Intentions to seek severe weather information among travelers in New Zealand

Master-thesis Leisure, Tourism and Environment

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Lincoln University
Te Whare Wānaka o Aoraki
CHRISTCHURCH, NEW ZEALAND

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For quality of life

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Acknowledgements

The last six months I have dedicated to writing this thesis. During this period all steps were taken in the process of an academic research. This thesis has studied the influence of intrapersonal variables on severe weather information seeking behaviour among travelers in New Zealand. The intention was to shed more light on how tourists perceive severe weather as a hazard and a risk during their holiday in New Zealand. Taking on this individual perspective was in line with the increasing awareness among risk communicators that the receiver-oriented approach is the way forward to successful communication of potential risks in the context of severe weather.

Having finished the report, it now seems as if time has passed by so quickly. It has been a great learning experience, but also a lot of fun to do. Being able to travel through New Zealand for this is something I will never forget. During this period I have had invaluable support of a number of people and organisations that I would like to mention here.

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Executive summary

Background

Climate and weather have been found as important aspects that influence holiday experiences of tourists, their destination choice and holiday satisfaction. They can be seen as an integrated part of tourism. Even though climatic circumstances and weather characteristics at a holiday destination are often perceived (and sold) as positive features, sometimes adverse or even severe weather such as thunderstorms, heavy rain or tropical cyclones occur at holiday destinations. While tourists are able to adapt to severe weather to a certain extent, unprepared and misinformed tourists have an increased chance to be affected by adverse consequences of severe weather, resulting in possible harm or property damage. Providing correct information about possible risks due to environmental circumstances such as severe weather is can help prevent this and is therefore very important. Also, vulnerability can be increased or decreased by the behaviour of tourists, for example by them seeking information about possible hazards.

This thesis investigates social psychological antecedents of severe weather information seeking behaviour of tourists in New Zealand. The weather of New Zealand is characterised by a high level of variability, both in nature as in amplitude, sometimes resulting in severe weather events, impacting on the society, including tourists and tourism industry. Traveling in remote, harsh environments, often by car or campervan, camping on camping grounds and being exposed to environmental conditions, tourists can be susceptible to severe weather hazards. The variability in the New Zealand weather is reflected in the severe weather warnings that exist and are used to communicate any emerging weather event to the public. The MetService, the official meteorological institute of New Zealand, is the crown supplier of weather information and issues a variety of weather warnings when necessary, distributed via a large number of media and used and passed on by other institutions. In order to stay safe during their holiday in New Zealand, tourists themselves are expected to actively stay up to date with the environmental conditions. However, to date it is not know sufficiently to date if tourists use this information and where they prefer to seek.

Theory

Taking on a receiver-oriented approach, this study investigates intrapersonal antecedents of risk information seeking behaviour. It provides new and interesting insights in information seeking behaviour of tourists. In the context of severe weather hazards and applying a framework based on established theories from social psychology and risk communication, it builds new linkages between tourism and more traditional social sciences.

Seeking information can be approached as a part of a communication process that aims to make people aware of possible risks and hazards. Recent studies have made considerable progress in framing risk information seeking behaviour, with an increasing emphasis of the role of the individual as receiver and processer of risk information. Combining knowledge from scholars in communication science and risk perceptions, several models have been developed that have been tested in the context of health and environmental risks. This thesis is based on the Framework for Risk Information Seeking of ter Huurne (2008), an adaptation of the Risk Information Seeking and Processing model of Griffin, Dunwoody and Neuwirth (1999). Variables included in this study are:

- Intention to seek Information
- Informational Subjective Norms
- Severe weather Worry
- Information Sufficiency
- Issue Involvement
- Protection Efficacy
- Perceived Locus of Responsibility

To test the relations between these variables, two research questions were formulated:

1. To what extent do Worry, Informational Subjective Norms and perceived Information Sufficiency predict the Intention of weather information seeking?
2. How do Issue Involvement, Protection Efficacy and Locus of Responsibility relate to the core-model's variables?

Methodology

A printed survey was developed, with scales measuring the concepts mentioned above. Also, a number of demographic variables were included, and scales measuring preferences for information sources used and perceived importance of severe weather information. The survey was distributed to tourists with sufficient English language fluency on three locations: The Interislander ferry between Wellington and Picton, Department of Conservation carparks in Franz Josef and the carpark on the lakeside in Wanaka around the i-Site visitor centre. A total of 424 respondents were approached, to whom 414 surveys were handed out. 402 usable surveys for the analysis were returned, resulting in a response rate of 94.8 percent. Respondents were between 16 and 70 years old (M=33.28, SD=13.99). Most respondents were 40 years old or younger (76.4%), resulting in a positively skewed sample. Sex was equally distributed with 51 percent male and 49 percent female respondents. Respondents came from all over the world, but mainly from West-Europe. Most respondents travelled in couples and by car or campervan. Average length of holiday was nine weeks (SD=13.21)

Results

All scales used for measuring the concepts had sufficient internal consistency. Mean scores on the variables are displayed in Table 1. To test the predicted relations between the concepts, Pearson correlations and (hierarchical) regression analyses were executed. Testing of significant group differences was achieved by conducting ANOVA's.

Table 1

Mean Scores and Standard Deviations

	n	***M***	***SD***
Information seeking intention	399	3.45	.81
Informational subjective norms	390	3.34	.71
Information sufficiency	394	3.19	.79
Worry	394	2.45	.71
Issue Involvement	399	3.25	.73
Protection Efficacy	388	2.99	.69
Locus of Responsibility	394	3.20	1.23

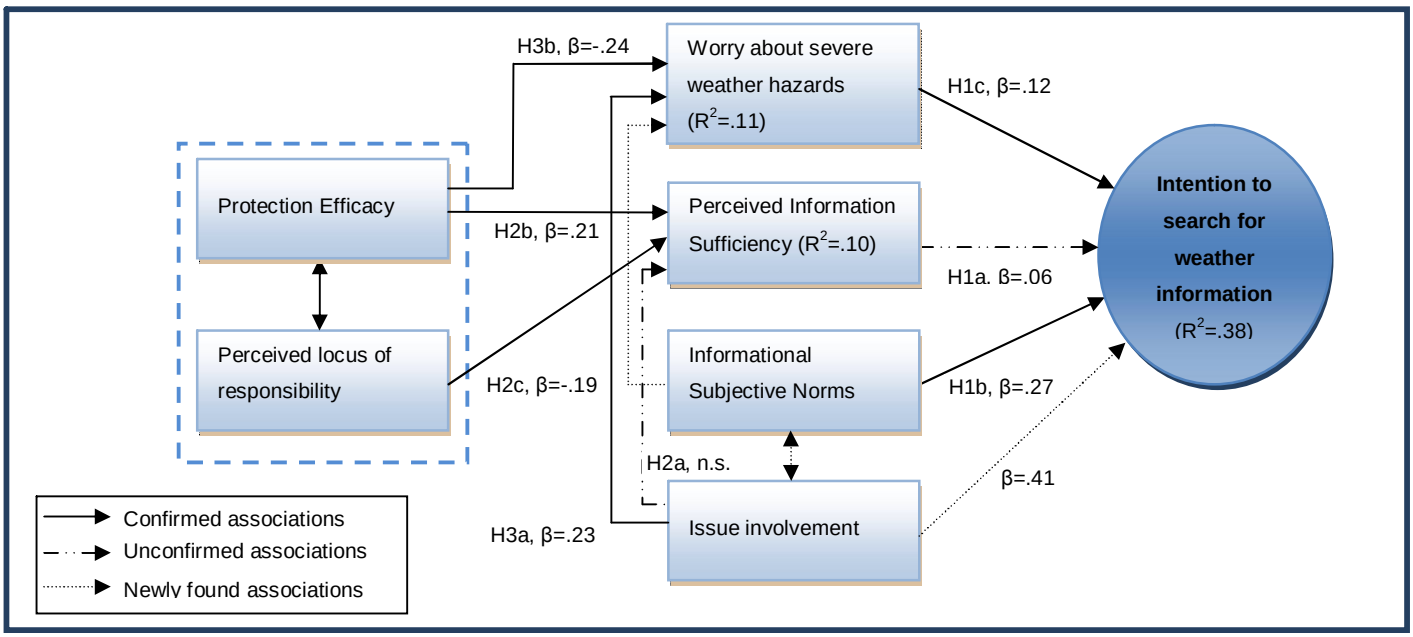
Scales range from 1 to 5, except Locus of Responsibility ranging from 1 to 7

Worry and Informational Subjective Norms appeared to be significant predictors of Intention. In addition to the predicted relationships between Worry, Informational Subjective Norms and the Intention to seek information, Issue Involvement was by far the strongest predictor of Intent. This is a major finding of this study. This relationship was expected to be mediated by feelings of worry, but perceiving severe weather risks to be relevant for one's personal situation directly results in a higher intent to seek information about it, even without inducing worries that result from perceiving this relevance. Worry and Informational Subjective Norms together accounted for 23 percent of the variance in Intention, but 38 percent of the variance in Intention was explained by the regression model when Issue Involvement was included.

Contrary to expectations, Information Sufficiency was not a significant predictor of Intention in this study. Information Sufficiency was predicted by Protection Efficacy and perceived locus of Responsibility. Also, an internal Locus of Responsibility was related to higher levels of Information Sufficiency, and an external Locus of Responsibility to lower levels of Information Sufficiency. However, Issue Involvement appeared to be unrelated to Information Sufficiency; perceived personal relevance of, and interest in severe weather is not related to tourists evaluating the information at hand to be sufficient (or insufficient). Issue Involvement was found to be positively related and Protection Efficacy to be negatively related to Worry. The results are graphically displayed in Figure 1.

Figure 1

Relationships and Effect Sizes between Variables predicting Severe Weather Information Seeking



Tourists are aware to some extent where they can collect information about severe weather, but some relevant sources are overlooked by the majority, while other less informative sources are relied on too much. Meteorological information was relatively little appreciated. On the other hand, respondents perceived information about temporal and spatial information, but especially impact and behavioural information very important.

Potentially vulnerable groups are females (low Information Sufficiency), young travelers between 16 and 25 years old (low Intention and a general tendency to care little about possible severe weather hazards), tourists from the United Kingdom (relatively low Information Sufficiency and relatively low Intention), tourists from Germany (relatively low Protection Efficacy).

Some tourists expect authorities to protect them from harm caused by severe weather. Also, some tourists tend to perceive some organisations to be responsible for this, that actually are not responsible for protecting people. Although all respondents perceived themselves to be responsible to some degree, a small but relevant group of tourists perceives authorities to be more responsible than themselves.

Tourists worry most about the types of weather that they find easiest to protect themselves against, but probably also happen most often: fog, heavy rain and severe wind. Worries about severe weather vary between type of weather, but in general tourists seem not to worry too much about severe weather and natural other hazards that might occur during their holiday. Also, tourists do not worry more about other natural hazards than they do about severe weather.

Conclusion

The main goal of this thesis was to study intrapersonal predictors of intention to seek information about possible severe weather. The results suggest that tourists, at least when it comes to seeking behaviour in the context of severe weather information, they are guided by their emotions (Worry), perceived expectations of others (Informational Subjective Norms) and perceptions of relevance of having information about severe weather hazards (Issue Involvement). A major finding of this study is that Issue Involvement complements Informational Subjective Norms and Worry as predictors of severe weather information seeking. On the other hand, the lack of a relation between Information Sufficiency and Intent was unpredicted and does not correspond with existing literature. Next. Protection Efficacy and Issue Involvement predict Worry, while Information Sufficiency is predicted by Protection Efficacy and Locus of Responsibility.

Although tourists want to get to know some meteorological features of the weather, in the context of severe weather they are mainly interested in consequential information and protection advice. Based on scores on a number of variables, some demographic groups of tourists might be more vulnerable to severe weather than other.

A reinterpretation of the directions of the relationships is proposed for the triangular relationship found between Information Sufficiency, Protection Efficacy and Locus of Responsibility. It is suggested that Information Sufficiency and Protection Efficacy can also be interpreted as *causing* an internal or external Locus of Responsibility instead of the other way around.

A number of research limitations apply and should be taken into account when interpreting the results and generalising beyond the sample of this study. These include cultural differences that might influence response, English language fluency and not taking into account the relation of severe weather with specific activities and locations.

Some implications and recommendations are given for future research and risk communication practices. Intention to seek information about severe weather might increase when aiming at enhancing Issue Involvement and making subjective norms salient. A balance however has to be found between enhancing awareness and making people afraid when framing information about severe weather. Also, visibility and accessibility of information sources has to be improved. Future research could also focus on source perceptions, linking information tourists expect to find with sources where they think they can this information. Finally, communication about the roles of organisations in the context of severe weather information and protection activities can make tourists more aware of their own responsibility.

Even when you're feeling warm
The temperature could drop away
Like four seasons in one day
-Crowded House, 1991-

1. Introduction

1.1 The relation between weather and tourism

Climate and weather have been found as important aspects that influence holiday experiences of tourists, their destination choice and holiday satisfaction. The tourism industry is depending on the quality of weather, which pertains to a qualitative aspect (e.g., how high is the temperature), but also to a temporal aspect (e.g., when does the high temperature occur). Both are rather variable, which can have both positive and negative impacts on tourism. For example, cold and rainy weather during the summer holidays influences camping ground occupancies in a negative way, while high temperatures in early spring can fill up the terraces and boost revenue of cafés. On a more individual level, aesthetic aspects of climate such as sunshine influence tourist experiences of a holiday destination (Becken & Hay, 2007), just like physical aspects like wind, rain and thermal aspects like temperature do. Limb and Spelmann (2001) concluded that weather is embedded in the holiday experience, but its influence on holiday decisions and holiday satisfaction varies among people and circumstances and is mediated by expectations about and activities during the holiday. As a result, climate and weather highly impact on a destination's attractiveness (Andrade, M.J. Alcoforado and S. Oliveira, in: Matzarakis, Freitas, & Scott, 2007). Climatic circumstances are even seen as one of the main reasons why people travel to holiday destinations and climate is often used to sell a destination (Becken, 2010).

While climate is an abstract concept that refers to long term trends in weather, what people sense are concrete weather features. Climate and weather are thus very much related. Yet, they should be approached and used as distinct matters: 'climate is defined as the prevailing condition observed as a long term average in a location. In contrast, weather is the manifestation of climate at a specific point in time and place' (Becken, 2010, p.2). In other words, while weather pertains to extremes and variations, climate data average them out. Changes in climate influence the weather people experience on the long term. Yet, on a shorter term, it is the variability in weather patterns that directly influences people's lives, including their holidays. In the tourism context, Becken (2009) points out a number of factors that are important for the degree of sensitivity of the tourist industry to weather variabilities. They include tourists' responsiveness to certain climatic conditions, importance of weather and weather-related natural hazards for tourism businesses and their successful operation of specific activities and how infrastructure or natural resources relevant to tourist operations might be temporarily or permanently affected by weather events. In sum, climate and weather can be seen as an integrated part of tourism.

Yet, people and organisations (not the least tourism organisations), tend to mix and confuse climate and weather. For example, tourists are provided with climate information by

tourism agencies, websites and guide books, which is presented to them or interpreted by them as weather information (Becken, 2010). Also, by some sources, climate and weather information tends to be skewed in a way as if the weather has no downside and has no potentials risk for tourists (see for example the website of one of the leading tourism marketing organisations in New Zealand: www.newzealand.com). This is probably very logical from a marketing perspective; there is a thin line between warning tourists and scaring them. But since tourists at least partly base their destination choice decisions (both when and where) on these climate data (Hamilton & Lau, 2004), this may lead to misinterpretations, false expectations about the holiday weather and possible disappointments about a holiday as a whole. Figure 1.1 displays how tourists use climate and weather data in their pre-travel and at travel stages. While climate data are generally used to choose a destination, actual weather data are only used from some weeks before and during the trip.

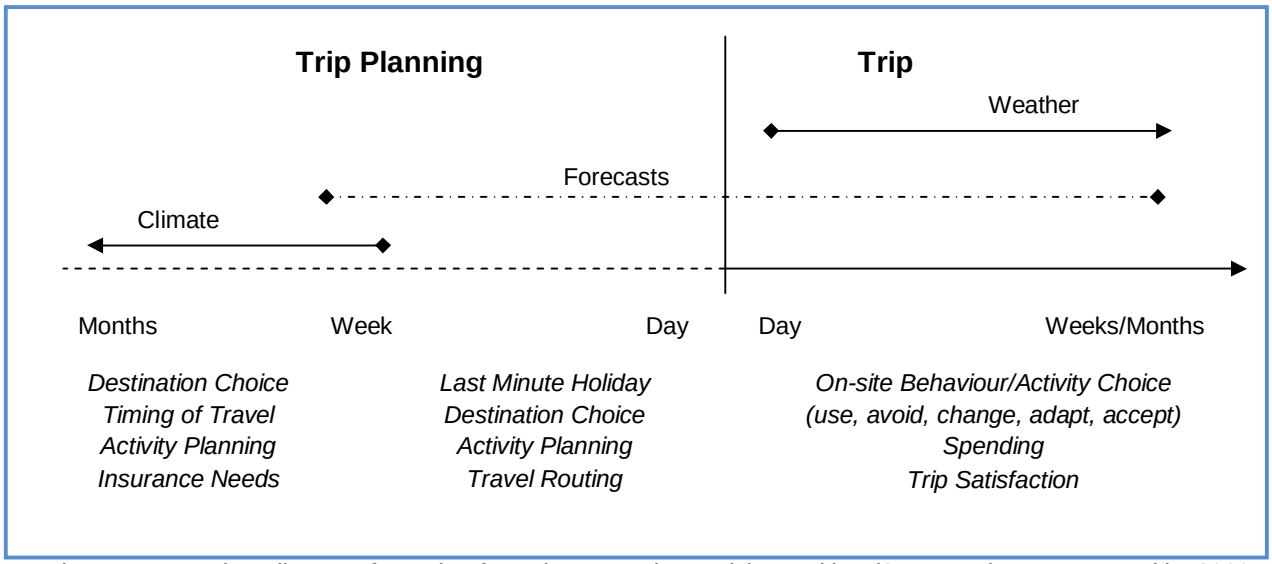


Figure 1.1 Weather-climate Information for Leisure Tourist Decision-making (Scott, Freitas, & Matzarakis, 2009, adapted from: Scott, 2008)

Misinterpreted weather information can also lead to tourists being less well prepared for extreme weather conditions such as thunderstorms, tropical cyclones and heavy rainfall. These are examples of severe and potentially dangerous weather. Unprepared and misinformed tourists can be more vulnerable to adverse consequences when the weather turns bad, resulting in possible harm or property damage. Providing correct information (both pre- and at-travel) about possible risks due to environmental circumstances such as severe weather is therefore very important.

1.2 Weather as a natural hazard

Even though climatic circumstances and weather characteristics at a holiday destination are often seen (and sold) as positive features, sometimes adverse or even severe weather occurs at holiday destinations. Tropical cyclones, heavy rainfall, tornadoes and severe thunderstorms are affecting tourist areas and tourists around the world (Scott, et al., 2009). Moreover, climate change is expected to boost the occurrence of extreme natural events at some locations, resulting in higher frequency and amplitude of weather variability (Becken & Hay, 2007). Without intending to add to the discussions around climate change happening or not, it is safe to say that severe weather events have and will have potential adverse consequences for tourism industry, both on business as on individual level.

Severe weather events happen alongside other natural hazards such as earthquakes, volcanic eruptions and tsunamis; natural hazards exist in many forms. A general classification can be made between geophysical hazards and hydrometeorological hazards (Silver & Conrad, 2010). While the first category contains hazards like earthquakes and volcanic eruptions, the second category includes tropical cyclones, floods, windstorms and drought. In recent years, impact of both type of natural hazards on human societies have increased, both in economical terms and in number of fatalities (Stewart, 2009)). In this thesis, the focus is on the second category, hydrometeorological hazards. The impact of these hazards however (although this also counts for geophysical hazards), does not only depend on the severity and strength of the hazard itself, but even more so on the interaction between characteristics of the society, human activities and the environment where these activities take place. This is often specified as a degree of social vulnerability (Cutter, Boruff, & Shirley, 2003). Debates about the relative impact of climate change versus increased social vulnerability as causes of growing impact of natural hazards are widespread (Cutter, et al., 2003; Etkin, 1999; Silver & Conrad, 2010; Stewart, 2009), but generally it is agreed that a growing world population, higher urbanisation levels (on a higher number of relatively vulnerable locations) and increased dependence on technology place mankind in a more susceptible position towards impacts from natural hazardous events. In the context of social vulnerability of populations around the world, the impact of natural hazards and, in this thesis, severe weather, demands increasing attention from societies, governments and academics.

In the field of tourism, the adverse impact of weather and climate (change) has been recognised by both the industry itself and tourism scholars. When in literature weather and climate are related to tourism in a natural hazard context, this is often done in terms of mitigation measures by tourist organisations, revenue loss due to natural hazards impacting on tourist destinations and impact assessments of climate change on the tourist industry at specific destinations (see, for example, Burby & Wagner, 1996; Johnston et al., 2007; Scott,

et al., 2009). Less frequently studied are individual perceptions of weather hazards and mitigation options among tourists themselves. This is surprising, since it is the tourist as individual who is the consumer, who experiences both positive and negative situations during a holiday. In other words, mitigation measures and revenue loss are in the end aimed at or due to individual tourist behaviour and making sure the tourists stay safe and continue visiting destinations, despite possible natural hazards. Studying how tourists themselves deal with hazardous situations such as severe weather events during their holiday thus is paramount, but still somewhat overlooked. This thesis intends to fill a part of this existing knowledge gap.

1.3 Tourist behaviour and natural hazards

People generally go on a holiday to gain positive experiences, but sometimes tourists get involved in more unpleasant situations during their time away from home. This includes robberies, accidents and terrorist attacks, but also getting a disease or getting struck by natural disasters like earthquakes or tropical cyclones (Lepp & Gibson, 2003). These things can happen at home too, but tourists seem to be as much as or even more 'at risk' for some events than locals, for several reasons (Bauer, 2001; Burby & Wagner, 1996). With the important notion that there is always a certain level of risk people are exposed to, tourists tend to reside in relatively hazard prone locations, often in order to get the unique experiences they are looking for during a holiday. Examples of 'risky' locations range from remote natural environments to much visited locations that attract pocket thieves and that might function as targets for terrorism. Also, in unfamiliar situations (which holiday destinations often are) it may be difficult to decide what to do and where to go to be safe, when a hazardous situation appears. Sources to decide upon what is the right protective behaviour are not as logically available as when at home. Thus, tourists, when faced with a risky or hazardous situation, are challenged with uncertainty and decisions to be made in order to stay on the safe side.

To reduce uncertainty and prepare tourists for the risks they might be exposed to while they travel the world, tourist guidebooks and websites (both commercial and governmental) -among other sources- provide tourists with information about possible risks and sometimes give advice about do's and don'ts when on a holiday. Yet, it is still up to the tourist self to decide what to do with the information (read or not read), decide if the information is appropriate for his or her situation, and decide whether the information is trustworthy at all. Hence, tourists' way of seeking and using information when on a holiday or in a hazardous situation is likely to influence if provided information serves the goal: safeguarding the public.

According to Quarantelli (1984, in: Paton, 2006), tourists' reaction to a dangerous situation in an unfamiliar environment is trying to leave as soon as possible and find a safe place. However, this leaves the question where they go to, and more importantly, when they decide to leave. More generally, tourists, just like locals, have several options to adapt to hazardous circumstances. Staying or moving, searching for or ignoring information. But, a decision to engage in 'protective action' (in terms of Lindell & Perry, 2004) is induced by many factors, and differs along persons, environments and hazards. When the hazardous situation is perceived in the wrong way and when wrong decisions are made, not only the positive holiday experience can be ruined. Also, this can result in considerable adverse consequences, such as injuries, death or loss of property. Hence, knowledge about the risk or hazard, knowing how to adapt to it and where to gather the right information to base protective action on is essential. Hazard managers and information providing authorities then have to be aware which factors influence the communication process to make sure people and, in this case, tourists, know about the hazard, get information about it and perform the right protective behaviour.

