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PROTECTION MOTIVATION OF RESIDENTS IN SCHOORL REGARDING WILDFIRE

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Protection motivation of residents in Schoorl regarding wildfire

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Abstract

Research problem: The Netherlands needs to learn how to live with fire, just as it lives with water as due to the increasing warmer and drier weather patterns, the risk of wildfires is increasing. Thus, efficient wildfire management must be developed. To do this it is of importance to take residents perceived risk and personal preparedness into account. Therefore, this research will focus on perceived risk and personal preparedness through the use of the Protection Motivation Theory. As this research takes place in Schoorl, a village that has dealt with wildfires before, the influence of previous experience on perceived risk and personal preparedness will also be taken into account.

Methods: These main research question and the sub research questions of this study are answered by using a mixed methods approach of both surveys and interviews at the individual level. By the use of the mixed methods approach numbers can be added to words and the other way around. Furthermore, interviews were conducted with official bodies. This causes a more comprehensive view of the topic.

Main findings: Residents in Schoorl do perceive wildfire risk in Schoorl overall. However, they often do not perceive this risk at the individual level. Furthermore, the coping appraisal of residents in Schoorl is deemed as high, however this does not translate into protective behaviour. This is related to the fact that many residents in Schoorl do not necessarily see it as their own responsibility to act upon or inform themselves about the wildfire risk, but the responsibility of official actors. This is also reflected by the fact that most protective measures with which participants are familiar are protective measures that they cannot necessarily take themselves, but have to be taken by these official bodies. Furthermore, this is also affected by the fact that people have high trust in the official bodies to take these protective measures. Additionally, previous experience with wildfire has also not led to a higher intention of personal preparedness, even though it did lead to viewing the area of Schoorl as more vulnerable to wildfire.

Acknowledgements

This thesis was written as part of my graduation from the Master's programme 'International Development Studies' at Wageningen University & Research. During my masters I became interested in this topic as a result of taking courses at Wageningen University & Research that covered this topic. In particular, I owe my interest in this subject to the Natural Hazards course, where many interesting lectures and guest lectures have fascinated me. I would like to thank the people who made this course possible. One in particular is also my current supervisor: Jeroen Warner. I would like to express my gratitude to him for encouraging me through my thesis process from the beginning, which was not always easy. He gave me the space to create my own research, while also giving me the confidence and support when I needed it. Furthermore, he was always quick to give his feedback, which was very helpful.

During these times of writing my thesis it was not easy to keep high spirited and motivated. I would like to thank my friends with whom I could talk well about the struggles of thesis life and laugh when I needed to. I would like to thank my boyfriend, Casper Groenink, for his support during my thesis and pushing me to do better. Furthermore, I would like to thank him for sharing his insights on conducting and writing a research with me, which helped me take this thesis to a higher level. Finally, I would like to thank my parents, Marlon Wagenaar and Jules van Roessel, for always giving me a place where I could unwind for a while when thesis life got too much.

Contents

1. Introduction

The Netherlands does not have a important historical background when it comes to wildfires, since the wildfires the Netherlands has faced so far did not have disastrous consequences (Oswald, Brennan, Williams, Darville & McCaffrey, 2018). However, according to leading experts, e.g. Cathelijne Stoof (2020), the Netherlands needs to learn how to live with fire, just as it lives with water. Due to the increasing warmer and drier weather patterns, the risk of wildfires is increasing. Often wildfires remain small and are easily controlled. Yet, wildfires are becoming bigger, brighter and therefore on occasion more difficult to fight. The Netherlands is also affected by this trend and experts warn of an increasing threat with regard to wildfires (Oswald et al., 2018; Verhoeven et al., 2023). Currently there are up to 949 wildfires per year in the Netherlands, and this will only increase in the future along with a higher impact of these wildfires (Stoof, 2020). Schoorl, a village in the province of Noord-Holland and the setting of this research, is one of the places in the Netherlands that has experienced wildfires before. From 2009 to 2011, Schoorl was hit several times by wildfires, with the largest wildfire in 2009. The wildfire in 2009 approached the village up to a few metres and residents had to be evacuated (Oswald et al., 2018; NH Nieuws, 2019).

1.1. Problem Statement and Research Questions

Because the Netherlands is densely populated, these trends raise concerns. With these current prospects, uncontrollable and simultaneous wildfires are more frequently expected to occur that cannot be fought with current capacity of the fire department, technology and tactics (Verhoeven, 2023). Therefore, efficient wildfire management must be developed. However, to develop efficient wildfire management it is vital to communicate with communities affected by wildfire and to take risk perception of these communities into account. This is necessary because natural disasters are socially constructed, and are therefore often not natural. The way in which humans manage natural disasters is shaped by the way their culture views nature (Oswald et al., 2018). Yet, current awareness concerning wildfire risk in the Netherlands is low. Therefore, a small fire can already have a great impact (Stoof, 2020). In a previous study in the Netherlands by Oswald et al. (2018) respondents were found to believe that wildfires were a threat to nature and wildlife, but not to humans. However, communities that are surrounded by dense vegetation should be aware that they are living within an interface.

Moreover, perceiving a risk is not enough to take action to manage a risk (Stoof, 2020). There exists a risk paradox, high risk perception will not necessarily lead to high personal preparedness. Many different factors play into being personally prepared or not (Wachinger, Renn, Begg & Kuhlicke, 2013). For example, in the Netherlands people have high trust in official bodies and therefore have high expectations for these organisations to handle wildfire risk and inform them about it (Oswald et al., 2018). To create efficient wildfire management it is important to know how people see their own coping capacity and what their expectations are of official bodies.

Protection Motivation Theory is a theory that looks into both the risk perception and the personal preparedness and how these two aspects lead to protective behaviour. Protection Motivation Theory explains how threat appraisal and coping appraisal come into play and how together they lead to protection motivation (Norman, Boer, Seydel & Mullan, 2015). Therefore, this theory is used as a theoretical foundation in this study to explore the individual risk perception, the perceived coping response and the intention to take individual mitigation actions. As explained in the previous paragraphs these elements are of importance to explain why some people might perceive a risk, but not act upon it. Furthermore, using the Protection Motivation Theory in this research causes the study to have an original perspective, as the theory has not yet been applied on research regarding wildfire risk in the Netherlands.

Furthermore, there is a debate about how previous experience plays into protective behaviour. Previous experience with wildfire can in some cases lead to a let-down in risk perception. In that case individuals believe that a wildfire will not happen again soon and that they are the victims of a low probability hazard. This can also lead to less motivation to start engaging with preventative measures (Arvai, Gregory, Ohlson, Blackwell & Gray, 2006; Dupey & Smith, 2019). When developing wildfire management it is important to take this into account. Therefore, as Schoorl has experienced wildfires before, this research will also include how previous experience plays into protective behaviour.

Thus, this research will focus on the risk perception of residents in Schoorl, their personal preparedness and their previous experience. This leads to the following research question:

What is the wildfire protection motivation of residents in Schoorl after the wildfire of 2009, 2010 and 2011?

With the following sub research questions:

- How do residents in Schoorl perceive the current wildfire hazard they are exposed to?
- How do residents in Schoorl perceive the current coping capacity to respond to wildfires?
- To what extent do residents in Schoorl feel responsible to take mitigating actions concerning wildfire?
- To what extent does the prior experience with wildfire influence the protection motivation of residents in Schoorl?

These main research question and the sub research questions of this study are answered by using a mixed methods approach of both surveys and interviews at the individual level. By the use of the mixed methods approach numbers can be added to words and the other way around. This causes a more comprehensive view of the topic (Johnson & Onwuegbuzie, 2004).

My thesis is an attempt to research risk perception of wildfires in the Netherlands and its influence on taking preventative measures. By means of a case study of Schoorl, the Netherlands, this research may be valuable for developing efficient wildfire management. It is interesting to see how a previous experience with a wildfire affects peoples risk perception and the motivation to take preventative measures. Furthermore, integrating Protection Motivation Theory in the research allows the relationship between risk perceptions of people living in an at-risk wildland-urban interface and personal preparedness to be clarified further (Dupey & Smith, 2018).

1.2. Thesis Structure

This thesis is organized in six chapters. What will be discussed in every chapter is presented below:

Chapter 1: Introduction – This chapter gives an introduction into the research problem of this research. It presents the research questions that are the guiding themes throughout this research. Furthermore, it discusses the value of this research.

Chapter 2: Literature Review – This chapter discusses the relevant literature that this research is built upon. It reviews literature upon risk perception, Protection Motivation Theory and its different variables. Furthermore it also reviews previous studies on Wildfire that have used Protection Motivation Theory and previous experience as the basis for their research.

Chapter 3: Methodology – This chapter discusses Schoorl and its surroundings as the study area used for this research, the operationalisation of the different variables presented in the literature review, the study design and the methods used for this research. Furthermore, the ethical considerations regarding this research will be discussed.

Chapter 4: Results and Analysis – This chapter will present the results of the surveys and the interviews held for this research. Furthermore, the results on the different variables of the Protection Motivation Theory and previous experience will be analysed.

Chapter 5: Discussion – This chapter discusses the main findings of this research and places these findings in the broader context of the existing literature. Furthermore, the limitations, strengths and implications of the research will be evaluated.

Chapter 6: Conclusion – In this chapter the key findings of this research will be presented and answers to the sub-research questions and the main research question will be given. Finally, recommendations for further research will be presented.

2. Theoretical Framework

In this chapter the theoretical framework used for the research will be discussed. Successful wildfire management involves both community and individual action. However, including residents in wildfire management will be more effective when residents are aware that there is a wildfire threat and that wildfire management is a combination of suppression and mitigation efforts. Furthermore, it is important that residents realise that this is a shared responsibility between residents and the government (McFarlane, McGee & Faulkner, 2011). Therefore the Protection Motivation Theory is used in this research. First, risk perception is explained and factors that influence a person's risk perception will be discussed. Furthermore, the theory of Protection Motivation will be explained in this chapter. Additionally, previous research concerning wildfire that uses the Protection Motivation Theory will be discussed and the different effects of previous experience on people will be explained. Finally, the link between the research and the used theory will be made.

2.1. Risk Perception

The concept of risk was invented to deal with the dangers and uncertainties of life. And even though these dangers and uncertainties are real, there is no 'objective risk' (Slovic, 1999). Everyone has his own definition of risk, this is called risk perception. Risk is socially constructed, it is internalized through social and cultural learning. And it is constantly being modified by outside influences and communication processes (Wachinger et al., 2013). Therefore, risk perception is influenced by many different factors. However, which factors influence risk perception and how they relate to willingness to act and to risk preparedness is debated (Slovic, 1999; Wachinger et al., 2013).

Slovic (1999) shows that gender and race are strongly correlated with risk perception. Men tend to have a lower risk perception than women, they see risk as smaller and less problematic. People with the lowest risk perception in the study by Slovic (1999) were white males. However, according to Wachinger et al. (2013), the most important factors are previous experience and trust. They concluded that cultural and individual factors, such as age, gender, education, income etc. play a not so important role but can act as mediators between experience, trust, perception and preparedness to take protective actions.

Smith (2004) believes that past experience of a hazard is of importance when this same hazards occurs again, because people with previous experience tend to have a more accurate view regarding the hazard (Smith, 2004). In this case previous experience can have a positive effect on risk perception, which could lead to more protective behaviour. However, it can also lead to a let down in risk perception when people believe that it is a event that they will not soon experience again (Wachinger et al., 2013). This will be discussed in further detail and in relation to wildfires in a later sub-section of this chapter.

Additionally, according to Wachinger et al. (2013) trust might lead to two responses. On the one hand if people trust the authorities, they are more likely to follow their warnings and orders. However, on the other hand it can also lead to people expecting official authorities to handle the risk. If people have great expectations about the government taking protective measures, they will have a low expectation for their own capacity to take protective measures. Furthermore, high trust can lead to expecting quality education efforts of these official bodies (Oswald et al. 2018). In an increasingly complex world individuals are not able to inform themselves about all the threats they face and which protective measures they can take (Wachinger et al., 2013).

Furthermore, according to Wachinger et al. (2013) there might exists a risk perception paradox in some cases. A high risk perception will not necessarily lead to people being personally prepared and taking

mitigating behaviour. According to Wachinger et al. (2013) there are explanations as to why this paradox might occur. The first reason might that people perceive the risk but choose to accept it because the possible benefits outweigh the negative impacts in their eyes (Wachinger et al., 2013). Higher perceived benefits are associated with a lower perceived risk (Slovic, 1999). The second reason is that individuals understand the risk but have only few resources to affect the situation themselves. The third reason is that people understand the risk but do not feel it as their own responsibility to take action, they transfer the responsibility of action to someone else. This is associated with trust (Wachinger et al. 2013). The Protection Motivation Theory is related to the risk perception paradox and will be discussed in the next sub-section of this chapter.

2.2. Protection Motivation Theory

Protection Motivation Theory was first coined by the psychologist Ronald W. Rogers in 1975 and was developed as a framework to predict health related behaviour. However, Protection Motivation Theory was later on used beyond health related issues. Nowadays the theory is used for any threat for which there is an effective recommended response that can be carried out by the individual. The first version of Protection Motivation Theory was based on research of fear appeals (Milne, Sheeran & Orbell, 2000). A central point in this research is that fear arousing communication can have a significant impact on attitudes and therefore also on behaviours. With Protection Motivation Theory Rogers wanted to bridge the gap between research on fear appeals and attitude change (Floyd, Prentice-Dunn & Rogers, 2000; Milne et al., 2000). Previous research suggested that there are three main stimulus variables in fear-appeal: The first one is the severity of a certain event, the second one concerns the probability that the given event will occur if no protective behaviour is adopted and the last one concerns the availability and effectiveness of coping responses to reduce the threat. Rogers adopted these three variables as the basis of Protection Motivation Theory (Milne et al., 2000).

The original formulation of Protection Motivation Theory described how the fear appeal communication initiates change in attitudes concerning the severity of the threat, the probability that this threat will occur and the efficacy of a recommended coping response (Maddux & Rogers, 1983). In 1983 Ronald W. Rogers revised his theory and included a broader spectrum of information sources that could have an effect on the coping or fear appraisal process. With this addition Rogers attempted to offer a more comprehensive theory (Maddux & Rogers, 1983; Milne et al., 2000)

Rogers has organized the Protection Motivation Theory along two mediating processes. He proposed that environmental and intrapersonal sources of information initiate two independent appraisal processes: threat appraisal and coping appraisal (Floyd et al., 2000; Norman et al., 2015). The variables that make up the threat and coping appraisal will be explained in the next section of this chapter.

2.3. Variables of the Protection Motivation Theory

The cognitive mediating processes of the Protection Motivation Theory are initiated by sources of information. This was one of the added revisions of the Protection Motivation Theory by Rogers in 1983. These sources of information initiate the threat appraisal and coping appraisal process. The sources of information consist of environmental and intrapersonal sources. Environmental sources are defined by communication, observations and learning and can be seen as fear appeals. The intrapersonal sources are defined by personal variables and prior experiences (Maddux & Rogers, 1983). A schematic overview of the cognitive mediating processes initiated by the sources of information and fear appeals can be found in figure 1.

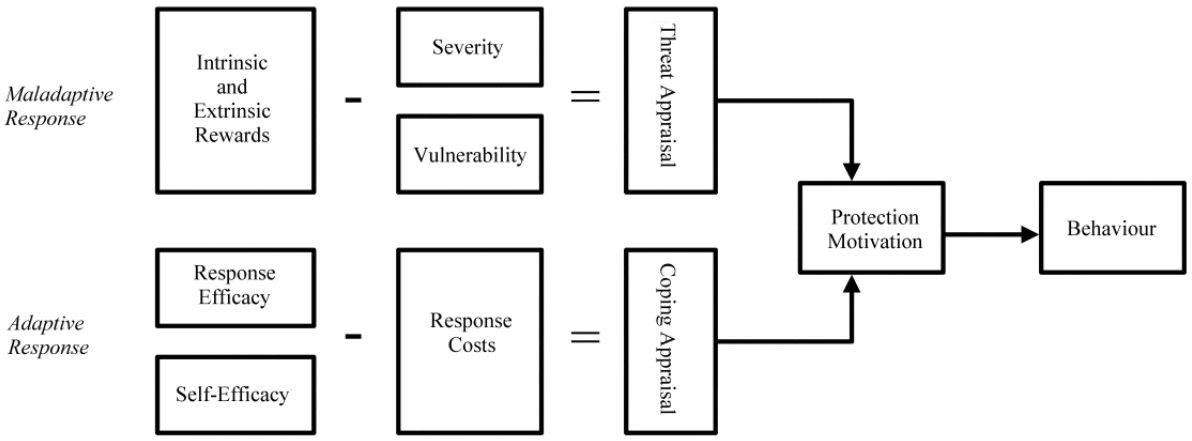

Figure 1 Schematic overview of the cognitive mediating processes of Protection Motivation Theory (Norman et al., 2015)

Firstly, the threat appraisal will be discussed. The threat appraisal focuses on the source of the threat and the factors that decrease or increase the maladaptive responses, such as denial, wishful thinking, hopelessness and avoidance. The threat appraisal is made up of three variables. The first variable is the intrinsic and extrinsic rewards. This is defined as the benefits of neglecting the mitigating behaviour of the threat. Intrinsic rewards of neglecting the mitigating behaviour can for example be pleasure, while extrinsic rewards of neglecting the mitigating behaviour can for example be social approval. This variable has a negative relationship with the threat appraisal and will increase the likelihood of maladaptive responses (Kothe et al., 2019; Norman et al., 2015). The second variable is perceived vulnerability. The perceived vulnerability assesses how susceptible a person feels to the communicated threat (Milne et al., 2000). In this research it would mean: to what extent do individuals estimate the probability that a wildfire will occur and how vulnerable they feel because of that (Dupey & Smith, 2019). The third variable of the threat appraisal is the perceived severity. With the perceived severity is meant how individuals would estimate the seriousness of the consequences of the threat (Milne et al., 2000; Kothe et al., 2019). These two variables have a positive relationship with the threat appraisal and serve to inhibit maladaptive responses (Norman et al., 2015). The threat appraisal overall has a positive relationship with the protection motivation (Milne et al., 2000).

