the quantitative studies were used to generate themes that guided the interviews focusing upon the meaning and perception of risk and associated risk management strategies. The Interviews enabled an exploration of participants’ experiences, interpretation and understanding of phenomena associated with kayaking in the sea. Their insights provided examples of a range of socio-psychological variables that offer possible explanations for risk related behaviour. Through an evaluation of their own experiences and behaviour, the interviewees were able to highlight their rationale for participation and decisions associated with risk taking. Based upon their direct experience of kayaking, they were able to propose reasons why there may be variation in safety practices amongst those paddling kayaks in the sea and factors that could be influencing risk taking behaviour. Additionally, they were able to suggest a number of practical steps to enhance safety and reduce the likelihood of incidents.
The insights provided by the interviewees were used to support the generation of a range of recommendations that could inform the development of safety initiatives and incident prevention strategies. These recommendations are presented in the following chapter.
Chapter 10

Informing Safety Initiatives and Incident Prevention Strategies

Introduction

Utilising the findings of the two surveys, the observational study and the in-depth interviews, this chapter aims to propose a range of steps that could be taken to inform the development and refinement of safety initiatives and incident prevention strategies targeted at those using kayaks in the sea. A series of recommendations are presented. The recommendations are considered as being of relevance to a broad range of organisations, interest groups, participants and individuals. The recommendations are likely to fall in the remit, realm of expertise and areas of interest of stakeholders from different sectors and settings: this presents scope for collaborative working. Key stakeholders who could play a role in the further development and implementation of the recommendations in the UK include:

- National organisations with a remit for promoting safety in the sea and coastal environment (e.g. RoSPA, the RNLI, the National Water Safety Forum, The Scottish Water Safety Forum, The Royal Lifesaving Society, Surf lifesaving GB and the Maritime and Coastguard Agency)

- Central Government Departments (e.g. the Department for Environment Food and Rural Affairs and the Office of the Deputy Prime Minister) and Devolved Administrations

- Navigation and Harbour Authorities
• National Parks Authorities with a responsibility for coastal areas
• Local Authorities
• The Health and Safety Executive and The Adventure Activities Licensing Authority
• Kayak related governing bodies
• Kayak Clubs
• Informal social groupings of participants
• Individual paddlers
• Kayak and safety equipment manufacturers
• Equipment retailers
• The kayak related media
• Outdoor education bodies
• Schools
• Commercial providers
• Local communities
• Public health bodies
• Academic institutions

The recommendations presented in this chapter are based upon the interpretation of findings from the various stages of the research and are therefore subject to bias. Given this and in line with the ethos underpinning the research, it is strongly advocated that they should be validated by people involved in kayaking in the sea environment. This is regarded as a necessary step in the development of an intervention strategy that reflects the experience of participants and is deemed to be of relevance to the context of their activities.
An underlying assumption in the recommendations is that the steps to promote safety, should enable participation and the achievement of desired outcomes. This is based upon the positive health impacts reported in the first quantitative study and the feelings of wellbeing described in the interviews. In addition to this, an emerging theme in the interviews was that encounters with risk can support a general ability to manage risk. This view reflects that of prominent organisations involved in safety and accident prevention. An approach to safety promotion and incident prevention is therefore advocated whereby, instead of inhibiting engagement with the risk, engagement is facilitated through strengthening the abilities of the individual to both assess and manage risk. For some, the process of developing the ability to assess and manage risk may correspond with desired outcomes such as self development. For others, the management of risk may enable them to have fun! A simple example of the latter point is that the wearing of a wetsuit may reduce the chances of hypothermia; this could be regarded as a risk management strategy. From the point of view of the participant, the management of risk and in particular the prevention of hypothermia may not be a priority, however, the wearing of a wetsuit may allow them to undertake activities in the water all year round and stay in the water for longer.

*Recommendations:*-

- Promote safety behaviour as action that can facilitate the performance of activities.
- Promote safety practices in such a way so that they come to be seen as valuable and accepted as good practice by participants.
Diversity in the Activity

The two surveys and the observational study provided evidence that those using kayaks vary according to a range of factors. Respondents reported differences in terms of their kayaking qualifications, self-reported ability, training undertaken, membership of clubs and kayaking associations and the number of years they had been paddling kayaks in the sea. A variety of kayaks were used and the nature of activities varied in duration and frequency, distance from shore, time of year undertaken and perceived level of challenge engaged with. Differences were noted in responses in relation to experienced and perceived health impacts, the perception of causality of health impacts, the reported planning of activities and the safety equipment carried. A number of these differences were linked to both characteristics of paddlers, the type of boat used and activities undertaken. The observational study indicated differences in the rate of adoption of personal flotation devices and helmets. In addition to this, the interviews highlighted that participants can vary in their level of engagement and identification with the activity, their motives for participation, desired outcomes and propensity to engage with risk and challenge.

Recommendation:-

- Whilst there may be information, skills and good practice applicable to all, recognise diversity in relation to individual characteristics, motives for participation, the nature of activities, performance characteristics of kayaks and the environments entered and target interventions accordingly.
Interviewees described a range of factors that could be regarded as influencing the assessment of and response to risk. These included the knowledge participants hold in relation to the existence of risk, the perception of one's ability to manage risk, the perception of the availability of external support, the social norms associated with the activity and engagement with risk, the beliefs held about how others would regard risk related behaviour and the desired level of risk. Such factors illustrate the importance of psycho-social variables in safety initiatives and incident prevention.

**Recommendation:**
- Evaluate the impact of socio-psychological variables upon the perception and response to risk and account for and utilise such variables in intervention strategies.

**Approaches to the Management of Risk**
It could be argued that there are two broad approaches to the management of risk. One approach relates to reducing risk through avoiding or altering the environments entered; the other approach focuses upon enhancing the ability of individuals to cope with environments. These two approaches can be complimentary. The alteration of the physical environment represents external control of risk; the response to this may be different to situations where control of risk is undertaken by the participant. The literature indicates that to plan and control for risk can be a motive for participation. External control may act against primary motives for participation. In many cases, the alteration of the physical environment to reduce risk may be economically unviable and socially unacceptable. For
those wishing to enter particular environments, the development of skills and knowledge and the utilisation of equipment are means of supporting the successful engagement with risk. The facilitation of decision-making and the promotion of skills and appropriate equipment represent steps to enhance intrinsic control of risk. This approach to safety may act to support, rather than oppose, motives for participation.

**Recommendation:**

- Promote opportunities to enhance safety knowledge and skills to support the intrinsic control of risk. This in turn may act as a means of enabling participants to achieve desired outcomes and as an alternative to the external control of risk.
- Promote safety equipment as technology that can support the pursuit of activities and the management of risk.

There may be situations where the alteration of the physical environment may be accepted as it enhances the experience of participation. For example, interviewees described the possibility of collisions with swimmers when surfing kayaks and as a result, they restricted their activity.