The focus of this study is on a specific natural hazard, severe weather, that in a context of climate change and weather patterns potentially becoming more extreme, is of increasing relevance for tourism (Becken & Hay, 2007). Also, since personal experience of weather at a holiday destination is the main information source for repeated visitors (Hamilton & Lau, 2004), from a mere economical perspective, negative weather experiences are to be avoided as much as possible. Thus, accurately informing tourists about possible weather circumstances and its variability appears crucial for maintaining a high level of tourists visiting destinations. Yet, it is not the intention of this thesis to analyse economic risks of severe weather for the tourism industry. Tourist safety is the matter of interest here. How tourists anticipate on possible hazardous weather events, how and to what extent they prepare themselves for it and where they get their information about what they should do when such a situation occurs, are to date rather understudied subjects. Research has been done however on behaviour in the context of (severe) weather on a more general population level. An interesting overview of relevant approaches to weather from a psychological perspective is given by Stewart (2009). Focusing on adaptation to climate and weather events, he distinguishes three types of adaptation; primary (safety checks, preparation measures such as information seeking) , secondary (adapting to current weather circumstances, changing activities, seeking shelter) and tertiary adaptation (recovery) measures. Of course, these adaptation measures can also apply to tourists. According to Scott et al. (2009), tourists are able to adapt to changes in weather by changing their activities and itinerary. However, they emphasise only pre-travel adaptation in terms of destinations choice or at travel adaptation in reaction to weather, without mentioning a

combination of both: Anticipating for potentially severe weather situations during a holiday. Likewise, more knowledge is required about tourist information seeking behaviour and risk perceptions in relation to severe weather events. In sum, there is a need for better understanding of tourist behaviour in hazardous weather situations.

Hence, intending to shed light in this subject, this thesis investigates social psychological antecedents of severe weather information seeking behaviour of tourists in New Zealand. New Zealand attracts numerous tourists, up to 2.5 million international visitors a year, staying twenty days on average and spending around six billion NZ dollars in total. Tourism industry in total accounts for 9.1 percent of the country's GDP and one in every ten jobs is tourism related (Tourism Strategy Group, 2010, "Key Tourism Statistics,"). So, tourism is an important source of income and one of the pillars of New Zealand's economy. Among other things, tourist are attracted by the beautiful scenery and the great range of outdoor activities. Being an outdoor focused tourism destination implies that both tourism organisations and tourists themselves are exposed to the thrills and frills of the environment. New Zealand is, due to its geographic characteristics, prone to significant weather variability, both in quality as in intensity (Becken & Wilson, 2010) and hazardous weather events happen on regular basis. Tourists have to deal with this unpredictable weather and related risks that come with flooding, drought, storms and heavy snowfall. Also other natural hazards are present, such as tsunamis, volcanic activity and earthquakes. The most recent, with a strength of 7.1 in the Richter scale, left Christchurch and surroundings severely damaged in September 2010. The quake received global media attention and impacted significantly on the New Zealand society.

The choice to focus on tourists in New Zealand, is thus based on the fact that it is an important tourist destination, and is characterised by a variable and regularly extreme weather pattern that requires sufficient measures of preparation and adaptation by the tourists themselves. In addition, a large part of these tourists spending a holiday in New Zealand not only have travelled a long way to get there, they often tend to travel inside the country by renting a car or campervan. As opposed to the 'package tourist', who is travelling in an organised tour, self-driving tourists might be relatively vulnerable, since they are often 'on the road' in unfamiliar environments, not in touch with regular community information sources and travel to and stay in remote places. In a way they are so called independent travelers. As Hoogenraad, van Eden and King (2004) put it, 'independent travelers and tourists are superficially more vulnerable to natural hazards because they travel outside formally organised tours or groups, they stay in cheaper or more remote accommodation and are usually travelling into new places of which they know relatively little' (p.25). Being independent, able to go wherever they want to go at whatever time they want, results in these tourists needing to be prepared for potential hazardous circumstances. Also, they

might not be able to rely on the community sources of protection, such as warnings or help from neighbours and may be unaware of local emergency procedures. Therefore, in order to stay on the safe side during their holiday, it is for a large part up to the tourist to be informed about possible hazards, including severe weather. Tourists' seeking information about severe weather is then an important object of study and deserves more attention than it has received to date.

1.4 Thesis outline

The second chapter, after describing more in-depth the linkages between (severe) weather and tourism, narrows down to the New Zealand situation. In Chapter 3, theoretical concepts around information seeking behaviour are presented. These are then combined into a conceptual model, in order to form a theoretical foundation on which the thesis has been built. The chapter ends with a number of research questions and hypotheses, which have been tested in the field. In Chapter 4 the research methodology is outlined, while Chapter 5 contains the results of the fieldwork. Chapter 6 sums up the conclusions and elaborates on the implications of the results. Finally, Chapter 7 describes the research limitations and gives recommendations for future research.

2. Background

This chapter provides information about the research setting in terms of climate and weather conditions in New Zealand. Also, potential vulnerability of tourists travelling in New Zealand is considered. After giving a definition for severe weather and addressed concepts of vulnerability, it finally summarises how severe weather and other information concerning natural hazards is disseminated to the public in New Zealand.

2.1 New Zealand weather and climate

The climate of New Zealand is very diverse and is unique due to the relatively short distance between climate circumstances (Becken & Wilson, 2010). New Zealand, surrounded by oceans, is located on the 'roaring forties', a latitude notorious for its violent storms, which regularly visit the country. The far North of the country has a subtropical climate, while on the South Island circumstances are very diverse under influence of the Southern Alps. The West Coast of the South Island receives over six metres of rain annually, while just East of the mountains an alpine, almost continental climate exists, with hot summers and cold, sometimes snowy winters. Moreover, the wettest and driest places are only 100km apart (National Institute of Water & Atmospheric Research, NIWA, 2010). Mean annual rainfall and mean temperatures in January (summer) and July (winter) are given in Figure 2.1, particularly emphasising the rather large differences in rainfall on the South Island. Weather and climate being closely linked, potential effects of climate change are expected to be widespread in New Zealand. Expected changes in the New Zealand climate are shortly mentioned in the box below (Box 1), in order to present a complete picture of weather issues the tourism industry is dealing with. For a more extensive elaboration on the climate in New Zealand, see the website of the NIWA (2010).

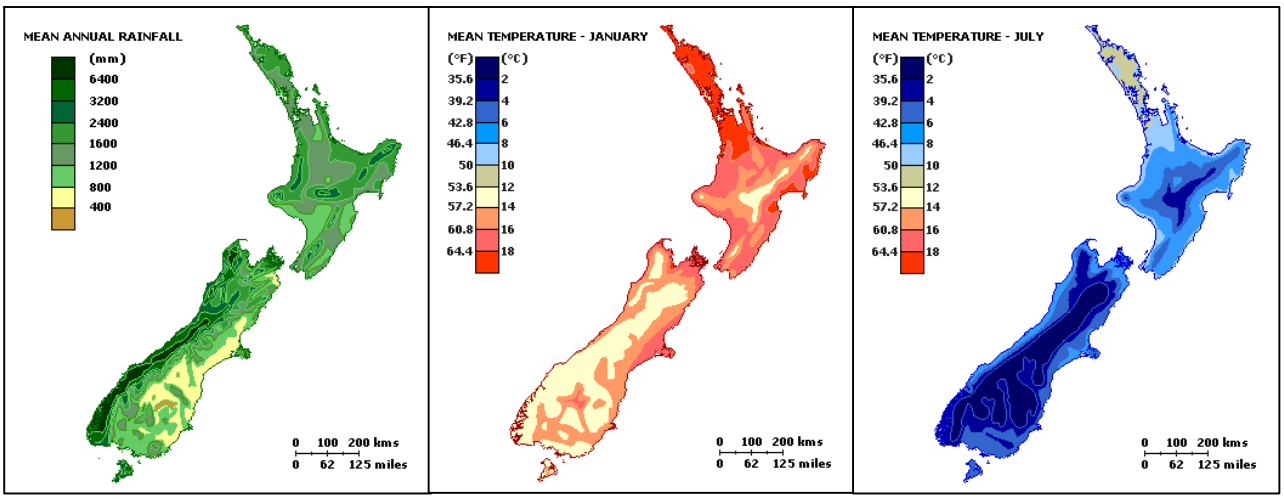


Figure 2.1

Mean Annual Rainfall, Mean Daily Temperature in January and July (www.tourismnewzealand.com)

BOX 1. Climate Change in New Zealand

According to the National Institute of Water and Atmospheric research (NIWA), it is expected that effects of climate change will be most significantly visible in terms of climate extremes such as floods and tropical cyclones (NIWA, 2010). On the website[1] of the government of New Zealand, a list of potential effects of climate change are mentioned: Decreased frost risk, increased frequency of high temperatures, increased frequency of extreme daily rainfalls, higher snow lines and possible reduced snow coverage, possible increase in strong winds and an increase in average sea level. These changes however are on a country level. On a more local level, some areas will take full account for the predicted changes, while at other places changes will be minimal (Becken & Wilson, 2010). Changes in climate integrate and possibly interfere with other environmental variations that impact the weather such as El Niño and La Niña. Finally, weather extremes already exist right now and these will continue to occur throughout the country in the future. Accurately providing of current climate and weather information becomes then even more important.

[1] http://www.climatechange.govt.nz/physical-impacts-and-adaptation/

All in all, a picture emerges of a country that can be battered by all types of weather. The almost cliché saying that one can get four seasons in one day appears to be very appropriate. Indeed, not only a wide variety in climate circumstances can be found in New Zealand, also the variability of the weather, both in nature as in amplitude is high. Nationwide record weather extremes are all found on the South Island (Table 2.1), making this the area with highest amplitude of weather variability.

However, weather, and particularly severe weather, which is by definition not occurring on a daily basis, becomes relevant when it has an impact on society, including

Table 2.1

New Zealand Record Weather Extremes (adapted from: www.niwa.co.nz)

		Location	**Date**
➢ Highest amount of rainfall in 24 hours	682mm	Colliers Creek, South Island, West Coast	21-22 January, 1994
➢ Highest amount of rainfall in 365 days	18.442mm	Cropp River, South Island, West Coast	29 October 1997 – 29 October 1998
➢ Highest Temperature North Island	39.2 °C	Ruatoria, East Coast	7 February 1973
➢ Highest Temperature South Island	42.4 °C	Rangiora, just North of Christchurch	7 February 1973
➢ Lowest temperature North Island	-13.6 °C	Chateau Tongariro, Tongariro National Park	7 July 1937
➢ Lowest temperature South Island	-21.6 °C	Ophir, Central Otago	3 July 1995
➢ Highest wind gust North Island	248 km/h	Hawkins Hill, Wellington	6 November, 1954 & 4 July 1962
➢ Highest wind gust North Island	250 km/h	Mt. John, Canterbury	18 April 1970

tourists. In Table 2.2, a number of exemplifying severe weather events and their consequences are summed up, that have occurred in 2010 in New Zealand. Interestingly, 2010 appeared to be a relatively 'quiet' year in terms of severe weather, exemplifying that even variability itself is variable. Earlier years showed much more severe weather events.

Table 2.2

Severe Weather Events in New Zealand in 2010 (adapted from the New Zealand national climate summary 2010, NIWA, http://www.niwa.co.nz/our-science/climate/publications/all/cs/annual)

- On 3 January, winds wreaked havoc during the annual New Year Regatta in Napier, with one girl concussed, and another fished out of the water after boats collided. About half of the 120 boats, competing in 12 classes, withdrew from the regatta. Strong winds were also recorded in Wellington.
- In the 10 minutes before 2 pm on 7 January, Invercargill Airport recorded 8.4 mm of rain. The extreme rainfall was caused by an intense mid-afternoon thunderstorm, with hail covering northern and central Invercargill. Buildings throughout the CBD, including the Southland District Council and the Invercargill Public Library were flooded. The thunderstorm also caused electricity cuts, which affected 3500 customers in south Invercargill, Bluff and Awarua.
- On 22 January, heavy rain flooded streets in Flaxmere, near Hastings, and closed SH50 between Ongaonga and Tikokino. The flash flooding was caused by downpours from thunderstorms in the area. Overnight on 22–23 January, Hawke's Bay experienced about 2000 lightning strikes. On 23 January, heavy rain caused a large slip on SH5, near Titiokura Summit, with one lane closed, and other sections of the road affected by flooding.
- Heavy rain on 22 March caused slips in Fiordland, closing the Milford Sound Road. About 200 trampers were stranded in huts on the Kepler, Milford, and Routeburn tracks after landslides blocked the tracks.
- On 22 March, severe gales disrupted flights in and out of Wellington Airport, and brought down trees and phone lines. Two Cook Strait ferry sailings were cancelled, and the Eastbourne ferry service between Queens Wharf and Days Bay was also cancelled.
- Heavy rain on 25 April caused flooding on the road to Milford Sound, stranding visitors. On 26 April, flooding closed SH94 from Milford Sound to Te Anau, and from Te Anau east to Mossburn. SH97 was closed between Five Rivers and Mossburn, and SH6 between Kingston and Athol was affected by surface water. About 120 trampers were evacuated by helicopter from the Milford Track. Te Anau residents were without telephone links after flooding cut the main fibre optic cable at Whitestone Bridge.
- On 27 April, on the Milford and Routeburn Tracks, several bridges were washed away, and there were many slips and washouts, causing track closures. Access roads into Mt Aspiring National Park were also damaged.
- On 24 March, gale force winds and heavy rain battered Wellington, delaying flights and damaging windows, roofs and power lines. A tornado was reported at Rutherglen, near Greymouth, felling trees and damaging property.
- On 29 April, the high levels of Lake Wakatipu caused some roads and reserves on the Queenstown foreshore to be flooded, mainly due to wind-blown waves. At 8am on 30 April, Lake Wakatipu had risen to its "threshold" level where water overflowed on to foreshore streets and parks, but major flooding such as seen in 1999 was largely avoided because of flood protection measures.
- On 18 May, a tornado was reported above Rotorua airport.
- Flooding occurred in Tawa and Titahi Bay (near Wellington) after heavy rain on 25 May, with one person rescued from a submerged car. Further south, several properties and businesses in

Richmond, north of Oamaru, were evacuated, a property in York Street Oamaru was evacuated, as was the Oamaru Camping Ground.

- On 26 May, the Avon River burst its banks causing minor flooding in Christchurch. Heavy rain resulted in a rock fall that blocked the entrance to Ngai Tahu Maori Rock Art site, near SH83 south of Duntroon
- On 23 and 24 July, heavy rain caused flooding and slips on SH1 between Blenheim and Waipara, and on SH7 between Springs Junction and Waipara. In southern Wairarapa flooding closed the Ponatahi Bridge near Martinborough, and White Rock Road at the intersection with Lagoon Hill Road.
- On 12 August, the access to Mt Hutt ski field was closed because of high winds. About 1,000 people were forced to spend the night in the cafes.
- On 17 September, there were heavy hail storms on the West Coast, with warnings in place for drivers on SH6 between Franz Josef and Fox Glacier. In Wellington, an electrical storm struck about mid-day, causing power outages to thousands of lower North Island residents, and setting alight a shed in Lower Hutt and trees in Wairarapa.
- On 27–28 December, heavy rain caused flooding in the West Coast, Nelson and Marlborough. Several South Island roads were closed by surface flooding, including SH60 at Takaka, cutting off much of Golden Bay, SH6 at Renwick and at Canvastown (between Blenheim and Nelson), SH6 at the Lower Buller Gorge, SH63 between Arthurs Pass and Otira, SH73 between Otira and Kumara, SH69 from Inangahua to Reefton, SH65 from Murchison to Springs Junction, SH67 from Westport to Mokihinui, and SH7 from Hanmer Springs to Springs Junction. The James Road bridge in Bainham was washed away. Bainham is on the Aorere River, 120 km (75 miles) from Nelson. A bridge in the Glen Roy Valley, near Murchison, was washed out. Significant stock losses occurred in several areas.

Above, some consequences of severe weather are mentioned, though mainly focusing on damage to the infrastructure. But how vulnerable are tourists? And is the safety of travellers in New Zealand at stake? A number of studies provide further insight in this by using analyses of severe weather media reports Becken (2010), recreational and traffic accidents (Bentley, Meyer, Page, & Chalmers, 2001; Page, Bentley, & Walker, 2005; Walker & Page, 2004). Before turning to these questions, which are addressed in section 2.3, it is necessary to formulate a definition of severe weather.

2.2 A definition of severe weather

Definitions of severe weather vary throughout countries and meteorological organisations (Silver & Conrad, 2010). For the sake of the thesis, it is important to apply a definition that not only emphasises the severity of weather events *an sich*. A useful definition of severe weather also underlines the potential impact of the weather on society, hence taking into account the relation with social vulnerability. However, a common approach for defining weather severity has a clear origin in the natural sciences, defining weather by probabilities of occurrence, quantities of precipitation or average wind speed (Rauhala & Schultz, 2009). Yet, official definitions and warning criteria, despite their clear cutting points, remain somewhat vague with respect to the extent people are at risk, because this approach does

not say anything about the potential impact the weather has on people. Some institutions take possible social impact into account and define severe weather by linking probabilities to risk and potential consequences. The World Meteorological Organization (WMO) has defined severe weather as 'any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life' (WMO, 2004). Likewise, in Canada severe weather is defined as any type of weather that can pose a risk to personal safety or property, including thunderstorms, tornadoes, freezing rain, heavy rain, wind, dust storms, blizzards, heavy snowfalls, frost, fog and wind chill (Silver & Conrad, 2010).

This thesis applies the definition used in Canada, emphasising the potential social impact of severe weather events. It has to be noted though, that there is no such thing as no risk. Risk is always present, and even moderately adverse weather circumstances can, in combination with other factors, result in hazardous situations. Also, this definition still does not leave much space for subjective assessments of severity of the weather. People who are used to variable weather are likely to perceive the New Zealand weather differently than people who are used to a more stable weather pattern. Which weather is 'severe' and which is 'normal' might be perceived differently then. However, defining severe weather in terms of subjectivity is beyond the goal of this thesis. While it is recognised that weather severity is depending on the social context, including weather familiarity, situational relativity and previous experience of people, defining severe weather in this thesis as described above is done in order to emphasise on which grounds severe weather warnings are issued by meteorological services. Information about severe weather warnings and how they are disseminated in New Zealand can be found in section 2.4. The social impact of severe weather can be analysed in terms of vulnerability. Therefore, the next section defines the potential vulnerability of tourists and describes how severe weather impacts on the New Zealand society and on tourists specifically.

2.3 The vulnerability of tourists in New Zealand

As already mentioned in the introduction, tourists appear to be able to adapt to weather circumstances rather well, by changing their itinerary or activities. When weather is only unfavourable, this should not immediately pose tourists at risk of getting hurt, although it can have a possible negative impact on their holiday experience. For example, fog, rain and clouds, might limit visibility of tourist attractions. Also, rainy weather generally is accompanied by lower temperatures, making travelling around less pleasant. However, when not carrying enough warm clothing during a hike on a sunny day, it does not take a torrential storm to get freezing cold wearing only shorts and a t-shirt. The point is: A certain

combination of factors together influence how weather impacts on tourists. An important concept that describes how these factors interact is vulnerability.

In literature, terms to describe impact of hazards on individuals, communities and environmental systems are widespread. Risk, hazard, vulnerability, capacity, sensitivity and exposure are all related and sometimes used interchangeably. Moreover, lay people tend to interpret some of them as more or less equal (Brooks, 2003). Despite being closely related, there are some conceptual differences between these concepts. Lindell and Perry (2004) define risk as a condition in which there is a possibility that people or property could experience adverse consequences. Likewise, Paton (2008) terms risk as the product of the probability of a hazard occurring and the consequences of the hazard activity. Risk thus is a situation that is the outcome of a number of social and environmental factors interacting. The environmental factors can be termed the hazard and is seen as the source of the potential risk. A hazard can always exist (e.g., a steep cliff next to a walking track), but can also develop (e.g., a tropical cyclone). So when does a hazard result in a risk? The link between these concepts is made by the concept vulnerability, which defines the properties of societies (or, in the case of this thesis, individuals) potentially being at risk (Brooks, 2003).

In literature, vulnerability is conceptualised depending on the research perspective used (Cutter, 2003). In the Hyogo framework, vulnerability has been defined as 'the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards' (UNISDR, 2005 in: Alexander, 2006). However, Brooks (2003) identifies some contradictories in the use of the terms vulnerability. He suggests to make a differentiation between biophysical vulnerability and social vulnerability. Exemplifying this differentiation, Cutter (2003) identifies three approaches, of which the first focuses on the (biophysical) conditions of people and places, the second defines vulnerability as a social condition, while the third approach integrates both perspectives, focusing on specific places and regions.

Although individual factors are taken into account to some extent, for example in terms of mitigation and adaptation abilities as a function of socio-economic status, gender and age (see also Cutter 2003), psychological variables are taken into account less often. Stewart (2009) identifies, next to social vulnerability, intrapersonal characteristics as a factor that influences vulnerability of persons and communities, hence emphasising individual behaviour. He advocates an individual approach to vulnerability as complementing the wider used 'societal' approach', because 'organizations and institutions within society are comprised of individuals, each with their own unique histories, experiences, motivational, emotional, and cognitive systems. Such psychological variables can help us to understand and account for variability in individual behaviour that contributes to the behaviour of larger-scale societal systems' (Stewart, 2009, p.213). These psychological variables can affect

adaptation and mitigation behaviour, which in their turn can be influenced by cognitive and motivational biases. Accordingly, Morgan and Fluker state that 'individuals tend to hold unrealistic optimism about their vulnerability to risks' (Morgan and Fluker, 2003, in: Cioccio & Michael, 2007, p. 5).

Related to vulnerability is the level of exposure, often seen as another antecedent of vulnerability (Preston et al., 2008, in: Becken, et al., 2009). Exposure to a hazard, defined as the nature and degree to which a system (or individual) is exposed to a certain hazard (IPPC, 2001, in: Brooks, 2003), together with the level of social vulnerability, mediated by intrapersonal biases and behaviour), defines the level of vulnerability of a person to adverse consequences of a hazardous situation.

Having made this differentiation and applying this to the context of severe weather, some weather types are a hazard because of their characteristics such as strong wind or high precipitation (one can ask what is defined as strong or high, but that is not the point to be made here). These weather conditions occurring in New Zealand mean a higher level of biophysical vulnerability among tourists. What is most important in the context and approach of this thesis is the intrapersonal factor of vulnerability: individual perceptions of severe weather as a hazard and how they should behave and prepare in relation to severe weather, for example by seeking information about it. Now let's turn to how these hazards are perceived, while taking into account the notions above as a background.

Around the world there are quite some reports on severe weather impacts on tourists (see Becken & Wilson, 2010). Less data are available about how the situation is in New Zealand. To illustrate how severe weather impacts on tourists in New Zealand, in Table 2.3, a number of media reports are stated, collected by Becken and Wilson (2010). Without giving a quantitative report of biophysical vulnerability, these media reports show that severe weather is a potential hazard, to New Zealand communities and to tourists travelling in New Zealand.

It can be stated that, next to the external influence of potential environmental hazards (biophysical vulnerability), tourists can be vulnerable, due to a number of aspects of the tourists and their activities. These aspects reflect the social and individual vulnerability of tourists. Five factors are identified that are argued to make specifically tourists potentially vulnerable to severe weather as a hazard. It has to be noted that identifying these factors is is not an attempt for all encompassing analysis of vulnerability issues. It is however an indication of specific aspects that makes tourists potentially vulnerabile and should be seen as setting the scene of the research and making clear the motives for conducting this study.