The coping appraisal is also made up of three variables. The first variable of the coping appraisal is the perceived response efficacy. The perceived response efficacy concerns the beliefs of an individual about the effectiveness of recommended coping responses to reduce the communicated threat in the future (Milne et al., 2000; Dupey & Smith, 2019). The second variable is perceived self-efficacy. With perceived self-efficacy the beliefs of an individual about their own capability to perform the recommended responses themselves is meant (Milne et al., 2000). The final variable of the coping appraisal is the perceived response costs. The response costs refer to the individuals estimation of the costs associated with performing the recommended response. These costs can be calculated in time, money, labour etc. (Milne et al., 2000; Dupey & Smith, 2019; Kothe et al., 2019). While the response efficacy and the self-efficacy have a positive relationship with the coping appraisal, the response costs has a negative relationship with the coping appraisal and serves to inhibit adaptive responses (Norman et al., 2015). The coping appraisal overall has a positive relationship with the protection motivation (Milne et al., 2000).

The final part of Protection Motivation Theory is the actual health protective behaviour that will occur after the cognitive mediating processes. The protection motivation operates as a mediating variable between the threat and coping appraisal processes and the protective behaviour (Norman et al., 2015). Protection motivation can be seen as the intention to perform a behaviour. This variable has a positive relationship with the actual health protective behaviour (Milne et al., 2000).

2.4. Wildfires and Protection Motivation Theory

In previous research Protection Motivation Theory has been used to explain risk perceptions and mitigation behaviours regarding wildfire risk of residents living in at-risk wildland urban interface areas (Dupey & Smith, 2019; Dupey Larsen et al., 2021; McFarlane et al., 2011). These studies have concluded that many residents living in at-risk wildland urban interface areas have completed some mitigation efforts on their property. Often low-cost, low-effort mitigation options that address multiple objectives are chosen by residents living in these areas. Removing vegetation or making structural changes to their houses are among the less chosen options by residents in these studies (McFarlane et al., 2011).

Residents who perceive the threat of wildfire as unlikely to happen or as random and uncontrollable often do not start engaging in wildfire mitigation actions. Furthermore, relevant to wildfire management are previous experiences of successfully supressing wildfires. When residents believe that fire fighters will protect their home there is a reduced risk perception. This suggests that residents have an unreal sense of protection. There are limits to the fire suppression capabilities. This relates to the fact that it is often assumed that personal experience with wildfire will enhance a person's threat appraisal (McFarlane et al., 2011).

However, in various research studies it was concluded that previous experience with wildfire had different effects on the perceived risk. In some cases it leads to a heightened sense of vulnerability, this is often seen as a wake-up call. When individuals view a previous event this way, they tend to show higher motivation to engage in mitigation actions. Yet, in some cases it leads to a decrease in risk perceptions. In this case individuals believe that a wildfire will not soon happen again and that they are the victim of a low probability hazard. These people often show less motivation to start engaging in mitigation actions (Arvai et al., 2006; Dupey & Smith, 2019; Wachinger et al., 2013). In another study by Dupey Larsen et al. (2021) it was concluded that the belief that a wildfire would happen again dropped by 20% after a near-miss wildfire. So, experiencing the wildfire decreased the risk perception. However, the same research by Dupey Larsen et al. (2021) found this did not lead to less desire to mitigate future wildfire risk. The near-miss wildfire did push the residents to proactively engage with mitigation actions.

After experiencing a near-miss wildfire, removing vegetation and making structural changes to their property is chosen by residents as the more effective mitigation actions that can be undertaken (Dupey & Smith, 2019). This presents a unique opportunity to start engaging the community in wildfire preparedness and mitigation efforts because of the increased willingness to take mitigation actions (Dupey Larsen et al., 2021).

2.5. Linkage between theory and research

This chapter served as a way to give a general background into risk perception and the Protection Motivation Theory as well as to explain the model and its different variables. Furthermore, this chapter has shown insight into previous research done regarding risk perception and the protection motivation of residents who live in at-risk wildland urban interface areas or have previously faced wildfire. This information provides the basis of this research, since the research is focused on the protection motivation assessment concerning wildfire of the residents in Schoorl. During the research the values of different variables of the Protection Motivation Theory, as discussed in this chapter, will be

measured. Furthermore, the knowledge of previous studies about the Protection Motivation Theory and wildfire will be taken into account. How these different variables will be measured and analysed will be discussed in the next chapter.

3. Methodology

In this chapter, the study area, the operationalisation, the study design, the methodological decisions and the ethical considerations of this research are discussed. I will clarify the different concepts used in the research question and I will discuss how these concepts are preliminarily operationalised for this study. Furthermore, I will elaborate on how the research will be conducted and analysed. Finally, ethical considerations of this research are examined.

3.1. Study area

Schoorl is the context of this study, and a wildfire prone area (Verhoeven et al., 2023). To give a clear picture of Schoorl, demographic characteristics will be discussed first. Schoorl is a village in Noord-Holland that lies within the municipality of Bergen, see figure 2. Schoorl had approximately 4,700 inhabitants in 2022 distributed over 2,155 households. Most of the houses (71%) in Schoorl are privately owned. Moreover, Schoorl is characterised by a high average age of its residents, the largest proportion (35%) of the residents are 65+ years old. This can be seen as high as compared to the Netherlands as a whole, where this percentage lies at 20%. Furthermore, the gender distribution is divided equally. Finally, around 86% percent has a native Dutch background. Only around 3% of the inhabitants in Schoorl have a non-western migration background; this can be seen as low as compared to 14% in the whole of the Netherlands (AlleCijfers, 2022).

In addition, Schoorl has an interesting context for this study because it has faced wildfires before. Schoorl is directly adjacent to the Schoorl dune and forest area. This area experienced several small and four big wildfires from 2009 to 2011 in which large areas of natural land burned down. A total of 270 hectares of nature burned including heath, deciduous and coniferous forest (OBN-Deskundigenteam Duin- en Kustlandschap, 2012). Furthermore, during the first big wildfire in 2009 the wildfire approached the village of Schoorl within a few metres (NH Nieuws, 2019). This led to the evacuation of 550 inhabitants of Schoorl. After that more wildfires followed, see figure 3. In this study there will be researched how these events have impacted the risk perception and the personal preparedness of the residents living in Schoorl.

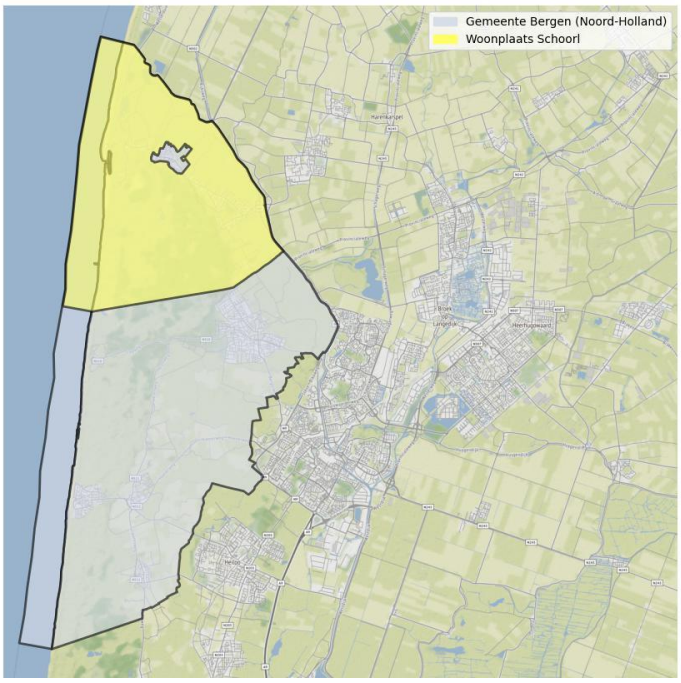

Figure 2 Map of Schoorl within the municipality of Bergen (AlleCijfers, 2022)

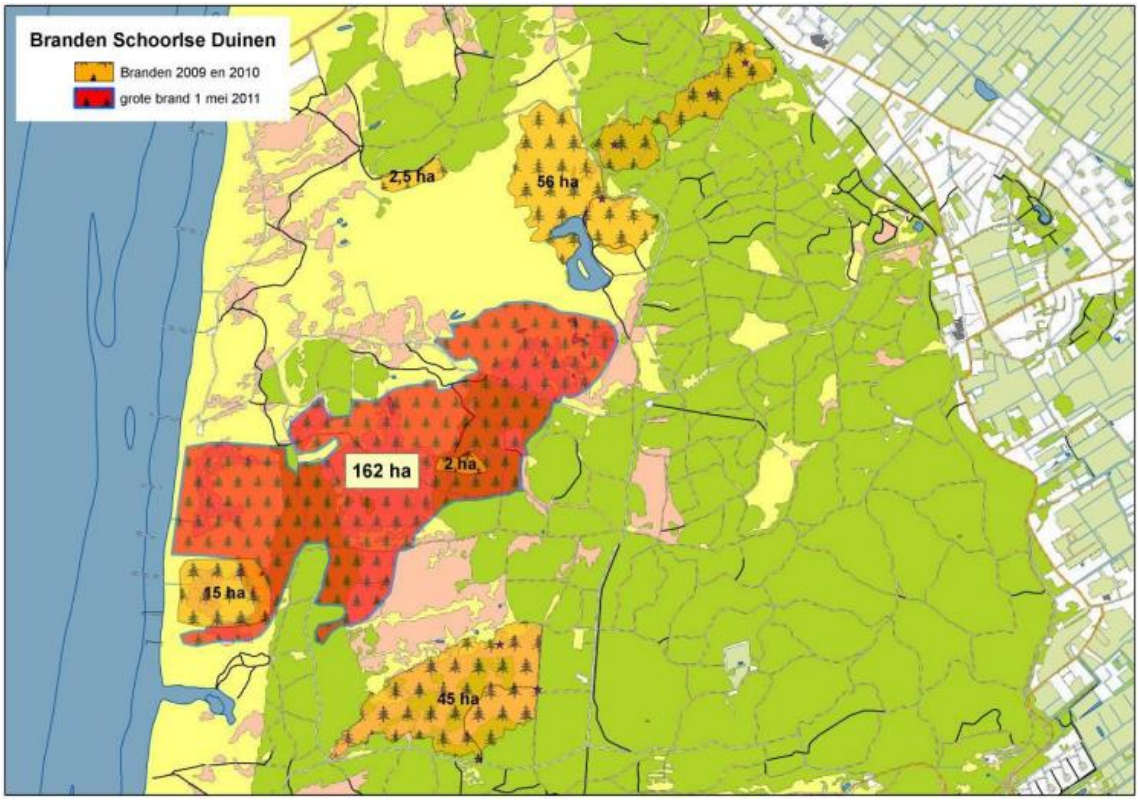

Figure 3 Wildfires of 2009, 2010 and 2011 in the Schoorl dune and forest area (OBN-Deskundigenteam Duin- en Kustlandschap, 2012)

3.2. Operationalisation

In this subsection of the chapter the operationalisation of the different variables of the research will be presented. In the theoretical framework the different variables were defined. In table 1 the operationalisation of those definitions for this research is presented. To operationalise the variables, information from different previous studies on Protection Motivation Theory and previous experience regarding wildfire was used (Dupey Larsen et al., 2021; Dupey & Smith, 2019). More specifically, I have used operationalisations from the cited literature where possible. Where I could not find a usable operationalisation of a variable, I have created the operationalisations myself by applying the given definitions to the context of this study. These studies provide a good guide for this purpose, as they also examine Protection Motivation Theory and previous experiences related to wildfire risk. Furthermore, all variables were researched through a mixed methods approach of both surveys and interviews. The different methods will be elaborated upon in the next sub-section of this chapter.

Table 1 Operationalisation (Dupey Larsen et al., 2021; Dupey & Smith, 2019)

Concept	Variables	Operationalisation	Method
Perceived threat	Perceived vulnerability	How susceptible do residents/tourists in Schoorl feel towards the communicated threat?	Survey & Interviews
	Perceived severity	What will the consequences be of a wildfire according to residents/tourists in Schoorl?	
	Rewards	What are considered rewards by the residents of Schoorl of living at the at-risk wildland urban interface?	
	Fear	Do residents/tourists in Schoorl experience feelings of fear and worry when thinking about wildfire risk?	
Perceived coping response	Response efficacy	What are effective coping responses according to residents/tourists in Schoorl?	
	Self efficacy	What recommended coping responses do residents/tourists in Schoorl think they are able to perform themselves?	
	Response costs	How costly will coping responses be according to residents/tourists in Schoorl (in time, money, labour etc.)?	
Previous Experience	• Do residents/tourists in Schoorl have previous experience with wildfires? • How did residents/tourists in Schoorl experience previous wildfires? • Did residents/tourists in Schoorl take measures after their previous experience with wildfires?		

3.3. Research Design

To answer the main question and sub-questions of this research a mixed-methods approach was used. The research methods are both qualitative and quantitative and each bring a particular kind of insight into the study. By the use of the mixed methods approach numbers can be added to words and the other way around. This causes a more comprehensive view of the topic (Johnson & Onwuegbuzie, 2004). Furthermore, this is also an often used approach in previous studies concerning wildfire incorporating the Protection Motivation Theory. Mixed methods is important since it improves the reliability and validity of the research. Triangulation can validate findings obtained from two or more methods and make sure that the results are valid and not just the result of a methodological error (Dupey & Smith, 2018). For this research a quantitative survey and qualitative individual in-depth interviews are used.

3.4. Research Methodology

Both the surveys and interviews were held at the individual level rather than at the household level. The individual level was chosen for this research since most studies concerning wildfire that also incorporate the Protection Motivation Theory predominantly analysed perceptions and behaviours related to wildfire at the level of the individual and thus will be more easily comparable (Dupey & Smith, 2018). Furthermore, the existing literature has not shown a reason not to use these methods. Where we speak of "residents" in this study, this category denotes both people who live in Schoorl and people who temporarily stay in Schoorl on holidays or for other reasons. This is done because Schoorl is an area that attracts many tourists. Bergen, of which Schoorl is a part of, is a coastal municipality with 1.3 million overnight stays by tourists per year (Gemeente Bergen, 2017). Many tourists visit the area especially in the summer, which is the time of year when the risk of wildfires is high. This is of significance as this study runs from June 2022 to February 2023, with its fieldwork period from the 1st August to the 1st of November.

Survey

In this section the survey method used in this research and the type of analysis will be discussed. In this research a survey is used because it is one of the most used methods in studies concerning wildfire that also incorporate Protection Motivation Theory (Dupey & Smith, 2018). Furthermore, a self-administered survey according to a drop and collect technique has additional advantages. Firstly, it allows a single researcher to gather data from a large sample of respondents at a relatively low cost. Secondly, with a self-administered questionnaire there is no worry about the interviewer or response bias (Bernard, 2017).

The population for the research was selected according to the proximity of the house to the at-risk wildland urban interface. During a wildfire of 2009 houses were evacuated up to 500 m from the at-risk wildland urban interface (NH Nieuws, 2019). Therefore, for this research houses that lie within this area in Schoorl will be asked to participate in the survey. The survey was held in Dutch, since most residents in Schoorl are from the Netherlands. The surveys were administered in this area at random days between the 1st of August and the 1st of November, between 10 a.m. and 7 p.m. Within this research it was chosen not to include underage people. This decision was made because they do not fall within the target group of this research, since this research is focused on property owners or tenants.

Furthermore, the survey instrument was designed to measure each variable described by Protection Motivation Theory. The questions were framed according to my own understanding of Protection Motivation Theory as described in the theoretical framework and the operationalisation. In the survey control questions were incorporated to make sure that people do not just fill out the survey without

thinking their answer over. Additionally, the survey was designed such that respondents had the option of indicating that they have never engaged with wildfire risk and mitigation actions. The complete survey can be found in Appendix I.