**Recommendation:**

- Consider extrinsic control as a risk management option when it enhance the experience of participation (e.g. zoning).
The interviewees provided an insight into the meaning of risk to individuals and factors influencing their assessment and response to risk. The interviews provided support for the view that risk is often regarded as part of everyday life and voluntary risk taking is considered in the context of general exposure to risk. Whilst all interviewees recognised that there are risks associated with paddling kayaks in the sea, the level of risk that people wished to engage with varied. The risk propensity was described as varying from risk avoidance to deliberately increasing the level of risk to increase the intensity of experience. This suggests that a definitive, socially determined level of risk that should guide behaviour, does not necessarily match individual conceptions of the desirability and acceptability of risk.

Recommendation:-

- An externally defined acceptable level of risk may conflict with individuals’ aspirations and may therefore be rejected. This should be considered when developing risk messages.

Accounting for Variation Between Individuals and Sub-Groups of Paddlers

Individual experience and collective beliefs about the nature and cause of health impacts appears to vary according to the activity and type of boat used. Particular boats and particular activities may present different demands and increase the risk of certain injuries and health conditions. For example, those undertaking activities in the surf zone may be at a higher risk than others of being involved in collisions with other boats; those using sit-on kayaks maybe more vulnerable to being hit by the boat.
Recommendation:-

- Further research is required to determine the risks associated with particular activities and the use of different style of boats. The determination of such information would support the refinement of safety advice and the targeting of initiatives in response to specific issues.

The motives and perceived benefits of kayaking are multi-dimensional; themes include peace and tranquillity, escape from everyday concerns, excitement and thrill, social interaction, challenge and opportunities for self development and reinforcement of self identity. Furthermore, the literature indicates that risk per se is not necessarily the primary motivation for participation; risk is often something that is encountered as a means of achieving desired outcomes. This suggests that the modification of the level of risk in a way that does not negatively impact upon the achievement of desired outcomes, may prove to be acceptable to participants. Steps to manage risk that are in conflict with motives for participation and perceived benefits may be resisted; there may be scope to manage risks in a way that increases the likelihood of securing desired outcomes. For example, some may welcome information to help them avoid risk, others may wish to have information to enable them to engage with risk. Other steps could include skills enhancement that enables the facing of a higher level of challenge or the adoption of equipment that aids performance and self-sufficiency.
Recommendation:-

- Desired outcomes from participation should be determined and where possible, reflected in intervention strategies.

Interviewees indicated that the view of what constitutes a risk differs between novice and experienced paddlers. Conditions that intimidate a novice paddler would actively be sought out as a source of fun by experienced paddlers. The perception of risk may be linked to abilities and experience; what constitutes a risk may therefore be ‘in the eye of the beholder’. Descriptions provided by interviewees suggest that during the early stages of undertaking an activity, a large amount of information needs to be assimilated and skills developed. Actions that eventually become automatic initially have to be concentrated upon.

Recommendations:-

- For initiatives targeted at beginners, there is a need to prioritising information and focus on essential actions for safety.

- Experienced paddlers should be aware that what appears as benign conditions to them, may produce anxiety in a novice paddler and this anxiety could have an impact upon their performance.

With experience, a more refined approach to the assessment of risk which enabled appreciation of the interaction of variables and the prediction of consequences, was
described as developing. Less experienced paddlers were seen to be at times focusing upon lower level risks and not responding appropriately to other risks.

Recommendations:-

- The knowledge and understanding of experienced paddlers should be utilised to help inexperienced paddlers discriminate between risks and develop appropriate knowledge and skills.

- Steps should be taken to determine the safety knowledge of paddlers of differing levels of experience; this may identify gaps but also provide information to support others to assess and manage risk

The American Canoe Association has highlighted that the simplicity of kayaks can be misinterpreted as them being easy to operate and safe. The interviews suggested that this may be particularly case for beginners, inexperienced paddlers and those using sit-on kayaks.

Recommendation:-

- Beginners, inexperienced paddlers and those using sit-on kayaks should be specifically targeted to raise their awareness of potential hazards, the steps necessary to minimise risk and the skill and knowledge necessary to operate a boat safely.
For those who had been paddling over a longer period and who had not encountered problems, the perception of the likelihood of occurrence of an incident may decrease; additionally, familiarisation and acclimatisation to conditions may result in an increase in one’s acceptable or desired level of risk. During the interviews, it was suggested that not encountering difficulties and being less anxious in conditions, could result in complacency.

**Recommendations:-**

- Initiatives should be targeted at experienced participants. These initiatives should recognise the nature of activities undertaken and the environments entered.
- Consideration should be given to refreshing the knowledge and skills of more experienced paddlers and reiterating the need to account for unlikely but possible scenarios.

The level of risk was described as being a function of individual attributes and the demands of activities and conditions. Improvements in the ability to manage risk may not necessarily lead to a no-incident situation. Interviewees described how as ability improved, there can be a tendency to seek out a higher level of challenge. What may be a high risk activity to some, may not be to others who have appropriate knowledge and skills. Given this, safety initiatives need to reflect both the abilities of paddlers and the demands of activities. For some, guidance may be to avoid certain environments, for others, the advice may be how to effectively manage risk associated with particular environments. In some cases, not carrying particular items of safety equipment and undertaking higher risk practices may be a rational response based upon the level of skill and an in depth assessment of risk.
Recommendations:-

- An approach to the assessment of risk should be advocated that is based upon an evaluation of the interaction between individual participants’ abilities and limitations, activity demands and environments entered.

- The development of knowledge and skills that support a dynamic approach to risk assessment and management that reflects the changing nature of environments entered and level of challenge encountered, should be advocated and facilitated.

Encounters with risk were described as providing opportunities to learn to manage risk. To follow guidance, without an understanding of the rationale behind the guidance, may restrict participants’ ability to assess and manage risks when they encounter situations that are not encompassed by the guidance. This may be of particular importance in an activity, as described by interviewees, where conditions can rapidly change.

Recommendation:-

- Whilst safety guidance can provide a framework for decision-making, support should be provided to participants to aid the development of skills to anticipate and manage risk and conduct personalised risk assessments that are context specific.
The questionnaire looking at safety practices and the interviews indicated that the demands of activities, the nature of activities and the environment within which activities take place vary greatly. Differences were noted in safety practices and equipment carried. The interviewees proposed that in many cases, the requirements for activity planning and equipment required to support safety varied and this variation was often appropriate for the level of risk encountered. For example, the carrying of flares and navigation equipment was described as being more appropriate for those paddling sea kayaks away from shore. This suggests that ‘blanket’ approaches to safety advice may not reflect the context of activities. Safety messages that do not reflect the context and demands of the activity may lose credibility.

Recommendation:-

The steps that should be taken to prepare for particular activities and what equipment should be carried when undertaking those activities should be clarified.

Nature of the Risks Encountered

Interviewees illustrated how the sea is a rapidly changing environment and presented a range of hazards. The level of risk associated with these hazards was described as being linked to the ability of paddlers. In a static environment, it may be possible to determine the level of skill and knowledge required for a particular activity; in a dynamic environment the skills required to cope with conditions can alter in a very short space of time.

Recommendation:-
• As conditions can rapidly change, the development of skills beyond a basic level should be encouraged to enable participants to cope with deteriorating conditions.