First, the geographic location of tourists attractions are often remote, in harsh natural areas (Becken & Wilson, 2010). Tourists have to rely on themselves, because help is not always near when needed. As the remoteness and extreme environment is often the

Table 2.3

Severe Weather Events Impacting on Tourists Travelling in New Zealand (Becken & Wilson, 2010)

- *Hundreds hit by fast-ferry delays'*, Dominion, Jan 4, 1995
- *'Ships forced to stay in capital',* Dominion, Oct 13, 2000
- *Hopes fading for UK tourist in freezing weather on mountain'*, The Daily News, Nov 9, 2000
- *Foul weather brings spate of accidents, cancels ferries'*, The Dominion, Jul 23, 2001
- *'Tourist killed in swollen river'*, Stuff: National News,Jan 5, 2002
- *'German hit by lightning twice is recovering'*, The Press, Jan 7, 2002
- *'Tourist sleep in terminal'*, The Evening Post, Feb 7, 2002
- *'2000 holidaymakers stranded'*, Dominion, Apr 2, 2002
- *'Rain and flooding cause havoc for holidaymakers'*, Waikato Times, Jan 10, 2003
- *'Blocked roads add to misery'*, Waikato Times, Jan 11, 2003
- *Freak gust sweeps woman to her death'*, The Press, Jan 10, 2004
- *'Ferries delayed by 6m swells'*, New Zealand Herald, Nov 14, 2004
- *'Tourists flee bad weather',* Press Release: Flight Centre, Dec 23, 2004
- *'Campers brace for more bad weather'*, The Marlborough Express, Dec 23, 2004
- *Tourist swept away in swollen creek'*, Southland Times, Mar 7, 2005
- *'Silence before tornado flips camper'*, The Press, Mar 12, 2005
- *'Holiday park evacuated ahead of flood'*, The Marlborough Express, Mar 30, 2005
- *'Twister rips through Oakura beach camp'*, Taranaki Daily News, Feb 9, 2006
- *'Weather bomb strands tourists and locals near Cape Reinga'*, Radio NZ, Feb 7, 2007
- *'Oh my goodness, [..], the river is coming up into the restaurant'*, The Dominion Post, Mar 30, 2007
- *'Snow causing major disruption in Central Otago'*, Radio New Zealand Newswire, June 20, 2007
- *'Wintry blast causing havoc in lower South Island'*, Radio New Zealand Newswire, June 23, 2007
- *'Heavy snow disrupts travel, causes road crashes'*, Otago Daily Times, July 7, 2008
- *'Mount Taranakiputs freeze on T-shirt tourist'*, The Press, Jan 8, 2010
- *'Mass evacuation after wild weather'*, Southland Times, Mar 24, 2010

attraction itself, it is likely tourists will be confronted with extreme conditions in order to get the desired holiday experience. Next, many tourists travel throughout the country during their holiday. About 75 percent of the tourists even travel on their own, by a rented (or bought) campervan or car (Becken & Wilson, 2010). Therefore, they are independent in their itinerary and are not travelling in an organised way, such as package tourists tend to do. This implies that they have to drive themselves, facing and assessing certain road and weather conditions and often having to drive on the left side of the road, often the opposite if what they are used to back home. Tourists are causing a significant number of crashes on New Zealand roads (Walker & Meyer, 1996, in Walker & Page, 2004). They mention the highly variable weather in New Zealand as a factor that makes driving for tourists a challenging endeavour. Third, the tourists that travel around by car or campervan, might also to choose for vulnerable

accommodation, such as camping grounds. This can be seen as part of the holiday experience they are looking for, but it does add to the degree of vulnerability to natural hazards such as severe weather events.

Fourth, many attractions and activities in New Zealand are related to 'the outdoors' (Becken & Wilson, 2010). Yet, vulnerability varies between activities. A tramp in a remote area of the West coast of the South Island is obviously more prone to severe weather than a boardwalk around a visitor centre. However, severe weather can happen everywhere and distinguishing between activities would imply an analysis on micro level that goes beyond the scope of this thesis. Also, tourists tend to engage in a large variety of holiday activities during their trip, which makes differentiating between them even more complex. Therefore, in this thesis being on a holiday in New Zealand is seen as an activity as a whole, during which tourists get to do activities that are more or less risky. Moreover, although holiday activities can be planned and changed, only one activity can be done at a time; it is not a matter of going tramping, but just in case the weather turns bad, we also go bowling at the same time; it is a matter of either or. Preparing for adverse circumstances however means taking the tools with you that help to deal with possible severe weather. These tools can be extra clothing, but also information, which has been collected in advance.

Vulnerability also depends on actions taken (or not taken) by the tourists themselves in order to prepare themselves for the possible circumstances they might face during their holiday. This is a fifth factor of influence and according to a study of Page, Bentley and Walker (2005) on tourist safety issues in Scotland and New Zealand, tourists appeared to ignore safety briefings of activity guides and also tended to overestimate their abilities to deal with the activities and the environment. Interviewing operators from the tourism industry, they state that 'all operators acknowledged the dangers posed by changeable and unpredictable weather, but clients' lack of preparation or awareness of the level of challenge posed by activities in both cases was a major barrier to safety' (p.162). In sum, tourists can be vulnerable due to external hazards (biophysical vulnerability), but this vulnerability can be increased or decreased by their own behaviour, which is a combination of societal and individual vulnerability factors. Measures tourists can apply to decrease vulnerability and increase capacity can for example be seeking information about the environmental circumstances in which they travel such as weather information. With this information, tourists can still decide to go tramping or bowling, but it is this process of seeking information that is of importance here. To be able to find the information that is being sought by the public, it is of course important to assess if, how and by who this information is provided. The next section illustrates which information about weather, severe weather and related environmental conditions is available and how this is disseminated to the public.

2.4 Providing weather information to the public

Since New Zealand is not new to variable and severe weather, the country is rather well adapted to it. The variability in the New Zealand weather is reflected in the severe weather warnings that exist and are used to communicate any emerging weather event to the public. The MetService, the official meteorological institute of New Zealand, is the crown supplier of weather information (nature, intensity and timing) and issues a variety of weather warnings when necessary (see Table 2.4). Also, based on certain criteria[1], two warning levels exist, with a general severe weather outlook as the default level (Table 2.5). Severe weather warnings are distributed via a large number of media, including specific warnings for areas (national parks), activities (tramping) and type of weather (snow, heavy rain, gales, severe thunderstorms).

Table 2.4

Weather Warnings Issued by MetService[1]

➢ Heavy rain	➢ Snow (road warning)
➢ Wind (gales and storm)	➢ Heavy snow
➢ Tropical cyclone	➢ Ice accretion

Table 2.5

Warning Levels Used by MetService[1]

➢ Severe weather warning	➢ Severe thunderstorm warning
➢ Severe weather watch	➢ Severe thunderstorm watch
➢ Severe weather outlook	➢ Severe thunderstorm outlook

Although the weather warnings and watches are made available to the general public through the MetService website, they firstly are aimed at the Regional and District councils around the country (Ross Marsden, personal communication, September 13, 2010). When necessary, these bodies then take action to protect the people and their property. This includes protection advice and other mitigation measures. A clear demarcation exists in terms of type of information between the data provided by MetService and the consequences and advices that are based on these data. As this is the 'official' way of dissemination and

[1] See http://www.metservice.com/help/help-warning

BOX 2. i-Site and the Department of Conservation

i-Site (www.i-site.org.nz)

The i-Site visitor centres embody the official visitor information network of New Zealand. They are aiming at providing general information about local attractions, activities and accommodation. Around New Zealand 80 i-Site centres can be found, some of which are accommodated in close to or in the same location as the Department of Conservation centres.

DoC (www.doc.govt.nz)

The Department of Conservation is the leading central government agency responsible for the conservation of New Zealand's natural and historic heritage. In the context of this thesis, this includes maintaining tracks in national parks, visitor management and also providing information to visitors. About 25 visitor centres are spread over the country. The Department of Conservation centres are seen as the most important bodies where tourists can find information about local environmental conditions, including severe weather information.

distribution of information providing responsibility, many other organisations and institutions use the weather data and warnings too, to inform themselves and the public, creating a complex network of information sources. For example, visitor information centres of i-Site and the Department of Conservation (DoC) (see Box 2) directly use the weather data from MetService, and apply this to the national parks and other areas they supervise in order to inform the visitors about current conditions.

Next to these organisations, other more informal sources include the many websites that present weather data and forecasts (or climate data, as will be discussed below), local tourist organisations and even other tourists. Also, institutions such as the New Zealand Transport Agency, the Police and the Mountain Safety Council use weather information more or less directly in their products. They all make up the sphere in which tourists can inform themselves about current and predicted environmental circumstances. Yet, in the case of natural hazards such as severe weather events, they are only predictable to a certain extent, especially because they often are only happening on a very local (but intense) level (Becken & Wilson, 2010). Therefore, in order to stay safe during their holiday in New Zealand, tourists themselves are expected to actively stay up to date with the environmental conditions. As there are so many sources, it might be difficult to assess which is the appropriate source for a certain type of information.

But do tourists use this information and where do they prefer to seek it? This is not known sufficiently to date. The study done by Becken et al., (Becken & Wilson, 2010), focused at expectations and experiences of New Zealand weather in general among international tourists. They also gathered data about information preferences and used sources in terms of holiday weather. They found that a quarter of the respondents on a regular basis looked for an update on the weather during their holiday. Also, respondents reported dissatisfaction with the available information, with a lack of information about

extremities (as opposed to average conditions that were found in the information sources). Tourists that did seek weather information mostly used the internet. However, no particular websites were mentioned. Although this study gives some interesting insights in use of weather information by tourists, the question remains if these tourists look for weather information in order to prepare themselves for any *severe* weather events that they might run into during their holiday. Also, even though seeking for weather information in general can include getting information about severe weather, this is not necessarily the case. Furthermore, only 25 percent of the respondents did look regularly for weather information during their trip, implying that the majority of international tourists was likely to be unaware of any possible emerging severe weather event during their holiday in New Zealand. It can be stated that generally, it appears that tourists find the weather a relevant aspect during their holiday, but they approach it as something they will deal with as it comes.

Yet, sometimes the weather turns bad in a way that just changing or cancelling activities is not enough. For example, when driving to the next destination, one can be confronted with heavy rainfall, causing floods or limited sight. Also, during outdoor activities, a storm can destroy tracks, let rivers rise and make tourists plain cold and wet. Next to primary adaptation (in the words of Stewart, 2009), tourists then have to engage in secondary adaptation. Knowing what to do and where (not) to go in such situations implies a substantial degree of hazard preparedness. Tourists are even more likely to have to engage in secondary adaptation if primary adaptation fails. Studying if, how, where and under influence of which intrapersonal concepts information about severe weather is sought in order to be prepared might bring the needed insight into these processes of informing and communicating. The next chapter discusses literature around information seeking and its antecedents, providing a theoretical basis to approach the issues described above.

3. Theory

This thesis intends to study if and how tourists seek information about possible severe weather. Seeking information can be approached as a part of a communication process that aims to make people aware of possible risks and hazards (Stevens, 2009; ter Huurne, 2008). This process of risk communication can be defined as 'the flow of information and risk evaluations back and forth between academic experts, regulatory practitioners, interest groups, and the general public' (Leiss, 1996, p.86). Risk communication has become more and more important in recent years, both due to and resulting in an increased concern with safety in our modern society (Kozak, Crotts, & Law, 2007; Maditinos & Vassiliadis, 2009). The grown attention for risks and safety concerns is aimed at an enhanced awareness of possible risks among the general public. An increased level of awareness about possible risks may improve people's ability to cope with hazards (ter Huurne, 2008). This rationale has in its turn led to an increased pressure on risk communicators to provide accurate information to the public (Stevens, 2009).

In the mid-eighties of the twentieth century, risk communication was mentioned specifically in literature for the first time (Leiss, 1996) and from then on started to receive increasing attention in literature (Kahlor, 2007; ter Huurne, 2008). The foundation of this interest however was built in earlier studies of risk perceptions and on discrepancies in these perceptions between experts and in the general public in particular (Leiss, 1996). Moreover, scholars in risk communication have been able built on a robust base of communication literature (Leiss, 1996) that goes back over 60 years and is rooted in the 'sender-receiver' paradigm (Shannon & Weaver, 1949, in: Wardman, 2008). Initially, the common approach to risk communications was it being a top-down process of governments and authorities informing the general public. However, it was recognised that this approach led to several problems, of which the most important one was that the public often did not respond 'adequately' (i.e., how the experts wanted them to respond). Hence, the risk communication did not reach the intended goals (Griffin, Dunwoody, & Neuwirth, 1999; ter Huurne, 2008). Also, this one-way communication overlooked the possibility of interaction with the public (ter Huurne, 2008), resulting in the public being dissatisfied with the provided information. Since then, scholars have increasingly focused on incorporating the end-user perspective and behavourial aspects of risk communication. Risk communication is increasingly approached as a 'social process' (Ter Huurne, 2008, p.10). She advocates a receiver oriented approach, where the public not only receives information, but also actively seeks for information in order to be prepared for possible risks. For risk communicators, listening to the public, becoming aware of their perceptions and information seeking behaviour can facilitate an improved

communication process, ultimately leading to the public being better prepared for situations where they might be facing any of the hazards that exist in contemporary societies.

3.1 Information seeking behaviour

According to ter Huurne (2008), information seeking behaviour contains the 'totality of behaviours or actions motivated by the recognition of missing knowledge' (p.15). Information seeking behaviour is part of the more general field of information behaviour, which contains all possible information behaviours and responses to information (Wilson, 1999). Likewise, information searching behaviour include user-media interactions. Figure 3.1 clarifies the conceptual differences. However, boundaries are rather blurry in practice, since one type of behaviour can lead to the other, with persons transcending from one concept to the other. This thesis is concerned with information seeking behaviour, but also takes intrapersonal evaluations of information sources into account, hence touching on aspects of information search behaviour.

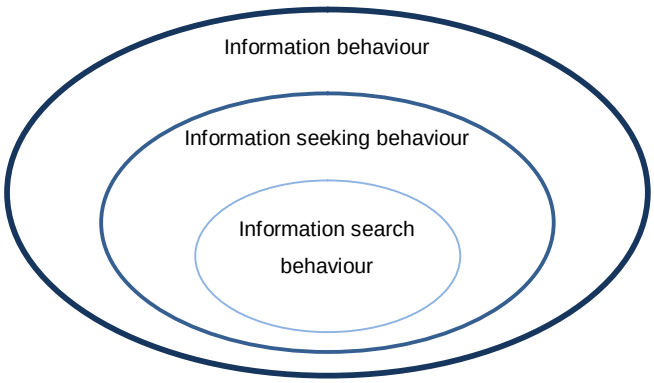


Figure 3.1

Concepts of Information Behaviour (Wilson, 1999)

Stevens (2009) indicates a distinction between two information seeking approaches, the system-centered approach and the person-centered approach. System-centered approaches of information seeking focus on relationships between information sources and information seeking behaviour (which thus links Wilson's concepts of information search behaviour and information seeking behaviour). Contrary, the person-centered approach originates from social sciences and takes individual factors and contextual factors into account that influence processes of information seeking (Stevens, 2009; ter Huurne, 2008). The person-centered approach became the more widely used approach (Wilson, 2000).

Information seeking behaviour often is not as black-and-white as suggested by the approaches above. Hence, several authors recognise the linkages between the conceptual

approaches and have intended to incorporate them in new models. This has become very clear in the field of risk information seeking and risk communication. Several models have been developed to assess how people evaluate risk information (Eagly & Chaiken, 1993; Trumbo, 2002), seek or avoid risk information (Griffin, et al., 1999; Kahlor, 2007, 2010; ter Huurne, 2008) and decide to perform protective behaviour (Bockarjova, van der Veen, & Geurts, 2009; Lindell & Perry, 2004; Terpstra, 2010). Recent studies have made considerable progress in framing risk information seeking behaviour, and although 'still in its infancy' (ter Huurne, 2008, p.23), some promising models have been developed. Among the most notable are the Risk Information Seeking and Processing model (RISP) (Griffin, et al., 1999; Griffin, Neuwirth, Dunwoody, & Giese, 2004) and a more recent adaptation to it, called the Framework for Risk Information Seeking (FRIS) (ter Huurne, 2008). A third attempt to improve the RISP by Kahlor (2007, 2010) intends to connect its concepts more strongly with the Theory of Planned Behaviour (Ajzen, 1991), with a resulting proposed model called Planned Risk Information Seeking Model (PRISM). Before giving a more in-depth account of conceptual models of information seeking behaviour, I now address relevant concepts that appear to be of influence on processes of risk information seeking.

3.2 Antecedents of risk information seeking

3.2.1 Informational Subjective norms

People's perception of what important others believe he or she should do is found to be one of the strongest predictors of behaviour (Ajzen, 1991; Griffin, et al., 2004). Likewise, normative pressures from the social context also influence seeking and processing of risk information (Griffin, et al., 2004; Kahlor, 2007, 2010; ter Huurne, 2008; ter Huurne, Griffin, & Gutteling, 2009). Subjective norms about specific behaviour is one of the concepts of the Theory of Planned Behaviour and is directly influencing behavioural intent. In the Risk Information Seeking and Processing (RISP) model (Griffin, et al., 1999; Griffin, et al., 2004) however, information sufficiency (i.e., one's perceived gap between needed and actual knowledge) is mediating this association (Griffin, et al., 1999), so that so called informational subjective norms (i.e., perceptions of whether important others think he or she should (not) seek information about severe weather risks) are influencing the desire to knowledge. The RISP model claims that informational subjective norms potentially increase the information needs, hence enlarging the gap with current knowledge (ter Huurne, 2008). Also, according to Eagly and Chaiken (1993), comparisons are made between one's abilities to perform certain behaviours and other people's abilities, aiming for social approval.

Yet, as theorised by Kahlor (2010), the strong relationships between subjective norms and behavioural intent might reflect an inflated judgment of the level of knowledge of other people. Nevertheless, informational subjective norms appear to be one of the main factors influencing how people seek and process risk related information. This seems to be true particularly for environmental risks that do not immediately pose people at risk (Kahlor, Dunwoody, Griffin, & Neuwirth, 2006). In other words, when there is no immediate danger at a certain moment, it is likely to be the informational subjective norms that influence whether people anticipate on possible future risks and seek information about them. This applies to the situation at stake in this thesis. Seeking information about possible severe weather is likely to occur without instant risks surrounding tourists. Therefore, informational subjective norms are expected to have a significant impact on information seeking intention.

3.2.2 Information sufficiency

The concept of information sufficiency (or information *in*sufficiency) is derived from the assumptions of Eagly and Chaiken's Heuristic-Systematic Model (Eagly & Chaiken, 1993). An important aspect of the model is the sufficiency principle, which states that 'people will exert whatever effort is required to attain a 'sufficient' degree of confidence that they have accomplished their processing goals' (Eagly & Chaiken, 1993, p. 330). The *sufficiency threshold*, which can be formulated as people's needed level of knowledge to confidently give judgments about a certain (risky) situation (Griffin, et al., 2004), is then compared with the actual knowledge, which results in a perception of an 'information gap', that triggers information seeking and processing. According to HSM, people can use two routes of information processing, a heuristic, more superficial way and a systematic, deeper way of processing. Increased discrepancies between actual and needed knowledge is found to induce more systematic processing (Bohner et al., in Griffin, et al., 2004). Translated to the context of information seeking, Griffin et al., (1999) introduced the term Information Sufficiency, which is the main concept of their Risk Information Seeking and Processing model. The HSM alike, information sufficiency directly influences information processing and seeking behaviour of people. Although Griffin et al. define information sufficiency predominantly as a quantitative need for information, ter Huurne (2008) theorises that this overlooks the qualitative aspect of information needs; one may have a lot of information about a certain topic, but if it is not the needed information, people still have a sense of information insufficiency. This issue is reflected in the methodological way of measuring information sufficiency and will therefore be addressed further in the methodology section (Chapter 4).

Information sufficiency is tested in several studies as part of the RISP model (Griffin, et al., 1999; Griffin, et al., 2004; Kahlor, et al., 2006), the FRIS model (ter Huurne, 2008; ter Huurne, et al., 2009) and the PRISM (Kahlor, 2007, 2010). It appeared to be associated with intention to seek information (except in the study of Kahlor, 2010) and is on its turn influenced by concepts as self-efficacy, affective responses, involvement and subjective norms. The strength of the relationships vary across studies, and although affective response and subjective norms (the main predictors of information sufficiency in the RISP model) also appear to have direct relationships with behavioural intentions, the concept of information sufficiency appear to be relevant when studying risk information seeking behaviour. Therefore, applying the Information Sufficiency as a predictor of severe weather information seeking is worth taking into account.

3.2.3 Worry as a risk induced emotion

Risk perceptions are approached in many ways and classification of risk research can be done accordingly (Stevens, 2009). A two-way classification that is used often discerns Cultural Theory and the Psychometric Paradigm (Bockarjova, et al., 2009). While Cultural Theory, developed by sociologists and anthropologists tends to focus on social issues around risks (e.g., cultural differences, values, unequal distribution of risks), the Psychometric Paradigm (developed by psychologists) is interested in hazard characteristics and intrapersonal evaluations of risks based on cognitive calculations. Yet, there has been an increasing number of scholars trying to integrate them (Marris, Langford, & O'Riordan, 1998). For a more extensive description of differences, commonalities, applications and critique on the psychometric paradigm and cultural theory see, for example, their analysis of both approaches. Studies from both paradigms conclude that risk perceptions influence how people value and perceive risks (Stevens, 2009). More specifically, risk perceptions are seen as being multidimensional, including evaluations about the immediacy of the risk (perceived likelihood) and about the seriousness of the risk (perceived severity). According to Kasperson et al. (1988), risk can only be determined by the context in which it is perceived. Risk perceptions are formed by ‘information processes, institutional structures, social-group behaviour and individual responses’ (p. 181). Hence, risk perceptions should be approached by taking into account individual evaluations and public opinions. Also, risk perceptions are theorised to be amplified or attenuated by interactions between people, sources and channels, with an emphasis on the role media plays in the so called Social Amplification of Risk (Kasperson, et al., 1988). Bockarjova et al. (2009) state that risk perceptions have a direct influence on risk acceptance and attitude, which has consequences for behavioural

decisions in risk situations. Perceptions of risk then are important for protective action decisions, including information seeking about risks.

This approach is employed in several studies in the context of environmental hazards and environmental risk communication (Becker, Johnston, Paton, & Ronan, 2009; Griffin, et al., 1999; Griffin, et al., 2004; Johnston et al., 2005; Kahlor, et al., 2006; Neuwirth, Dunwoody, & Griffin, 2000; Paton, Millar, & Johnston, 2001; Paton, et al., 2008; Paton, Smith, & Johnston, 2005; Stevens, 2009; Terpstra, 2010). Risk perceptions are included in several theoretical models that aim to explain risk behaviour, risk information seeking and protective actions.

While most studies recognise that risk perceptions, next to a cognitive component also have an affective element (e.g., fear, dread, worry), differences appear in whether affective responses to risk perceptions are part of the same concept or should be approached separately. Slovic et al. (2004) advocate the *risk as feelings* approach (Figure 3.2), which claims that risk perceptions do not only include affects such as worry, this affective component has direct influence on behavioural decisions and at least partly mediate cognitive risk perceptions (Loewenstein, Weber, Hsee, & Welch, 2001). Moreover, when cognitive and emotional risk perceptions diverge, the emotional component takes the lead in influencing behaviour. Also, emotions can exist without any cognitive awareness (e.g., being afraid but not knowing for what). Therefore, it is also called the *affect heuristic* (Slovic, et al., 2004; ter Huurne, et al., 2009). Increasingly it is held true that the cognitive risk perceptions are guided by emotional responses to risks (Stevens, 2009).

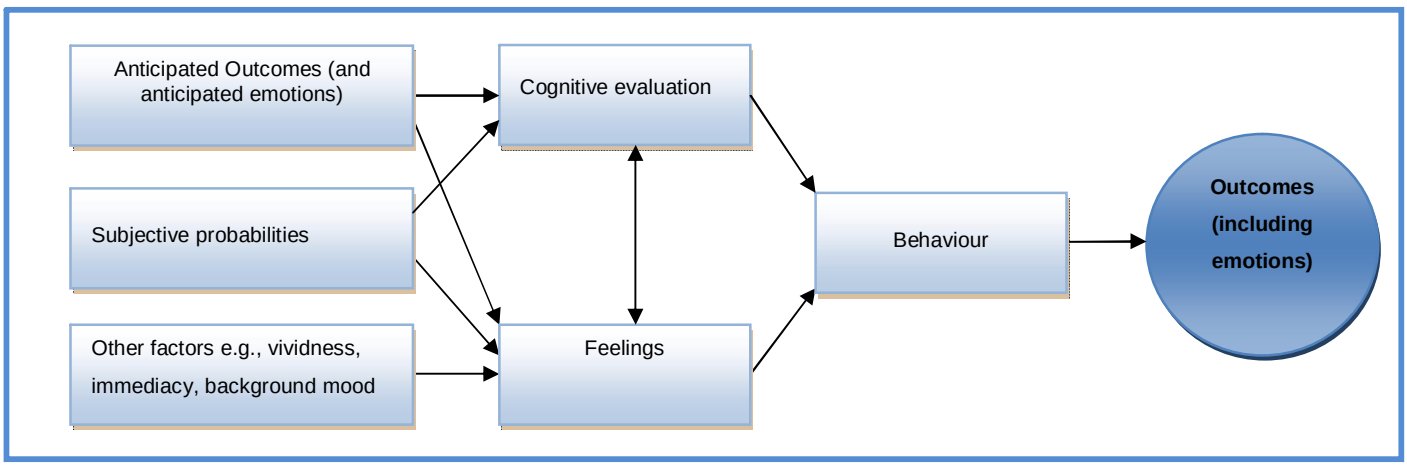


Figure 3.2

The Risk as Feelings Approach (Stewart, 2009, adapted from Loewenstein et al., 2001)

A number of studies found that emotional responses directly influence behaviour (Kahlor, et al., 2006; ter Huurne, 2008), for example seeking information instead of influencing intent via

information sufficiency (ter Huurne, et al., 2009). Moreover, it is suggested that risk perceptions result in a certain affect, and if this affect is negative, it increases risk perceptions (Terpstra, 2010). Thus, seeking information is not merely based on a cognitively acknowledged need, but also is predicted by an affective response to risk information (ter Huurne, 2008).