During the research two new questions were added to the survey, after it became clear that information was missing. This was discovered when analysing the first round of surveys. This means that these two questions only have 29 respondents. One question was added about the approximate distance from the respondents house to the edge of the forest. This question was added to see if residents who live closer do the edge of the dune and forest area of Schoorl gave different answers than people who live further away. The second question that was added was about whose responsibility respondents think it is to take mitigation actions. This question was added after it became clear during the first round of surveying that respondents did not always think it was their own responsibility to take mitigation actions.

The analysation of the surveys was done with the help of Statistical Package on Social Science (SPSS). With descriptive statistics the data was organised and the characteristics were summarised. Additionally the descriptive statistics gave a clear illustration of the distribution of responses among respondents. Furthermore, cross tabs were used to see if there is a relationship between certain characteristics and answers to questions. Finally, correlations between variables were researched. This was done to see if there were surprising correlations between the results. However, as this is not the main objective of the research, the results on the correlations will be presented in Appendix III. The method used to calculate the correlations will also be explained in this Appendix.

Interviews

In this subsection the in-depth interview method and the type of analyses will be discussed. In-depth interviews were used for this research to understand the motivations and decisions of people in more detail, as surveys are constraint in length. The data generated through this method helped to understand the personal context better (Ritchie, Lewis, McNaughton Nicholls & Armstong, 2014; Yin, 2015). Furthermore, with in-depth interviews the interviewee is allowed to codetermine the agenda of the interview. The idea of the method is to have an unstructured way of interviewing which allows people to open up and to let the interviewees articulate their own ideas. This gave me the opportunity to follow the course of the conversation (Bernard, 2017). This means interviewees could introduce themes that I had not yet thought of, but are of importance. In addition, this helped to sharpen the operationalisation of the research.

Participants for the interviews were found through the survey. In the survey it was asked if participants were open for an interview about the topic. If this method did not generate enough interviews the snowballing method was to be applied. This means asking other interviewees if they can recommend other people that might be open to an interview (Bernard, 2017). If there were more than 20 applications for the interviews, there would have been a stratified sampling among the applications. This was done because 20 interviews was seen as the maximum number of feasible interviews within the specified time allowed for conducting and analysing the interviews. The stratification would have been done based on the personal characteristics, such as age, gender, income and how long the respondent has lived in Schoorl. This was chosen to ensure diversity. However, when planning the interviews neither of these methods were necessary. Furthermore, the interviews were held over the same time period as the surveys, between the 1st of August and the 1st of November.

Additionally interviews were held with the municipality (local authority) and auxiliary organisations, like Staatsbosbeheer[1] and Veiligheidsregio (safety region) Noord-Holland Noord which includes the fire department. This was done to gain a broader insight into what is already communicated by these organisations about mitigation actions regarding wildfire. Overall, these interviews gave a broader context of wildfire risk and mitigation actions in Schoorl.

The interviews were held either online or live. This was dependent on the preference of the interviewee. During the interviews it was important to be non-directive and neutral. The goal of these interviews was to gain insight into the participants own meanings (Yin, 2015). Furthermore, the interviews were recorded with a voice recorder after consent was given through an informed consent form. Additionally, notes were written down during the interviews to make sure that no data was lost when the voice recording failed. These recordings and notes were stored confidentially on the OneDrive of Wageningen University & Research in a password protected folder.

The interviews were analysed by first transcribing the interviews and using Atlas.ti to code all the transcribed interviews. During the research a code tree was developed to help structure the coding process. With the coding I searched for patterns and ideas that helped explain why these patterns existed. The code tree can be found in Appendix II.

Limitations of methods

The first limitation of this research is that the non-representative sample of the survey will make the results of this study less generalisable. Furthermore, the selection of Schoorl as the only research area may cause a selection bias due to environmental factors. The environmental factors of this area will therefore have an important impact on the results of this study. For example, the fact that Schoorl has had previous experience with wildfire may impact the protection motivation of the respondents.

Additionally, the survey was conducted in Dutch only. This ensured that only residents and tourists who were proficient in the Dutch language could participate in the survey. As a result, information on how non Dutch speakers perceive and act upon wildfires might be lacking.

Finally, the self-selection of respondents for the interviews may be an added limitation of this research. The self-selection leads to little influence on who responds to participate in the interviews, which may cause the interviewed group to be non-diverse.

Furthermore, the chosen methods of this research will also come with some ethical considerations, such as obtaining informed consent, confidentiality and the fact that everyone who wants to participate should be enabled to do so. These ethical considerations are important to keep in mind from the start of the research. Therefore, the next sub-section will consider the ethical considerations that are relevant for this research and the chosen methods.

3.5. Ethical considerations

Ethics should be at the core of every research from the early start. Therefore, it is important to consider how the ethical considerations will be taken into account in the research. Good ethical research means putting the participants interests at the core of the decision-making process and to develop an ethical conscience. In this chapter the ethical considerations that are relevant for this research will be discussed (Ritchie et al., 2014).

[1] Staatsbosbeheer is an organisation in the Netherlands that manages and protects 270,000 hectares of nature. The organisation, founded in 1899, is an independent administrative body of the central government, and is part of the Ministry of Agriculture, Nature and Food Quality (LNV) (Staatsbosbeheer, 2023).

The first ethical consideration that will be addressed is the fact that a research should not make unreasonable demands for participation. The research should be worthwhile for the participants (Ritchie et al., 2014). This research did not make unreasonable demands as the participation in the research only took one survey and if wanted also one interview. Furthermore, this research can help to further develop efficient wildfire management in the area of Schoorl which will benefit the residents and might decrease wildfire risk in the area.

Additionally, informed consent is an important ethical consideration in this research. The participants should know what the research is about and what is asked of them (Ritchie et al., 2014; Yin, 2015;). This was done by giving an introduction into research before the surveys are handed out. Furthermore, at the bottom of the survey there was a box that could be checked when consent was given to use the outcome of the survey for the research. Moreover, an informed consent form was provided to the participants of the interviews.

The third ethical consideration that should be taken into account is the confidentiality and the anonymity of the respondents of the survey and the participants in the interviews. Maintaining confidentiality and anonymity means that it will not be disclosed who has taken part in the research (Ritchie et al., 2014; Yin, 2015). In this research confidentiality and anonymity was maintained by not naming the participants by name in the written research. Furthermore, during the interviews with official bodies, there was asked how these interviews were allowed to be mentioned in the study. Furthermore, data collected during the research was stored in a password protected folder.

Furthermore, adverse consequences of participating in the research should be avoided (Ritchie et al., 2014). The potential harms and risks of the research should be assessed and minimized. The harms and risks can be physical, psychological, social, legal or economic (Yin, 2015). In this research the potential psychological harm were assessed. Previous experience with wildfires can cause serious trauma. Therefore, talking about this experience can come with emotions. This was respected during the surveys and the interviews. It might be so that participants were unable to complete their participation for this reason. In that case it is important not to put pressure on participants and to let them calm down. To assess the vulnerability of the interviewees a question was added in the survey to ask about previous experiences with wildfire. However, these emotions have not occurred among participants in this study.

The final ethical consideration that is relevant for this research is that all people willing to participate in the research should be enabled to do so. Ethical research means that you must include diverse views. Therefore, it is important that people have the right to participate in the research to have their views and experiences be taken into account (Ritchie et al., 2014). This also relates to the fact that research needs to be open and truthful. By not incorporating all views research cannot be open and true (Yin, 2015). Currently there might be some obstacles because of the Covid-19 pandemic. Not all people might be comfortable with having face to face contact. Therefore, the option of online interviews was available. However, the Covid-19 pandemic did not appear to be a reason for participants to schedule an online interview. Yet, many interviewees did prefer an online interview, as this suited their daily schedule better. Therefore, six out of the nine interviews with residents in Schoorl were conducted online. Furthermore, visiting the research area around different times gave the opportunity for residents who are not at home during the day or during the evening to participate during another time.

4. Results and Analysis

In this chapter the results and the analysis of the results will be discussed. The structure of this chapter will be presented separately in de sub sections of the results and the analysis.

4.1. Results

In this section the results of the survey and the interviews will be presented. In total 80 surveys and nine interviews have been conducted among residents of Schoorl. Additionally, three stakeholder interviews have been conducted with the municipality of Bergen, Staatsbosbeheer and safety region Noord-Holland Noord.

The first paragraph of this section starts with a short overview of the characteristics of the respondents who participated in this research. In the additional paragraphs of this section the results from both the survey and the interviews will be structured according to the different variables on the Protection Motivation Theory and Previous Experience. Within the presentation of the results the data obtained from the surveys and interviews will be integrated together into the results section. Descriptive statistics from the survey will be used to give a schematic overview of the answers obtained in the survey, while the interviews will be used to give a more in depth view into the context of the data obtained in the surveys. Finally, the last part of this section will discuss the results of the three interviews held with representatives from official bodies to give a broader context to the situation.

4.1.1. Characteristics of the respondents

This section of the results chapter will provide a short overview of the characteristics of the respondent group of the surveys. Firstly, in figure 4 it is shown that the majority of the respondents on the survey identified as male, namely 57,7%. None of the respondents identified as non-binary or did not want to state their gender.

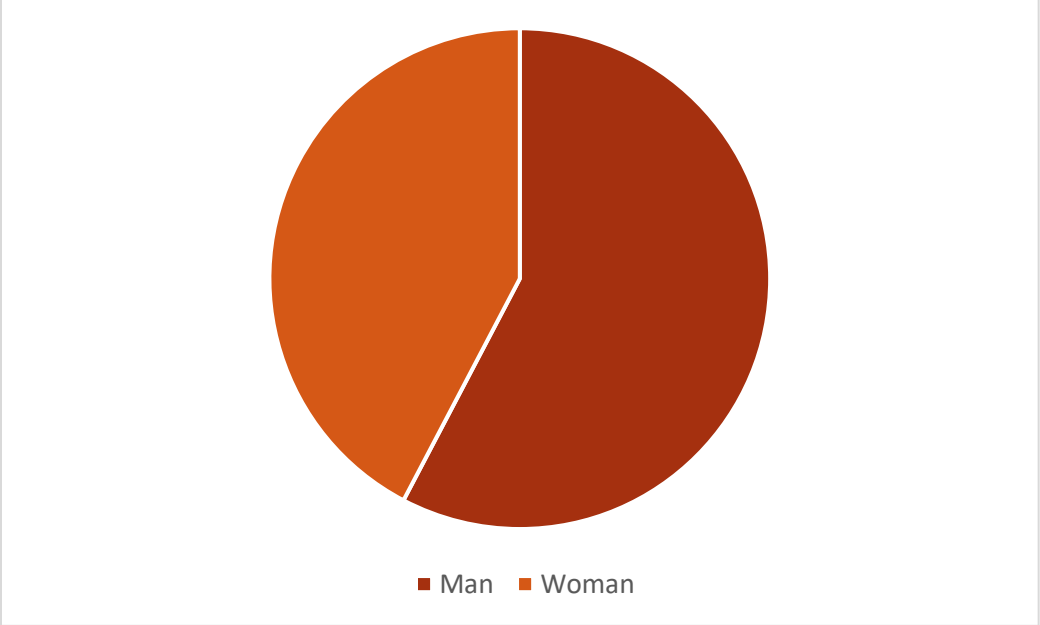

Figure 4 Gender distribution among respondents of the survey

Furthermore, In figure 5 it is shown that most of the respondents indicated that they were between 51-65 years old, 34.6%. Also, most of the respondents are above 50 years old in this survey.

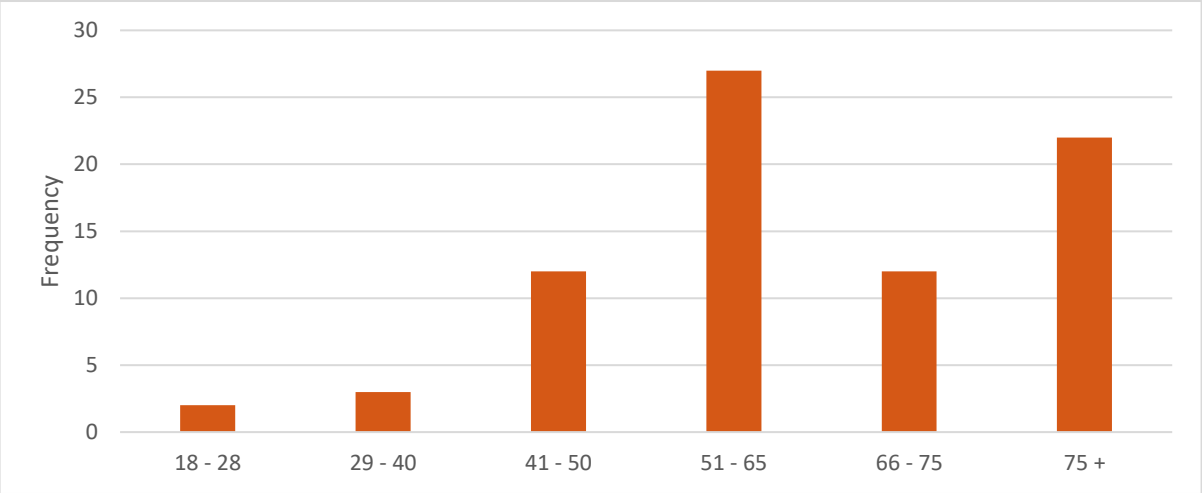

Figure 5 Age distribution among respondents of the survey

Moreover, in the survey there was also asked about the highest level of education and the estimated gross income. In figure 6 the results show that the majority of the respondents have attended higher vocational education (39%) or university (34%). To the question about the estimated gross income 40% of the respondents have chosen the option in the survey to keep this to themselves and are therefore categorised as non-responsive. The majority of the people who did respond to this question, namely 70%, responded that they estimated their gross income above average, see figure 7. Only 4% of the respondents who answered this question estimated their gross income below average.