A view was expressed in the interviews that novices and those who may be unfamiliar with the locality and paddle occasionally, were sometimes unaware of the existence of hazards. Whilst the majority of activities that such people undertook were regarded as being safe, examples were given where situations could deteriorate; for example, inexperienced paddlers not being aware of the difficulties of paddling against a strong wind. Descriptions were provided of how a minor event can act as a starting point to more serious incidents.

**Recommendations:**

• The profile of particular hazards such as wind, currents and geological features and how these can combine and result in challenging conditions should be highlighted. Additionally, guidance should be provided as to the expected skill and equipment required to deal with these particular conditions.

The responses of a number of interviewees suggested that proximity to the shore influenced the perception of risk. Being close to land may be giving an impression of relative safety. Particular hazards are present close to land. ‘Impact with beach and rocks’ was identified in the first questionnaire as a causal factor for injuries; additionally those paddling in the surf zone identified impact with others as being the cause of injuries. Tidal rips can often be present on beaches; headlands can often be associated with strong currents and overfalls. These features pose particular challenges. Paddlers may be unaware of the existence of these hazards or are underestimating the risk.
Recommendation:-

- Attention should be drawn to risks close to land as well as out at sea.

The importance of assessing environmental conditions was stressed by interviewees. Information to assess weather and tidal conditions and to determine the presence of geological features is often available. However, this information is often not present in one source and requires integration of information to be able to predict conditions. The assimilation and appraisal of information may for some, form and integral part of their kayaking activities. Others may not have the motivation to seek out information or have the knowledge to interpret the findings. The provision of this information may have a more general impact of raising awareness of the existence and importance of environmental factors.

Recommendation:-

- Develop easily accessible and consumable information for less experienced, occasional paddlers and people not familiar with the locality. An example of this is the provision of information at popular launch sites relating to the position of local hazards.

The perception of risk may be influenced by beliefs in the ability of rescue services to be able to respond to an incident. For example, it was suggested that the presence of local
beach lifeguards may result in people inappropriately believing that if they got into difficulties, support was readily available. This suggests that in some circumstances, there may be an inappropriate delegation of responsibility to rescue services.

Recommendations:-

- Ensure that participants are aware of the limitations of safety and rescue services and do not have false expectations of their abilities to respond to situations.

- The need for personal responsibility for the management of risk and self reliance should be emphasised.

A similar process may exist within groups of paddlers. Interviewees described how the presence of experienced others, supported them in engaging with higher levels of risk. Inexperienced paddlers may be assuming that more experienced paddlers have appropriately assessed the risks and have the ability to manage the risk and look after less experienced group members.

Recommendation:-

- Highlight risks associated with over estimating the abilities of other group members and the need for managing one’s own personal safety (e.g. skills development and the carrying of equipment).

**Accessing Kayak Users**
The two surveys indicate that the level of participation in kayaking in the sea varies greatly. The interviews also suggest that some paddlers see kayaking as part of their identity, whilst others do not. Views expressed reflected the concept of ‘serious’ and ‘casual’ leisure and ‘lifestyle sport’. Those engaged in ‘serious leisure’ and for whom participation represents part of their identity, the pursuit of knowledge and skills and the adoption of socially approved safety practices may be the norm. Access to and promoting safety behaviour amongst those not immersed in the activity may present challenges. Whereas those engaged in ‘serious leisure’ may choose to actively seek out information and skills and become members of formal social groupings, casual paddlers may not be accessing kayaking related social networks, not have ready access to training and appropriate safety behaviour may not be reinforced.

Recommendation:-

- Make use of the array of means available for accessing such groups and promoting appropriate practice. This could include guidance at point-of-sale of equipment, the availability of guidance at launch sites and the promotion and easy access to safety advice (for example online information as produced by Maritime New Zealand). This information could highlight basic information such as potential hazards, the skill levels that would be expected for engaging in particular activities, steps to minimise risk and an overview of appropriate conduct to protect oneself and others.

A number of approaches are currently used to disseminate safety information and encourage good practice. These range from formal qualification bearing training courses
through to leaflets and Internet-based information. The favoured route to access information and skills development to support safety may vary according to different groups and individual motivation and preferences.

*Recommendation*:-

- Engage with different groups to determine needs and the preferred mechanisms for accessing resources to support their safety practices.

**The Acquisition of Knowledge and Skills**

Interviewees highlighted a range of ways in which skills and knowledge are acquired. They suggested that different groups had different levels of motivation to develop paddling skills and knowledge. The level of immersion in an activity and the significance of the activity to the individual may influence the steps taken to acquire knowledge and skills.

*Recommendation*:-

- The design of mechanisms to impart knowledge and skills need to reflect different levels of motivation to acquire knowledge and skills.

The observation and modelling of behaviour was described by interviewees. Concern was expressed in the interviews that novice paddlers observing behaviour, do not always realise the complexity of behaviour and the planning required for success. Experienced paddlers gave examples of occasions when they did not necessarily follow standard safety protocol. Their behaviour, particularly if engaging in ‘Edgework’ is likely to be underpinned by
extensive planning and the development of appropriate skills. The undertaking of extreme activities may be presented in the media and this can act as a marker for behaviour. Whilst such behaviour may be aspired to, there is a need to develop requisite skills and knowledge. An understanding of the expertise required for successful performance, could act as encouragement to others to seek out training qualifications. By utilising the experiences of those who have been paddling for longer, it may be possible to provide beginners with an insight into the risks associated with activities, causal factors associated with incidents, the lessons learnt and recommended steps for the management of risk. Such an approach may act as a means of providing realistic and relevant information from a credible source of information.

**Recommendations:-**

- Provided information to experienced paddlers (who act as role models) emphasising how their attitudes and behaviour may influence those of people new to kayaking.
- Utilise credible, experienced paddlers to provide behavioural templates and to demonstrate the actual demands and planning required to undertake what may on the face of it, appear to be accessible activities.

Interviewees described how helping others learn was a rewarding experience and how the process of supporting others to develop skills enhanced one's own ability.

**Recommendation:-**
• To encourage peer led education and training, promote the positive outcomes associated with supporting the learning of others.

Kayaking clubs and associations provide networks through which the development of knowledge and skills can be facilitated and social support provided. Interviewees illustrated how paddling with competent others can stimulate skills development. The results of the surveys indicate that many paddlers, particularly those using sit-on kayaks are not members of kayaking groups. It would appear that those using sit-on kayaks are not perceived as "kayakers"; this could act as a barrier as they may perceive themselves as not being eligible to join a club or that clubs do not cater for sit-on kayaks. The British Canoe Union has in recent years, taken steps to embrace sit-on kayaks. The promotion of this may encourage sit-on kayak paddlers to join and benefit from kayak club membership.

Recommendations:-

• As a means of encouraging membership, highlight the opportunities that clubs can provide to paddle with experienced kayakers.

• Encourage sit-on kayak paddlers to join kayaking groups as a means of supporting their skill development and ability to assess and manage risk.

Variation was noted in relation to the immersion in and identification with kayaking. For those not wishing to join clubs yet still access personal development opportunities, attention could be given to alternative means of facilitating the acquisition of appropriate
skills and knowledge. Two of the interviewees who were not members of clubs, had sought out training.