A difference can be made however, between several types of affective responses. Worry, fear and dread are all affective responses (and are often used interchangeably), but can be differentiated in terms of perceived threat proximity (Griffin, et al., 2004). According to Peters and Slovic (Peter & Slovic, 1996, in: Loewenstein, et al., 2001), the social-psychological aspects of risk consist of two factors: 1. dread, a concept that contains feelings of worry and fear, but also pertains to perceptions of a lack of control, and perceived catastrophic potential and 2. the risk of the unknown, which is a judgement of a hazard being unobservable, new or impact imminence (Loewenstein, et al., 2001). Hence, dread refers to emotions stemming from perceptions of hazard characteristics, while worry and fear signify the perceived distance towards the hazard. Griffin et a., (2004) define worry as 'a cognitive manifestation of anxiety, distinguished by a recurrent negative affective state provoked by a future hazard' (p.29). In other words, worry is an emotional response to less acute hazards, while perception of a more imminent hazard is more likely to result in fear. In this thesis, severe weather is assumed to be at considerable distance from the tourists. Also, information seeking, being a form of primary adaption (Steward, 2009), is likely to be performed without an imminent threat. Therefore worry, as an emotion induced by perceptions of risk, is used as the most relevant concept and is included in the conceptual model.

Accordingly, in recent studies worry is included as one of the predictors of risk information seeking (Huurne ter, 2008). Worry then can be a motivator for protective actions (Stewart, 2009). Likewise, Baron et al. (2000) found that desires for risk reducing actions toward a number of hazards (from diseases, to natural hazards to accidents) were primarily predicted by worry. Terpstra (2010), in his thesis about flood risk perceptions in The Netherlands, approaches worry as the affective part of risk perception. This is in line with the conceptualisation of dread risk by Slovic (2001, in: Kahlor, 2010).

Griffin et al. (2004) found worry to play a central role in risk responses and as a precursor of information needs. This is recognised by several other scholars, who studied the influence of worry in the processes of information seeking and protective actions (Kahlor, et al., 2006; ter Huurne, 2008; ter Huurne, et al., 2009). Worry is then a feeling of uncertainty, and in order to take away this uncertainty one needs information about the perceived risk. Although the RISP model does not include a direct relationship between affect and behavioural intent (Griffin, et al., 1999), more recent studies successfully explored the direct

influence of affects such as worry on intention to seek risk information (Kahlor, 2007, 2010; ter Huurne, 2008; ter Huurne, et al., 2009).

So why would worry be relevant in the tourism context? Tourists reside in often unusual environments, with unfamiliar circumstances, cultures and people. Hence, as Larsen et al. (2009) state, 'being a tourist represents a certain degree of unpredictability' (p.1). Also, the wealth of attention by media about threats that pose people at risk around the world, such as terrorism and viruses such as S.A.R.S (see Larsen et al., 2009, for a short overview), might influence people's risk perceptions and hence their worries about them. Based on these assumptions, Larsen et al. (2009) developed a Tourism Worry Scale, that quite adequately measures several subjects of worry among tourists, including worries about health, terrorism and crime. He found that tourists worry most about petty crime and accidents. One item in the scale specifically focuses on worry about natural hazards, but this was not found to be a main source of worry among tourists. However, as stated above, climate change is expected to result in more intense severe weather, with higher chances of impacts on societies, including tourist destinations and tourists. This makes that tourists are more likely to be at risk for adverse consequences from severe weather events. The extent to which people in general and tourists specifically in this study are worried about adverse consequences of severe weather, might influence their need of information but also, more importantly, might relate to their information seeking behaviour in order to be prepared for a hazardous weather event. Hence, it is felt necessary to examine tourist worries about natural hazards and specifically severe weather more closely. Thus, from the findings described above, the emotional component of risk perception (as opposed to the cognitive component) appears to be most relevant for behaviour. This emotional component is measured through the concept of worry, which is expected to relate directly to seeking risk information.

3.2.4 Protection efficacy

Originating from cognitive theory (A. Bandura, 1986; Albert Bandura, 2000) and also known as perceived behavioural control, one of the main concepts predicting behavioural intention in the Theory of Planned Behaviour (Ajzen, 1991), self-efficacy 'is concerned with judgments of how well one can execute courses of action required to deal with prospective situations' (Bandura, 1982, in Ajzen, 1991). Likewise, Wiegman and Gutteling put it in the risk context as 'the cognitive subjective judgments of the person's own possibilities of carrying out certain behaviours, given adequate skills and sufficient motivation' (Wiegman & Gutteling, 1995 p.234-235, in Stevens, 2009).

Throughout different lines of studies, the concept has been used in several ways, with slightly varying interpretations. In the context of risk communication for example, the RISP

model contains two self-efficacy related concepts: perceived behavioural control (PBC) and information gathering capacity (Griffin, et al., 1999). While the first conceptualisation is concerned with 'one's own sense of power in dealing with the risk and protecting the self, others, or the environment from possible harm' (ter Huurne, 2008, p.93), information gathering capacity contains beliefs about how well one is able to collect information about a risk. Although both concepts are concerned with behavioural control, they are about different types of behaviour and have different relations with the other variables in the RISP model. PBC, as part of Hazard Characteristics, directly influences information sufficiency (mediated by affective responses such as worry), while perceived information gathering capacity moderates the relationship between sufficiency and information seeking intent.

In the FRIS model of ter Huurne (ter Huurne, 2008), self-efficacy pertains to the extent to which a person thinks he can control the risks. In other words, 'self-efficacy must also refer to the core of the risk-issue itself (i.e., the ability of the provided risk information to enable the person to deal with the danger while staying safe)' (ter Huurne, 2008, p.40). Protection Motivation Theory (Maddux & Rogers, 1983) makes another division, claiming that efficacy beliefs are concerned with 1), self-efficacy: the ability to successfully perform protective behaviour (knowing how do it) and 2) response-efficacy: the confidence that this behaviour has actually protective instrumentality (knowing what to do) (Stewart, 2009). However, one could reason that knowing what to do is necessary before even having beliefs about being able to perform these behaviours; a person can not have beliefs about protective actions that he or she is not aware of and does not have any knowledge about. Therefore, here I am concerned with beliefs about knowing how.

Based on these slightly confusing conceptualisations, I feel the need to reconceptualise self-efficacy about perceptions of being able to protect oneself against adverse consequences from risky situations as 'Protection Efficacy'. Being concerned with how well one thinks he or she can handle risky situations is influencing one's need of information and affective responses (ter Huurne, 2008). A person with beliefs that he or she is not able to protect oneself is likely to look for more risk related information than a person who is confident about accurate protective behaviour. Also, lack of beliefs about knowing how to appropriately perform protective actions can induce worries about adverse consequences of the risky situation. Thus, Protection Efficacy is likely to influence the information seeking processes in risky situations. In the context of severe weather, seeking or avoiding information about imminent severe weather events and how to deal with it is expected to be impacted by personal levels of beliefs about protective actions.

3.2.5 Perceived locus of responsibility

Related to perceived social pressures such as subjective norms are personal norms about certain behaviour (Ajzen, 1991). In a study about the influence of social norms on behavioural intentions, perceptions of moral obligations about unethical behaviour such as shoplifting were significantly improving the explanatory power of the TPB (Ajzen, 1991). As personal norms can be related to the content of the behaviour, they can also pertain to the instrumentality of performing behaviour. This approach is relevant for behaviour that is aimed at outcomes that are ethically 'valued', such as protecting people. In the context of environmental hazards (such as severe weather events, but also earthquakes, floods and other external hazards such as industrial hazards), a concept that is closely related to the instrumental focus of personal norms is perceived locus of responsibility. Perceptions of who is responsible for protecting people can be divided in internal (self) and external (others, such as government or other authorities) (Lalwani & Duval, 2000; Terpstra, 2010).

The history of risk communication displays a general assumption that individuals themselves are often incapable of assessing and handling environmental risks, hence depending on expert knowledge (ter Huurne & Gutteling, 2009). This resulted in top-down communication effort by authorities, educating people about risks and what to do to protect. How successful authorities are in communicating and protecting is reflected in the degree of trust people have in them. A study by Bockarjova (2009) explored locus of responsibility for protecting against floods in The Netherlands. She concluded that people's locus of responsibility is influenced by trust in authorities, in a way that trust can motivate or constrain the relationship between perceived personal responsibility and intention to prepare for flood risks. This is also found in several other risk communication studies (see also Griffin, et al., 2004). Likewise, perceived responsibility appears to influence people's protective action behaviour (Lindell & Perry, 2004; Mulilis & Duval, 1997; Terpstra, 2010), while attributions of responsibility on their turn are induced by a combined assessment of a threat in relation to perceived efficacy to respond to the threat (Lalwani & Duval, 2000; Terpstra, 2010). This notion is derived from the Person relative to Event model (Mulilis & Duval, 1997).

Indeed people differ in their locus of responsibility for protection when confronted with environmental hazards (Baron, et al., 2000). Stewart (2009) gives some examples of studies that identify the complex role of perceived locus of responsibility in the case of hurricanes. People found themselves willing to evacuate when advised to do so by the government, but also thought it is one's own responsibility to evacuate. This may reflect that people are unaware of and underestimate risks, while they overestimate their efficacy to cope with hazardous situations (Mileti, 1999, in: Stewart, 2009). In the context of flood risks in The Netherlands, Terpstra (2010) studied responsibility perceptions, finding that 75 percent of the people think that the government is responsible for protecting people from flood damage.

Also, he found that the majority of people accept a personal responsibility in flood protection. Terpstra explains this interesting finding by a sense of moral obligation governments have to protect the public. However, moral intuitions appear to be independent of one's own behavioural context (Terpstra, 2010).

Internal locus of responsibility for protection was found for risks that were perceived to be personally controllable such as tornadoes, lightning but also house fires (Baron, et al., 2000). The opposite was found for personally uncontrollable risks such as asteroids, airplane accidents and new diseases. Interestingly, when risks were found to be controllable by both government and individuals, governments were held responsible for controlling (i.e., protecting the public against) the risks (this included hurricanes). As weather related phenomena appear in all three groups, it remains unclear how perceived locus of responsibility for protecting against weather related risks affects the process of information seeking.

Just like the locus of responsibility varies between people, Lindell and Perry (2004) state that responsibility perceptions vary across threats. Unfamiliarity with a threat may result in external locus of responsibility. This is important in the tourism context, since tourists generally find themselves in unfamiliar environments, with risks they are unaware of, or for which they do not know how to protect themselves. Moreover and on a practical note, Lindell and Perry (2004) claim that varying perceived loci of responsibility for protection can pose serious problems in hazardous circumstances, so that 'environmental hazard managers need to identify any audience segments that lack a sense of personal responsibility for protection or self-efficacy for adopting hazard adjustments. Any groups that are low on these characteristics should be targeted for special attention during the implementation of the risk communication program' (p.193).

Issues about responsibility touch on discussions concerning developments in the 'risk society'. This term, introduced by Ulrich Beck (Beck, 1992, in: Beck, 2002) signifies how risk has become a part of our lives and has made its way into our society. In this society that is ruled by fear rooted in increased levels of uncertainty, knowledge has become an important product. Knowledge and information are seen as the tools to reduce uncertainty and products are 'traded' (Stevens, 2009) by complex communication processes. Beck states that the roles of governments and authorities as protecting and information providing institutions are becoming more unstable. In this context of uncertainty, perceptions of the government's responsibility to guarantee the safety of the public are changing and governmental versus individual responsibility for risk protection are questioned related to all types of hazards (from terrorism to environmental hazards) (Stevens, 2009). She states that responsibility questions are taken into the political domain, by governments who put responsibility in the hands of civilians, 'trying to induce perceived readiness and

preparedness and to create a false feeling of control and power over the risk' (p.23). Although this discussion goes beyond the scope of this thesis, it signifies the importance of locus of responsibility in public safety issues and links the subject of the thesis with processes in contemporary (Western) societies.

In the weather context, national (governmental) meteorological institutions often are responsible for assessing weather hazards and communicating possible severe weather event information (in the form of warnings) to the public. However, legal responsibility for protection advice generally is beyond this responsibility (Scott and Lemieux, 2009). Also, a clear demarcation has to be made between responsibility for informing and responsibility for protection. While the first type is preventive (no present risk), the second one pertains to protective actions in hazardous situations (present risk). Here, the interest is in perceptions of responsibility to protect tourists in case of severe weather situations.

At the moment, it is unclear how perceived loci of responsibility for protecting tourists are influencing tourist risk information seeking. Tourist companies are generally seen as having a responsibility to ensure tourist safety (Johnston, et al., 2007), but responsibility is divided by several organisations and institutions (Walker & Page, 2004). For tourists themselves, besides their own perceptions of responsibility, this adds to the diffuse picture of responsibility issues when on a holiday. In environments that potentially pose tourists at risks such as severe weather, confusion about responsibility issues can have severe consequences. This thesis includes locus of responsibility for protection as a variable of study, intending to shed some light on the situation.

Evidence that perceived locus of responsibility has a two-way relation with information sufficiency comes from Lalwani and Duval (2000), whose study indicates that when circumstances apply to self attribution of responsibility, this is only done so when there are sufficient resources (e.g., knowledge) to perform the behaviour. The relationship was also found to count for the other direction, which highlights the possible impact perceived responsibility can have in the process of information seeking; when people see themselves as not knowledgeable or capable to handle a hazardous situation, they are more likely to attribute responsibility for protection to an external source This relationship was confirmed in the risk context by Terpstra (2010). Here, based on the literature described above, locus of responsibility for protection is included as a variable in the conceptual model on an exploratory basis. Better knowledge about its possible role in information seeking and processing can give important insights for severe weather risk management.

3.2.6 Issue involvement

The concept of issue involvement is relatively new to risk communication research (ter Huurne, 2008). According to her, involvement pertains to a personal interest stemming from a perceived relevance of situational circumstances for one's own life and well-being. Lindell and Perry (2004) already stated that 'perceived relevance of a risk, and personal involvement with it, motivates people to think more extensively about risk communication messages' (p.30). However, an 'in depth understanding of antecedents of issue involvement remains somewhat elusive' (ter Huurne, 2008, p.139). So, further exploration of this concept is needed in the risk context. Involvement has been found to impact on both affective responses and information sufficiency. High levels of issue involvement as framed by ter Huurne (2008) resulted in stronger affective responses and lower levels of information sufficiency.

Measures of issue involvement might be relevant in the context of severe weather information seeking. While a certain level of risk (both in terms of probability of occurrence as outcome risk) is always present, it can be assumed that the default weather conditions (weather that is not defined by warning issuing authorities as being severe) should not put people at risk for adverse consequences in terms of safety or property damage. Knowledge about the degree of issue involvement in those 'normal' circumstances is important to get a 'point of departure' for information seeking.

Being interested in potential risks might not only be coming from negative perceptions. They can also provide certain rewards, based on the assumption that risks are tolerated and even enjoyed to a certain extent. This approach is reflected in a model that Adams (1995) calls the Risk Thermostat, explaining why people perform risky behaviour, taking into account perceptual filters of cultures, rewards and costs. Issue Involvement reflecting an interest in severe weather originating from this perspective can also increase a need for more information, just because of being interested in severe weather phenomena. In line with the FRIS model, in this study the associations of issue involvement with affective responses (worry) and information sufficiency are taken in to account. However, since this thesis is set in a different context, the concept is included on an exploratory basis.

3.3 Models of information seeking behaviour

Having described a number of concepts that are expected to be relevant in the context of severe weather information seeking, now I turn to models that have applied them before, in different settings if environmental risks.

3.3.1 The Risk Information Seeking and Processing model

Developed by Griffin et al. (1999), the Risk Information Seeking and Processing model (RISP) is one of the first models that 'concedes to the recently changing views on public responses to risks and risk communication' (ter Huurne, 2008, p.21) and is oriented at the

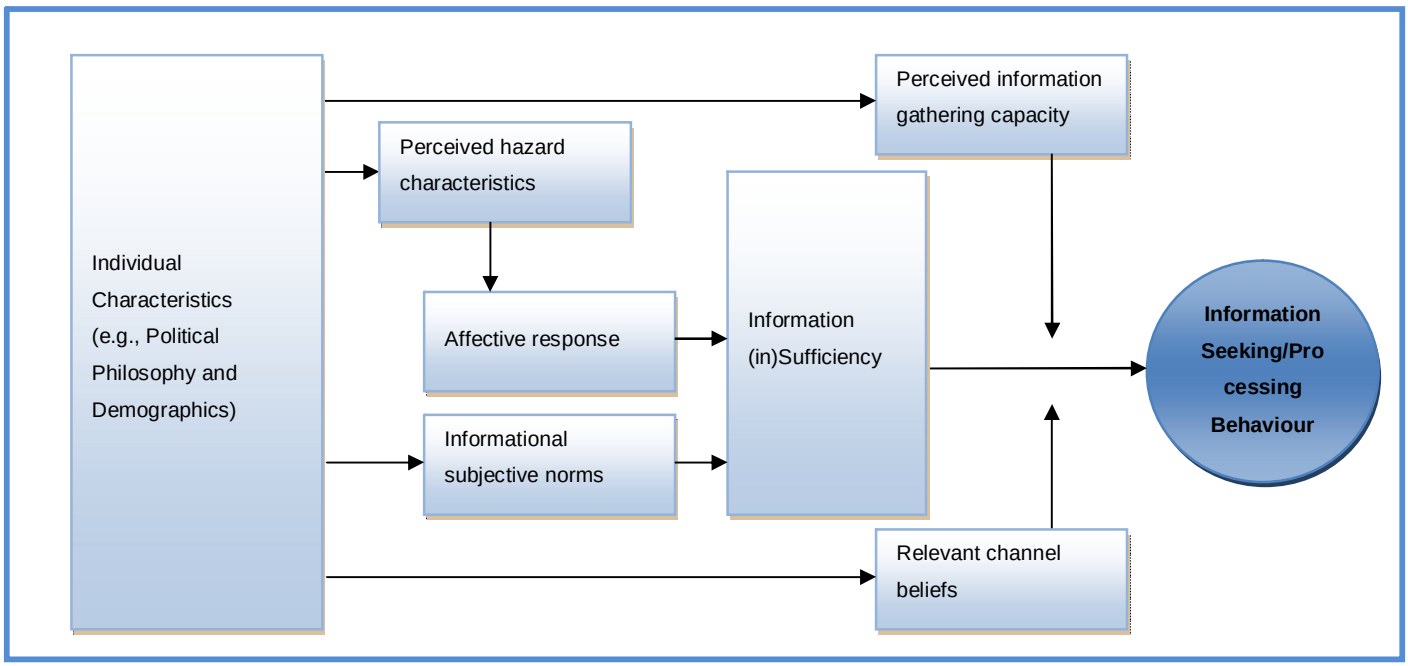


Figure 3.3

The Risk Information and Processing Model (Griffin, et al., 1999)

receiver of risk information in a variety of settings. It states that a person's perceived need for risk information is influenced by subjective norms about information seeking and affective responses such as worry. The need for risk information is conceptualised as a certain degree of information sufficiency, resulting from the cognitive awareness of a discrepancy between current knowledge and needed knowledge about how to protect against certain risks. Next, it is claimed that the information sufficiency is directly related to the intention to seek or process more information about the topic, while this relationship is influenced by beliefs about the information channels and by the extent to which the person thinks he or she is able to gather the needed information. The indirect variables influencing the proposed relationships are hazard characteristics (e.g., hazard severity and likelihood), personal

control of coping with the hazard and trust in protecting institutions, all influencing the affective response. Figure 3.3 displays the RISP model.

The model is mainly based on the assumptions of the Heuristic-Systematic Model (HSM, Eagly & Chaiken, 1993) and Ajzen's Theory of Planned Behaviour (Ajzen, 1991). Eagly and Chaiken's 'sufficiency principle' (Eagly & Chaiken, 1993; ter Huurne, 2008), claims that persons need a certain level of knowledge to be confident that the possessed knowledge is enough to handle the risk situation. The RISP model is tested in a number of settings with moderate to good results. Griffin et al. (2004) further explored the concept of information sufficiency in the context of food poisoning in two Great Lake areas. They found, as proposed by the RISP model, that subjective norms and affect (worry) were strong predictors of information sufficiency.

In line with the abovementioned merge of the TPB concepts with the more risk specific RISP concepts are recent findings suggesting that the anteceding concepts of information sufficiency, affect and subjective norms, are directly related to behavioural intentions (ter Huurne, 2008; ter Huurne, et al., 2009). Ter Huurne, in her thesis about risk information seeking behaviour related to industrial risks, developed a promising framework, the Framework for Risk Information Seeking, which is explained below. In sum, the RISP model is a very useful framework to study risk information seeking behaviour. Yet, given the model being relatively new, and the continuous adaptation and development of the model by several authors, additional research is needed in order to strengthen the robustness of the RISP model, for example by employing it in varying risk settings.

3.3.2 The Framework for Risk Information Seeking

The Framework for Risk Information Seeking (Figure 3.4) brings together several factors that influence how and if people seek or avoid risk information (ter Huurne, 2008). As stated by Stevens (2009, p.153), the FRIS 'incorporates the audience or receiver-based perspective of risk communication and (…) incorporates guidelines for connecting the underlying processes of responses to risk-related information'. Based on the RISP model of Griffin et al. (1999), it claims that risk perceptions, affective responses, subjective norms, self-efficacy and information sufficiency predict the intention of a person to seek or avoid risk related information. Ter Huurne also recognises another intention predicting concept, involvement, which emphasises a person's interest in, relevance or salience of a risk related topic.

The most important finding is that next to the perceived information gap, emotions and social context directly influence information seeking behaviour. In other words, in order to embark upon information seeking (or avoiding), a perceived lack of information is not

always a necessity, since the behaviour can be induced directly by affect or social pressures. This is supported by previous research (Loewenstein, et al., 2001).

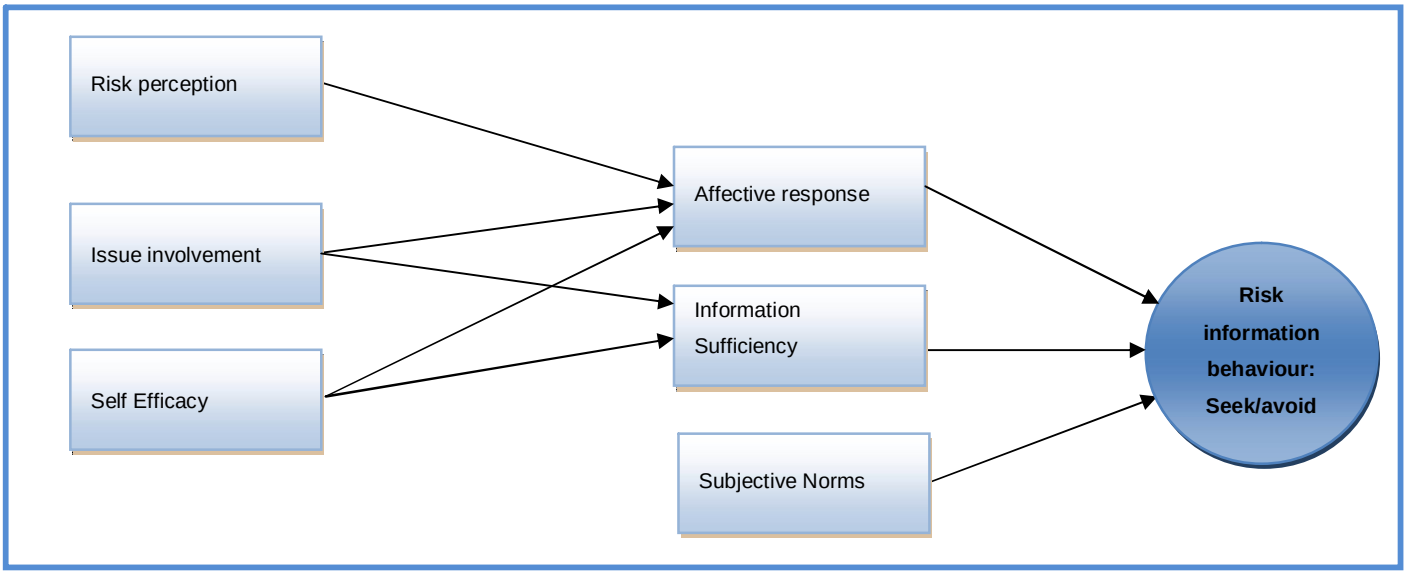


Figure 3.4

The Framework for Risk Information Seeking (ter Huurne, 2008)

Likewise, empirical findings, although rather small in number, tend to support the propositions of FRIS at least partially (ter Huurne, 2008; ter Huurne, et al., 2009), therefore meriting further exploration of the suggested relations between the concepts.