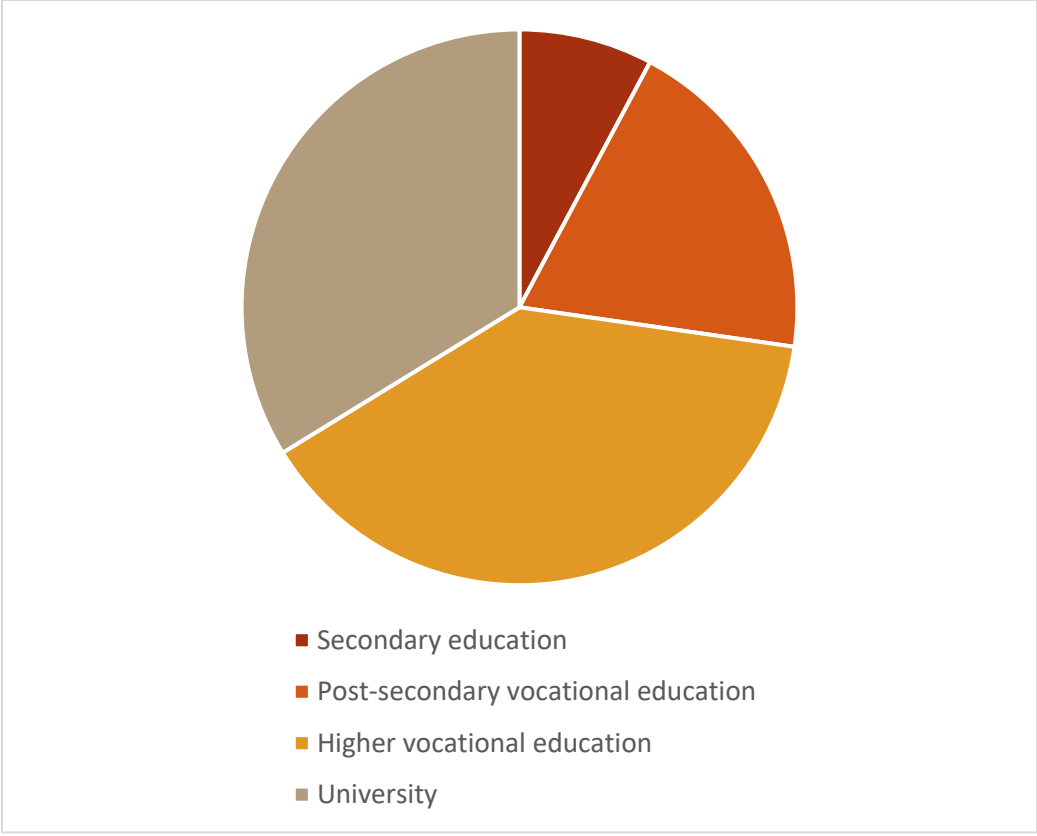

Figure 6 Distribution of education level among respondents of the survey

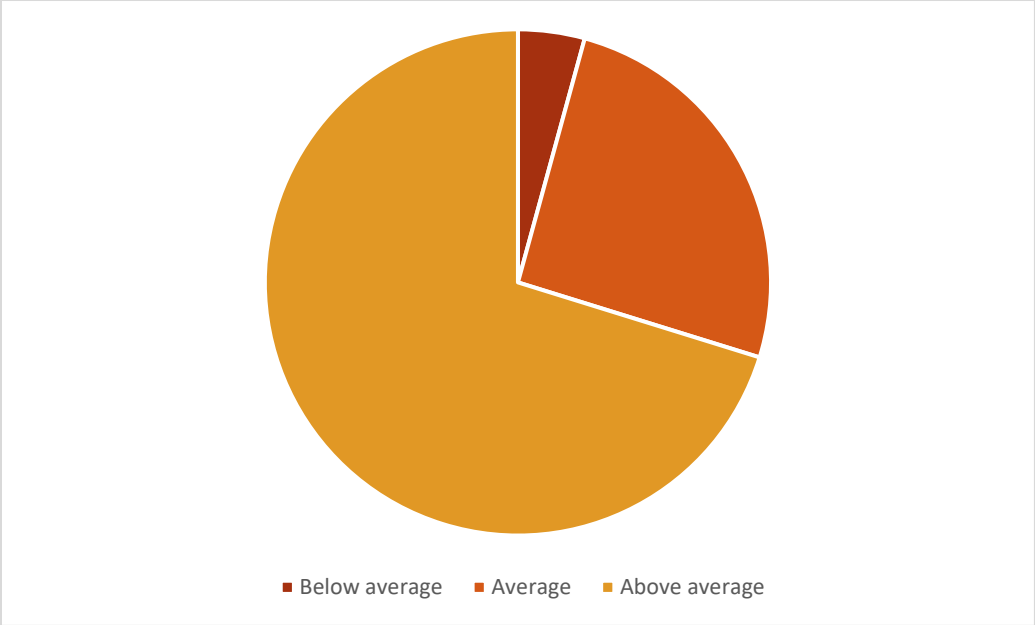

Figure 7 Distribution of estimated gross income among respondents of the survey

Following the general characteristic questions, there were questions in the survey about the housing situation of respondents in Schoorl. The vast majority of the respondents, 91%, lived in Schoorl permanently. The other 9% of respondents were there on a short stay, for example a holiday. Furthermore, from the permanent residents of Schoorl 90% had a privately owned home. The other 10% of respondents was living in a rented house. The respondents were also asked about since when they live in Schoorl and since when they live in their current home. Figure 8 shows the distribution of since when the respondents live in Schoorl and since when they live in their current home. The results show that the majority of the respondents already lived in Schoorl during the previous wildfires of 2009, 2010 and 2011. However, also a large section/proportion of the respondents, namely 35%, has moved to Schoorl after the wildfires. 41% of the respondents have moved to their current home after the previous wildfires in Schoorl.

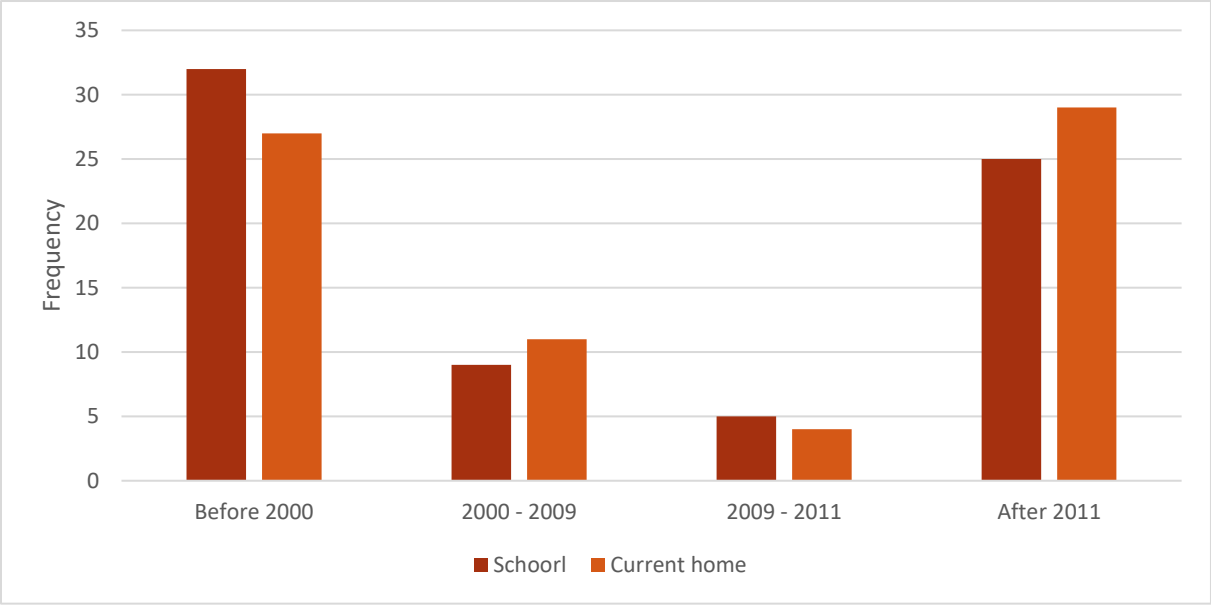

Figure 8 Distribution of since when the respondents live in Schoorl and since when they live in their current home

Moreover, respondents were asked how far they think their home is from the edge of the Schoorl dune and forest area. This question was only included in the second round of surveying. This led to only 29 respondents answering to this question. The results of this question show that the majority of the respondents (72%) think they live within 500 metres of the Schoorl dune and forest area. In a previous evacuation during a wildfire in 2009, everyone was evacuated within 500 metres of the dune and forest area that was at risk. However, only a small group of the respondents (3%) think their house lies within 50 metres of the dune and forest areas. A distance within 50 metres can be seen as living at the edge of the forest and dune area in Schoorl.

4.1.2. Threat Appraisal

In this section the results on the different variables of the perceived threat will be presented. The perceived threat consists of the rewards, the perceived vulnerability and the perceived severity. Furthermore, in this section of the chapter the emotional feelings that respondents of the survey and interviewees experience regarding the wildfire risk in Schoorl will also be discussed.

Rewards

In the survey it was asked what people saw as benefits of living in Schoorl. This was an open-ended question where people could write down multiple answers. These answers were quantified; it was counted how often certain benefits were mentioned. In figure 9 the most frequent mentioned benefits are shown. The results show that nature and peacefulness are most often mentioned as benefits of living in Schoorl.

The interviews also reveal that Schoorl residents see nature as the biggest advantage of living in Schoorl. Interviewees feel they live in the middle of the nature. What also emerges from many of the interviews is that interviewees like the fact that facilities in Bergen and Alkmaar are also very close by. It was also mentioned *(Interviewee 5)* that you can be in Amsterdam within 40 minutes, which is an advantage for many interviewees. One interviewee called this: *'The best of both worlds' (Interviewee 9)*. Other interviewees also indicated that one reason for moving to Schoorl is precisely to seek some more peace and quiet: *'So there's all kinds of things still to do in the area. But we don't have to live in the middle of it anymore' (Interviewee 2)* and *'I lived in Amsterdam, for 35 years. And I live here now.*

That's quite a big difference. There was a desire for more peace and quiet and space and nature, though' (Interviewee 3).

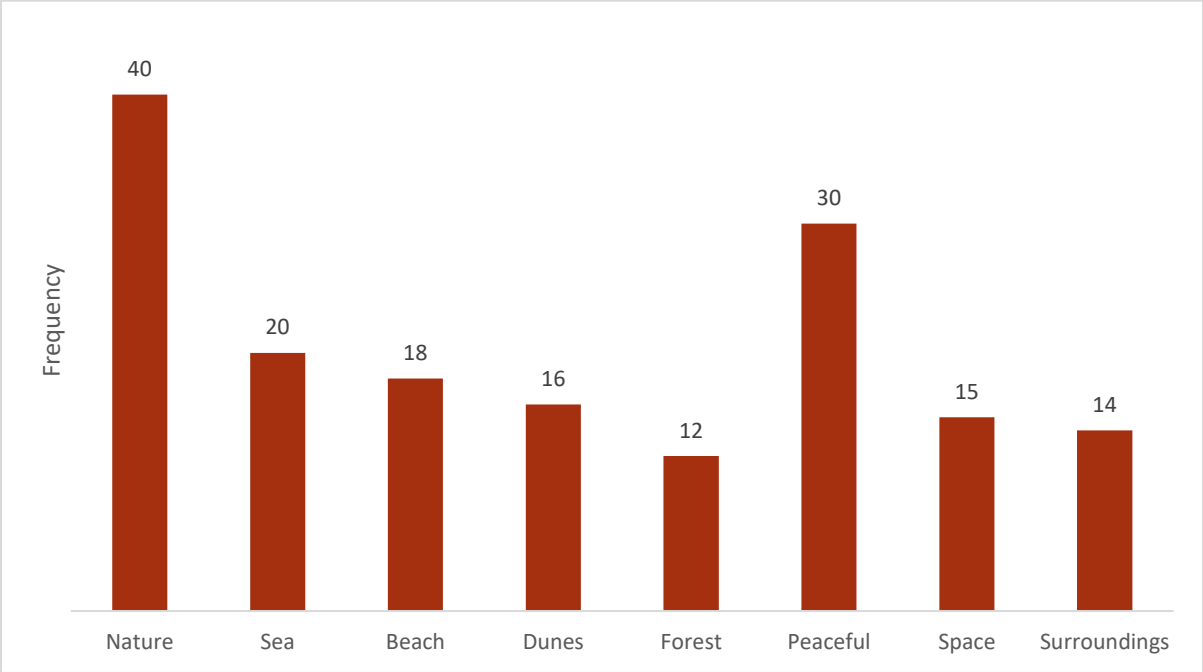

Figure 9 Benefits of living/staying in Schoorl according to respondents of the survey

Perceived vulnerability

The perceived vulnerability was measured in the survey by three different questions: how likely do respondents think it is that parts of Schoorl will be affected by a wildfire in the next ten years, how likely do respondents think it is that their own home will be affected by a wildfire and do they think that because of climate change wildfires will happen more often.

In response to the first question, the majority of the respondents (70%) indicated that they see it as considerable or very likely that parts of Schoorl will be hit by a major wildfire in the next 10 years. A small group of the respondents (11%) see it as unlikely that this will happen. However, in response to the second question the majority of the respondents (66%) answered that they see it as unlikely that their home will be hit in case a wildfire will occur in Schoorl. No link can be found between the answers to this question and how far respondents estimated that their home is situated from the edge of the dune and forest area. For question three, the majority of respondents (54%) indicated that they think climate change will cause wildfires to become more frequent in Schoorl. However, a small portion of the respondents (4%) completely disagreed with this statement.

During the interviews it became clear that many interviewees indicate that the dune and forest area around Schoorl is vulnerable, also because they have already learnt this from the past during the previous wildfires of 2009, 2010 and 2011. One interviewee mentioned: *'I think it's also because history has taught us that, I must say that before that happened I was less aware of that vulnerability. Because it never occurred in that intensity then. And then suddenly in succession' (Interviewee 2)*.

Furthermore, interviewees also qualify the area as a vulnerable area because they see the desiccation of the nature. One interviewee mentioned: '*So, I live here now next to forest, and you can see how that part of the forest is already very much drying up. Because before, under the trees that are there [in the forest], it really borders our back garden, there used to be ferns growing underneath. Ferns that benefit very much from moisture. But they are all gone. Just because of the drought' (Interviewee 7).* The same

interviewee also indicated that pine trees were being cut down because of the dry periods*: 'Also, that road I was just talking about towards the climbing dune, there were some very large pine trees there too, they had been there for decades, and now three of them have also dried up. Those have also been cut down and new ones are planted. But these are all signs that something is changing' (Interviewee 7)*. During the interview the interviewee mentioned that she saw this as a sign of climate change.

However, what stood out during the interviews was that several interviewees saw houses located directly on the forest edge as particularly vulnerable to wildfires, not the whole village of Schoorl. One interviewee was asked which parts exactly he saw as vulnerable, his answer to this was: '*Not the village, but say, there are still some houses in the forest. Say, the adjacent houses that are really in the woods*' *(Interviewee 9)*. Another interviewee indicated that nature and village are very much intertwined. However, she still perceives the houses at the dune and forest edge, where she herself has lived before, as more at risk to wildfires: *'Dunes, forest and village blend together very fluidly. I also notice when I'm up there on top of the dunes, I can't see our own house. So you could say that this is a continuous area. But there are still roads and houses in between. So I think that's why I don't see it as a big risk. But on the immediate edge, where I have lived, it is a threat you can't control' (Interviewee 7)*.

The perceived severity

The perceived severity of wildfires in Schoorl was measured in the survey by two different questions: if an extreme wildfire occurs in Schoorl, how much disruption do the respondents think it will cause to society in Schoorl, and how much disruption do the respondents think it will cause to them individually.

To the first question just under half (49%) indicated that an extreme wildfire would cause considerable disruption to the society of Schoorl, as can be seen in figure 10. The second largest group of respondents (19%) even think it will cause a lot of disruption. The same figure also shows the results of the second question. The majority of the respondents (44%) indicated that they think that a wildfire in Schoorl will cause considerable disruption individually. However, the results show that overall respondents see a wildfire as more of a disruption to Schoorl than as to themselves. Furthermore, when using crosstabs, the results show that women generally tend to see a bigger individual disruption than men. Furthermore, respondents generally see a bigger individual disruption when they estimate that their home is closer to the edge of the forest and dune area in Schoorl.

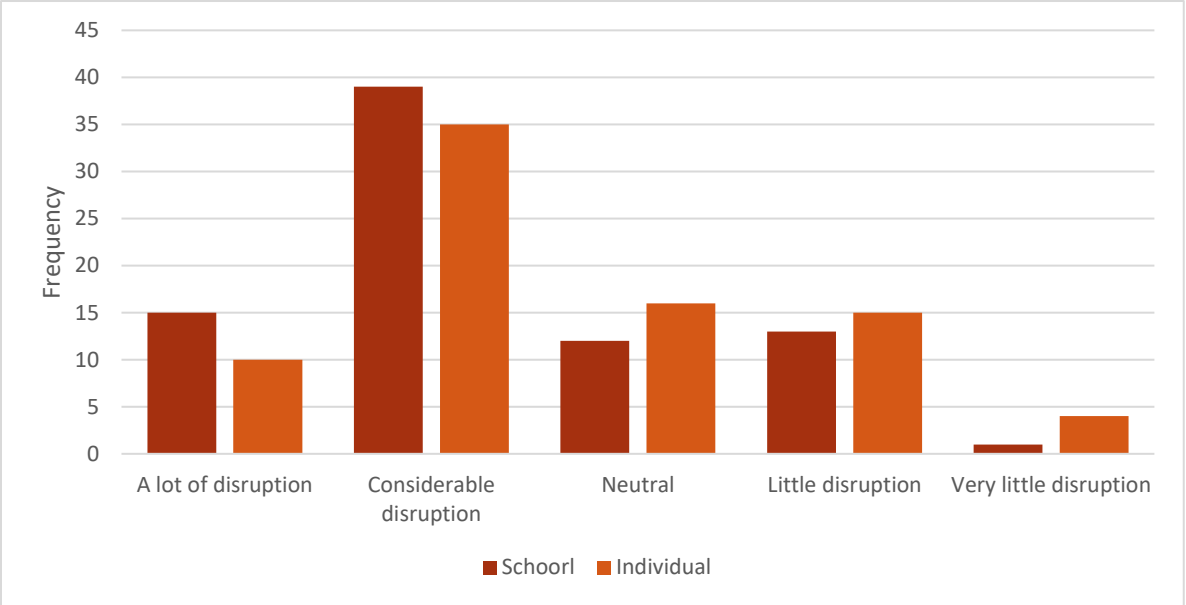

Figure 10 Distribution of disruption respondents see to society and individually in case of a wildfire

Fear

In the survey fear was measured by asking about feelings of fear and worry regarding wildfire risk in Schoorl. The majority of the respondents (46%) indicated that they experience considerable or very few feelings of fear when it comes to wildfires in the dune and forest area of Schoorl. A smaller group of respondents (24%) indicated that they experience considerable or very many feelings of fear. When it comes to feelings of worry, still the majority of the respondents (44%) indicated that they experience few of very few feelings of worry regarding wildfire risk in Schoorl. A smaller group of respondents (30%) indicated that they experience considerable or very many feelings of worry. Overall, these results show that respondents feel slightly more feelings of worry than of fear regarding the possibility of a wildfire in Schoorl.

During the interviews a divided picture emerged. One of the interviewees mentioned that she does not necessarily experiences fear: '*But it's not that I experience fear of it now. I am not afraid of forest fires, but I am aware that it is a real possibility and that it can occur more often' (Interviewee 7)*. Another interviewee said that: *'People are afraid of it, but I myself, because we live just a bit too far away, am not. But the people who live close by are aware of it' (Interviewee 8)*.