**Recommendation:**

- Provide short basic training opportunities for those who wish to develop skills but do not wish to join clubs or pursue formal qualifications.

Learning from interaction with peers was described as a means of acquiring skills and knowledge.

**Recommendation:**

- Develop materials that could be used by informal social networks to promote good practice. Such materials may be of particular value to those who do not wish to undertake more formalised training.

**Social Processes**

Interviewees described how the group and others can have an influence on paddling behaviour. A number of cases were cited where interviewees pushed themselves to keep up with others; this was attributed to competing with oneself and others but also not wishing to let the group down.
Recommendations:-

- Raise awareness amongst experienced paddlers that if conditions deteriorate, less experienced colleagues may be at the edge of ability with no margin for error.

- Whilst there are risks associated with individuals pushing their performance to keep up with others, this needs to be weighed against the opportunity for personal development and enhanced perception of the Self.

- Utilise the drive to compete with others as a means of encouraging skills development.

The need to plan activities according to the ability of the weakest member of the group was suggested in the interviews. Being willing to admit to one's limitations could support the determination of appropriate activities and overall safety of the group.

Recommendation:-

- Encourage the development of a culture amongst groups of paddlers where it is acceptable to ‘back off’ from activities. Linked to this, groups should look to develop protocols to match ability with the activity.

The way in which others were seen to perceive practices was described as influencing behaviour. This influence was both positive and negative. Concerns over image may inhibit the adoption of some equipment (e.g. helmets), in other cases, not to make use of safety equipment was regarded as something that would be disapproved of (e.g. personal flotation
devices). Examples were also provided where people may be carrying equipment to make statements about themselves.

**Recommendations:-**

- Undertake action to enhance the social desirability of safety behaviour and equipment.
- Investigate why PFD's have come to be socially desirable and valued and apply findings to encourage the adoption of other safety practices.

**Managing the Risks**

The interviews suggested that the variation in safety practices identified in the quantitative study were often justifiable given the demands of activities and risks encountered. For example the equipment and planning required for ‘off shore’ activities were seen to be different to that for activities close to the beach. Generic safety advice may promote practices that are excessive, given the level of risk likely to be encountered. A focus on negative outcomes may inhibit participation in activities which, with appropriate planning and skills, are feasible. Additionally, there is need to accept that a number of participants will seek out and face high levels of challenge; they too could benefit from safety guidance.

**Recommendation:-**

- There is a need for context specific safety advice.
The possibility of being hit by or hitting others was raised in both the interviews and the questionnaire focusing upon the cause of health impacts. It would appear that being hit by one's boat is an issue amongst those using sit-on kayaks. Compared to a number of other groups of users, a larger proportion of those using playboats identified being hit by others as a likely cause of injury. Examples were provided in the interviews where boats in the surf zone posed a risk to others.

*Recommendations*:-

- The importance of self protection in the case of a capsize should be promoted to those using sit-on kayaks (e.g. helmets, protective body position, position in relation to boat in the surf).

- Promote the rules of ‘surfing etiquette’ as a means of reducing the likelihood of collisions in the surf zone.

- Draw attention to the duty of care that kayak users owe to others. As a consequence, paddlers should consider avoiding certain areas if they feel they do not have appropriate control of the boat to steer away from a collision.

- The relative merits of a leash as a means of preventing a capsized boat being pushed at speed through the surf zone needs to be considered against potential risk a leash could represent to a paddler (e.g. the risk of shoulder dislocation).

- In crowded conditions, consideration should be given to the segregation of activities in the surf zone to minimise the likelihood of collision.
Lifting and carrying was identified as the most likely causes of injuries and medical conditions by the respondents to the first quantitative study. Lifting and carrying does not appear as a major issue in the safety guidance literature.

**Recommendation:**

- The perceived significance of lifting and carrying to the causes of injury should be reflected in safety guidance.

‘Impact with rocks and beach’ was identified as the second most likely cause of injuries and medical conditions; the head was a commonly cited part of the body injured. However, the observational study demonstrated that the proportion of paddlers wearing helmets was much lower than those wearing personal flotation devices. Interviewees who reported not wearing helmets recognised the possibility of experiencing head injuries.

**Recommendation:**

- Promote the use of helmets and investigate factors operating against their adoption.

‘Cuts and abrasions’ and ‘sprains and pulled muscles’ were identified as the perceived most common health impacts amongst those kayaking in the sea. The most commonly experienced injury or medical condition was seen to be associated with ‘joints and tendons and muscles’. The literature also suggests that the demands of paddling a kayak can result in overuse injuries. Much of the safety guidance for managing risk emanating from water safety organisations, does not seem to emphasise steps that can be taken to militate against
the development of chronic conditions and common acute injuries. It could also be argued that safety guidance tends to focus upon the avoidance of situations leading to major loss or the need for intervention of emergency services. This may not reflect the actual experience of injury.

Recommendation:-

- Safety guidance, in addition to promoting action to avoid major loss, should also provide advice on steps that can be taken to reduce the occurrence of more common health impacts.

Interviewees described how safety equipment, which may not be used, is often carried as insurance in case something does go wrong. There was also discussion about how over time, one can become complacent. Situations were also described by interviewees where people may carry equipment yet be unfamiliar with its deployment. Almost half of respondents in the safety practices questionnaire indicated that they carried mobile phones. A mobile phone can be useful to call for support; however, in the area of the study, mobile phone networks are often unattainable.

Recommendations:-

- The importance of the carrying of certain equipment in the case of unlikely but significant incident should be highlighted.
- Stress that in addition to carrying safety equipment, there is a need for skills to ensure effective and safe deployment.
Interviewees suggested that some paddlers are not aware of the existence of risks. The classification of equipment as being for ‘safety purposes’ could result in it being regarded as not required, if it is perceived that risks are not present.

**Recommendation:**

- Promote safety equipment as core equipment for paddling activity and not just for safety.

Interviewees emphasised that assessment of risk with reference to individual abilities was an important component of risk management. Many of the interviewees described situations where they felt the appropriate response would be not to undertake activities.

**Recommendation:**

- Advocate the view that to retreat from a situation or to decide not to undertake the activity should not be regarded as failure, instead it should be considered as an expression of an appropriate assessment and response to risk.

Information sources such as weather forecasts, nautical charts and predictions of surf and swell provide data that can aid the planning of activities. In addition to this, Interviewees stressed the value of local knowledge.
Recommendation:-

- Encourage paddlers not familiar with an area to seek out local advice. This may be available through local kayak clubs, surf and kayak rental outlets and local lifeguards.

Interviewees discussed the embarrassment they would feel if they had to call rescue services. Whilst this may encourage appropriate risk management strategies, this tendency could also inhibit calling for external support when it is required. One of the interviewees specifically stated that they thought it was inappropriate to contact the coastguard prior to activities. The UK Maritime and Coastguard Agency 2010 Canoe and Kayak Incident Report proposes that the longer trips, paddlers provide local coastguard with trip plans.

Recommendation:-

- Provide guidance as to when it is appropriate to contact the local coastguard.