As becomes clear, the original relations between affective responses such as worries, subjective norms and information sufficiency as suggested by the RISP model, are replaced by better fitting direct relationships with the dependent variable, information seeking. The RISP model then seems to return towards one of its basic theoretical frameworks, the Theory of Planned Behaviour (Ajzen, 1991). Based on this line of reasoning, Kahlor (2007, 2010) studied the additional value of the TPB concepts in terms of explained variance of risk information seeking intent in an augmented RISP model. This resulted in a new model, the Planned Risk Information Seeking Model, which is described below.

3.3.3 The Planned Risk Information Seeking Model

A very recent study (Kahlor, 2010) proposes a Planned Risk Information Seeking Model, based on the RISP, TPB and a number of other information seeking and processing models, mostly used in health communication. The study was inspired by a previous study (Kahlor, 2007), where she tested an augmented RISP model in the context of environmental risk information (global warming). Her main finding was the very strong direct relationship between subjective norms about information seeking and behavioural intent. This

relationship was also found by ter Huurne (ter Huurne, 2008). In another setting (health risk information), Kahlor (2010) replicated her initial attempt, testing several relationships between the concepts of RISP and TPB (see figure 3.5). Explained variance in behavioural intent to look for health related information was higher than the RISP and TBP explained separately. Several significant associations were found. First, intention appeared to be directly influenced by affect (a concept not present in TPB, but in the Extended Parallel Processing Model (Witte, 1998, in Kahlor, 2010)), as opposed to the RISP's assumption that

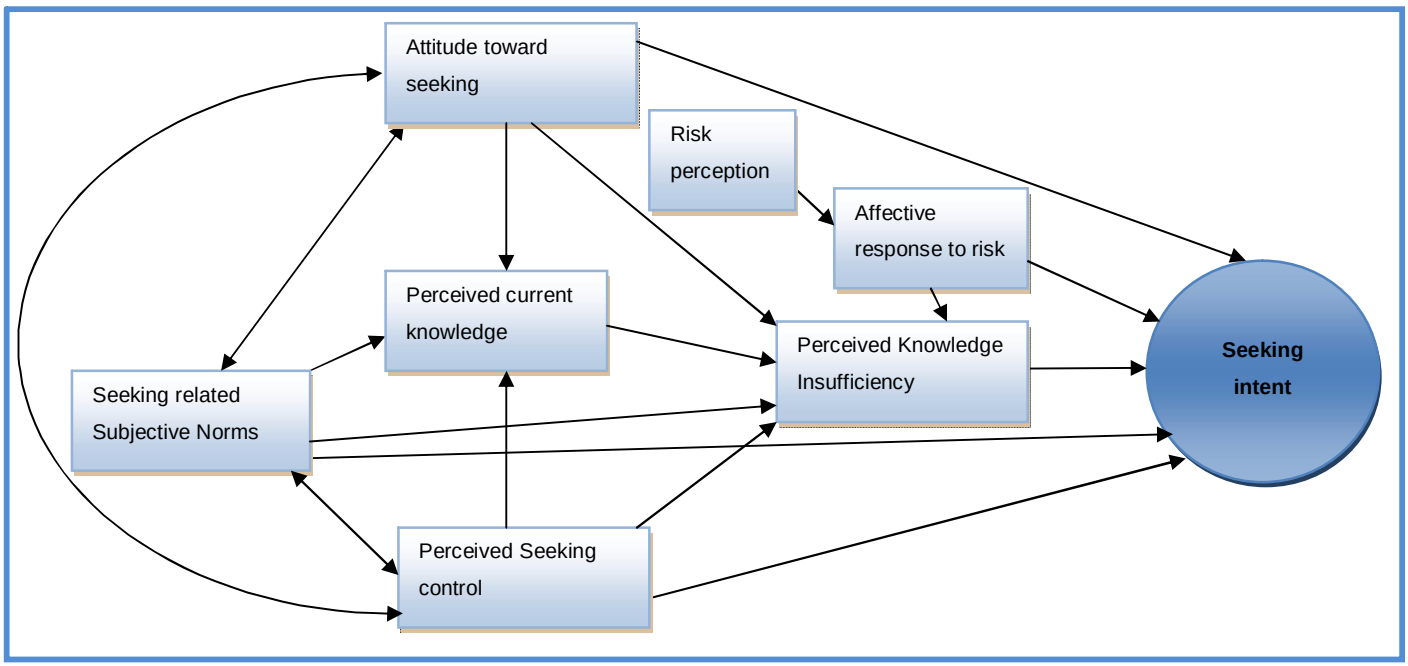


Figure 3.5

The Planned Risk Information Seeking Model (Kahlor, 2010)

this relationship is mediated by sufficiency. This result is in line with other findings (ter Huurne, 2008; ter Huurne, et al., 2009). Second, as found in several other studies (Kahlor, 2007; ter Huurne, 2008; ter Huurne, et al., 2009), subjective norms had a strong direct relationship with intent to seek information. Third, attitude towards information seeking were found as a significant predictor of behavioural intent. One drawback was the lack of significant association between information sufficiency and seeking intent. This was explained however by the nature of information, health risks, that was perceived to be sufficiently available on the internet and other media, therefore resulting in people having a very high level of information sufficiency and not needing additional risk information. Also, the study focused on general health risks instead of more specific risks, therefore possibly constrained by a lack of urgency to find general health information. In sum, PRISM provides an interesting new approach to risk information seeking, and the relationships found that go beyond the RISP model are worth taking into account.

3.4 Research questions and hypotheses

This thesis aims to link theory and empirical findings about information search antecedents in the context of travelers' weather perceptions in New Zealand. Based on the empirical findings of studies that employed the Risk Information Seeking and Processing model of Griffin et al. (2004) and the Framework for Risk Information Seeking of Ter Huurne (2008), a conceptual model is developed (Figure 3.6) to explore the relationships between relevant concepts in the context of severe weather. A new concept was added, perceived locus of responsibility, that did not have a place in the abovementioned models. Significant influence of locus of responsibility was expected however, in the process of severe weather information seeking.

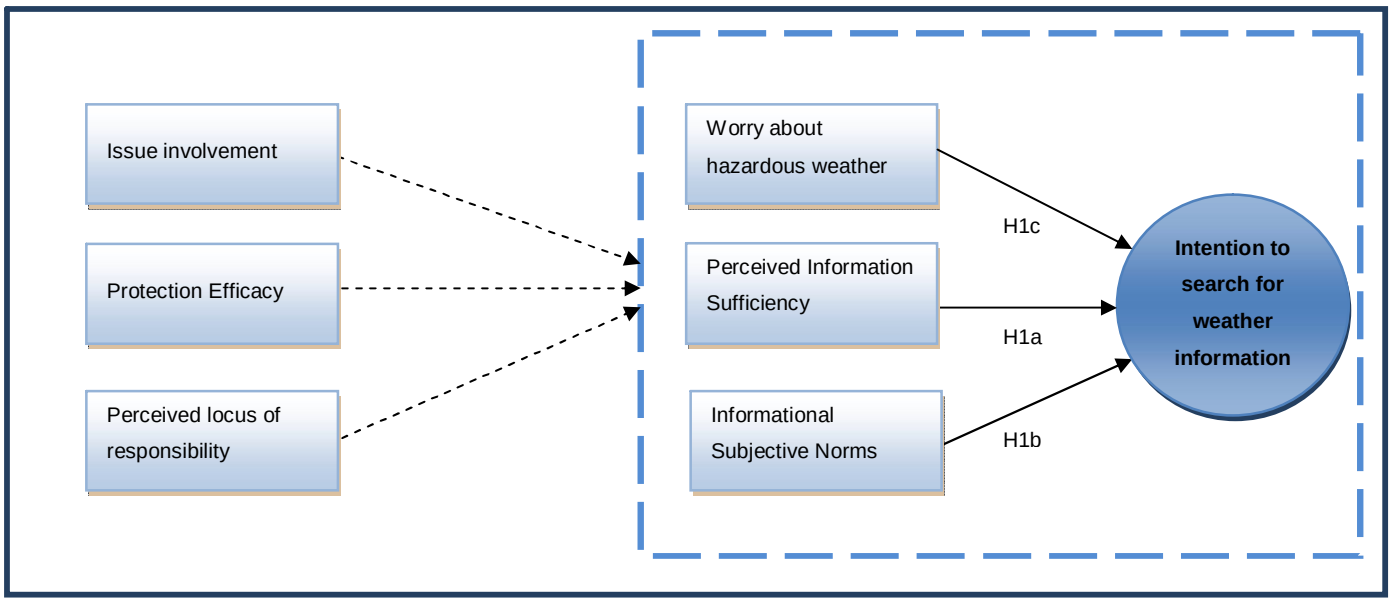


Figure 3.6

Conceptual Model for Severe Weather Information Seeking

Main research question: To what extent do Worry, Informational Subjective Norms and perceived Information Sufficiency predict the Intention of weather information seeking?

In line with the F.R.I.S. model, the following hypotheses are tested:

1. *a) Perceptions of Information Sufficiency are expected to be negatively related to Intention to search for information.*

   b) Subjective Norms are positively related to Intention.

   c) Higher levels of Worry are expected to result in a higher Intention to search for severe weather information.

Exploratory research question: How do Issue Involvement, Protection Efficacy and Locus of Responsibility relate to the core-model's variables?

Based on the findings of Ter Huurne (2008), I expect a direct relationship between Issue Involvement and Information Sufficiency and between Protection Efficacy and Information Sufficiency:

2. *a) Issue Involvement is negatively related to Information Sufficiency (and consequently positively related to information insufficiency).*

   b) Protection efficacy is positively related to Information Sufficiency (and consequently negatively related to information insufficiency).

Next, based on findings from (Terpstra, 2010) and (Lalwani & Duval, 2000), it is expected that perceived Locus of Responsibility is associated with Information Sufficiency in a way that:

c) Internal Locus of Responsibility relates to higher levels of Information Sufficiency, while an External Locus of Responsibility results in lower levels of Information Sufficiency.

The expected importance of Worry in explaining Intention to perform behaviour is rooted in the Risk as Feelings approach (Loewenstein, et al., 2001; Slovic, et al., 2004). In its turn, high levels of Issue Involvement have been found to induce Worry (ter Huurne, 2008). This association is tested in the context of severe weather, so that:

3. *a) Higher levels of Issue Involvement result in higher levels of Worry.*

Next to the expected direct effect of Protection Efficacy on Information Sufficiency, it is expected that Protection Efficacy influences levels of Worry one has about possible severe weather situations.

b) Protection Efficacy is negatively related to Worry.

4. Methodology

This chapter entails a description of the research setting, the procedure used to collect the data and response rates. Also, an overview of demographics is given, followed by item and scale constructions, including factor analyses and reliability measures.

A printed survey (a5 format) was developed, with scales measuring the concepts mentioned in Chapter 2. Also, a number of demographic variables were included, such as country of origin, age, sex, holiday duration and mode of transport. Since some scales, although based on previous research, were adapted to the context of severe weather and tourists or newly developed, a small online survey was distributed in order to test for scale reliability and possible measurement difficulties[2]. Although Cronbach alphas were sufficient ($\alpha \geq .6$), a number of revisions were made in order to improve scale quality and item comprehensibility. For scale composition, used items and reliabilities of the final survey, see section 4.3.

4.1 Research location

Three research locations were chosen, based on the reasoning that 1) many independent travelers tend to come there and spend significant amounts of time around the locations, 2) the nature of the locations allows approaching possible respondents, and 3) the locations are in areas that are prone to rather changeable and regularly severe weather such as heavy rainfall and windstorms. The locations include:

- Passenger terminals and ferry of Interislander. This company maintains services between Wellington on the North Island and Picton on the South Island. The ferry is used by many tourists with an itinerary that covers both North and South Island. The sailing takes around three hours, hence there was plenty of time to approach tourists enabling them to fill in the survey. During five days fieldwork was conducted here.
- The car park in front of the Department of Conservation (DoC) centre in Franz Josef and the car park at the start of the walking track to the Franz Josef glacier. Being a village near the Franz Josef glacier on the West-Coast of the South Island, it is frequented by many tourists who visit the glacier. The DoC centre is functioning as tourist information centre, including official source of weather information for outdoor activities. Four consecutive days of surveying were conducted here.
- The i-Site information centre in Wanaka. Just like Franz Josef, Wanaka is a popular tourist village, mainly due to its surrounding environmental attractions and outdoor

[2]Scales that were pre-tested were 'Information seeking intention', 'Informational Subjective Norms', 'Issue involvement' and 'Information sufficiency'.

activities tourists can undertake. It is located in a parking lot next to Lake Wanaka and therefore is very suitable to approach tourists. On five consecutive days fieldwork was conducted here.

All locations were visited during the spring season from mid November to early December 2010 (see Figure 4.1for geographic locations).

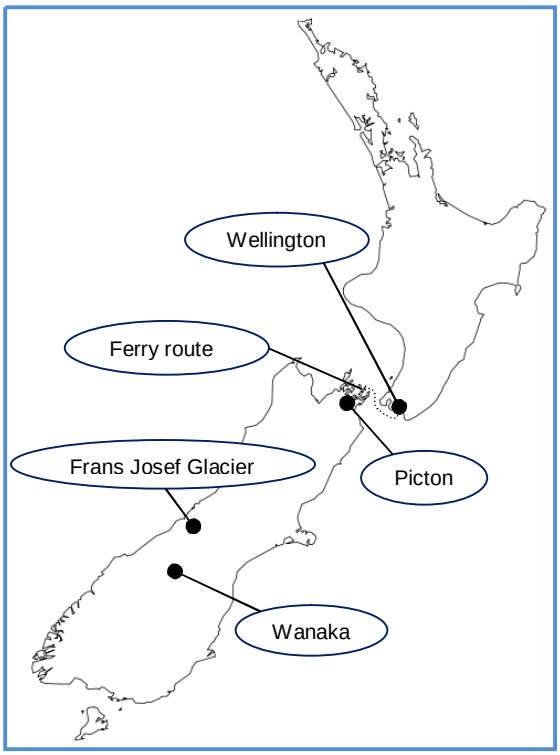


Figure 4.1

Research Locations

4.2 Respondents

People that appeared to be tourists were approached and asked if they were on a holiday. If they responded positively, they were asked to fill out the survey, which was handed over to them. The survey was written in English. During the approach an estimation of respondent's English language fluency was made by the researcher, in order to avoid response bias (and confused respondents). Approached people that had major linguistic difficulties answering the posed questions were thanked for their time, but no survey was handed over to them.

A total of 424 respondents were approached, to whom 414 surveys were handed out. Generally, the approached tourists were very much willing to participate, yet some refused. A small number of surveys handed out got lost or were returned incomplete, leaving 402 usable surveys for the analysis. The response rate thus was 94,8 percent. See Table 4.1 for an overview.

Table 4.1

Response Rates

Location	Handed out	Completed	Refused / language	Incomplete	Lost	Total	*Response rate*
Wellington	217	211	4	2	4	**221**	***95,5%***
Franz Josef	87	85	3	0	2	**90**	***94,4%***
Wanaka	110	106	3	4	0	**113**	***93,8%***
Total	414	402	10	6	6	**424**	***94,8%***

Respondents were between 16 and 70 years old (*M*=33.28, *SD*=13.99). However, most respondents were 40 years old or younger (76.4%), resulting in a positively skewed sample. While per country most of the respondents were from the youngest age group, this was not the case for tourists from The Netherlands (39.4%) and Switzerland (54.5%). Tourists from these countries were mostly between 26 and 40 years old. See Appendix 1 for an extensive summary of the demographic descriptives.

Table 4.2

Mostly Used Transport

	n	***%***
Car	174	*43.3*
Campervan	125	*31.1*
Bus, hop on hop off	39	*9.7*
Bus, public transport	23	*5.7*
Bus, package tour	22	*5.5*
Bicycle	8	*2.0*
Train	1	*.2*
Other	5	*1.2*
Missing	*5*	*1.2*
Total	402	*100.0*

Table 4.3

Type of Accommodation

	n	***%***
Camping in tent	40	*10.0*
Camping in campervan	127	*31.6*
Hotel/motel/hostel/B&B	227	*56.5*
Other	7	*1.7*
Missing	*1*	*.2*
Total	402	*100.0*

About three out of four tourists that completed a survey travelled by car or campervan (Table 4.2). Likewise, a large group (31.6%) used their campervan (or car) as accommodation. So called ‘hop on hop off’ buses, typically aiming at younger tourists, were indeed only used by the younger respondents. Younger tourists used a wider variety than the older groups, who were mainly using a car or campervan to get around (98.1%). Ten percent of the respondents used a tent to stay in. Yet, most respondents (56.5%) said to be sleeping in a hotel or hostel type of accommodation (Table 4.3).

Average length of holiday was nine weeks (*SD*=13.21). Length of holiday was divided in short (up to two weeks), medium (three to five weeks) and long (six weeks or longer)

(Figure 4.4). Most long stay visitors were relatively young, reflecting the 'backpacker' segment of the sample. Long-stay respondents consisted for a large part of German tourists (28.4%). Interestingly, of the German tourists, almost half (48.8%) said to be staying six weeks or longer, while of the tourists from the United Kingdom this was only 23.0 percent. See also Appendix 1.

Table 4.4

Holiday Duration Distributed per Age Group

	Holiday duration					
	Short (<2 weeks)		**Medium (3-5 weeks)**		**Long (>6 weeks)**	
Age	*n*	*%*	*n*	*%*	*n*	*%*
<25	20	*32.3*	56	*28.4*	80	*38.8*
26-40	28	*45.2*	81	*41.1*	42	*37.6*
41-55	7	*11.3*	28	*14.2*	5	*10.0*
>56	7	*11.3*	32	*18.2*	16	*13.7*
Total	62	*100.0*	197	*100.0*	143	*100.0*

4.3 Scale measures

Intention to seek information (α=.79) was measured with four items. The scale was adapted from ter Huurne (2008) and only measured intention to seek information, as opposed to the original scale, that also measured intention to *avoid* information. Respondents were asked how likely they would perform certain actions in order to protect themselves against harm from severe weather (e.g., 'search for information that helps you to be prepared'). Asking for expected likelihood of performing certain behaviour in order to measure intentions has been used in previous research (Neuwirth, et al., 2000). Moreover, according to the Theory of Planned Behaviour, intention to perform certain behaviour is a proxy of the likelihood to actually perform this behaviour (Ajzen, 1991).

Informational subjective norms about seeking severe weather related information was measured with two items, that appeared to correlate highly (r=.42, p<.001). The two items were adapted from Ter Huurne (2008) and Griffin et al. (2004).

In previous studies a number of ways to measure Information sufficiency (or *in*sufficiency) have been used (Eagly & Chaiken, 1993; Griffin, et al., 2004; Kahlor, et al., 2006; Trumbo, 2002). This method, originally employed by Eagly and Chaiken (1993), where information insufficiency was measured by the difference between scores on two self-rating scales for current knowledge and needed knowledge, has some analytical disadvantages, however. Also, the indirect measure of sufficiency appeared to be difficult to estimate

correctly by respondents (see ter Huurne, 2008, p.140). Therefore, in this study a three item scale (α=.83) was used adapted from Ter Huurne (2008), which directly measured Information sufficiency. Example of an item is 'I am satisfied with the amount of knowledge I have about how to protect myself when the weather turns bad'.

Worry about severe weather was measured with a self constructed scale. Based on the Tourist Worry Scale from Larsen et al. (2009), worries about several types of severe weather were measured. By measuring worry about specific types of severe weather, it was intended to be able to discern between different sources of worry (i.e., different types of severe weather), and at the same time get a calculated, more general severe weather worry

Table 4.5

Factor Loadings per Item for Severe Weather Worry

	Factor 1	***M(SD)***
I worry that I might suffer from severe wind	.75	*2.57 (1.03)*
I worry about a severe thunderstorm occurring	.73	*2.31 (.94)*
I worry about being affected by heavy rainfall	.70	*2.81 (1.09)*
I worry that I might be affected by heavy snowfall	.69	*2.17 (1.02)*
I worry that dense fog might limit my sight	.67	*2.72 (1.08)*
I worry about a tropical cyclone occurring when I am around	.63	*2.12 (.94)*
N		*397*
Alpha		*.79*
Explained variance		*48.4%*

measure. Also, a number of other natural hazards such as a strong earthquake and a landslide were included as possible sources of worry, for exploratory measures. In total ten items were measured. Six of them reflected types of severe weather and were based on the severe weather warning categories of MetService[3]. A Principal Component Analysis was used to identify a consistent scale that measures severe weather Worry. Indeed, a one factor solution was found, explaining 48 percent of the variance. See Table 4.5 for factor loadings.

The same type of items (with different wording) was used to measure Protection Efficacy against severe weather consequences. Respondents were asked how easy or difficult they thought it was to protect themselves from damage or harm caused by the different types of severe weather. Again, some other natural hazards were added as well. Although the PCA (43 percent of variance explained) presented one item (Tropical cyclone) to load rather low, it was not removed from the scale (α=.73), since internal consistency of the scale did not suffer significantly from it. See Table 4.6 for factor loadings.

[3] See: http://www.metservice.com/national/warnings/index

Table 4.6

Factor Loadings per Item for Protection Efficacy

	Factor 1	***M(SD)***
Severe wind	.79	*3.15 (.98)*
Severe thunderstorm	.68	*2.73 (1.14)*
Heavy rainfall	.72	*3.74 (.99)*
Heavy snowfall	.65	*2.87 (1.11)*
Fog	.72	*3.48 (1.14)*
Tropical cyclone	.45	*1.97 (.94)*
N		*384*
Alpha		*.73*
Explained variance		*43.3%*

Issue Involvement was measured with three items. The items were adapted from Ter Huurne (2008) and asked whether respondents were interested in potential risks of severe weather, if they thought it was important to be familiar with severe weather risks and if having information about severe weather risks in New Zealand was important to them. Internal consistency appeared to be good (α=.80).

Locus of responsibility for protecting tourists from the possible consequences of severe weather was measured with one item. While previous studies (Lalwani & Duval, 2000) on locus of responsibility measured this with two items (i.e., measuring internal and external responsibility indirectly, as two separate concepts), here a scale was used where the two scale ends reflected external and internal locus of responsibility. Hence, this way LR was directly measured, with advantages similar to the reasoning behind the Information Sufficiency scale. Also, when respondents indicated LR as being somewhere in the middle, this was directly visible from their answer. The scale ranged from 1 to 7, where 1 indicated that respondent was fully responsible himself (internal LR) and 7 indicated that respondent thought New Zealand authorities were fully responsible. Also, respondents indicated for a number of agents to what extent they found them to be responsible for making sure that tourists stay safe in case of severe weather during their holiday in New Zealand. They could answer on a Likert type scale from 1 to 5 (1, not at all responsible; 5, extremely responsible).

Next to the concepts to measure the proposed model to seek severe weather information, two additional sets of questions were included in the questionnaire. These questions measured information preferences and aimed at both source and type of severe weather information. Knowing where tourists seek information and what kind of information they look for is necessary to give the conceptual model practical functionality. Respondents could tick which sources of information they would use to inform themselves about severe

weather and the possible risks that might come from it. Also, several types of information could be rated on a 5 point Likert scale (1, not important at all; 5, extremely important), that measured perceived importance for being able to protect him/her self against severe weather in New Zealand. Fifteen items were included (plus one 'other' item, to enable respondents to suggest another type of information). Eight items measured meteorological characteristics such as temperature, wind speed and amount of precipitation. Two items focused on temporal and spatial information, two items focused on possible consequences of the weather, and three items intended to measure communication information such as survival advice. Data were used for exploratory measures.

Analysis was done with PASW 18, a commonly used statistical software package for the analyses done in this research. To test the predicted relations between the concepts of the model, Pearson correlations and (hierarchical) regression analyses were executed. Testing of significant group differences was achieved by conducting ANOVA's. A complete list of used items can be found in Appendix 2. Unless specified otherwise, all scales were measured with 5-point Likert scales.