However, there are also interviewees who do experience feelings of fear and worry: *'Yes, we heard the stories [about the previous wildfires]. And that was quite frightening. It came so close' (Interviewee 3)* And *'Yes, it does, not day and night, stay on my mind. But it is a concern' (Interviewee 1)*. Other interviewees mentioned that they experience more feelings of worry during dry periods of time. One interviewee said: *'You notice that when you walk in the dunes, that loose sand and leaves are already falling earlier. And then sometimes when I see people lighting a cigarette in the area. I register that immediately, and I also find that unpleasant. I notice a kind of alarm bell going off. Is this person going to put out their cigarette properly' (Interviewee 2)*.

4.1.3. Coping Appraisal

In this section the results on the different variables of the perceived coping response will be presented. The perceived coping response consists of the perceived response efficacy, self-efficacy and response costs. Furthermore, in this section of the chapter there will also be discussed who respondents of the

surveys and interviewees see as the responsible stakeholder to take action regarding wildfire risk in Schoorl.

Response efficacy

In the survey respondents were asked to indicate with which measures to manage wildfire risk in Schoorl they were familiar. The question was open-ended, which meant that respondents had to come up with their own ideas and could give multiple answers. The measures could be for either residents themselves or for official agencies such as the fire department and Staatsbosbeheer. Mitigation actions are best known among respondents of the survey. In total different mitigation actions were mentioned 89 times, different preparedness actions were mentioned 38 times and different response actions were mentioned 50 times. Table 2 shows the most frequent mentioned measures. The measures are categorized according to the disaster cycle. The measures with which respondents were found to be most familiar are: no open fire, installing water basins in the dune area for firefighters and creating firebreaks that prevent fire from spreading. However, there were also four respondents who mentioned that they had no idea what potential measures to manage wildfire could be.

Table 2 Most frequent mentioned measures by respondents of the survey

Mitigation	*Preparedness*	*Response*
No open fire (33)	Installing water basins (20)	Fire breaks (20)
Awareness raising (9)	Accessibility for the fire department (5)	Extinguishing fire (16)
Forest management (8)	Installing a fire hose (4)	Firefighting aircraft (6)
Vigilance residents (8)	Quality material fire department (3)	Evacuate (2)

Furthermore, respondents were asked if they thought that damage and casualties from large wildfires could be prevented by taking measures. The majority of the respondents (88%) agrees that taking measures would help prevent damages and casualties from wildfire. A small group of respondents (6%) disagreed with this statement.

During the interview interviewees talked about different measures that they themselves could take or measures that could be taken by the municipality, Staatsbosbeheer or safety region Noord-Holland Noord. Firstly, the measures residents and visitors of Schoorl can take themselves will be discussed. No open fire and vigilance by residents were the measures most frequently mentioned by interviewees. One interviewee told: '*Suppose, no one gets it into their head anymore, but suppose you start a campfire then you will really be approached by everyone walking by who is from here' (Interviewee 8)*. Another interviewee said: '*When the weather is so very dry like last summer, everyone is very aware. And everyone from here is also very alert to seeing smoke somewhere, everyone also absolutely knows how to behave in a way to prevent it' (Interviewee 5)*. Other measures that were mentioned during the interviews that interviewees could take themselves were: not smoking in the dune and forest area, no thatched roof and getting buckets of water from their house or a water reserve to extinguish the wildfire. One response that stood out was an interviewee who talked about how they used to have shovels in the dunes so that if you saw a fire you could put it out yourself by grabbing a shovel and throwing sand on the fire: '*I used to live in Camperduin [Village next to Schoorl]. And then I noticed that if you cycled to the beach, here and there, and it won't be possible in this day and age, but there were just poles with shovels. So, if there was a fire, you could grab a shovel. You knew that was on the main road and that you could go there to put out a fire by just throwing sand on it. That's something you can do' (Interviewee 3)*.

Secondly, there were also a number of measures that interviewees talked of that had to be taken by official bodies such as the municipality, fire department or Staatsbosbeheer. The most frequent measure that was mentioned by interviewees was raising awareness, this was mentioned seven times. Interviewees were divided on how this had been arranged so far. One interviewee was aware of the municipality working on raising awareness: *'A lot of preventive measures, they [the municipality] are always working on it, with a lot of raising awareness' (Interviewee 8)*. However, the other interviewees were not aware of this and thought that this could be done better. One interviewee mentioned: '*You actually read and hear very little about it [wildfire risk in Schoorl]. More attention could be given to it' (Interviewee 1)*. Another interviewee said: '*Perhaps, if you could start educating people as a municipality, you could also make them more aware of the risks. That you advise them to do or not to do certain things. So in the first place it starts with awareness*' *(Interviewee 4)*.

Other measures that were frequently mentioned during the interviews were warning signs and more diversity of trees in the forest. However, one interviewee said about warning signs: '*I think they also have signs at the entrance to the forest telling you to watch out for that and that open fire is not okay. But I don't really know that much about it. I must honestly say I don't read them either' (Interviewee 6)*. Furthermore, many interviewees talked about how Staatsbosbeheer is currently thinning the pine tree forest and is planting more deciduous trees. One interviewee said about this: '*I do know that, by the way, now that I mention it, Staatsbosbeheer is now thinning out those big pine forests. Because those pine forests, there are all these needles underneath and of course they are also dry. And through those pine trees, a fire also spreads pretty fast. And by placing or growing deciduous trees between them, you can probably provide a buffer. I think they are doing that a bit now too' (Interviewee 7)*.

Self-efficacy

This variable of the Protection Motivation Theory was measured by asking a variety of questions. Firstly, there was asked if respondents felt like taking measures to manage wildfire risk in Schoorl themselves would diminish the change of damages to their own property or to Schoorl in general. The results to these questions are shown in figure 11. The results who that the majority of the respondents (46%) agree that taking measures themselves would reduce the likelihood of damage to their own home and property. Furthermore, the results also show that the majority of the respondents (40%) believe that taking measures regarding wildfire risk themselves could reduce the likelihood of damage to Schoorl. However, the results also show that respondents are more likely to feel that they can make a difference at the individual level than when it comes to the general level of the whole of Schoorl.

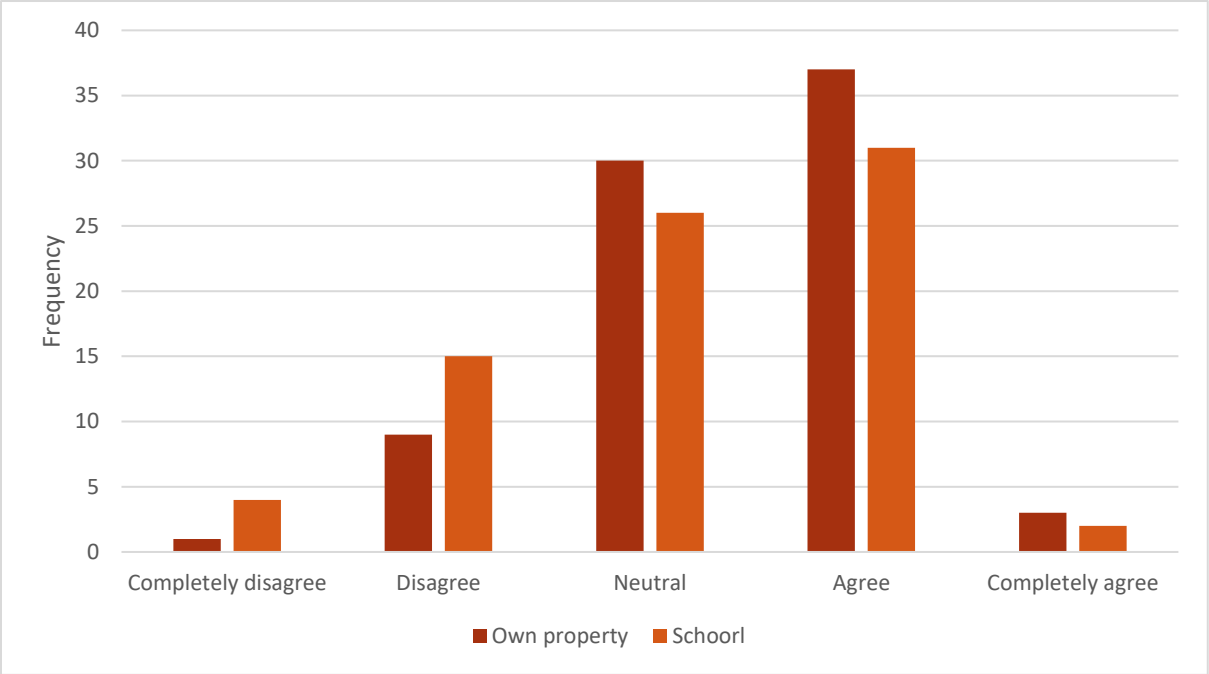

Figure 11 Distribution of answers to the statements 'Taking measures myself to manage wildfire risk in Schoorl will diminish damages to my own property' and 'Taking measures myself to manage wildfire risk in Schoorl will diminish damages in Schoorl'

Secondly, it was asked if respondents to the survey felt financially and physically able to take measures to manage wildfire risk in Schoorl. In figure 12 the results are shown. The majority of the respondents (61%) considered themselves physically able or completely able to taking measures themselves to prevent or mitigate wildfire risk. However, there was also a small group of respondents (10%) who do not consider themselves physically able to take measures against wildfire risk in Schoorl. Furthermore, the majority of the respondents (48%) consider themselves financially able or completely able to take measures against wildfire risk in Schoorl. Only a small group of the respondents (11%) do not consider themselves financially able to take measures. When using crosstabs the results show that respondents with a higher monthly income also felt more financially able to take protective measures themselves compared to respondents with a lower monthly income. Furthermore, men generally felt more physically able to take protective measures themselves compared to women.

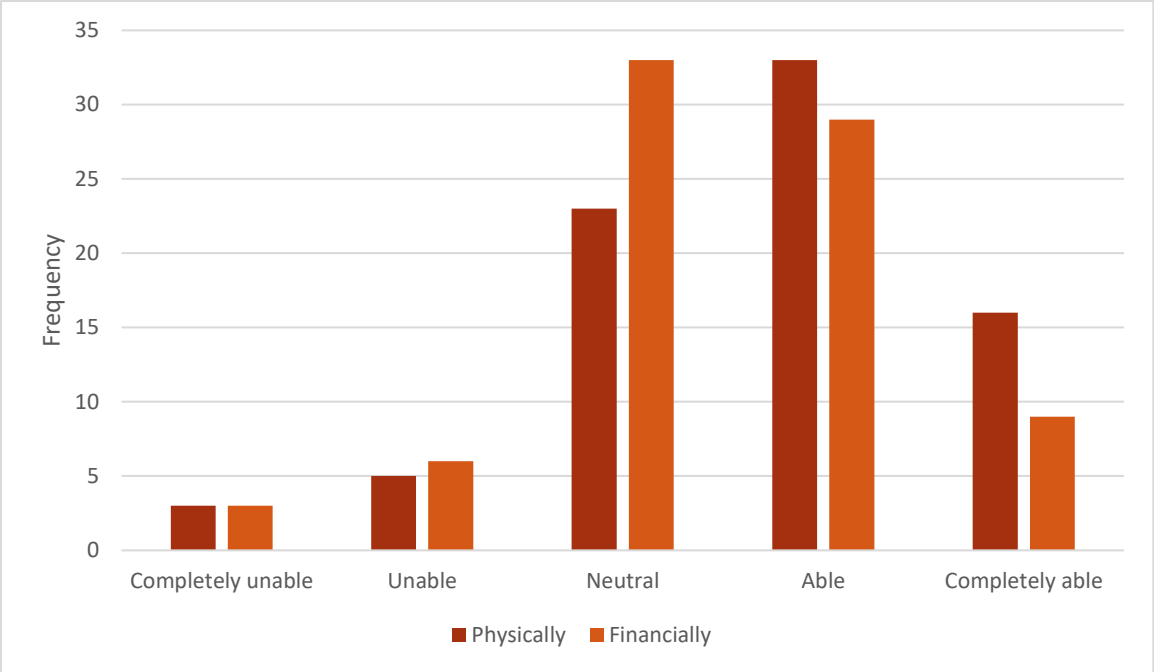

Figure 12 Distribution of answers to the question in respondents feel physically or financially able to take protective measures themselves

Response costs

The response costs were measured in the survey by asking respondents the question if they think that the costs of taking measures to manage wildfire risk in Schoorl are worth it. The results to this question are shown in figure 13. It is shown that the majority of the respondents (63%) of the survey agrees with this statement and feel that the costs of taking measures to manage wildfire are worth it. There is a small group of the respondents (2%) that disagrees or completely disagrees with this statement.

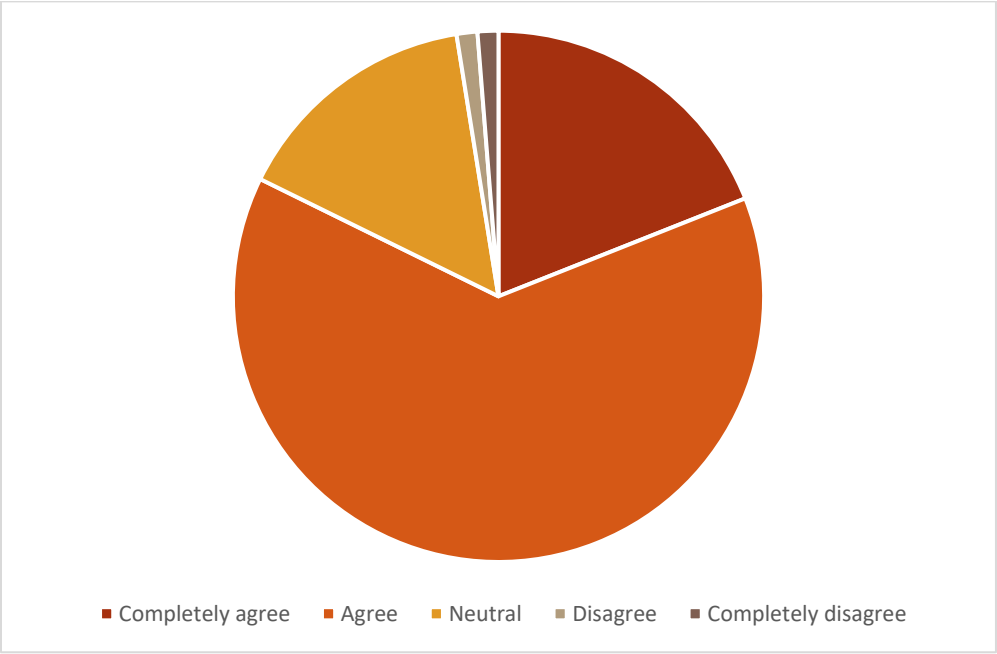

Figure 13 Distribution of answers to the statement 'The costs of taking measures to manage wildfire risk in Schoorl are worth it'

From the interviews it became clear that most interviewees are willing to invest in measures to manage wildfire risk. One interviewee said: '*If a municipality were to make proposals, I would certainly be willing to look at that. I wouldn't mind investing in it at all. If, for example, I am ready for an adjustment to the garden or that I think it I might be better off installing that hedge. I would honestly be very happy to get that information*' *(Interviewee 2)*. Yet, this statement shows that there are people that depend on the municipality to suggest measures residents can take to manage wildfire risk. Additionally, interviewees also mention they are willing to take measures to a certain extent. For example, one interviewee *(Interviewee 8)* talks about the cluster storms they have had in Schoorl. The interviewee said that the different measures for different problems should not contradict each other. This was also revealed in another interview. The interviewee mentioned that she finds biodiversity really important and that measures to manage wildfire risk often contradict measures that she has been taking to improve biodiversity: '*Because actually from biodiversity and natural garden management perspective, you want to help hedgehogs and critters as much as possible. Currently, I'm about leaving everything in the garden, as many leaves as possible and covering the ground well. And just not raking everything away*' *(Interviewee 2)*.

Responsibility

The survey also asked respondents who they considered responsible when it comes to taking action regarding wildfire risk. Respondents were able to give multiple answers to this question. However, this question was added to the survey later on during the fieldwork, resulting in fewer responses to this question. The results in figure 14 show that the majority of respondents felt taking action regarding wildfire is the responsibility of Staatsbosbeheer and the municipality of Bergen, which includes Schoorl. However, eleven of the respondents said they also felt it was the responsibility of the residents themselves.