Further Research

Whilst this research has provided a number of insights into the experience and practices associated with kayaking in the sea, there is scope for its extension to provide a more in-depth evaluation of issues to support the development of safety initiatives. Social desirability may have influenced responses in the safety practices questionnaire. As a check on this, an audit of equipment carried may provide a more accurate picture of practices. An understanding of environmental conditions, the impact of those conditions on paddling activity and the determination of whether those conditions had actually been assessed prior to activity could also be investigated at launch sites. The examination of the rationale
behind carrying or not carrying equipment and factors considered when planning activities may provide and insight into the perceived relevance of equipment and assumptions underpinning decisions.

The questionnaire dealing with causality focused upon injuries and health impacts. The responses were unlikely to have considered incidents that did not lead to physical harm yet had the potential for serious injury or death. A further study could be undertaken to investigate paddlers’ perception of the causes of situations where they regard things as having ‘gone wrong’. This could be complemented by interviews with paddlers who had found themselves in difficulties. This could provide rich information relating to the sequence of events leading to an incident, perceived causal factors and decision-making processes. An analysis of incidents may identify a series of ‘lessons learnt’ that could aid the decision-making of others.

The two questionnaires that underpinned quantitative components of the research strategy identified variation between categories of variables. To avoid the inflation of type one errors, categories were combined when undertaking statistical analysis. As discussed earlier, this may have masked relationships between variables. Further studies could be conducted utilising a deductive as opposed to an inductive approach to determine the existence of differences between categories.

The findings of this research were based upon responses and views of paddlers. A comparison of these findings with the perceptions and current advice of organisations
involved in promoting safety and avoiding incidents may identify differences in knowledge, understanding and assumptions of both groups. An exploration of these issues may strengthen safety initiatives.

Findings indicated differences in the perception of health impacts and cause according to the type of boat used and the activity undertaken. Further analysis of the demands associated with kayaking and the hazards encountered could support the development of targeted safety advice.

A number of recommendations have been proposed that could be considered as part of safety initiatives and incident prevention strategies. It is recommended that these proposals be evaluated by a focus group drawn from people who paddle kayaks in the sea. The feasibility and acceptability of these proposals could then be considered in more depth. Discussion with such a group may help identify further issues and advice and so support the development of interventions that are informed by those undertaking the activity.

**Conclusion**

This chapter represents the culmination of the research strategy. An emphasis in the research has been the exploration of participants’ experience, views, behaviour and interpretation. The early stages of the research gathered data on the experience and perception of health impacts and associated perceived cause and safety practices. The data identified a number of issues of relevance to safety and incident prevention. The findings of
the studies, combined with the review of the literature, were used to generate themes to guide interviews with individuals who had experience of paddling kayaks in the sea. The interviewees were able to elaborate upon issues identified by the quantitative studies; they provided explanations for attitudes and behaviour and suggested steps that could be taken to enhance safety and reduce the likelihood of incidents. The insights provided by both the quantitative and qualitative phases of the research were utilised to generate recommendations. These recommendations could form the basis for further discussion amongst stakeholder groups in relation to the development of safety initiatives and incident prevention strategies.
Chapter 11

Conclusions and Recommendations

Introduction

Underpinning this thesis, was the assumption that understanding the way in which individuals and groups conceptualise risks, their knowledge and attitudes associated with risk activities, and the significance of the activities to participants, can inform risk management strategies.

Using a mixed methods approach to the gathering of data and focusing upon participants engaged with kayaking in the sea environment, this research explored the meaning of risk, the motivations for participation, the perception of health impacts and cause, factors influencing the perception of risk and risk mitigation strategies and their associated rational. The findings of this research were utilised to generate recommendations that could inform safety initiatives and incident prevention strategies.

With reference to the stated research questions and research aim, the following sections summarises key findings and proposes generic recommendations.
The Research Questions and Research Aim

Research questions

What are the perceived and experienced health impacts amongst people using kayaks in the sea environment?

The reported health impacts, in general, reflect those discussed in the literature. Injuries such as cuts and abrasions, sprains and pulled muscles were regarded as the most common health impacts affecting the wider kayaking group. The back was regarded as the most commonly injured part of the body. Amongst those who had directly experienced health impacts, conditions affecting ‘joints and tendons and muscles’ was the most frequently identified health impact. The significance of certain conditions such as dislocations or gastrointestinal problems, do not appear to be as pronounced among those using kayaks in the sea, compared to those paddling kayaks in river conditions.

Differences were noted in relation to responses according to a range of factors such as the type of boat used, the activity undertaken and the frequency of paddling. Differences were not observed in responses according to self-reported ability, duration of activities or the number of years of paddling kayaks in the sea. Twenty-seven of the 61 respondents who reported having experienced health impacts indicated that the injuries or medical conditions had resulted in them taking time off kayaking; 21 respondents indicated that they had required medical treatment. The majority of those who had and those who had not experienced health impacts, indicated that they regarded injuries and medical conditions as uncommon and not serious. An overwhelming majority of respondents stated that there were positive health impacts associated with kayaking in the sea.
What are the perceived causes of health impacts?

‘Lifting and carrying’ and ‘impacts with rocks and beach’ were described as the most likely cause of injuries and medical conditions. The perception of what was regarded as the most likely cause of health impacts varied according to the type of boat used, the activities undertaken, the number of years paddling, self reported ability and whether or not health impacts had been directly experienced. It is proposed that many of the differences reported related to the demands of particular activities and the characteristics of different boats. The differences observed between paddlers according to personal characteristics, is regarded as being related to an interaction between individual skills, the type of boats used and the activities engaged with.

What risk mitigation strategies are adopted and how these relate to current guidance?

The respondents were seen to be a diverse group in terms of experience, self rated ability, qualifications, training and membership of kayaking clubs or associations. Many aspects of what is currently regarded as good safety practice, appears to be widely adopted by those paddling kayaks in the sea. In particular, the reported and observed wearing of personal flotation devices was high. The majority of respondents indicated that they were able to perform a self rescue, paddled in groups and left plans of their activities. The majority also reported checking a range of environmental conditions such as wind direction and force, high and low tide and wave conditions. Those using sea kayaks were more likely than others to report that they assess conditions related to tidal streams and races and overfalls.
The carrying of equipment and the steps taken into account when planning activities varied according to the type of boat used. This variation is attributed to the nature of the activities and environments encountered by those using different types of boats. It is also proposed that the norms associated with different categories of user may be influencing safety practices. Factors such as the distance activities took place from land, perceived demands of conditions, self reported ability and the holding of qualifications were seen to be associated with variation in safety practices. The likelihood of needing the safety equipment tended to be regarded as low, however, it was reported that equipment was still carried.

The findings demonstrate that there is variation in safety practices. What cannot be determined from this study is the appropriateness of the observed variation according to the level of risk faced.

What differences exist between categories of participants in relation to the perceived health impacts and associated cause and mitigation strategies adopted?

As discussed above, those paddling kayaks in the sea are a diverse group in relation to personal characteristics, the boats used and the activities undertaken. These factors appear to be associated with variation in the experience and perception of health impacts, perceived cause and risk mitigation behaviour. The findings suggest that what might be an issue for one group, is not necessarily an issue for another. Furthermore, what might be a priority to ensure safety amongst one group may be of less importance to another group.
What factors influence the motivation to engage with risk?