5. Results

5.1 Descriptive statistics

Table 5.1 presents the mean scores and standard deviations of the variables used in the model. Highest scores were on Intention and lowest on Worry about severe weather. Worry and Locus of Responsibility were the variables on which respondents scored lower than the scale average. Scores on Locus of Responsibility displayed a higher standard deviation than other variables, which is logical on a wider scale range. The mean scores suggest that respondents have moderate to high intentions to seek information. Also, they appear to think that their social environment values them looking for information about severe weather during their holiday. Next, respondents are moderately involved, are moderately happy with their information about severe weather and estimate their ability to stay safe in severe weather situations to be on an average level. Finally, they appear to worry relatively little about severe weather risks and they tend to think that it is mainly their own responsibility to stay safe from harm due to severe weather.

Table 5.1

Mean Scores and Standard Deviations

	n	***M***	***SD***
Information seeking intention	399	3.45	.81
Informational subjective norms	390	3.34	.71
Information sufficiency	394	3.19	.79
Worry	394	2.45	.71
Issue Involvement	399	3.25	.73
Protection Efficacy	388	2.99	.69
Locus of Responsibility	394	3.20	1.23

Scales range from 1 to 5, except Locus of Responsibility ranging from 1 to 7

In Table 5.2 the correlations between the seven variables of the conceptual model are displayed. According to expectations, Intention to seek severe weather information had a positive significant correlation with Informational subjective norms and Worry. However, unlike expectations, Information sufficiency appeared to be positively correlated with Intention. Also, a positive (unexpected) correlation was found between Intention and Issue Involvement. As predicted, Protection Efficacy was positively correlated with Information Sufficiency. On the other hand, no relation was found between Information sufficiency and Issue Involvement. According to the exploratory hypotheses, a negative correlation was found between Locus of Responsibility and Information sufficiency, a positive correlation

between Issue Involvement and Worry, and a negative correlation between Protection Efficacy and Worry. The (not predicted) correlations between Informational subjective norms and Worry and between Locus of Responsibility, Worry and Protection Efficacy, are addressed in section 5.4.

Table 5.2

Pearson Correlations

	1	2	3	4	5	6
1. Information seeking intention						
2. Informational subjective norms	.44***					
3. Information sufficiency	.11*	.07				
4. Worry	.24***	.23***	-.05			
5. Issue Involvement	.52***	.35***	.04	.23***		
6. Protection Efficacy	-.02	.02	.26***	-.24***	.00	
7. Locus of Responsibility	.01	-.02	-.23***	.12*	.04	-.20***

***(p<.001); *(p<.05)*

5.2 Predictors of severe weather information seeking

5.2.1 Intention to seek information

In order to test hypotheses 1a, 1b and 1c, a hierarchical regression analysis (Enter) was executed. In the first step Informational Subjective Norms, Information Sufficiency and Worry were included in the regression model to test for their ability to predict Intention to seek severe weather information (Table 5.3). As expected, Informational subjective norms and

Table 5.3

Hierarchical Regression Analysis of Informational Subjective Norms, Worry, Information Sufficiency (step 1) and Issue Involvement (step 2) on Intention to Seek Severe Weather Information

		R	R^2	β step 1	β step 2
Step 1	Informational subjective norms			.40***	.27***
	Worry			.18***	.12**
	Information sufficiency	.48	.23	.08	.06
Step 2	Issue Involvement	.61	.38		.41***

***(*p*<.001); **(*p*<.01), standardised Beta coefficients are displayed

Worry about severe weather had a significant positive relationship with Intention to seek severe weather information. Contrary to expectations, Information sufficiency did not predict Intention. The model explained 23 percent of the variance of Intention

($F(3,381)=38.33$, $p<.001$). These results suggest that the intent of people to inform themselves about possible severe weather during their holiday increases with increased perceptions that others expect them to do, but that they are even more likely to engage in information seeking when they are worried about severe weather too. Whether they assess their readily available information to be sufficient appears not to influence this intention.

In the second step Issue Involvement was added to the model (Table 5.3). Although not predicted, the strong correlation with Intention justifies testing this relationship, resulting in a significant improvement of the model. With both Informational subjective norms and Worry still being strong predictors of Intention too ($R^2_{change}=.14$, $F_{change}(1,380)=86,80$, $p<.001$), now 38 percent of the variance was explained. How interested respondents are in severe weather and related risks, how relevant they think these risks are for them is a strong predictor of information seeking intentions, when controlled for Worry and Informational subjective norms. Thus, Intention is predicted by Worry, Informational subjective norms and Issue involvement. All three variables add significantly to the explained variance of intention. Issue involvement reflects a general interest in (severe) weather, but (based on the correlations found, see Table 5.2) might also be induced by perceived expectations of others to be knowledgeable about it.

5.2.2 Information Sufficiency and Worry

Next, another regression analysis was done to test the exploratory hypotheses 2a, 2b and 2c (Information sufficiency predicted by Issue Involvement, Protection Efficacy and Locus of Responsibility. Since no correlation was found between Information Sufficiency and Issue Involvement, this variable was excluded from the analysis. The relationships were as predicted, with a significant negative contribution of LOR ($\beta=-.19$, $p<.001$), and higher scores on Protection Efficacy predicting a more sufficient level of perceived available information ($\beta=.21$, $p<.001$). These results suggest that people who think they are responsible themselves for staying safe in severe weather are happier with to them available information than people who have an external locus of responsibility. Also, respondents who think they are able to protect themselves from damage or harm from severe weather are more likely to be content with the information they have than people who think they are less well capable of staying safe in severe weather. However, only a small proportion of variance was explained ($R^2=.10$, $F(2,371)=19.74$, $p<.001$).

Third, a regression analysis was conducted to test exploratory hypotheses 3a and 3b. The ability of Issue Involvement and Protection Efficacy to predict levels of Worry about severe weather appeared to be significant and in the expected direction ($\beta=.23$, $p<.001$ and $\beta=-.24$, $p<.001$, respectively). Being interested in severe weather and finding severe weather

risks personally relevant appears to be accompanied by higher levels of Worry. Also, low estimations of Protection Efficacy are related with increased levels of worries about severe weather. Yet, as was the case with predictors of Information Sufficiency, the proportion of explained variance was relatively low (R^2=.11, $F(2,376)=23.38$, $p<.001$). In sum, all the hypotheses were confirmed, except hypothesis 1a and 2a. A graphical overview is shown in Figure 5.1. Next, in Figure 5.2 also other associations are displayed, and the conceptual model is modified based on these additional data. The additionally found associations are investigated further in section 5.4.

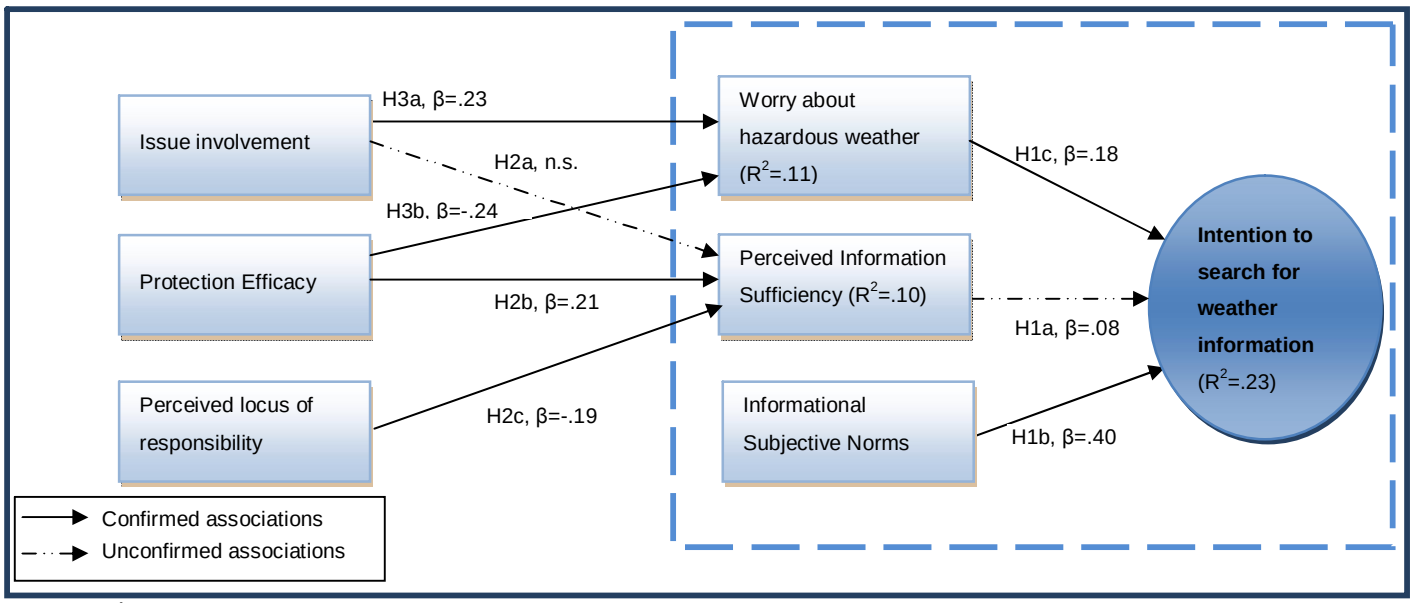


Figure 5.1

Relationships and Effect Sizes between Variables predicting Severe Weather Information Seeking

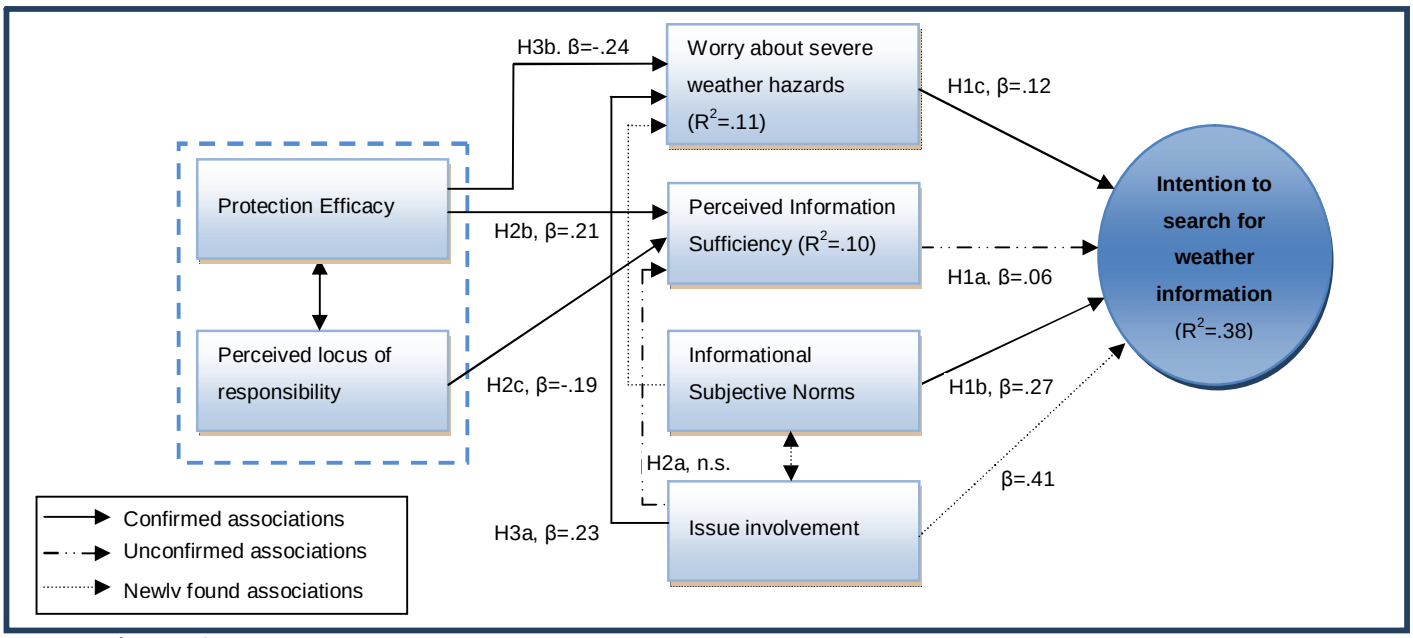


Figure 5.2

Relationships and Effect Sizes between Variables predicting Severe Weather Information Seeking

5.3 Information preferences

Information preferences were measured to complement the above findings in terms of source and type of information that tourists intent to seek. All of the sources given in the survey were (or would be) used by tourists in order to inform themselves about possible risks that might come from severe weather. However, as was to be expected, some were used by a larger group of respondents than others. Table 5.4 presents the number of times each source was ticked. Sources most often used were *locals*, the *i-Site information centre* and *television*, while for example the *police* and the *Land Transport New Zealand website* appeared to be used rarely. Locals were often mentioned as source of information by respondents from North America (71%) and Australia (57%). The i-Site information centre was stated to be used by the majority of respondents from Switserland (73%) and Asia/Middle east (79%). None of the respondents from New Zealand said to use the i-Site centre to inform themselves about severe weather and possible risks from it. Television was more often used by respondents older than 40 years, while the i-Site centre was relatively more popular among younger respondents (under 40 years). Visitor centres from the Department of Conservation, an important source of information in terms of area-specific conditions, including weather circumstances, were used by one-third of the respondents. Respondents from Anglo Saxon countries (USA, Canada, Australia and the United Kingdom) referred to television relatively often compared to respondents from other countries.

Table 5.4

Used Information Sources (n=399)

Source	***%***	***Source***	***%***
Locals	49.9	Other tourists	23.8
i-Site information centre	49.4	Department of Conservation website	18.0
Television	47.4	Tourism New Zealand website	18.0
My tourist guidebook	35.6	Family and friends	13.5
Department of Conservation centre	33.6	NZ Mountain Safety Council website	5.0
MetService website	32.6	Mountain Radio Service	3.5
Radio	31.6	Police	2.5
Newspaper	27.6	Automobile Association	2.5
i-Site information website	26.8	Land Transport New Zealand website	2.0

Next, perceived importance of type of information was calculated to shed light on the preferred content of information among respondents. The fifteen items covered four types of weather related information (meteorological characteristics, temporal/spatial information, severe weather consequences and behaviourial advice) and are presented in Table 5.5. Of

the meteorological information category, the predicted amount of precipitation, the highest and the lowest temperature were found to be moderately to very important. However, next to some meteorological characteristics, respondents stated that they find information about where and when the weather occurs, the possible impact of it and what they should do during severe weather to stay safe even more important. Four out of five respondents found information about possible consequences for traveling very to extremely important (item-scores 4 or 5). Also, contact information in case of an emergency appeared to be very to extremely important by over 75 percent of the respondents.

Table 5.5

Importance of Type of Weather Information

	M	***SD***	***% respondents found item to be very to extremely important***
Meteorological characteristics			
Amount of precipitation (rain, snow, hail)	3.36	*.92*	*50.2*
Forecasted lowest temperature	3.34	*.94*	*49.4*
Forecasted highest temperature	3.20	*.96*	*43.1*
Wind speed	2.94	*.93*	*28.1*
How temperature develops over time	2.91	*.97*	*28.5*
Wind direction	2.27	*.98*	*10.3*
Air humidity	2.07	*.93*	*5.6*
Air pressure	1.98	*.94*	*6.4*
Temporal and spatial information			
Where the severe weather if forecasted to occur	3.99	*.89*	*74.5*
How long the severe weather continues	3.98	*.83*	*75.9*
Impact information			
Consequences for travel/road conditions	4.12	*.86*	*81.5*
Possible consequences (power cuts, floods)	3.86	*.92*	*72.5*
Behavioural advice			
Who I should contact if I am in urgent need of help	4.11	*.93*	*76.1*
Advice about what I should do to be prepared	3.83	*.93*	*69.0*
Survival advice in case I get in a threatening situation	3.82	*.95*	*67.0*

1= not important at all, 2= slightly important, 3= moderately important, 4= very important, 5= extremely important

5.4 Additional exploratory analyses

The results presented above provide knowledge about how tourists seek information and which information they find important. Yet, in order to provide the right information and communication channels to the people who need it, it is essential to know which people are in need of information about severe weather. Some people are potentially more vulnerable to adverse consequences of severe weather than others. For example because of their lack of intention to inform themselves about potential risks when travelling through New Zealand. Additionally, some people do recognise they are in need of more information in order to be able to deal with severe weather and this can be reflected in a high intention to seek this information. It can be said that the only limit to the information to be provided should be with the tourists themselves. Identifying people with a high need for information is important too, for example for organisations such as visitor centres to be able to provide them with the information they seek. Building on the results presented above, this section first explores several groups of respondents that can be distinguished on demographic data. This segregation can give a more specific picture of potentially vulnerable groups, to which specific attention might be given by policy makers and risk communication institutions. Next, a division is made between people with varying scores on Locus of Responsibility and differences between groups with varying loci of responsibility are discussed. Finally, comparisons are made between several types of natural hazards for which measurements of Worry and Protection Efficacy were conducted, and how respondents perceived these hazards.

5.4.1 Identifying potentially vulnerable tourists

Individual vulnerability indicates intrapersonal factors that, in combination with levels of exposure to certain hazards and characteristics of these hazards influence if tourists are potentially at risk for adverse consequences of severe weather events. In this line an indication of individual vulnerability can be given, based on these perceptions of respondents. Here, an overview is given of demographic groups who are potentially vulnerable, based on their scores on a number of intrapersonal concepts; Information Sufficiency, Protection Efficacy, Information Seeking Intention and perceived importance of information, with a special attention for behavioural advice.

The items for information preferences were grouped in two factors, based on a factor analysis (Eigenvalues > 1, Varimax rotation with Kaiser normalisation). The first factor contained all Meteorological and Temporal/Spatial items and was named ‘Meteorological Information’. The second factor consisted of the Impact and Behavioural Advice items and

was named 'Impact Information'. Lower perceived importance of these two types of information were thought to be an indication of possible higher vulnerability.

Sex

First, respondents were divided based on their sex (Table 5.6). To test for significant differences in mean scores on the abovementioned variables, ANOVA's were executed. Male respondents (*n*=205) were significantly happier with the severe weather information they had available than their female counterparts (*n*=196). Also, male respondents scored higher on Protection Efficacy than female respondents. However, effect sizes were only minimal to typical. While male respondents scored moderately high, female respondents scored moderately low on the Protection Efficacy scale. With both groups scoring moderately high on information seeking intention, no significant differences were found.

Table 5.6

Differences in Average Score between Male and Female respondents on

Information sufficiency, Protection Efficacy, Intention to Seek Information and Information Preferences

	Sex				
	Male	**Female**	***F***	***p***	***η***
Information sufficiency	3.34	3.04	14.64	.001	.19
Protection Efficacy	3.11	2.87	12.26	.001	.18
Information seeking intention	3.43	3.46	.16	n.s.	
Meteorological information	2.77	2.75	.09	n.s.	
Impact information	3.89	4.03	4.32	.04	.11
➢ *Advice about what to do to be prepared*	*3.71*	*3.95*	*6.38*	*.01*	*.13*
➢ *Advice in case I get in a threatening situation*	*3.71*	*3.94*	*5.81*	*.02*	*.12*
➢ *Who I should contact if I am in urgent need of help*	*3.98*	*4.26*	*9.27*	*.002*	*.15*

Scales from 1-5

When looking at perceived importance of information, both male and female respondents find impact information more important than meteorological information, with females scoring significantly higher than their male counterparts, especially on information about emergency contacts. While taking into account the relatively low effect sizes, a picture emerges of female tourists being in higher need of information about severe weather, including specific advice about what to do and where to go.

Age

Next, ANOVA's were conducted to check for differences between age groups on the same variables. All groups scored moderate to high on Information Sufficiency. Significant

differences were found for Intention to seek information. A significant lower (yet still moderate) Intention was found, with an effect size that can be qualified as typical, among the youngest age group compared to the other groups (Table 5.7), suggesting that the large group of younger tourists (*n*=156) such as backpackers are less likely to search for information about severe weather and the potential risks from it. Although not significant, based on the scores on Protection Efficacy, there appeared to be a tendency that older respondents feeling less confident about them being able to cope with severe weather. Impact information was found more important than meteorological information. Respondents with age between 26 and 55 scored significantly higher than the youngest and oldest age groups on perceived importance of information about the consequences for road and travel conditions due to severe weather. This may be related to the fact that most of these tourists travel by car or campervan, while the youngest group also travels by public transport (section 4.2). Based on these results, the youngest age group appears relatively vulnerable, mostly based on their lower score on Intention. However, age appears not to be a big factor when it comes to distinguishing potentially vulnerable tourists.

Table 5.7

Differences in Average Score per Age Group on Information sufficiency, Protection Efficacy, Intention to Seek Information and Information Preferences

	Age group[1]						
	16-25	**26-40**	**41-55**	**56-70**	***F***	***p***	***η***
n	156	151	40	55			
Information sufficiency	3.11	3.24	3.32	3.22	1.11	n.s.	
Protection Efficacy	3.02	3.04	2.91	2.81	1.72	n.s.	
Information seeking intention	3.20[a]	3.55[b]	3.71[b]	3.69[b]	9.46	.001	.26
Meteorological information	2.72	2.80	2.73	2.75	.47	n.s.	
Impact information	3.89	4.01	4.05	3.93	1.02	n.s.	
➢ *Consequences for road/travel conditions*	*3.98[a]*	*4.21[b]*	*4.38[b]*	*4.11[ab]*	*3.06*	*.03*	*.15*
➢ *Advice about what to do to be prepared*	*3.76*	*3.91*	*3.90*	*3.72*	*.97*	*n.s.*	
➢ *Advice in case I get in a threatening situation*	*3.76*	*3.87*	*3.90*	*3.81*	*.42*	*n.s.*	
➢ *Who I should contact if I am in urgent need of help*	*4.10*	*4.12*	*4.13*	*4.11*	*.01*	*n.s.*	

1. Means with different superscripts are significant at $p<.05$ (LSD)

Country

When divided per country of residence, respondents originating from Northern America (U.S.A and Canada), scored significantly higher on Protection Efficacy and Information Sufficiency (Table 5.8). Though not significantly different, tourists from The Netherlands score relatively low on Protection Efficacy, just like respondents from Asia/Middle East.

Respondents from the United Kingdom score lowest on Information Sufficiency and Information seeking Intention, making this a potentially more vulnerable group. Overall, respondents from North America tend to score relatively high on all variables. Interestingly, respondents from New Zealand perceive Impact Information as much less important than tourists from overseas.

Table 5.8

Average Score per Country on Information sufficiency, Protection Efficacy, Intention to Seek Information and Information Preferences

	Country[1]											
	North America	**Germany**	**United Kingdom**	**Netherlands**	**Australia**	**Europe other**	**New Zealand**	**Asia / Middle East**	**Switserland**	***F***	***p***	***η***
n	42	82	87	33	30	65	14	19	22			
IS	**3.48^{a}**	3.17^{ab}	**2.98^{b}**	3.28^{ab}	3.31^{ab}	3.07^{ab}	**3.74^{a}**	3.31^{ab}	3.22^{ab}	2.66	.005	.24
PE	**3.34^{a}**	2.90^{b}	3.00^{b}	2.79^{b}	2.97^{b}	2.92^{b}	**3.49^{a}**	**2.70^{b}**	3.03^{ab}	3.11	.001	.26
ISI	**3.76^{a}**	3.53^{ab}	**3.24^{b}**	3.70^{ab}	3.43^{ab}	3.37^{ab}	3.64^{ab}	3.50^{ab}	3.30^{ab}	2.32	.015	.23
MI	2.89	2.76	2.69	2.89	2.76	2.75	2.57	2.99	2.65	1.27	n.s.	
II	**4.18^{a}**	3.87^{b}	4.01^{ab}	3.84^{b}	4.00^{ab}	4.00^{ab}	**3.35^{c}**	**4.18^{ab}**	3.91^{ab}	2.37	.013	.23
➢ *II.1*	*4.00^{a}*	*3.78^{a}*	*3.87^{a}*	*3.91^{a}*	*3.87^{a}*	*3.88^{a}*	***2.93^{b}***	*4.00^{a}*	*3.77^{a}*	*1.95*	*.044*	*.21*
➢ *II.2*	*3.93*	*3.80*	*3.76*	*3.82*	*3.93*	*3.91*	***3.00***	*3.89*	*3.95*	*1.53*	*n.s.*	
➢ *II.3*	*4.17*	*4.11*	*4.09*	*3.97*	*4.13*	*4.25*	***3.29***	*4.35*	*4.23*	*1.74*	*n.s.*	

1. IS and ISI: Means with different superscripts are significant at $p<.05$ (Tamhane). PE, II and II.1: $p<.05$ (LSD)
2. IS: Information Sufficiency
   PE: Protection Efficacy
   ISI: Information seeking intention
   MI: Meteorological Information
   II: Impact Information
   II.1: *Advice about what to do to be prepared*
   II.2: *Advice in case I get in a threatening situation*
   II.3: *Who I should contact if I am in urgent need of help*

Mode of transport

A new variable was calculated for transport mode, distinguishing between self-driving tourists (n=307) and tourists using mostly some sort of public transport (n=85)[4]. Being on the road means that the level of exposure to severe weather is likely to be increased, resulting in

[4] Self-driving included car, campervan and bicycle. Public transport included public transport bus, package tour bus, hop-on-hop-off bus and train.

higher potential vulnerability. Especially self-driving tourists can be more vulnerable, since they would have to assess driving conditions themselves, as opposed to tourists who travel by public transport. Self-driving tourists score higher on Intention to seek information than people using public transport (Table 5.9). Both groups are moderately content about the to them available information. While Meteorological information is significantly more important for self driving tourists, the effect size is minimal and both groups find this information of little to moderate importance. While no significant differences are found for Impact information as a combined variable, it is both interesting and logical that self driving tourists find information about consequences for road and travel conditions to be very to extremely important. Hence, these results suggest that the more vulnerable group in terms of transport actually does intent to prepare themselves by seeking information that helps them while they are on the road. Providing self driving tourists with enough information about road and travel conditions appears to be most relevant for this group. As mentioned in section 4.2, it is mostly the youngest age group (16-25) travelling with public transport (hop on hop off buses). This might also reflect the relatively low score on intention to seek information when distinguishing by mode of transport.