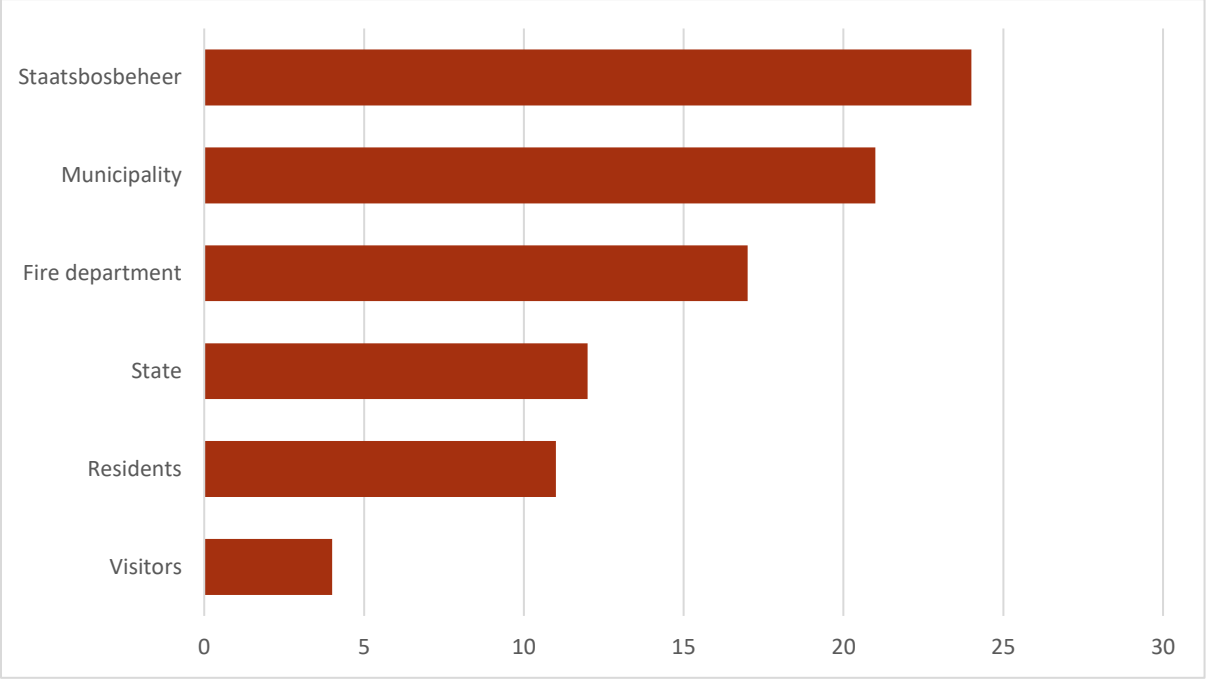

Figure 14 Responsibility taking action regarding wildfire risk according to respondents of the survey

During the interviews it became clear that some interviewees saw wildfire risk management as a shared responsibility among stakeholders. One interviewee mentioned: *'I think it is a shared responsibility of government, municipality, Staatsbosbeheer, fire department and the individual citizen' (Interviewee 7)*. Another interviewee said: *'We all are there, the fire department is there for putting*

out the fire, and the municipality is there for maintenance, and possibly also some education and prevention. But yes, the citizens themselves should also be aware of the fact that if you are in a dry forest, that you don't go abusing fire. It is not that I am going to sit and wait until the municipality will do everything for me. I assume that the citizens themselves will also think about that' (Interviewee 9). This shows that some interviewees see it as their own responsibility to be aware of the wildfire risk and hold other visitors of the area accountable for their actions such as not smoking or open fire. However, one interviewee mentioned that she wanted to take responsibility but doesn't know what else she could do: '*And I also very much want to take responsibility as a citizen, but I cannot think of much more than I am doing now' (Interviewee 6)*. This was a reoccurring theme during the interviews. Interviewees mentioned that they would like more information about what measures they could take themselves to prevent wildfires in the area. They hold the official bodies such as the municipality, Staatsbosbeheer and the fire department responsible to provide them with this information. Furthermore, some interviewees mentioned that they pay taxes and therefore expect the official bodies to invest a part of these taxes in protective measures so that they do not have to do that themselves.

Another recurring theme during the interviews was the faith that the interviewees have in the official bodies to act accurately when there is an wildfire in the area. This is partly based on the previous experience they have had with wildfires. One respondent, who lived at the edge of the dune and forest area during the previous wildfires, mentioned: *'The fire department was also very active then [during the wildfires of 2009, 2010 and 2011]. So, I thought: well I am sure that it will be okay' (Interviewee 7)*. Another interviewee mentioned that they just have the feeling that everything is well organized within the Netherlands: '*But then again, I always think, the fire department, in the Netherlands it is all so well organised. Of course, you only see whether it is really well organised when it actually* happens' *(Interviewee 6)*. A different interviewee mentioned *(Interviewee 4)* that he sees people of Staatsbosbeheer surveying the area in the summer and that this gives her the feeling they have it under control.

4.1.4. Protection motivation

The protection motivation can be seen as the intention to perform a behaviour. To measure if respondents have the intention to take measures to manage wildfire risk in Schoorl two questions were asked: firstly, if people have the intention of taking measures and secondly, if respondents do not take measures to manage wildfire risk because they think that it will not happen to them. The results of these two questions will be shown in this section of the chapter.

The answers to the first question can be seen in figure 15. When asked if they agree with the statement: 'I intend to take my own measures against wildfire risk in Schoorl' the majority of the respondents responded neutrally. Furthermore, the amount of respondents that disagreed with this statement (28%) and the amount of respondents that agreed with this statement (24%) are fairly similar.

Furthermore, in answer to the second statement: 'I don't take precautions against wildfires because I don't believe it will happen to me' the majority of the respondents answered that they disagreed (57%). However, there is also a group of respondents (18%) that mentioned that they agree with this statement. The distribution of answers to this statement are presented in figure 16.

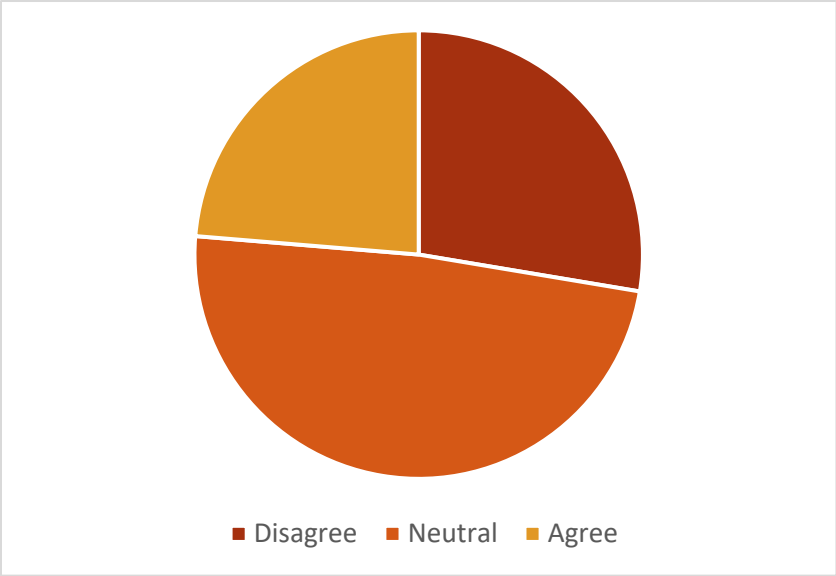

Figure 15 Distribution of answers to the statement 'I intend to take my own measures against wildfire risk in Schoorl'

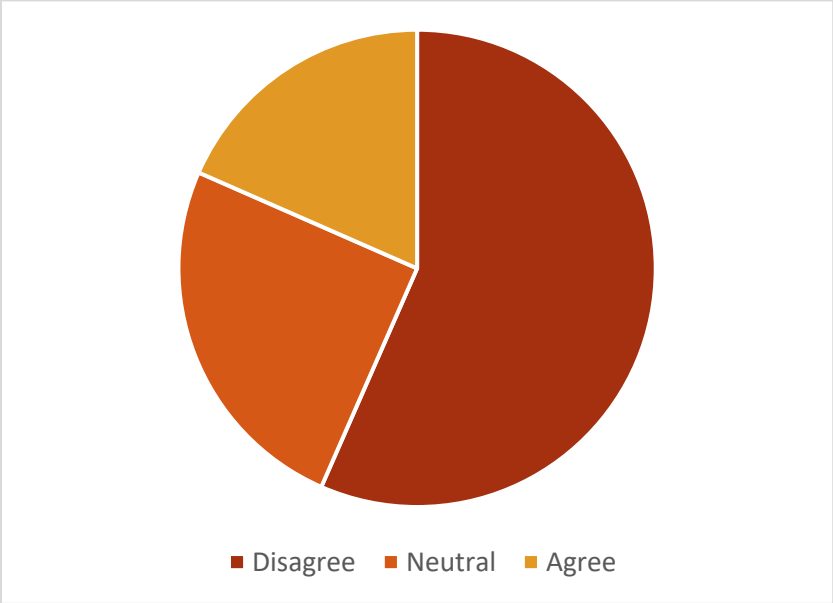

Figure 16 Distribution of answers to the statement 'I don't take precautions against wildfires because I don't believe it will happen to me'

4.1.5. Previous Experience

In the surveys and during the interviews respondents and interviewees were also asked about their previous experience with wildfire. The results on previous experience with wildfire will be discussed in this section of the chapter.

Firstly, it was asked if respondents of the survey had previous experience with wildfire. The majority of the respondents (59%) answered that they do have previous experience with this. The respondents who did not have any previous experience with wildfire were asked to skip the questions concerning previous experiences. So, the following results are only of the 47 respondents who do have previous experience with wildfire. The degree of experience with wildfires is dispersed among the respondents.

However, the majority of the respondents (49%) had little or very little experience with wildfires. A smaller group of the respondents (32%) had considerable or a lot of experience with wildfires.

Furthermore, the respondents were asked to respond to two statements: 'Since the previous wildfires, I feel that wildfires will become more frequent' and 'I experienced the previous wildfires as a wake-up call'. The results to these questions can be found in figure 17. The majority of the respondents (57%) do feel that wildfires will become more frequent. Moreover, the majority of the respondents (56%) has also experienced the previous wildfires as a wake up call.

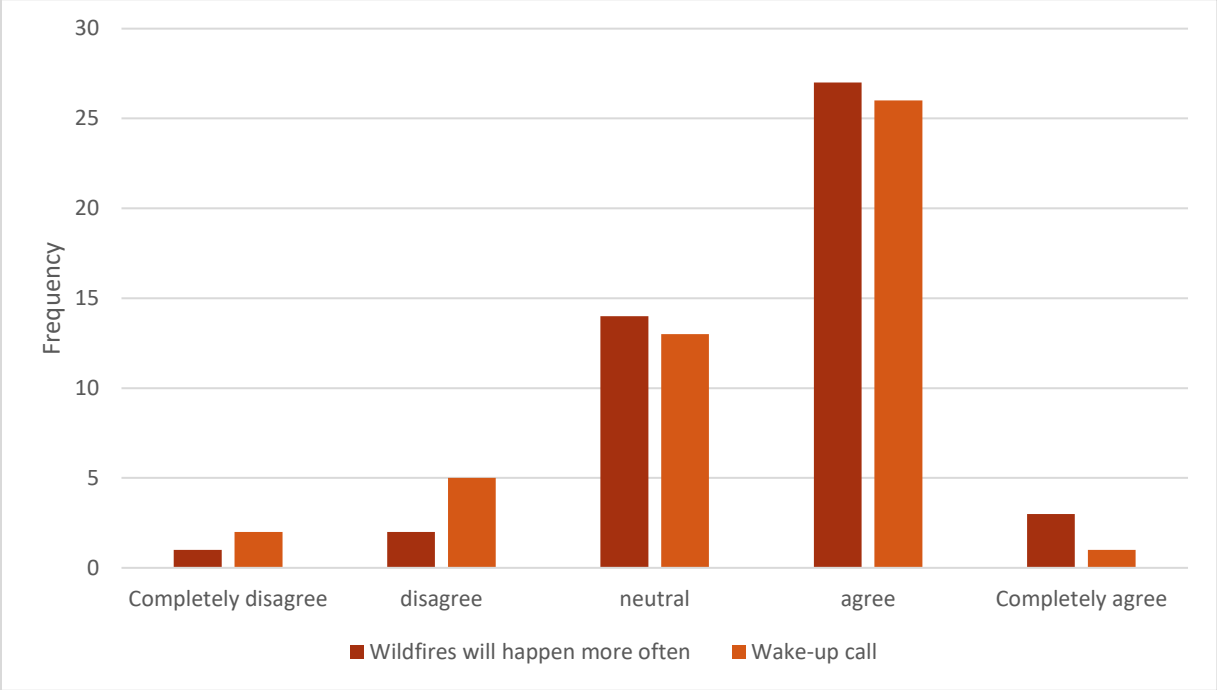

Figure 17 Distribution if answers to the statements 'since the previous wildfires, I feel that wildfires will become more frequent' and 'I experienced the previous wildfires as a wake-up call'

Respondents of the survey were also asked if they had taken measures to manage wildfire risk since their previous experience with wildfires. Only seven respondents answered that they had indeed taken measures to manage wildfire risk. Respondents who have taken precautions since previous experiences of wildfires have most often had fire extinguishers installed for in case of fire. There are also those who have not made open fires since experiencing previous wildfires. One respondent also indicated that they would like to take precautionary measures but did not know what these might be.

During the interviews most interviewees had some kind of experience with wildfires. Some interviewees already lived in Schoorl during the wildfires of 2009, 2010 and 2011, while others had encountered wildfires on for example a holiday. Some interviewees currently see the forest and dune area as vulnerable to wildfire because previous experience has taught them that, as discussed in the perceived vulnerability section. About the previous wildfires in the area around Schoorl one interviewee said: *'The previous fire, 10 years ago I believe, the fire came as far as the Heereweg [See figure 18], where there was also a care home. And through those pine trees it flew over the houses, maybe 500 metres to the whole neighbourhood, where fires then also started' (Interviewee 5).* Another interviewee mentioned that her mother in law lived in Schoorl during the previous wildfires, while she did not yet at that time. She said about her mother in law: '*She lived at the Jan van Scorelpark, so that's against the Heereweg, where the forest starts [See figure 18]. So, that's also where those fires were. She rang up saying: I see all this smoke here, and it's very close and what should I do. We were in*

Mozambique at that time, so we couldn't do anything. But then we said: well ask the neighbours. And then indeed at some point the order came for those houses to be evacuated. So then she also left the house and was taken in somewhere. She really did feel the threat after that' (Interviewee 8). Interviewees mentioned that after these experiences there was a bit of shock among residents of Schoorl. One interviewee *(Interviewee 2)* said that her neighbour still experiences fear when she hears an helicopter. This makes her think about the previous wildfires.

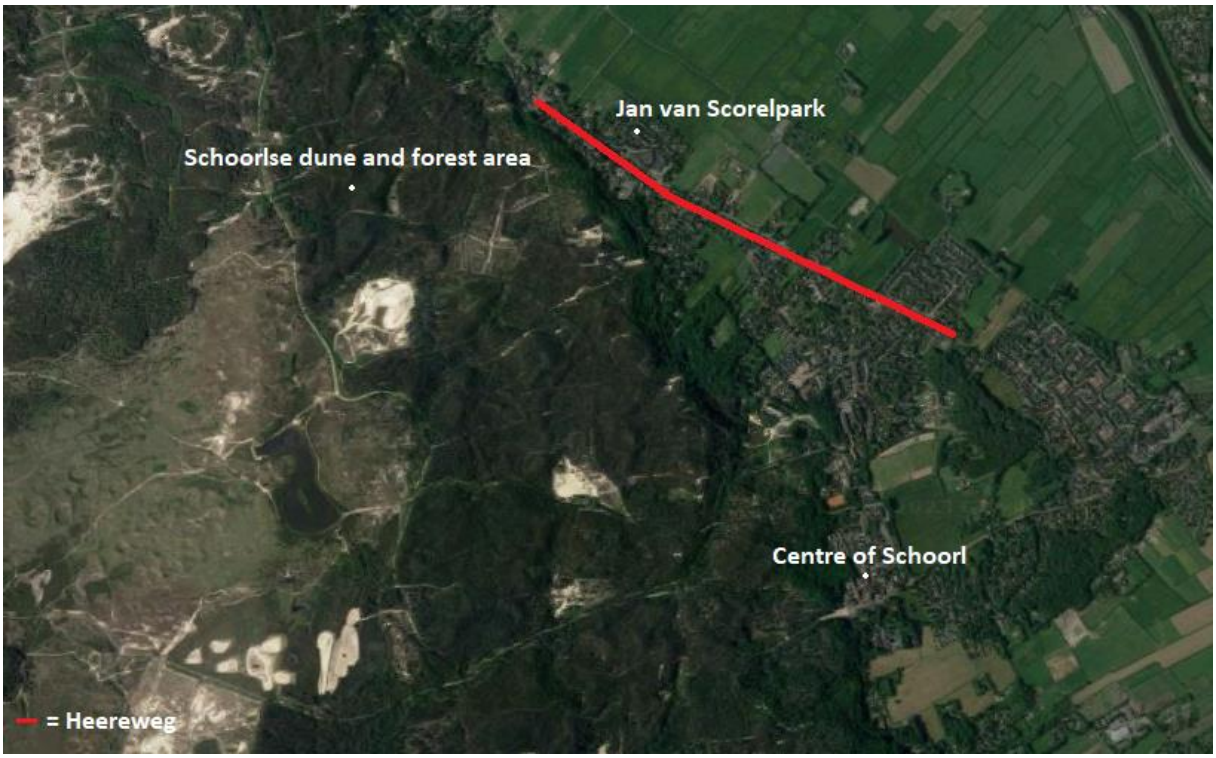

Figure 18 Map of Schoorl and Schoorlse dune and forest area.