Interviewees described a broad range of positive outcomes associated with kayaking. The outcomes were multi-faceted and ranged from peace and tranquillity through to intense encounters at the edge of performance. The activity was seen to provide opportunities to experience a broad range of emotions.

Risks were recognised as being associated with the activity but engagement with risk was described as being a part of life and providing the opportunity for positive experiences. The positive experiences described included challenge, thrill and excitement, escape from everyday aspects of life and the opportunity to apply and test ones skills. These factors reflect those described in the literature related to voluntary risk taking.

What factors influence the perception of and response to risk?

The interviewees described a range of factors that influenced both the perception and response to risk. They were able to comment upon their own perception of risk but also that of others. In many cases, they reported that safety practices adopted were commensurate with the level of risk. Those entering more challenging environments were seen to pay more attention to the planning of activities and carried a wide array of safety equipment. Thus, the perceived level of risk was regarded as being reflected in the response to risk. An understanding of the hazards and how they could combine was described as being important in the assessment of risk. However, some groups were regarded as having limited knowledge which resulted in distorted perceptions of risk and this acted as a weakness in their assessment of risk.
Descriptions of factors influencing the perception and response to risk reflected themes in the literature, these included the meaning of risk to the individual, outcome expectancies, control, cost benefit analyses, subjective norms, personality traits, group processes, risk homeostasis and the availability of behavioural templates.

**What factors influence individual risk management strategies?**

Interviewees indicated that activities and the demands of activities were different and this required different risk management strategies; this included the factors considered when assessing risk and the equipment and skills required to manage risk. The findings of the quantitative study into safety practices suggest that the perceived demands of activities influences risk management strategies. For example, the nature of equipment carried varied according to the distance that activities took place from land and how demanding conditions were regarded as being. Other factors such as qualifications and training were also seen to be linked to the safety practices; it is not clear whether this is a result of increased understanding of the risks or whether this reflects those with higher ability being more likely to enter challenging conditions.

A factor influencing risk management strategies was seen to be the desire to raise or lower the level of risk. Examples were provided where risks were avoided, activities were restricted and safety equipment was adopted as the group was seen as being less able. Other examples were provided where risk was deliberately sought out and steps were taken to reduce safety backup as a means of enhancing the intensity of experience.
Assessment of ability against demands of activities was described as influencing the decision whether to engage with a risk or not. The ability to recover from an incident may influence risk management strategies. For example, being able to swim to shore was seen to increase safety. Being away from shore appeared to encourage greater self-sufficiency. Those who perceived their ability to be high, appeared to be more willing to face more demanding conditions. Thus, an assessment of ability against anticipated risk could be seen to be influencing risk management strategies.

Age was described as a factor that influenced risk management strategies. Descriptions were provided of situations where when younger, an interviewee would have undertaken an activity; now when they were older, they would walk away. Restricted physical ability, less susceptibility to social pressure and increased responsibility were proposed as explanations for this behaviour.

Beliefs about what others thought, was presented as a factor influencing risk management strategies. Embarrassment over having to call for external assistance was described as encouraging caution in activities. Social approval would appear to influence risk management strategies, this is particularly noted in relation to the adoption of personal flotation devices.

Descriptions were provided of observing practices, reinforcing practices and adoption of norms associated with safety practices. It would appear that for some, there is socialisation
into the culture associated with activities; the adoption of particular responses to risk was described as a feature of the socialisation process.

The carrying capacity of boats was indicated as limiting the equipment carried. To accommodate equipment there may be a need to prioritise what is carried and what is left behind. Examples were given where over time and through experience, there were refinements in what was deemed to be essential equipment. Whilst not needing to use equipment was seen to possibly lead to complacency, the carrying of equipment that could help manage uncommon but potentially serious incidents was regarded as “insurance”.

What steps would participants advocate to promote safety and minimise the likelihood of incidents?

The interviewees were asked to suggest measures that would enhance safety. The key themes identified were the need for education and skills development and appropriate activity planning.

Education and skills development was seen to be achievable through both formal networks and by learning from one's peers. It was recognised that some groups may be reluctant to undertake training; it was suggested that members of these groups were in the greatest need of safety knowledge and skills.

The need to plan activities and prepare for eventualities was described as fundamental to safety. Planning was regarded as including the assessment of conditions, the carrying of
appropriate equipment, the recognition of one's limits, the presence of others to provide safety support and leaving details of proposed activities.

**Research Strategy Aim**

The overall research aim was "Using participant centred methods, generate recommendations to inform the development of safety initiatives and incident prevention strategies associated with an outdoor adventure activity".

Those factors that were seen to impact upon health and their associated cause were identified in the first quantitative study. Reported safety practices and safety behaviour in relation to the wearing of personal flotation devices and helmets was subsequently determined. The findings of these studies, together with the review of the literature, generated themes for consideration in the qualitative study. The interviews illuminated a range of issues including the attraction of kayaking and the meaning of risk, the mechanisms through which knowledge and behaviour is acquired, differential perceptions of kayaks and kayakers, the impact of group and social variables, risk acclimatisation and differentiation, the impact of safety support on paddling behaviour, factors influencing injuries and safety practices and steps to improve safety. Based upon the findings of the quantitative studies and the interviews, a range of specific recommendations were generated that could inform safety initiatives and incident prevention strategies targeted at those using kayaks in the sea environment.
Generic Recommendations

A number of themes emerged from the recommendations presented in Chapter 10. Based upon these themes, the following generic recommendations, applicable to a variety of adventure activities are proposed:—

- To avoid conflict with underlying motives for participation, wherever possible, safety practices should look to facilitate participation and support the performance of activities.
- The link between safety practices and the achievement of desired outcomes should be emphasised.
- As an alternative to the external control of risk and as a means of supporting participants’ pursuit of desired outcomes, facilitate individual capabilities to assess and manage risk.
- Promote the adoption of safety equipment as technology that supports participation, performance and the management of risk.
- To account for the influence of cost benefit analysis and subjective norms, safety initiatives should aim to create a climate of opinion whereby safety practices come to be viewed as valuable and accepted behaviour. Safety advice needs to reflect the dynamic nature of environments and how the level of risk is influenced by the ability of the participant.
- Whilst safety guidance can provide a framework for decision making, attention should be given to supporting the ability of participants to be able to assess, anticipate and manage risk in a dynamic environment.
• Safety promotion should consider the prevention of specific injuries and medical conditions as well as the prevention of incidents potentially requiring external assistance.

• The significance of activities to individuals may vary; this is likely to influence the motivation to develop skills and knowledge. This needs to be reflected in the techniques used to promote skills and enable the acquisition of knowledge.

• Safety guidance needs to reflect the diversity in the motivation for participation, desired outcomes, the individual attributes of participants, nature of activities, equipment used and the environments entered. This suggests the need for targeted initiatives and context relevant advice.