Table 5.9

Differences in Average Score for Mode of Transport on Information Sufficiency, Protection Efficacy, Intention to Seek Information and Information Preferences

	Mode of transport				
	Self driving	**Public transport**	***F***	***p***	***η***
Information sufficiency	3.22	3.07	2.48	n.s.	
Protection Efficacy	3.01	2.97	.19	n.s.	
Information seeking intention	3.52	3.20	10.97	.001	.17
Meteorological information	2.80	2.65	3.89	.05	.10
Impact information	3.97	3.89	.87	n.s.	
➢ *Consequences for road/travel conditions*	4.20	3.86	11.22	.001	.17
➢ *Advice about what to do to be prepared*	3.82	3.87	.15	n.s.	
➢ *Advice in case I get in a threatening situation*	3.81	3.88	.34	n.s.	
➢ *Who I should contact if I am in urgent need of help*	4.12	4.08	.12	n.s.	

Items measured on scales from 1-5

Accommodation

When segregating by accommodation type (Table 5.10), ANOVA's only reveal significant mean differences for advice about what to do to be prepared; while all groups report importance to be on a moderate to high level, tourists camping in a tent (*n*=40) find this

information less important than others. Tourists using a tent as accommodation seem to score lower (but not significant) on all items of impact information, which is interesting, since camping is seen as being more prone to severe weather hazards than other types of accommodation. Nevertheless, tourists sleeping in campervan (*n*=127), score almost similar on every variable as tourists sleeping in a hotel (*n*=227). Since people in a campervan mostly stay on a camping ground, they should also know very well how to protect themselves when facing severe weather.

Table 5.10

Differences in Average Score for Accommodation Type on Information sufficiency, Protection Efficacy, Intention to Seek Information and Information Preferences

	Accommodation					
	Tent	**Camper-van**	**Hotel/motel/ hostel/b&b**	***F***	***p***	***η***
Information sufficiency	3.41	3.10	3.19	2.23	n.s.	
Protection Efficacy	3.21	2.96	2.96	2.35	n.s.	
Information seeking intention	3.57	3.46	3.41	.64	n.s.	
Meteorological information	2.81	2.71	2.77	.49	n.s.	
Impact information	3.85	3.95	3.97	.55	n.s.	
➢ *Consequences for road/travel conditions*	3.98	4.13	3.14	.66	n.s.	
➢ *Advice about what to do to be prepared*	3.50[a]	3.86[b]	3.89[b]	3.03	.05	.12
➢ *Advice in case I get in a threatening situation*	3.60	3.80	3.86	1.31	n.s.	
➢ *Who I should contact if I am in urgent need of help*	3.88	4.12	4.14	1.41	n.s.	

Items measured on scales from 1-5

Length of stay

Three categories of holiday duration were calculated, as presented in section 4.2. When conducting ANOVA's to check for mean differences between these categories however, no significant differences were found.

5.4.2 Internal and external locus of responsibility

Being both a predictor of Information Sufficiency (hypotheses 2a and 2b), the strong negative correlation between LOR and Protection Efficacy asked for additional analyses on the relation between these variables. The data appear to reflect how a LOR is formed as found in literature (Lalwani & Duval, 2000). Perceiving one's own ability to deal with severe weather as low, and having a more external LOR, seems to be related with a low level of Information Sufficiency (hypotheses 2b and 2c). As Lalwani and Duval theorise, this can also be turned around; low levels of Protection Efficacy, combined with low levels of perceived Information Sufficiency can result in responsibility being attributed to an external source. A linear regression analysis indeed reveals this is the case, although effect size is rather small (Protection Efficacy: β=-.16, p<.01 and Information Sufficiency: β=-.20, p<.001, R^2=.07, $F(2,371)=15.93$, p<.001).

Although LOR is not a predictor of the main dependent variable of this thesis (Intention to seek information), having an internal of external LOR can be important as a secondary variable, as becomes clear from above. Especially when responsibility for staying safe is attributed to an external source, this might lead to higher vulnerability in situations where responsibility in reality is located with the individual. To explore this potentially vulnerable characteristic further, based on scores on the Locus of Responsibility variable, respondents were divided in three groups: One group finding that tourists were mainly responsible themselves to stay safe (internal LR, item score≤3, n=126), one group that perceived an equally distributed LR (mixed LR, item score=4, n=208) and one group that

Table 5.11

Differences in Average Score on Model Variables for Internal (n=126), Mixed (n=208) and External (n=57) Locus Of Responsibility groups

	Locus of Responsibility[1]								
	Internal		**Mixed**		**External**				
	M	***SD***	***M***	***SD***	***M***	***SD***	***F***	***p***	***η***
Intention to seek information	3.42	*.76*	3.53	*.90*	3.42	*.81*	.62	n.s.	
Worry	2.38[a]	*.72*	2.52 [ab]	*.66*	2.62 [b]	*.65*	3.58	.03	.14
Informational subjective norms	3.35	*.73*	3.38	*.69*	3.25	*.68*	.60	n.s.	
Information Sufficiency	3.32[a]	*.76*	3.14 [a]	*.81*	2.82 [b]	*.79*	9.40	.001	.22
Issue Involvement	3.24	*.75*	3.30	*.70*	3.30	*.68*	.37	n.s.	
Protection Efficacy	3.06 [a]	*.69*	2.98 [ab]	*.68*	2.82 [b]	*.60*	2.74	n.s.	

1. Means with different superscripts are significant at p<.05 (LSD). Items measured on scales from 1-5, higher item scores indicate higher perceived importance

found that New Zealand authorities were more responsible than the tourists themselves (external LR, item score≥5, *n*=57). This small but relevant group of tourists perceives that it is the responsibility of New Zealand authorities to inform them about and keep them safe from hazardous weather events.

ANOVA's were used to identify differences between the groups on Information Sufficiency, Worry, Protection Efficacy, Informational Subjective Norms, Issue Involvement and Information Seeking Intention (Table 5.11). Tourists in the sample with an external LR (*M*=2.82) were significantly less satisfied with their available information (i.e., score lower on Information Sufficiency) than tourists with a mixed LR and tourists with internal LR. Although all groups worried relatively little about possible severe weather, the external LR group and the mixed LR group worried more than the internal LR group. Also, external LR tourists scored lower on the Protection Efficacy scale. However only marginally significant, post-hoc tests show that respondents with an external LR appear to estimate their ability to protect themselves against severe weather to be lower than tourists with an internal LR. Yet, with all groups scoring moderately high on Intentions to seek information about severe weather risks, no differences were found between the groups in their Intention to seek information. Thus, when tourists have an external LR, they worry more, are less satisfied with their information about severe weather risks, and feel less capable of handling severe weather circumstances. However, this is not reflected in them actively seeking for information in order to relief their worry, protection efficacy or level of information sufficiency. It must be noted that, despite significant mean differences were found, effect sizes were only minimal to typical.

Next, in order to check how groups with varying locus of responsibility thought to what extent several institutions were responsible for making sure that tourists stay safe in severe weather, ANOVA's were conducted. As was to be expected, respondents with an external LOR found, more than respondents with an internal LOR, that organisations and authorities were responsible for this. Perceived responsibility differed per organisation however, as can be seen in Table 5.12. Significant differences on mean responsibility were found for all items between internal LOR and external LOR, while for some items also a significant difference was found between internal LOR and mixed LOR (Table 5.12). For the item 'As a tourist I am responsible myself', the exact opposite was found. Interestingly, even respondents with mixed and external LOR found tourists themselves to be moderately to very responsible for their own safety. Moreover, when an average 'institutional responsibility' was calculated, all groups found tourists themselves to be more responsible for their safety than institutions. However, the institutions that were perceived as most responsible by respondents with internal LOR were the New Zealand government, the Department of Conservation, MetService and the New Zealand Mountain Safety Council. The mixed responsibility and

external LOR groups showed similar results, yet on a higher level of responsibility, plus a relatively high score for i-Site.

Table 5.12

Differences in Average Scores on Perceived Responsibility for Internal (n=126), Mixed (n=208) and External (n=57) Locus Of Responsibility groups

	Locus of Responsibility[1]					
	Internal	**Mixed**	**External**	***F***	***p***	***η***
1. As a tourist, I am responsible myself	4.51[a]	4.00[b]	3.81[b]	30.90	.001	.37
2. The government of New Zealand	3.06[a]	3.70[b]	3.91[b]	23.91	.001	.34
3. My travel agent	2.52[a]	2.79[ab]	3.00[b]	4.26	.02	.16
4. i-Site	2.99[a]	3.51[b]	3.91[c]	19.79	.001	.31
5. Department of Conservation	3.11[a]	3.66[b]	3.75[b]	13.24	.001	.26
6. MetService	3.22[a]	3.85[b]	3.78[b]	13.86	.001	.27
7. Land Transport New Zealand	2.38[a]	3.01[b]	3.07[b]	13.48	.001	.30
8. New Zealand Mountain Safety Council	3.48[a]	3.71[ab]	3.92[b]	4.08	.02	.16
9. Institutional responsibility[2]	*2.91*[a]	*3.43*[b]	*3.57*[b]	*18.51*	*.001*	*.37*

1. Means with different superscripts are significant at p<.05 (LSD), except Land Transport New Zealand, used post-hoc is Tamhane's T2. Items measured on scales from 1-5, higher item scores indicate higher perceived responsibility.

2. Mean score of institutional items 2-8).

5.4.3 Severe weather and other natural hazards

Finally, the scales measuring Worry and Protection Efficacy not only included several types of severe weather, but also consisted of items about other natural hazards such as earthquakes, flash-floods and landslides. This section investigates perceptual differences in Worry and Protection Efficacy between these hazards.

Worry being an important predictor of Intention to seek information about severe weather, Pearson correlations were calculated to examine how each type of weather correlates with Intention. All worry items correlate positively with Intention on a significant, yet only minimal to typical level. Worry about fog (r=.22) and worry about a flash flood (r=.20) have the highest correlations with Intention (Table 5.13).

Table 5.13

Correlation of Worry items with Intention to Seek Information

	r
I worry about when dense fog limits my sight	.22**
I worry that I might suffer from severe wind	.19**
I worry about the possibility a severe thunderstorm occurs	.16**
I worry that I might be affected by heavy snowfall	.16**
I worry about being affected by heavy rainfall	.16**
I worry about a tropical cyclone occurring when I am around	.10*
I worry about running into a flash-flood	.20**
I worry about a landslide that might take place	.15**
I worry about a forest fire crossing my path	.14**
I worry that a strong earthquake might occur	.13**

*$p \leq .05$, **$p \leq .01$

To check for potential additional predictive value of Intention by the non-weather hazards, a mean score for the combined worry items was calculated, which was used in a hierarchical regression analysis (Enter) to predict Intention. The procedure, which was otherwise similar to the one reported in section 5.1, did not reveal an increase in explained variance. This suggests that intention among tourists to seek information about severe weather is not additionally influenced by a more general worry about natural hazards that might occur during their holiday in New Zealand.

As for worrying about severe weather, people generally tend not to worry much about other natural hazards either. Of the other natural hazards, they worry mostly about a strong earthquake to occur (Table 5.14). This might be induced by the recent earthquake in September 2010, during which Christchurch and surroundings suffered extensive damage. Interestingly, fog is among the type of weather respondents worry most about, although this is generally not seen as 'severe weather'. While heavy rainfall and fog are the weather types respondents worry most about, they are also they types of weather perceived as most easy to deal with (Table 5.16'. Together with severe wind, fog and heavy rainfall scores above scale average on Protection Efficacy, indicating that tourists are moderately confident about protecting themselves from harm or damage caused by these types of weather. On the other hand all other kinds of severe weather score below scale average, with a tropical cyclone perceived as most difficult to deal with, scoring between 'very' and 'slightly difficult'. Moreover, all 'non-weather' hazards are perceived as very to slightly difficult to protect oneself from. Especially a strong earthquake is seen as the most difficult to cope with (Table 5.15).

Table 5.14

Mean Scores and Standard Deviations for Worry items

	n	***M***	***SD***
I worry about being affected by heavy rainfall	400	2.81	*1.09*
I worry about when dense fog limits my sight	399	2.72	*1.07*
I worry that I might suffer from severe wind	400	2.57	*1.03*
I worry about the possibility a severe thunderstorm occurs	401	2.32	*.94*
I worry that I might be affected by heavy snowfall	401	2.17	*1.02*
I worry about a tropical cyclone occurring when I am around	401	2.13	*.95*
I worry that a strong earthquake might occur	402	2.73	*1.07*
I worry about a landslide that might take place	397	2.47	*.98*
I worry about running into a flash-flood	394	2.38	*.91*
I worry about a forest fire crossing my path	400	2.30	*1.01*

Scales range from 1 to 5, higher scores indicate higher levels of Worry

Table 5.15

Mean Scores and Standard Deviations for Protection Effiacy items

How easy or difficult is it to protect yourself from damage or harm caused by the following types of hazards?	***n***	***M***	***SD***
Heavy rainfall	395	3.74	*1.00*
Fog	395	3.46	*1.16*
Severe wind	394	3.14	*.98*
Heavy snowfall	396	2.86	*1.11*
Severe thunderstorm	395	2.71	*1.15*
Tropical Cyclone	396	1.95	*.94*
Flash flood	394	2.13	*.99*
Forest fire during drought	396	2.12	*1.01*
Landslide	394	1.91	*.95*
Strong earthquake	396	1.51	*.78*

Scales range from 1 to 5, higher scores indicate higher levels of Protection Efficacy

6. Conclusion

6.1 Predictors of severe weather information seeking

The main goal of this thesis was to study intrapersonal predictors of intention to seek information about possible severe weather. With the exception of hypotheses 1a and 2a, all predicted relationships were supported (Figure 6.1). The results suggest that tourists, at least when it comes to seeking behaviour in the context of severe weather information, they are guided by their emotions, perceived expectations of others and perceptions of relevance of having information about severe weather hazards. Their motive for seeking information can thus come from emotions, involvement or from the social context and may be triggered, even without a cognitively perceived need for extra information.

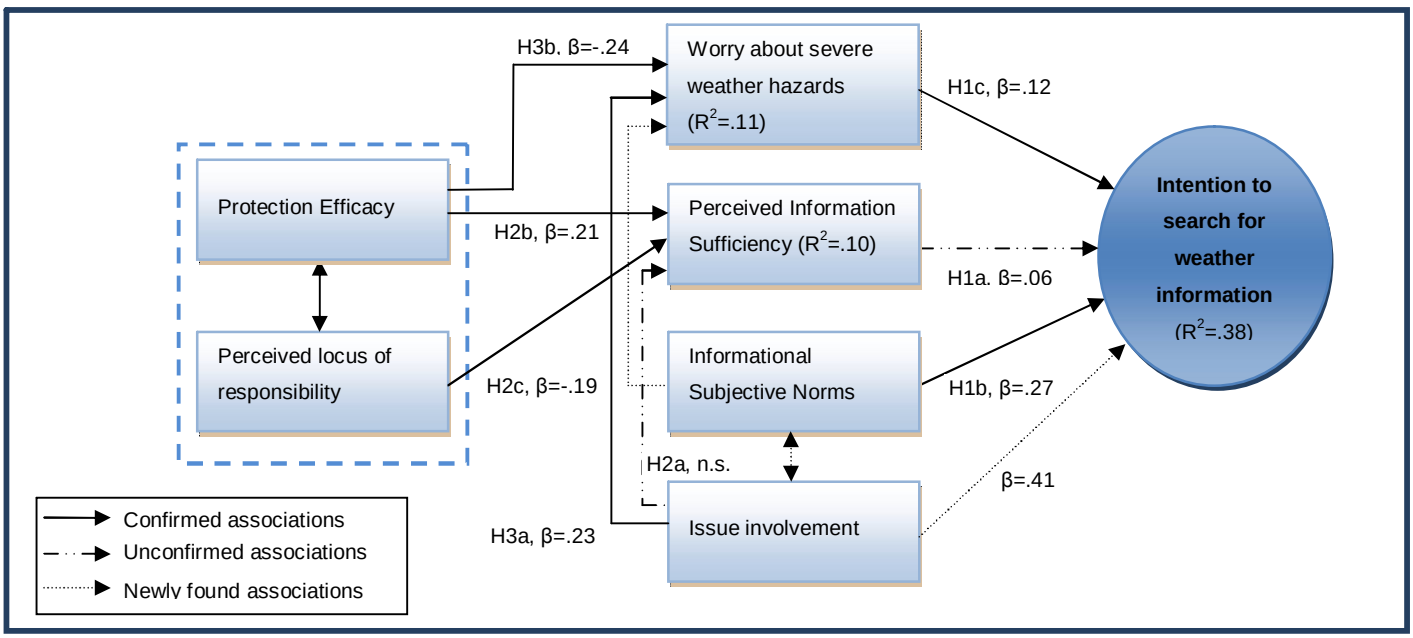


Figure 6.1

Relationships and Effect Sizes between Variables predicting Severe Weather Information Seeking

Worry and Informational Subjective Norms appeared to be significant predictors of Intention. In addition to the predicted relationships between Worry, Informational Subjective Norms and the Intention to seek information, Issue Involvement was by far the strongest predictor of Intent. This is a major finding of this study. This relationship was expected to be mediated by feelings of worry, but perceiving severe weather risks to be relevant for one's personal situation directly results in a higher intent to seek information about it, even without inducing worries that result from perceiving this relevance. Worry and Informational Subjective Norms together accounted for 23 percent of the variance in Intention, but 38 percent of the variance in Intention was explained by the regression model when Issue Involvement was included. Though with slightly different concepts used, level of explained

variance of Intention is comparable to results of ter Huurne (2008). Contrary to expectations, Information Sufficiency was not a significant predictor of Intention in this study. Thus, a cognitive evaluation of a need for additional information about possible severe weather does not influence tourists in this sample planning to seek this needed information.

Next, Information Sufficiency was predicted by Protection Efficacy and perceived locus of Responsibility. Also, an internal Locus of Responsibility was related to higher levels of Information Sufficiency, and an external LOR to lower levels of Information Sufficiency. However, Issue Involvement appeared to be unrelated to Information Sufficiency; perceived personal relevance of, and interest in severe weather is not related to tourists evaluating the information at hand to be sufficient (or insufficient).

Finally, Issue Involvement was found to be positively related and Protection Efficacy to be negatively related to Worry. People finding severe weather risks relevant for their personal situation and perceiving themselves as not very capable to perform appropriate protective behaviour during severe weather are likely to have increased worries about possible severe weather.

6.2 Information preferences

It can be concluded that tourists are aware to some extent where they can collect information about severe weather, but some relevant sources are overlooked by the majority, while other less informative sources are relied on too much. Some important sources of severe weather information (including secondary information such as road and travel conditions) were mentioned by relatively few respondents. It thus can be concluded that tourists, despite a moderate intention to seek information, are not very much aware of where they can find information about the consequences of severe weather.

Meteorological information was relatively little appreciated. On the other hand, respondents perceived information about temporal and spatial information, but especially impact and behavioural information very important. Apparently people have a need for information that is readily interpretable for their personal situation. In sum it can be concluded that tourists, although they want to get to know some meteorological features of the weather, in the context of severe weather they are mainly interested in consequential information and protection advice.

6.3 Potentially vulnerable tourists

Based on scores on a number of intrapersonal variables, potentially vulnerable groups are females (low Information Sufficiency), young travelers between 16 and 25 years old (low

Intention and a general tendency to care little about possible severe weather hazards), tourists from the United Kingdom (relatively low Information Sufficiency and relatively low Intention), tourists from Germany (relatively low Protection Efficacy).

6.4 Locus of responsibility

It is concluded that 1. Some tourists expect authorities to protect them from harm caused by severe weather and 2. Some tourists tend to perceive some organisations to be responsible for this, that actually are not responsible for protecting people. Although all respondents perceived themselves to be responsible to some degree, a small but relevant group of tourists perceives authorities to be more responsible than themselves.

6.5 Severe weather and other natural hazards

It can be concluded that tourists worry most about the types of weather that they find easiest to protect themselves against, but probably also happen most often: fog, heavy rain and severe wind. Worries about severe weather vary between type of weather, but in general tourists seem not to worry too much about severe weather and natural other hazards that might occur during their holiday. Also, tourists do not worry more about other natural hazards than they do about severe weather. However, they find non-weather hazards (e.g., earthquake) or hazards that can be a consequence of severe weather (e.g., landslide or flash flood), to be very difficult to protect themselves against.

7. Discussion

7.1 Interpreting the model

This study provides new and interesting insights in information seeking behaviour of tourists. In the context of severe weather hazards and applying a framework based on established theories from social psychology and risk communication, it builds new linkages between tourism and more traditional social sciences. Taking on a receiver-oriented approach it complements the growing body of literature around risk information seeking behaviour.

The thesis was largely based on the FRIS model of ter Huurne (2008). In line with this study and other previous literature (Baron, et al., 2000; Kahlor, 2010; Kahlor, et al., 2006; Terpstra, 2010), it provides evidence of two concepts that are important predictors of information seeking behaviour: Informational Subjective Norms and Worry. Being a major finding of this study, Issue Involvement complements Informational Subjective Norms and Worry as predictors of severe weather information seeking. The direct relations between negative emotional responses (Worry) and information seeking behaviour confirm the validity of the risk-as-feelings approach (Slovic, et al., 2004). This finding is important, because it supports the increasing evidence that this relation is not mediated by cognitive evaluations of needed and available information (Information Sufficiency), as suggested by the RISP model (Griffin, et al., 1999).

Next, the lack of a relation between Information Sufficiency and Intent was unpredicted and does not correspond with existing literature (Griffin, et al., 1999; ter Huurne, 2008). An explanation for this might be twofold: First, it might be that this is due to respondents' familiarity with weather. A similar line of arguments was used by Kahlor (2010) in the context of general health risks. Weather affects their lives on a daily basis and they might be habituated to it. Maybe they do not perceive an imminent need for information, because they are familiar with weather in general and perceive information about it as easily available. Indeed, weather information appears prominently in several media on a daily basis. Second, Issue Involvement appeared to be a key predictor of information seeking behaviour. In the FRIS model Issue Involvement was related to Information Sufficiency. However, no such relation was found here. The lack of a correlation between Issue Involvement and Information Sufficiency might be due to people having different base-levels of available information. Information Sufficiency as measured here might indeed reflect a valuation of the current knowledge level, but might not say anything about a need to gather more information, because this base-level is found insufficient. In other words, both people with high and low Issue Involvement might report to be content with their level of knowledge about severe weather risks. This conceptual issue should be considered in future studies.