However, it also became clear that the shock right after the wildfires has now mostly died down. Interviewees said: '*I also don't read it about it at all, I never talk about it with others. It's not necessarily a hot topic in the neighbourhood' (Interviewee 9)* and '*My partner's twin sister also lives in Schoorl. A bit further on, I've never heard them talk about it either. And they are very much into fire and all that. In that respect, I don't think it's very much a hot topic' (Interviewee 4)*. Yet, when there have been small wildfires in the area it is a topic that sometimes comes up: '*Well not that it is eminent [the topic of wildfire], but it does pop up every now and then, of remember that fire. And if it is very dry again like last summer, then everyone is very much aware' (Interviewee 8)*.

4.1.6. Official bodies

In this sub-section the results of the three interviews with official bodies in Schoorl, the safety region Noord-Holland Noord, Staatsbosbeheer and the municipality, will be discussed. These interviews were held to give a broader context to Schoorl and its policy regarding wildfires.

The municipality

This interview was held on October 4th, 2022 with an employee of the municipality of Bergen who works there as an advisor on public order and safety. Disaster response is part of the job as advisor on public order and safety. The municipality uses colour codes to indicate the risk on wildfires. These colour codes have been adopted from the province of Gelderland, which has more often had to deal with wildfires in the Veluwe, a nature reserve in the province of Gelderland. The interviewee

mentioned that these colour codes are communicated towards the inhabitants of the municipality. This is something the municipality has changed after the first large wildfire in 2009.

More things have changed after the first large wildfire in 2009. Within the municipality of Bergen they did have plans on what to do during a crisis. However, the first wildfire of 2009 was mostly chaotic within the municipality because some agreements made for disaster response could not be met. For example, a building in Schoorl that would be used to accommodate people in times of crises was suddenly threatened by the fire itself. And the snack bar that would provide food was closed because of the holidays. This has taught the municipality that a distribution of accommodation locations during a disaster is of great importance. Furthermore, they also ran into problems with the finances of the crisis situation afterwards. During the wildfire everyone ordered busses to accommodate the evacuation that was ordered. However, afterwards came the question of who was going to pay for these busses. Now the safety region is authorised to spend an certain amount of money on behalf of the municipality. Moreover, during the wildfires of 2009 many firefighters from other parts of the country were deployed in Schoorl because local firefighters had to be relieved. However, they did not know the area. Now the maps of the area are improved, something they learned from this situation. Additionally, they build a better transmission mast to improve the telephone access in the area.

Because wildfires were a priority within the municipality after these events a lot of measures, like mentioned in the paragraph before, could be arranged quickly. However, the interviewee mentioned that currently wildfire is not necessarily a hot topic anymore within the municipality of Bergen. One of the causes of this is that since 2015 the fire department is no longer a part of the municipality of Bergen but of the safety region Noord-Holland Noord. This was not yet the case in 2009. Transferring the fire department to the security region was done because people there are better and more specifically trained in this part of disaster management. The municipality of Bergen is to small to do that. If a wildfire would break out now the safety region Noord-Holland Noord would have the lead. However, the mayor will always be informed when there is a wildfire. The mayor of Bergen will only take the lead if the wildfire becomes more severe.

Currently the municipality of Bergen works together with the safety region Noord-Holland Noord and Staatsbosbeheer to work on wildfire risk management. Furthermore, they also work together with the rescue teams in the area. These rescue teams have knowledge of the area and have ways of transportation within the area. For example, they also help the ambulance in case of accidents within the area.

The municipality employee mentioned that many people who live in Schoorl are vigilant when it comes to wildfires. However, the youth and the tourists, who often have not consciously experienced the previous wildfires, still smoke and use the barbeque in the area while this is forbidden. The smoking ban is also new since the wildfires of 2009, before these events this had been abolished. Furthermore, more attention is being paid to wildfires on social media and their website. This is also how they communicate about wildfire risk and the colour codes with residents of Schoorl. However, the municipality does not make use of banners in the area warning people about wildfires.

Safety region Noord-Holland Noord

The interview was held on October 4th, 2022 with an employee of the safety region Noord-Holland Noord who works as a coordinator of wildfire suppression. This means that he is responsible to maintain contact with the area managers, such as Staatsbosbeheer, and internal colleagues in terms of professionalism, practicing and training people regarding wildfires.

The risk of wildfires is measured by the safety region through the use of measuring stations which are scattered around Noord-Holland and of which one is stationed in the dune and forest area of Schoorl. These measuring stations measure wind direction, wind speed, rainfall, drought etc. These results come together in an index rating which corresponds with a colour coding. In general they speak of low risk, high risk and very high risk. When the index rating says 'very high' and there is a wildfire, then the highest capacity of the fire department goes to the area.

Furthermore, the interviewee mentioned that with many calamities, it is the case that it becomes a priority only after something has happened. This is also the case with wildfires. You saw this clearly in the wildfires of 2009, 2010 and 2011. Currently, this is more than 10 years ago and the attention paid to it does diminish. However, the interviewee does see that the attention to this topic is slowly coming back. Especially after the wildfires across Europe in the summer of 2022. The interviewee mentioned that nationwide a trend of longer periods of drought and warmer temperatures is evident. Which makes wildfires an incident type of which the risk is increasing.

After the wildfires of 2009, 2010 and 2011 the fire department and the safety region have taken additional measures. However, they do not focus on preventative measures. The fire department and the safety region focus on repressive measures. They have set up multiple specialist posts. Which means that there are multiple posts with wildfire fighting and exploration vehicles and firefighters who are trained for wildfires. There used to be two firefighting vehicles in the region of Schoorl, now there are seven. So, they have scaled up after the previous wildfires. Furthermore, they have installed water points in the area and they have created landmarks to make it easier to identify where the wildfire is.

Currently the safety region works together in-house with the fire department and externally with the area managers, such as Staatsbosbeheer, and the municipality. However, these different parties have different interests. For example, the fire department wants to train in the dune area of Schoorl to be prepared in case of a wildfire. However, Staatsbosbeheer prefers to have as little training as possible in the area because the trainings affect the nature in the area. Therefore, according to the interviewee it is important that they are in conversation about this to arrive at shared interests.

The safety region does not yet work together with residents of Schoorl or other places in Noord-Holland Noord regarding diminishing wildfire risk nor does it take into account risk perception of residents in Noord-Holland Noord. However, they do mention that there are precautions that residents who live close to the dune and forest area in Schoorl can take. These are: no open fire, watch your barbeque for flyfire (flyfire are sparks that fly through the air and can cause wildfires as a result), replace pine trees by other kinds of trees, take measures to make a thatched roof less vulnerable to fire and make sure there is an escape route.

Staatsbosbeheer

The interview was held on October 6th, 2022 with one of the forest keepers of Staatsbosbeheer in the north of Noord-Holland. The interviewee is the public forest keeper which means that she is responsible for the communication, working together with external parties and monitoring of the area. There are two additional forest keepers, one is responsible monitoring the flora and fauna and the other one is responsible for area management, such as cutting down trees and planting new plants.

To measure the wildfire risk Staatsbosbeheer also makes use of the colour codes distributed by the safety region Noord-Holland Noord. This is something that is of increasing importance as they see the area getting drier and for longer periods of time. Therefore, this is a topic that is often discussed within the organisation. However, Staatsbosbeheer does not necessarily see a big role for themselves to prevent wildfires. They mostly see an important role for the fire department and are therefore often

in conversation with them to see how they can facilitate this. Staatsbosbeheer does see safety as the most important interest, but the severity must outweigh the importance of biodiversity.

Furthermore, making an area fire proof often collides with the interest of biodiversity. Especially because Staatsbosbeheer thinks that most wildfires are human caused, they do not reckon that they can prevent this. If people want to do harm, they will. Therefore they do not cut down trees in terms of wildfire risk reduction. However, they are cutting down pine trees because these are exotics in the area. This will give deciduous trees a change to grow which is good for the biodiversity in the area. The risk of wildfires reduced by cutting down pine trees is an added benefit. Pine trees catch fire quickly due to the highly inflammable oil content. Yet, since the previous wildfires they have done some improvements. Mostly to the infrastructure to be better prepared and making the area more easily accessible for the fire department.

Currently Staatsbosbeheer is working together with the municipality, the safety region and the rescue teams in the area regarding wildfire. However, they do not involve residents in Schoorl. They do not do this because they believe that when there is more attention to the subject of wildfires, it will also happen more often. Therefore, this is not a subject which they actively propagate about. However, the interviewee did mention that if the municipality or the fire department would set up a campaign to make residents or tourists in Schoorl more aware, they would like to join in. Yet, they will not take the lead in this. Furthermore there are measures that residents can take according to the interviewee: no smoking, not throwing garbage or glass on the ground, watching out where you park your car so it is not blocking an emergency exit, making sure that the exhaust of your car is not positioned in dry grass and being vigilant.

4.2. Data Analysis

In this section of the chapter the results of the surveys and interviews presented in de previous section will be analysed to draw general conclusions. The general conclusions drawn in this section will be used to answer the sub research questions and therefore contribute to answering the main research question of this thesis. The structure of this section will be following the same lines as the previous section. Firstly, the variables making up Protection Motivation Theory will be analysed. After that the findings on the effects of previous experience will be examined. Finally, the interviews with the municipality, safety region Noord-Holland Noord and Staatsbosbeheer will be linked to the results of the surveys and interviews conducted with the residents in Schoorl.

4.2.1. Threat appraisal

The first aspect of Protection Motivation Theory is the threat appraisal. The variables that make up the threat appraisal in this research are the rewards, vulnerability, severity and fear. Rewards have a negative relationship with the threat appraisal and the vulnerability and severity have a positive relationship with the threat appraisal. Feelings of fear have an effect on how people view their vulnerability and the severity. A general conclusion on these variables will be presented in this sub-section.

From the field results it becomes clear from that the biggest reward of living in Schoorl is the natural beauty surrounding the village. Other important rewards of living in Schoorl are that it has peace and quiet, while it is also close to important facilities. These are also reasons why people chose to move to Schoorl.

When it comes to perceived vulnerability it can be concluded that the majority of the people participating in the research do think that it is likely that Schoorl will be hit by a major wildfire in the next 10 years. Participants see the desiccation, because of climate change, around them and therefore

perceive the area as becoming more vulnerable to wildfires. However, what is striking is that participants often do not see it as likely that their own house will be hit by a wildfire. Thus, participants of the research see it as more likely that Schoorl is hit by a wildfire than their own home. Participants see Schoorl as vulnerable, while their home as little or not vulnerable.

Furthermore, the majority of the participants of this research do believe that a wildfire will cause disruption to Schoorl and individual disruption. Therefore, the severity of a wildfire event in Schoorl seems to perceived as high among participants. However, what also stands out in these results is that overall participants see a wildfire as more of a disruption to Schoorl than as to themselves.

This relates to the concept of fear, which plays into how people see the vulnerability and severity. In this research the concept of fear was divided into two concepts: fear and worry. Only a small group of participants of this research mentioned that they deal with feelings of fear and worry when it comes to wildfires in the dune and forest area of Schoorl. Based upon these results it can be concluded that overall the fear with regard to wildfires in Schoorl is low among participants of the research.

Therefore, it can be concluded that among participants of this research there is a high threat appraisal when it comes to wildfire risk in Schoorl in general. Yet, the threat appraisal is lower when it comes to risk a wildfire would pose to the individual. This can relate to the high perceived rewards and the low perceived feelings of fear.

4.2.2. Coping appraisal

The second aspect of the Protection Motivation Theory is the coping appraisal. The variables that make up the coping appraisal are response efficacy, self-efficacy and the response costs. Response efficacy and self-efficacy have a positive relationship with the coping appraisal. The response costs have a negative relationship with the coping appraisal. Furthermore, who people view responsible for taking action regarding wildfire risk also plays a role in the coping appraisal. Therefore, the results on responsibility will also be analysed in this sub-section.

From the results on the protective response efficacy it becomes clear that the majority of the participants of the research believe that damage and casualties from large wildfires can be prevented by taking measures. Taking measures can be divided into two categories: measures official bodies have to take and measures people in Schoorl can take themselves. When it comes to taking measures by official bodies, participants of the research were most familiar with installing water basins, creating fire breaks, raising awareness. When it comes to taking measures themselves participants of the research were most familiar with no open fire and being vigilant. What is surprising in these results is that the majority of the measures that were mentioned by participants were measures that they could not take themselves, but had to be taken by official bodies.

Furthermore, based upon the results on the perceived self-efficacy it can be concluded that the majority of the participants of the research also feel like taking measures would reduce the likelihood of damage to their own home and property and to Schoorl in general. However, the results show that respondents are more likely to feel that they can make a difference at the individual level than when it comes to the whole general level of the whole of Schoorl.

Also, the results show that the majority of the participants in the research also feel physically and financially able to take measures to manage wildfire risk themselves. Moreover, the majority of the people feel that the costs of taking measures to manage wildfire risk are worth it. However, it also becomes clear from the results that participants feel that they do not have enough knowledge on this subject. Participants often refer to official bodies to come with suggestions about what these measures people themselves can take should be.

This relates to who participants in this research see as the responsible party to take measures to manage wildfire risk. The results show that Staatsbosbeheer, the municipality and the fire department are most frequently mentioned. This shows that participants do not necessarily place the responsibility with themselves. This might relate to the extent the participants of this research place trust in the official bodies. From the results it can be concluded that participants have high trust in these official bodies, often because of previous experience.

Based upon these results it is difficult to present one clear conclusion on the coping appraisal. On the one hand participants are known with measures, they think taking measures are worth it and they view themselves as capable of taking measures themselves. This would indicate a high coping appraisal. However, on the other hand most measures people are aware of, are not seen as measures they can take themselves, but have to be taken by official bodies such as the municipality, Staatsbosbeheer or the fire department. Moreover, people place high trust in these official bodies and therefore often expect them to inform them about which measures they can take themselves. Participants feel like they do not have enough knowledge on this subject themselves. Therefore, it seems like there is a gap between what people want to do and what people feel like they can currently do based on the information they possess. Overall, this may lead to a low coping appraisal.

4.2.3. Protection Motivation

The two cognitive processes of the threat appraisal and the coping appraisal make up the protection motivation. The protection motivation is seen as the intention to perform a certain behaviour. Results on the intention of the participants of this research will be analysed together with the results on the threat appraisal and the coping appraisal.

The results related to the intention dimension show that less than a quarter of the participants of the research intend to take measures themselves against wildfire risk in Schoorl. However, it also becomes clear from the results that this is not because the participants believe that a wildfire will not happen to them. Yet, there are indications that people do not take measures themselves against wildfire risk because they feel like it is not their responsibility but of official bodies. This might relate to the fact that people pay taxes and therefore feel like the official bodies have the responsibility to invest these taxes in protective measures.

These results on the intention relate to the threat appraisal and coping appraisal discussed in the previous sub-sections. The threat appraisal on the individual level is low as is the coping appraisal. The Protection Motivation Theory argues that a low threat appraisal and a low coping appraisal will lead to little protection motivation.

4.2.4. Previous Experience

This sub-section will analyse the results regarding previous experience. Previous experience with wildfire can have a different effect on how people view wildfire. According to the literature, it can lead to a wake-up call, but it can also lead to a decreasing risk perception, in this case people feel like they are the victim of a low probability hazard.

The results show that the majority of the participants of this research do have experience with wildfire. However, the majority of these participants had little experience with previous wildfires. When asked about how this previous experience affected their view on wildfires the majority of the participants of this research mentioned that they did experience the previous wildfires as a wake-up call and do think that wildfires will now happen more often. People mentioned how previous experience has taught people that the area is exposed and that their houses are vulnerable as a result. Therefore, it can be

concluded that previous events were a wake-up call increasing today's awareness of wildfire risk in Schoorl.

However, only a small group of participants actually did take measures after their previous experience with wildfire. The results show that the initial shock of the wildfires has now mostly died down, more than ten years after the big wildfires hit Schoorl. It is no longer an issue on the top of everyone's agenda.

Therefore, it can be concluded that previous experience did lead to viewing the area as more exposed and as a result seeing their houses as more vulnerable. However, the wake-up call does not necessarily translate into more protective behaviour, such as taking measures to manage wildfire risk.