Proposals for Further Research

This research has addressed a number of questions, however, there is a need for further investigation in relation to health impacts encountered, the cause of incidents and losses, factors influencing the assessment and management of risk and intervention options to promote safety and reduce the likelihood of incidents. Given this, a number of proposals for further research, some of which were discussed more fully in preceding chapters are proposed:

• The generation of more detailed information on the nature of health impacts and in particular the identification of injury patterns linked to specific demands, activities, environments and types of boats.
• An examination of actual as well as reported safety practices and how these practices are influenced by the assessment and perception of risk when planning a specific activity.

• Evaluation of the needs of different subsets of participants and the options to support their safety practices.

• Exploration of the psychological impact of experiencing injuries, medical conditions and being involved in incidents.

• Further examination of the influence of socio-psychological variables upon the perception, assessment and response to risk.

• Analysis of incidents to identify causal factors and to determine ‘lessons learnt’.

• Determination of the views and experience of a wider range of stakeholders in relation to the nature and cause of health impacts, the cause of losses and incidents and the options for risk management.

• Assessment of the acceptability, feasibility and scope for implementation of the recommendations presented in this thesis.

**Conclusion**

Adventure activities can and do present risks to participants, however, engagement can also provide a range of benefits. The challenge is to reduce the likelihood of harm in a way that is relevant and valued and at least maintains and if possible, increases positive benefits and the fulfilment of motives for participation. There is a need to recognise that there are different reasons for engaging with risk and that within a broad activity, there may well be differential experiences of risk. On the basis of this, it is proposed that a generic approach to
the management of risk may be inappropriate; it is advocated that there is a need to target safety initiatives and incident prevention strategies at particular subgroups of participants and for safety guidance to be context specific. Failure to acknowledge or learn from the experiences, knowledge, beliefs, attitudinal frameworks and context of behaviour of participants may result in the development of safety initiatives and incident prevention strategies that are viewed as irrelevant and lacking in understanding.

The methodology described in this research outlines an approach that builds upon the experiences and understanding of participants to generate a range of recommendations to inform safety initiatives and incident prevention strategies. Kayaking was used as the case study, however, the approach is of relevance to other activities be they in the realm of outdoor adventure or broader community based initiatives.
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Appendix
Injury and Medical Conditions Associated with Kayaking in the Sea

Thank you for agreeing to complete the following questionnaire. Most of the questions require you to tick a box. Some of questions ask that you tick only one box from a number of options; other questions ask that you provide a bit more information.

1 Which one of the following is your main kayaking activity in the sea?

(Please tick one box only)

- Expedition
- Coastal touring
- Rock hopping
- Play boating
- Recreational paddling
- Surf
- Other

(Please specify...........................................................................................................................................)

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2 Which type of kayak do you usually use to undertake your main kayak activity in the sea?

(Please tick one box only)

- Sea kayak
- General-purpose kayak
- Playboat
- Sit on kayak
- Surf kayak
- Touring kayak
- Other
  (Please provide details…………………………………)

3 Approximately how often do you paddle kayaks in the sea?

(Please tick one box only)

- Less than once a year
- 1-5 times a year
- 5-10 times a year
- 10-20 times a year
- 20-50 times a year
- More than 50 times a year

4 What is the typical duration of your kayaking activities in the sea?

...........................................................................................................................................
5 Do you hold any kayaking qualifications?

NO □

YES □ (If YES please list your qualifications…………………………………………………………
………………………………………………………………………………………………………………)

6 How would you describe your kayaking ability in the sea?

(Please tick one box)

Beginner □

Intermediate □

Expert □

7(a) For how many years have you been kayaking?

(Please tick one box)

Less than a year □

1-2 years □

3-5 years □

6-10 years □

11-15 years □

16-20 years □

More than 20 years □
7(b) For how many years have you been kayaking in the sea?

(Please tick one box)

Less than a year □

1-2 years □

3-5 years □

6-10 years □

11-15 years □

16-20 years □

More than 20 years □

8 Have you received any injuries or developed medical conditions as a result of activities associated with kayaking in the sea?

YES □

NO □ (if NO go straight to question 16)

9 What is the most common type of injury or medical condition you have personally had that is linked to kayaking in the sea?

........................................................................................................................................................................

........................................................................
10 What do you think is the most serious injury or medical condition you have had that is linked to kayaking in the sea?

…………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………

11 Have you had medical treatment as a result of activities linked to kayaking in the sea?

NO □

YES □ (If yes what was the injury or medical condition………………………………

…………………………………………………………………………………………………………………………
…………………………………………………………………………………………………………………………

12 Have injuries or medical conditions associated with kayaking in the sea resulted in you:-

(Please tick as appropriate)

Taking time off school, college or work YES □ NO □ Not Applicable □

Having to change your lifestyle YES □ NO □

Taking time off kayaking YES □ NO □
13 Have you experienced long term health effects as a result of your injuries or medical conditions associated with kayaking in the sea?

NO □

YES □ (Please state the nature of the injury or medical condition…………………………………………………………………………………………………..
…………………………………………………………………………………………………..)

14 Do you regard any of your injuries or medical conditions associated with kayaking in the sea as being serious?

YES □

NO □

15 Has the type of injury or medical condition you have had, changed as you have become more experienced?

NO □

YES □ (Please give details of how the type of injury or medical condition has changed………………………………………………………………………………………………………………
………………………………………………………………………………………………………………)

16 Do you think that injuries and medical conditions associated with kayaking in the sea are?

Common □

Uncommon □
17 Do you think most injuries associated with kayaking in the sea are:

- Serious [ ]
- Not serious [ ]

18 Which one of the following do you think is the most likely cause of injuries and medical conditions associated with kayaking in the sea?

*(Please tick one box only):*

- Other paddlers [ ]
- Launching and landing [ ]
- Capsize [ ]
- Impact with rocks and the beach [ ]
- Immersion in water [ ]
- Being trapped in the kayak [ ]
- Being hit by the kayak [ ]
- Lifting and carrying [ ]
- Paddling and controlling the kayak [ ]
- Impact of waves [ ]
- Cold [ ]
- Heat [ ]
- Other [ ]

*(Please Specify)*

..........................................................................................................................
19 Amongst people who kayak in the sea, which one of the following do you think is the most common injury or medical condition?

*(Please tick one box only)*

- Cuts and abrasions
- Bruises
- Blisters
- Painful joints or tendons
- Sprains and pulled muscles
- Broken bones
- Dislocation
- Concussion
- Hypothermia
- Near drowning
- Sunburn
- Painful or stiff back
- Upset stomach
- Headaches
- Other *(Please specify…………………………………)*

........................................................................................................................................................................
20 In relation to activities linked to kayaking in the sea, what do you think is the most commonly injured part of the body?

…………………………………………………………………………………………………………………………………………………………………………………………

21 In the UK, How many people would you estimate typically drown a year whilst kayaking in the sea?

(Please tick one box)

None □
1to 5 □
5-10 □
10-15 □
15 –20 □
20-30 □
30-50 □
50-100 □
More than a hundred □

22 Do you think there are positive health benefits associated with kayaking in the sea?

NO □

YES □ (Please specify…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………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…………………………………………………………………………………………………
23 What is your age in years?

..........................................