Given the implications of the results regarding Information Sufficiency, a reinterpretation of the directions of the relationships is proposed for the triangular relationship found between Information Sufficiency, Protection Efficacy and Locus of Responsibility. While predicted directions were based on the FRIS model's goal to explain Information Seeking, according to the original findings of Lalwani and Duval (2000), it is the perception of circumstances (i.e., person relative to event) that influences LOR instead of the other way around. In that sense Information Sufficiency and Protection Efficacy can also be interpreted as *causing* an internal or external LOR. Low perceptions of Information Sufficiency then consequently may cause people to estimate their own ability to protect themselves against severe weather being lower (lower levels of Protection Efficacy), because of this perceived lack of information. This combination of low Protection Efficacy and low Information Sufficiency results in people attributing responsibility for protection in severe weather situations to an external source. However, the study design used here did not allow to do more firm statements about these suggestions.

While Locus of Responsibility does not directly influence the process of information seeking (primary adaptation), it is important to take it into account as a variable that might indicate increased potential vulnerability for adverse consequences of severe weather, since it might influence *protective* behaviour (secondary adaptation), when tourists find themselves in a severe weather situation. Knowing what to do and where to go can be enhanced by information seeking behaviour, but actually performing the right protective action is necessary during present severe weather situations. Perceiving responsibility for protection to be located with an external source such as Search and Rescue, DoC staff or tour guides might result in tourists passively anticipating on these sources to protect them, while this might not happen. Further research on the role of LOR in protective behaviour during severe weather events can shed light on this still somewhat fuzzy relationships.

The role of Informational Subjective Norms in this study is an interesting one. It confirms the previously found (Kahlor, et al., 2006; Loewenstein, et al., 2001; ter Huurne, 2008) direct influence of perceived expectations of important others to stay on top of risk information on actual information seeking intention. An increasing number of studies thus suggest that the assumption of the RISP model (Griffin, et al., 1999) that this relation is mediated by Information Sufficiency is wrong. Moreover, this study found no correlation whatsoever between Information Sufficiency and Informational Subjective Norms. A sensed level of available information might only be relevant when personal safety is at stake (i.e., when actually facing a severe weather situation). In those kind of situations, what people think others would expect of them is not relevant anymore since they have to rely on themselves in order to stay safe.

7.2 Methodological limitations

The conceptual model that was used in this study performed reasonably well and provides a substantial basis to explore intrapersonal antecedents of information seeking in the context of severe weather. All of the scales used had a sufficient level of internal reliability. However, a number of limitations should be considered when drawing conclusions and more importantly, applying the results in communication policies that aim at the population of tourists that visit New Zealand. First of all, the conclusions drawn above should be interpreted within the context of the sample. Generalisations beyond it should be taken with care. Also, some methodological issues might have influenced the results of this study.

1. A generally recognised limitation of studies is related to measuring intentions as a proxy for behaviour. While there is a wealth of evidence that intentions do predict behaviour (Ajzen, 1991), this is a point to consider.
2. One item on the Information Sufficiency scale was reversely worded. Reverse wording is a common source of bias in surveys. When applying the scale in future research, it should be considered to revise this. Also, future studies should give a better insight in the ability of measuring the Sufficiency concept with one scale, as opposed to the original way of using two scales (see also ter Huurne, 2008).
3. Using a survey written in English may have resulted in misinterpretations of phrases or words by people with little English fluency. Given the international character of the sample, this might have influenced the response. Related to this, tourists who did not have this sufficient level of English were not included in the sample, resulting in them not being represented by the sample.
4. A list of possible sources was given in the survey, that tourists could use to find severe weather information. This method can be subject to availability bias, with respondents ticking sources they would not have come up with themselves, that they maybe never have used or even ticking sources that are not providing severe weather information.
5. In previous literature, models explaining information seeking behaviour typically were studied using Structural Equation Modelling (SEM) (ter Huurne, 2008). This method is increasingly preferred above regression analysis when studying causal relationships in social sciences. However, using SEM was beyond the opportunities of this thesis.
6. During the fieldwork, undertaken in late November and early December 2010, the South Island of New Zealand was experiencing an exceptionally stable and warm period of spring weather. This might have influenced severe weather perceptions of tourists into a direction of underestimation. On the other hand, the stable weather during the surveying allowed for constant and comparable circumstances during every day of the fieldwork.
7. As mentioned in Chapter 3, no division was made for activities tourists could undertake and situational circumstances these activities take place. It is acknowledged however that

different activities and locations require different types of weather information. Also, activities can, due to their specific nature and relation with the environment be impacted by severe weather in highly varying ways. Rafting or canyoning for example can be more directly prone to flash-floods than tramping. It was assumed that tourists during their holidays would undertake a variety of activities. Therefore, they were asked to answer the survey in the context of seeking information about possible risks from severe weather during their holiday as a whole, hence covering all types of activities they would do. Future studies should however focus on specific activities in order to get more knowledge about when tourists need which information, for example by focusing on outdoor tourist attraction like the Tongariro Crossing, or the Milford track.

8. A possible drawback of this study is that it did not sufficiently control for environmental familiarity in terms of travel experience in New Zealand and more importantly, severe weather experience. Severe weather events happen all over the world an when tourists are familiar with certain types of severe weather, and for example are able to recognise the signs of an emergent hazard, they might be better able to protect themselves, without seeking information. Future studies should focus on this variable by incorporating in their models.
9. The concept of Issue Involvement, relatively new in the context of information seeking behaviour, could overlap with perceptions of risk, but also reflect an interest in risk stemming from a source of pleasure (Adams, 1995). Future research should consider these considerations.
10. Tourists coming from different countries come from different cultures, bringing different values, norms, which can influence how tourists approach issues around information seeking. This is not taken into account in this thesis. Hofstede (Hofstede, 1983) identifies several cultural dimensions on which countries differ. These differences might also be relevant in the context of risk information seeking. Also, the Risk Thermostat model of Adams (1995) might explain differences in information seeking among respondents from different countries. Moreover, given the multicultural nature of tourists visiting New Zealand, taking cultural differences into account when providing risk information might important in order to reach more tourists.

7.3 Implications for communicating severe weather information

So what do the results of this study leave risk communication policy makers, warning issuing institutions and tourist visitor centres with? The results provide insight in how tourists traveling in New Zealand perceive severe weather information and how they think to deal with it. The moderately high level of intent to seek information among the respondents is a

promising result and signifies that tourists are intending to actively seek information about possible severe weather. However, as becomes clear from the discussion above, tourists are not always thinking rationally about risks from severe weather. Their motive for seeking information can come from emotions, involvement or from the social context and may be triggered, even without a cognitively perceived need for extra information.

Some tourists might underestimate the possibility of being affected by severe weather, while others find dealing with severe weather a difficult task. Increasing awareness about the weather in New Zealand, possible weather warnings and information providing sources that are available to tourists appears to be necessary to overcome these issues.

Designing a communication plan goes beyond this thesis and is probably in better hands with others, but it is recognised that a possible problem that comes with accurately framing information about severe weather might be to find a balance between enhancing awareness and making people afraid. This is a challenge that is to be taken seriously though, because increased interest and feelings of worry do increase seeking behaviour. As ter Huurne states: 'Evoking affect (without necessarily raising fears) may be an efficient way of motivating risk prevention or mitigation through the gathering of additional information' (ter Huurne, 2008, p.142).

Also, work is to be done to improve visibility and accessibility of information sources. Among the options most easy to adopt is linking the less frequently used websites with sources that are used more often. An important role can be played by i-Site information centres, the second most used source by tourists. These centres appear to be frequently visited. Adopting a way to provide tourists with a the sources they can use, may result in a higher level of Information Sufficiency and Issue Involvement among travellers in New Zealand.

Another point of interest is the relatively low reported use of visitor centres of the Department of Conservation. Although the information DoC centres can provide about specific environmental conditions might not be relevant for all tourists (not everybody will walk the Milford track, for example), they generally have (more than i-Site centres, who are more focused on activities and accommodation bookings) important information about possible severe weather conditions and possible impacts of it. Moreover, the finding that locals are the mostly considered source of information indicates that many tourists may not be aware of the local expertise of the DoC centres (which are almost by definition staffed by locals). A solution for this can be to increase collaboration between i-Site and DoC centres, for example by accommodating both visitor centres in the same building. This can increase the visibility of available information, possible enhancing levels of Information Sufficiency or even Protection Efficacy, but at least making the information of DoC centres more easily accessible to a larger group of tourists.

Differences found between demographic groups give some insight in which type of tourists might be relatively vulnerable due to low levels of Protection Efficacy, Intention or Information Sufficiency. This can provide information providers with a basis for targeting communication practices to certain groups. However, in order to actually be able to use these results, more knowledge is needed about which type of activities are undertaken by which tourists. Also, from the perspective of information providers such as DoC and i-Site, it would be interesting to get a better picture of information seeking behaviour and information preferences in the context of specific areas. Combining results from this thesis with data about tourists activities and locations, can provide further insight in which information is needed by who, but also *when* it is needed.

Future research could also focus on source perceptions, linking information tourists expect to find with sources where they think they can this information. Since it appears that tourists are, at least for some important sources, not very knowledgeable about the wealth of relevant information available, this is an important topic for policy makers and information providers. It should be noted that this does not say anything about perceived availability of these types of information. This is not measured here. It does however indicate relative and absolute levels of perceived importance of information types, providing a valuable basis for information providing organisations to check actual availability of information types. Making sure impact and behavioural information is available to tourists should remain high on the priority list of tourists service organisations. Finally, communication about the roles of organisations in the context of severe weather information and protection activities can make tourists more aware of their own responsibility. While MetService is responsible for informing about the weather, other organisations such as i-Site and DoC also have taken up the task to inform tourists about environmental conditions. However, none of these organisations are responsible for tourist safety and protection.

This study intended to shed more light on information seeking behaviour of tourists in the context of severe weather hazards. It applied a framework based on established theories from social psychology and risk communication. Yet, more research is needed to increase validity of the used concepts and to test their performance over time, in varying holiday destinations and in different weather situations. While a significant part of variance of Intention to seek information was explained by the model, it can be that other variables that were not included here, appear important as well. Future research should clarify this. This thesis can then be seen as a starting point to further study how tourists seek information about severe weather and other natural hazards while on a holiday.

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Appendix 1. Demographics

Table A1

Age and Sex

Sex	*Male*		*Female*		*Total*
Age	*n*	*%*	*n*	*%*	*n*
<25	62	*30.2*	94	*48.0*	156
26-40	85	*41.5*	66	*33.7*	151
41-55	20	*9.8*	20	*10.2*	40
56<	38	*18.5*	16	*8.2*	54
Missing	1	*0.0*	--	--	1
Total	205	*100.0*	196	*100.0*	402

Table A2

Main transport mode and type of accommodation

Accommodation	*Camping in tent*		*Camping in campervan*		*Hotel/B&B/ Hostel/Motel*		*Other*		Total
Transport	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*
Campervan	2	*1.6*	118	*94.4*	5	*4.0*	0	*0.0*	125
Bicycle	2	*25.0*	1	*12.5*	5	*62.5*	0	*0.0*	8
Car	28	*16.1*	8	*4.6*	131	*75.3*	7	*4.0*	174
Bus (public transport)	5	*21.7*	0	*0.0*	18	*88.3*	0	*0.0*	23
Bus (package tour)	0	*0.0*	0	*0.0*	22	*100.0*	0	*0.0*	22
Train	0	*0.0*	0	*0.0*	1	*100.0*	0	*0.0*	1
Bus (hop on hop off)	0	*0.0*	0	*0.0*	39	*100.0*	0	*0.0*	39
Other	3	*60.0*	0	*0.0*	2	*40.0*	0	*0.0*	5
Total	40	*10.1*	127	*32.0*	223	*56.2*	7	*1.8*	397

Table A3

Travel group size

Groups size	*n*	*%*
1	57	*14.2*
2	250	*62.3*
3	28	*7.0*
4	19	*4.7*
5	5	*1.2*
6 or more	42	*10.5*

Table A4

Country of origin

Country	*n*	*%*
United Kingdom	87	*21.6*
Germany	82	*20.4*
Europe other	65	*16.2*
North America	42	*10.4*
Netherlands	33	*8.2*
Australia	30	*7.5*
Switzerland	22	*5.5*
Asia and Middle East	19	*4.7*
New Zealand	14	*3.5*
South America	5	*1.2*
Missing	*3*	*.7*
Total	402	*100.0*

Table A5

Holiday duration and travel experience per country

Country	*Weeks of this holiday in total*	*Weeks during this holiday spent in NZ until now*	*Weeks travelled in NZ before this holiday*
Germany	12.3	6.8	.4
United Kingdom	7.5	3.3	3.2
Netherlands	5.7	2.7	.0
Switzerland	9.5	2.9	.9
Europe other	12.3	5.6	.9
Australia	3.2	1.2	18.3
New Zealand	1.4	1.5	n.r.
North America	11.0	6.1	6.7
South America	22.6	18.5	.0
Asia and Middle East	10.2	3.5	1.6
Total	9.4	4.7	3.2

Appendix 2. Survey

New Zealand weather and your holiday

This survey is part of my thesis for the Master in Leisure, Tourism and Environment at Wageningen University, The Netherlands.

The research is done in collaboration with Lincoln University, Christchurch, New Zealand.

We would be very grateful if you could fill out this questionnaire.

In the survey, you will find questions related to the weather in New Zealand, especially severe weather. The goal of this research is to know more about how tourists inform themselves about the weather during their holiday in New Zealand.

Of course we are greatly concerned with your privacy, so all the answers you give will be treated confidentially and anonymously. Every section of the survey provides clear instructions. Please read them carefully before answering the questions.

If, for any reason you do not wish to continue filling out the survey, you can always stop at any time. However, an entirely filled out survey would greatly help us with the research and the completion of my study!

Filling out the survey will take fifteen minutes approximately.

Thank you in advance for your cooperation!

Jelmer Jeuring MSc, Wageningen University, Wageningen, The Netherlands

Dr. Susanne Becken, Lincoln University, Christchurch, New Zealand

Lincoln University
Te Whare Wānaka o Aoraki
CHRISTCHURCH, NEW ZEALAND

WAGENINGEN UR
For quality of life

Thank you for your willingness to participate in this research!
To start with, we ask you to read the following text carefully.

We are interested in your opinions about several aspects related to the weather during your holiday in New Zealand. To be more specific, the questions often ask for your thoughts about 'severe weather'.
But what is severe weather in New Zealand?

Severe weather is weather that can negatively influence your situation in the sense that:

- **It can result in possible harm or damage to you or your property when not accurately adapting to the circumstances.**

Also, some questions refer to natural hazards that are not related to the weather. A natural hazard can be severe weather, but can also be a landslide or earthquake, for example.
Now, please start with the first questions. Remember, there is no right or wrong answer, it is about your personal opinion only. Good luck!

A.

First of all, we would like to know about your interest in severe weather in New Zealand and the possible risks that may come with it.

Please indicate to what extent you think the questions apply to you personally. The 5-point scale on which you can indicate your answer ranges from ***Not at all*** to ***Extremely.***

	Not at all	Slightly	Moder-ately	Very	Extremely
1. Are you interested in the potential risks of severe weather in New Zealand?	o	o	o	o	o
2. Do you think it is important to be familiar with the risks that severe weather in New Zealand can bring?	o	o	o	o	o
3. Is having information about severe weather risks in New Zealand important to you?	o	o	o	o	o

B.

Please indicate how likely you would carry out the following activities, while you are on a holiday in New Zealand.

You can indicate your answer on the 5-point scale, ranging from ***Very unlikely*** to ***Very likely.***

In order to protect yourself against harm from severe weather, how likely would you…	Very unlikely	Unlikely	Neither likely or unlikely	Likely	Very likely
1. Search for information that helps you to be prepared	o	o	o	o	o
2. Look for information about what you could do to protect yourself in case severe weather would occur	o	o	o	o	o
3. Ask experts about potential threats that severe weather can cause	o	o	o	o	o
4. Check if there are any severe weather warnings for the area you plan to be in	o	o	o	o	o

C. Next, we have some statements concerning information you might need in order to protect yourself against the possible risks of severe weather in New Zealand.

For the following statements, please indicate to what extent you agree or disagree.
The answer options range from ***Strongly disagree*** to ***Strongly agree***.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
1. I am satisfied with the amount of knowledge I have about how to protect myself when the weather turns bad	o	o	o	o	o
2. My current knowledge about protective actions in possible hazardous weather in New Zealand is sufficient	o	o	o	o	o
3. I need more information than I already have about how to protect myself when the weather turns bad	o	o	o	o	o
4. People whose opinions I value think I should stay informed during my holiday about how to be safe from harm caused by severe weather	o	o	o	o	o
5. It is expected of me that during my holiday I seek information about how to protect myself against possible severe weather risks	o	o	o	o	o

If applicable, where do you prefer to seek information about severe weather and possible risks that might come from it? (MULTIPLE ANSWERS POSSIBLE)

☐ Department of Conservation centre	☐ MetService website	☐ Locals	☐ Television	☐ Police
☐ Department of Conservation website	☐ NZ Mountain Safety Council website	☐ Other tourists	☐ Radio	☐ Automobile Association
☐ i-SITE information website	☐ Tourism New Zealand website	☐ Family and friends	☐ Mountain Radio Service	☐ Newspaper
☐ i-SITE information centre	☐ Land Transport New Zealand website	☐ My tourist guide book	☐ Other, i.e., _____	

D. Thank you for filling in the survey so far!

Now, some organisations and persons are presented. For each of them, please indicate to what extent you find them responsible for making sure that tourists in New Zealand stay safe in the case of severe weather.
The answer options range from ***Not at all responsible*** to ***very responsible***.

Remember, there is no right or wrong in the answers, it is about your opinion only.

To what extent are the following organisations/people responsible for making sure that tourists in New Zealand stay safe in the case of severe weather?	Not at all	Slightly	Moder-ately	Very	Extremely	No opinion
1. As a tourist, I am responsible myself	o	o	o	o	o	o
2. The government of New Zealand	o	o	o	o	o	o
3. My travel agent	o	o	o	o	o	o
4. Tourist info centre (i-SITE)	o	o	o	o	o	o
5. Tourist info centre (Department of Conservation)	o	o	o	o	o	o
6. MetService (New Zealand Meteorological Service)	o	o	o	o	o	o
7. Land Transport New Zealand	o	o	o	o	o	o
8. The New Zealand Mountain Safety Council	o	o	o	o	o	o
9. Other, i.e. _____	o	o	o	o	o	

The responsibility for protecting you as a tourist from possible harmful consequences of severe weather can be fully with the tourists themselves, fully with the authorities or can be a mix of responsibility.

Please indicate how, in your opinion, the responsibility for protecting you as a tourist is distributed.

In your opinion, how is responsibility distributed for protecting you as a tourist from the possible consequences of getting involved in severe weather?

	1	*2*	*3*	*4*	*5*	*6*	*7*	
I am totally responsible myself	o	o	o	o	o	o	o	New Zealand authorities are totally responsible

E. This part asks for how you feel about several natural hazardous events, especially related to the weather. The questions are divided in three sections. Although they might look a bit similar at first sight, please read them carefully, since they are all asking for something different.

First, we ask about if you are worried about any of the following events. Please indicate to what extent you agree or disagree with each statement.
Specify your answer on the 5-point scale, ranging from ***Strongly disagree*** to ***Strongly agree.***

When I am on vacation in New Zealand,	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
1. I worry that a strong earthquake might occur	o	o	o	o	o
2. I worry about a severe thunderstorm occurring	o	o	o	o	o
3. I worry that I might suffer from severe wind	o	o	o	o	o
4. I worry about a landslide that might take place	o	o	o	o	o
5. I worry about running into a flash-flood	o	o	o	o	o
6. I worry about being affected by heavy rainfall	o	o	o	o	o
7. I worry that dense fog may limit my sight	o	o	o	o	o
8. I worry about a tropical cyclone occurring when I am around	o	o	o	o	o
9. I worry about a forest fire crossing my path	o	o	o	o	o
10. I worry that I might be affected by heavy snowfall	o	o	o	o	o

Here, please indicate how easy or difficult you think it is to protect yourself from adverse consequences of several types of natural hazards.
You can answer on the 5-point scale below, ranging from ***Very difficult*** to ***Very easy.***
Again, please remember, this is about possible severe weather during your holiday in New Zealand.

How easy or difficult is it to protect yourself from damage or harm caused by the following types of hazards?	Very difficult	Slightly difficult	Neither easy or difficult	Slightly easy	Very easy
1. Heavy rainfall	o	o	o	o	o
2. Fog	o	o	o	o	o
3. A tropical cyclone	o	o	o	o	o
4. A strong earthquake	o	o	o	o	o
5. A severe thunderstorm	o	o	o	o	o
6. A forest fire during drought	o	o	o	o	o
7. A landslide	o	o	o	o	o
8. Heavy snowfall	o	o	o	o	o
9. Severe wind	o	o	o	o	o
10. A flash flood	o	o	o	o	o

For the following weather situations, please indicate how risky you think the following situations are for you personally, while you are on a holiday in New Zealand.

Please indicate your answer in the 5-point scale.
The answer options range from **Not risky at all** to **Extremely risky**.

How how risky you think the following situations are for you personally, while you are on a holiday in New Zealand?	Not risky at all	Somewhat risky	Moderately risky	Very risky	Extremely risky
1. Encountering heavy rainfall	o	o	o	o	o
2. Encountering fog	o	o	o	o	o
3. Encountering a tropical cyclone	o	o	o	o	o
4. Encountering a strong earthquake	o	o	o	o	o
5. Encountering a severe thunderstorm	o	o	o	o	o
6. Encountering a forest fire	o	o	o	o	o
7. Encountering a landslide	o	o	o	o	o
8. Encountering heavy snowfall	o	o	o	o	o
9. Encountering severe wind	o	o	o	o	o
10. Encountering a flash flood	o	o	o	o	o

Please, answer the questions below.	Yes	No	Not sure
1. On this trip in New Zealand, have you encountered any severe weather? (for example, any of the above types of weather)	o	o	o
2. If yes, what type of severe weather was this?	_____		
3. If yes, how were you affected by it?	_____		
4. If yes, did you do anything specific to protect yourself?	_____		

F. Below you find several types of information that can be provided about weather in general and about severe weather. In order to be able to protect yourself against possible harm or damage from severe weather, you might find this information important or not.

Please rate how important you find each type of information.
The answer options range from ***Not important at all*** to ***Extremely important***.

How important is the following information for you, in order to be able to protect yourself against severe weather during your holiday in New Zealand?	Not important at all	Slightly important	Moderately important	Very important	Extremely important
1. Forecasted highest temperature	o	o	o	o	o
2. Forecasted lowest temperature	o	o	o	o	o
3. How temperature develops over time	o	o	o	o	o
4. Windspeed	o	o	o	o	o
5. Wind direction	o	o	o	o	o
6. Amount of precipitation (rain, snow, hail)	o	o	o	o	o
7. Air pressure	o	o	o	o	o
8. Air humidity	o	o	o	o	o
9. Where the severe weather is forecasted to occur	o	o	o	o	o
10. How long the severe weather continues	o	o	o	o	o
11. Possible consequences (e.g., power cuts, floods)	o	o	o	o	o
12. Consequences for travel/road conditions	o	o	o	o	o
13. Advice about what I should do to be prepared	o	o	o	o	o
14. Survival advice in case I get in a threatening situation	o	o	o	o	o
15. Who I should contact if I am in urgent need of help	o	o	o	o	o
16. Other, i.e., _____	o	o	o	o	o

G. Finally, some general questions about yourself. We would like to remind you, that your answers will be treated strictly confidentially and anonymously.

1. What is your age? _____ Years

2. What is your home country? _____

3. Are you male or female? ☐ Male ☐ Female

4. How many weeks is this holiday for you in total? _____ Weeks

5. *For visitors from overseas:*
During this holiday, how many weeks have you already spent in New Zealand up to now? _____ Weeks

6. *For repeat visitors from overseas:*
How many weeks have you travelled in New Zealand BEFORE this holiday? _____ Weeks

7. *For New Zealanders:*
What region of New Zealand do you live? _____

8. What is your main mode of transport during this holiday in New Zealand?
☐ Campervan ☐ Bicycle ☐ Car
☐ Bus (public transport) ☐ Bus (package tour) ☐ Train
☐ Bus (hop on hop off) ☐ Other, i.e., _____

9. How many persons does the group you travel with during your holiday in New Zealand consist of?
☐ 1: just myself ☐ 2
☐ 3 ☐ 4
☐ 5 ☐ 6 or more

10. What type of accommodation do you use mostly during this holiday?
☐ Camping in tent ☐ Camping in campervan ☐ Hotel/motel/ hostel/B&B
☐ Other, i.e., _____

End of the survey

Thank you very much!

You can hand over your completed survey directly to the researcher.

If you would like to be informed about the results of the study,
you can leave your email address below:

E-mail: _____