24 Are you (Please tick the appropriate box)?

Male  □
Female □

Thank you for taking the time to complete this questionnaire.
Safety Practices Questionnaire

Thank you for agreeing to complete the following questionnaire. Most of the questions require you to tick a box. Some of questions ask that you tick only one box from a number of options; other questions ask that you provide a bit more information.

In which one of the following does most of your kayaking take place?

(Tick one box only)

Lakes and canals □
Rivers □
The sea □
Other (Please specify………………………………………..)

Which one of the following is your main kayaking activity in the sea?

(Tick one box only)

Coastal trips □
Recreational paddling □
Surf □
Other □ (Please specify………………………………………..)
Which type of kayak do you use to undertake your main kayak activity in the sea?

*(Tick one box only)*

- Sea kayak
- General-purpose kayak
- Playboat
- Sit-on kayak
- Surf kayak
- Touring kayak
- Other □ (Please specify……………………………………………………………)

Approximately how often do you paddle kayaks in the sea?

...........................................................................................................

Do you hold any kayaking qualifications?

- NO □
- YES □

(If YES please specify……………………………………………………………)

391
Have you attended any training courses that support your kayaking in the sea?

NO  □

YES  □ (If YES please specify………………………………………………………………………………………………
………………………………………………………………………………………………………………………………………………………………………)

How would you describe your kayaking ability in the sea?

Beginner □

Intermediate □

Expert □

Can you roll a kayak in sea conditions?

YES  □

NO  □ (If NO, are you able to reliably perform another type of self rescue Yes□ No□)

How long have you been kayaking in the sea?

………………………………………………………………………………………………………………………………………………………………………
Are you a member of a kayak club or a kayaking association?

YES □

NO □ (If no, have you been a member in the past YES □ NO □)

Do you paddle mainly *(please tick one box only)*:

On your own □

With one other person □

With two or more people □

In which of the following seasons do you usually kayak in the sea *(Tick all that apply)*

Winter □

Spring □

Summer □

Autumn □
Do you usually check any of the following before kayaking in the sea?

(Please tick all that apply)

Forecasts for wind direction and/or force □
Information on high and low tide □
Wave conditions □
Nautical charts and pilots □
Tidal streams □
Position of overfalls and/or tidal races □
Sea state □
Visibility □
Air temperature □
Water temperature □
Other □ (Please specify……………………………………………………...)

Which of the following best describes where your main kayaking activity usually takes place?

(Tick one box only)

An easy wade to land □
An easy swim to land □
A hard swim to land □
Probably further than I can swim to land □
When carrying out your main kayaking activity in the sea, do you carry any of the following equipment with you:-

*(Please tick all that apply)*

<table>
<thead>
<tr>
<th>Equipment</th>
<th></th>
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<tr>
<td>Compass</td>
<td></td>
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<tr>
<td>GPS (Global Positioning System)</td>
<td></td>
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<tr>
<td>Boat repair kit</td>
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<tr>
<td>Map</td>
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<td>Tow line</td>
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<td>Helmet</td>
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<tr>
<td>Throw bag</td>
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<tr>
<td>Flare or signal smoke</td>
<td></td>
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<tr>
<td>Whistle</td>
<td></td>
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<tr>
<td>VHF radio</td>
<td></td>
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<tr>
<td>Mobile phone</td>
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<tr>
<td>First aid kit</td>
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<tr>
<td>Spare paddles</td>
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<tr>
<td>Paddle float</td>
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<tr>
<td>Paddle leash</td>
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<tr>
<td>Emergency shelter</td>
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<tr>
<td>Spare clothes</td>
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<td>Food</td>
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<tr>
<td>Bailing equipment</td>
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<tr>
<td>Knife</td>
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How likely do you think it is that you will need to use safety equipment when paddling your kayak in the sea?

- Very likely
- Likely
- Unlikely
- Very unlikely

Do you **usually** leave details of your kayaking plans with someone on shore?

- NO
- YES

Does the kayak you use for your **main** activity in the sea have watertight compartments for buoyancy (e.g. bulk heads and hatches in a sea kayak or double skin construction of a sit-on kayak)?

- YES
- NO
  (If NO, does the kayak have air bags fitted for buoyancy YES  NO)

Which of the following best describes the sort of conditions you paddle in?

- Straightforward
- Intermediate
- Demanding
When carrying out your main kayaking activity, do you wear any of the following? *(Please tick all that apply)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Ticked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helmet</td>
<td></td>
</tr>
<tr>
<td>Buoyancy aid or life jacket</td>
<td></td>
</tr>
<tr>
<td>Wet suit</td>
<td></td>
</tr>
<tr>
<td>Cag or other wind proof jacket</td>
<td></td>
</tr>
<tr>
<td>Hat</td>
<td></td>
</tr>
<tr>
<td>Drysuit</td>
<td></td>
</tr>
<tr>
<td>Sun glasses</td>
<td></td>
</tr>
<tr>
<td>Ear plugs</td>
<td></td>
</tr>
<tr>
<td>Neoprene hood</td>
<td></td>
</tr>
</tbody>
</table>

Have the emergency services ever been called as a result of your kayaking activities in the sea (either as an individual or in a group)?

- NO       ☐
- YES      ☐

*(Please provide details of incidents)

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--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
What is your age in years?

........................................

Are you

Male  □

Female □

Thank you for your time. A “postage paid” envelope is provided to return the questionnaire.
Appendix III
Consent Forms

A Survey of
Injury and Medical Conditions Associated with Kayaking in the Sea

As part of my research activities at The University of Wales Institute, Cardiff, I am investigating aspects of safety and the perception of risk of kayaking in the sea. The attached questionnaire takes about 10 minutes to complete. Questions deal with paddling activities and experience, injuries and medical conditions and their possible causes.

You are under no obligation to take part in this study. If you do agree to participate, you have the right to refuse to answer questions and to stop participating in the study at any time. All information that you disclose will be anonymous.

If you are willing to fill in the questionnaire, you will need to sign that you consent to participating in the research. If you are under the age of 18, the form will also need to be signed by a parent or guardian. The consent form will be kept separate from the questionnaires so as to ensure anonymity. You are welcome to ask questions before deciding whether or not participate in the study.

My contact details are as follows:

Colin Powell
Senior Lecturer
School of Applied Science
UWIC
CF5 2YB
Tel 02920 416860
e-mail cpowell@uwic.ac.uk

Alternatively you can contact

Professor Adrian Peters
Director of Research and Enterprise
School of Applied Science.
UWIC.
Cardiff
CF52YB
Tel 02920 416830
Statement of Consent.
For people under the age of eighteen the signature of a parent or guardian is required
As the parent/ guardian of the above signatory, I consent to their participation.

Signed…………………………..Date……………..

Safety Questionnaire
As part of my research activities at The University of Wales Institute Cardiff, I am
investigating aspects of safety and the perception of risk of kayaking in the sea. The
attached questionnaire takes about 15 minutes to complete. Questions deal with paddling
activities and experience, activity planning and equipment carried.
You are under no obligation to take part in this study. If you do agree to participate, you
have the right to refuse to answer questions and to stop participating in the study at any
time. All information that you disclose will be anonymous.
If you are willing to fill in the questionnaire, you will need to sign that you consent to
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