4.2.5. Official bodies

The interviews with representatives from the official bodies had as main goal to give more context to the research. However, when the results of the interviews with the official bodies, the municipality, safety region Noord-Holland Noord and Staatsbosbeheer, are measured against the answers given during the surveys and interviews, some discrepancies are notable.

Firstly, the municipality mentioned that the risk indication by the means of colour codes is communicated to the residents within the municipality's territory. However, in the surveys and interviews it stood out that people mentioned that they received little or no information and also often do not know where they have to find extra information. Therefore, the communication of the municipality on the subject of wildfires does not always reach the residents of Schoorl.

Secondly, what stood out is that all the official bodies have learned from the previous wildfires and have installed many new protective measures. However, none of the official bodies included residents in the decision making process or researched the risk perception of the residents in Schoorl. Yet, many respondents and interviewees are aware of the measures that Staatsbosbeheer and the safety region name for residents to take themselves, such as no smoking, no open fire and being vigilant. Still, there are measures that residents can take that they are not yet aware of. Staatsbosbeheer mentioned to not position the exhaust of your car in dry grass or not blocking emergency exits. These measures were both never mentioned by respondents and interviewees. Furthermore, even though many respondents and interviewees talked about cutting down pine trees, they always mentioned it as something that Staatsbosbeheer could do and never mentioned it in the context of their own garden.

Finally, what stood out in the results is that Staatsbosbeheer does not see it as their responsibility to take measures, because they feel like they cannot make such an impact with these measures. They believe that most wildfires are human caused and that if people want to start wildfires this will happen anyway. However, when looking at the survey it becomes clear that the most frequent named actor that respondents view as responsible to take measures is Staatsbosbeheer.

5. Discussion

This chapter will first discuss the main findings and examine how these results match or vary from the broader context of the literature used in this study. Furthermore, additional literature on the Netherlands in regard to Protection Motivation Theory was found to see whether there are similarities and differences. After that, the limitations and strengths of this research will be discussed. Finally, the practical and theoretical implications of this research will be considered.

5.1. Broader context

The main findings of this research are that residents in Schoorl do perceive wildfire risk in Schoorl in general. However, they often do not perceive this risk at the individual level. Furthermore, the coping appraisal of residents in Schoorl is deemed as high, however this does not translate into protective behaviour. This is related to the fact that many residents in Schoorl do not necessarily see it as their own responsibility to act upon or inform themselves about the wildfire risk, but the responsibility of official actors. This is also reflected by the fact that most protective measures with which participants are familiar are protective measures that they cannot necessarily take themselves, but have to be taken by these official bodies. Furthermore, this is also affected by the fact that people have high trust in the official bodies to take these protective measures. Additionally, previous experience has also not led to a higher intention of personal preparedness, even though it did lead to viewing the area of Schoorl as more vulnerable to wildfires. When these main findings and other results of this study are placed in the broader context of literature used for this research there are several similarities and differences. These will be discussed in this sub-section of this chapter.

The first finding that relates to the broader existing literature is that people see wildfire risk as a threat but not necessarily to themselves or their own property. In this study people do see it as a threat to nature and to Schoorl in general and often most specific the houses that lie directly next to the dune and forest area that is bordering Schoorl. This relates to the conclusions of an article by Oswald et al. (2018). In this article they conclude that visitors and residents of the Veluwe in the Netherlands perceive wildfire risk. But they see it as a threat to nature, with which they mean the vegetation and animals, rather than to themselves. This is also the case with flood risk in the Netherlands, little people perceive floods as a personal risk (Terpstra & Gutteling, 2008). These conclusions are in accordance with the main findings of this study, where people see it as a risk for the dune and forest area of Schoorl and Schoorl in general, however often believe that their own homes are not at risk. Additionally, Slovic (1999) found that men tend to have a lower risk perception than women. This is similar to findings of this study. When respondents were asked to what amount they expect individual disruption when a wildfire would hit Schoorl, men generally saw less individual disruption than woman did.

Furthermore, Oswald et al. (2018) mentioned that people in the Netherlands have high trust in official bodies and therefore expect them to handle wildfire risk and inform them about it. Also in other studies, like Wachinger et al. (2013), the influence of trust on risk perception is mentioned. If people have high trust in official bodies this might lead to having a low expectation for their own capacity to take protective measures. This is also concluded in this research where people have hight trust in the official bodies and expect them to manage the risks and take protective measures. Furthermore Oswald et al. (2018) argued that having trust in official bodies led to expectations about quality education efforts. This has also been the case in this research where many respondents and interviewees mentioned that they would like the official bodies to educate the residents of Schoorl about wildfire risk and what they can to do respond to this risk. However, measuring trust was not the main objective of this research as it focused on protection motivation and the influence of previous experience. Yet, it proved to be a very valuable factor in risk perception.

Moreover, trust is one of the explanations that is mentioned by Wachinger et al. (2013) why people might see a risk but not act upon it. Another explanation they propose is the that the rewards outweigh the risk. This is also argued by the Protection Motivation Theory (Norman et al., 2015), where perceived benefits have a negative relationship with the threat appraisal and therefore has a negative relationship with the protection motivation. This might also be an explanation as for why respondents in this research perceive a general risk but often have no intention of acting upon this perceived risk. Respondents and interviewees of this research mention various important rewards of living in Schoorl of which the nature is often mentioned as the biggest reward. The nature is linked to Schoorl, meaning this benefit cannot be found the same anywhere else. This might result in less protective behaviour from the residents in Schoorl. As the benefit of living in the nature might outweigh the perceived risk of wildfire in this same natural area.

Until now most of the results are in line with the broader context of literature. However, there is one finding of this study that clearly differs from other studies. In other papers it was mentioned how previous experience with wildfires often led to more protective behaviour even if it led to a decreased risk perception when people thought they were the victim of a low probability hazard (Dupey Larsen et al., 2021; Dupey & Smith, 2019). Yet, this is not the case in this research. Respondents and interviewees who have had previous experience with wildfires often mentioned that they experienced the previous wildfire(s) as a wake-up call and now see the area as more exposed. But, in this case it did not lead to more protective behaviour. This might be explained by the fact that the studies of Dupey Larsen et al. (2021) and Dupey and Smith (2019) were executed shortly after the wildfires had hit the communities they were studying. While this study was executed more than ten years later. Therefore, it would be interesting to study a community in the Netherlands shortly after a wildfire has hit to see if the protective behaviour would be different from this study.

Furthermore, additional literature was found on Protection Motivation Theory in the Netherlands concerning flood risk, which is a more frequently researched topic in the Netherlands compared to wildfires. It interesting to see how this research relates to similar study focused on flood risk and what can be learned from other research.

Firstly, Baan and Klijn (2004) argue in their paper it is seldom reviewed how people that live in areas dealing with flood risk feel about flood risk and mitigation actions. This is also the case in Schoorl as both the municipality, safety region Noord-Holland Noord and Staatsbosbeheer don't involve residents in Schoorl in their decision making. Staatsbosbeheer even does this on purpose because they do not want to propagate on the subject of wildfires, as they believe this will lead to more wildfires. Baan and Klijn (2004) recommend that flood risk management should be developed in close co-operation with all the parties affected by flood risk. This is also something that I would recommend for wildfire risk management as this is important when developing efficient hazard management (Oswald et al., 2018). Kievik and Gutteling (2011) have argued in their paper on protective behaviour regarding flood risk in the Netherlands that not just any risk communication works. It needs to be prepared carefully and communicated measures need to score high on self-efficacy and response efficacy. This can only be incorporated when it is known how people perceive risk and protective measures.

Currently, respondents in Schoorl often do not perceive themselves as responsible for taking protective measures regarding wildfire. This is also the case regarding flood risk in the Netherlands. In a research by Terpstra and Gutteling (2008) in Friesland at the Wadden Sea Coast, it became clear that 73% of their respondents regard the government as primarily responsible for taking mitigation actions. This relates to this research as this research sees official bodies, such as Staatsbosbeheer, the municipality and the safety region as responsible for taking mitigation actions.

Furthermore, in a paper by Terpstra (2011) it was argued that trust plays an important role in personal preparedness as it reduces risk perception and it lowers preparedness intentions. Historically, the Dutch are known for their strong and sizeable flood defences and this is often communicated. Many people have come in contact with this kind of communication one way or another, e.g. personally or on television. However, this has led to people putting their faith in the strength of these flood defences. This has led them to have little incentive to start engaging with flood preparedness themselves. This relates to this research as many people also put their trust in the Dutch official bodies to protect them from wildfires. Moreover, it might be interesting to study how trust and communication on flood protection also has had its effects on trust in wildfire management in future research. Can a link be found between positive communication on great flood defences and trust in official bodies to manage wildfire risk, which might lead to a low personal wildfire preparedness?

Additionally, in this study it seems that official bodies have failed to inform citizens of the possible large consequences of a wildfire, just as it has often failed to inform people living in areas prone to flood risk about the possible large consequences of a flood (Terpstra, 2011). A recent study by Verhoeven et al. (2023) has concluded in their report that the impact of wildfires in the Netherlands will increase and that people will more often have to flee for fire. They call for more education and awareness of residents in and near natural areas. According to the report residents will also have to take their own measures to diminish the flammability of their house and garden. And they have to know what to do when a wildfire occurs.

What is more, Terpstra (2011) has also focused on positive feelings that experiencing a flood might entail. He argues that some respondents in his study felt positive feelings when regarding their previous experience with floods. Respondents mentioned that they were impressed by the beauty and force of nature and felt feelings of sensation and relief. This is interesting as no one mentioned positive feelings in this study. However, this might be due to the framing of wildfire in this study as a risk and a 'problem'. Therefore, I would recommend for further research to be more open to positive feelings that experiencing a wildfire might bring.

5.2. Limitations and strengths

In the previous section some theoretical limitations have already been mentioned. This sub-section of the discussion chapter will focus on the methodological limitations and strengths of this research that were discovered when conducting this research. Limitations will be considered first, strengths will be discussed after that.

One of the goals of this research is to see how previous experience with wildfires affects people's risk perception and protective behaviour. However, as there has never been a research to see what people's risk perception and protective behaviour was before the wildfires of 2009, 2010 and 2011 it is not possible to make conclusions about this. However, this is not something you can necessarily do anything about as a researcher as you never know when a first large hazard is going to hit an area. However, what could be interesting to compare in a next research is the protection motivation right after the hazard and the protection motivation after ten years. As this research has shown wildfires do not have the same priority anymore it does right after the event hits. This might also lead to the research being less comparable to similar studies on protection motivation right after a wildfire event.

Another limitation of this research is the time span within which this research had to be conducted. A research of 8 months is not very long. Because of this, fewer surveys and interviews have been conducted than would have been possible when the research would have taken place over a longer period of time. This would have increased the reliability of the results of this research. Furthermore, I noticed during conducting the research that ideas often need a long time to form within your brain.

When you have a shorter period of time to conduct your research, you notice that some great ideas only form when the time has already passed. Therefore, I found taking your time to conduct a research to be of importance.

A third limitation of this research is that interviewees were recruited through the survey. However, only respondents of the survey who found the topic of importance signed up for an extra interview. This showed in the results of the interviews. Therefore, the group of interviewees consists of people who see wildfire risk as an important topic. This means that the results of the interviews may give a biased picture of how people perceive wildfire risk and protective behaviour. One way to avoid this is to give people an incentive to participate, for example through offering people money to do an interview. However, when this is impossible, I think it is of importance to also incorporate a survey in your research. As a survey is less time consuming, people who do not find it a topic of importance are more likely to participate anyway.

Fourthly, because this research has not made use of random sampling the results are not generalisable for the whole of Schoorl. Random sampling of respondents is needed when you want the get a reliable reflection of society. However, as this is a more time consuming method I would recommend this method when there is more time is available to you when conducting your research.

A fifth limitation of this research is that during the fieldwork period more questions were added to the survey. These questions increased the validity of the research, as these questions made it possible for me to improve measuring what I wanted to measure. However, this also led to the fact that two questions were filled out by only 29 respondents. This affects the reliability of the results of these two specific questions. Therefore, it is important to test out your survey extensively and to see what kind of results you can expect to get from the research if you use it. During this research the survey was tested to see if it was formulated clearly for the respondents. However, it was late into the research when it was tested to see if the results from the survey covered all the information. For next studies it is important to have a test run with the survey and also with analysing the results retrieved from the surveys.

A sixth limitation of this research is that the interviews with representatives of official bodies took place around the same time as the surveys and interviews with residents in Schoorl. This means that the results of the surveys and interviews were not yet analysed and conclusion could not have been made yet. However, it would have been interesting to confront official bodies with the results of these surveys and interviews with residents in Schoorl, and get their response to these results. Now the official bodies will only receive the results after the research is completed, and a response to the results will not be included in the research anymore.

A final limitation of this research is that some literature used as a theoretical basis for this research is Anglo-Saxon literature. However, Anglo-Saxon literature might not always be applicable to the Dutch context. Mainly, Anglo-Saxon literature is focused on homeowners, while this research focused on residents in general, tenants included. Anglo-Saxon literature often sees homeownership as the rule, while in the Netherlands this is not the case. This might not be a problem for this research, as in Schoorl most houses are privately owned (71%). Yet, it is important to consider this fact when applying Anglo-Saxon literature to the Dutch context. Furthermore, this is also the case with the fact that the Dutch context might differr from the context of the United States when it comes to the spatial distribution of houses. The Netherlands is densely populated and the fire department is often stationed close by, while this is not the case in some areas in the United States. Therefore, it might be seen as more of a necessity to be personally prepared in regard to wildfire risk in the United States as compared to the Netherlands. Because the used literature does not always match the research context, the results may

turn out differently than was expected when reading the literature. For example, the measures recommended to residents in the United States were much more wide-ranging and costly than the recommended protective measures in the Netherlands. Moreover, the differences might cause the research to be less comparable to the outcomes of the researches executed in the Anglo-Saxon context.

Additionally, I as a person also have affected the research. I noticed that because of my background and my knowledge of natural hazards and in particular wildfires that I found this a topic of great importance. This was something I was not always able to hide, while presenting the topic in a neutral manner. This may have affected the answers people have given me when they wanted to give socially desirable answers.

However, this research also has it strengths. Firstly, the research was done during the summer period, this meant that many people had the time to fill out the survey and to participate in an interview. This may have resulted in a higher number of surveys and interviews, which led to a higher reliability of the results. However, as wildfire risk is perceived as greater in the summer people might give different answers about their perception in autumn or winter. It would therefore be interesting to see if there is a difference in risk perception and personal preparedness across seasons. Because wildfire risk can also be high in winter, yet is often not perceived this way.

Furthermore, I found it a strength to combine the surveys with interviews. With the surveys it was possible to gain a lot of data. Additionally, the surveys were also filled out by people who did not necessarily find it a topic of great importance, which resulted in varied results. However, without the interviews it would have been a lot harder to give meaning to this data. The interviews were a lot more in depth and explained why people gave certain answers.

A final strength of the research concerns the interviews with the municipality, the safety region Noord-Holland Noord and Staatsbosbeheer. Even though the results of these interviews were not needed to answer the main question, it brought a lot more context to the research. Furthermore, the results of this research are of relevance to these official bodies.

5.3. Implications

Two implications of these results jump out. These implications are both of social and scientific relevance.

The first implication is of social relevance, as it is of relevance to creating efficient wildfire management. Because even though respondents see a risk, the taking of precautionary measures and personal preparedness is low. Respondents and interviewees expect action from official bodies such as the fire department, municipality and Staatsbosbeheer; if not taking measures, then more information about what residents in Schoorl can do themselves. This means that official bodies have the task to or take the precautionary measures or to inform the public about which measures they can take themselves. Currently official bodies have taken additional measures since the previous wildfires. Yet, these new measures have not included residents in Schoorl. With the increasing risk this might not long be sustainable, as is also argued by Verhoeven et al. (2023). In a broader context this shows the importance of taking into account the public risk perception and protective behaviour to create efficient wildfire management. Most respondents and interviewees mentioned that they want to do their part, but need better and easily accessible information on what to do.

A second implication of this research is of theoretical relevance. This research has shown the importance of the concepts of responsibility and trust in protective behaviour. These are concepts that seem to be lacking in the Protection Motivation Theory used in this research. Two of the three reasons

of the risk perception paradox by Wachinger et al. (2013) are explained by the Protection Motivation Theory. However, the third reason, i.e. people understand the risk but do not perceive it as their own responsibility to take action, is not explained by the Protection Motivation Theory. Therefore, Protection Motivation Theory on its own does not always explain as to why a threat appraisal, coping appraisal or protection motivation is perceived high or low. This shows that the Protection Motivation Theory is not applicable to any threat for which there is an effective recommended response that can be carried out by the individual.

6. Conclusion

As explained in the introduction of this thesis the risk of wildfires is increasing in the Netherlands. Therefore efficient wildfire management must be developed. However, to do this it is important to take risk perceptions and personal preparedness into account. As this research takes place in Schoorl, a village that has dealt with wildfires before, the influence of previous experience on risk perception and personal preparedness has also been included. This led to the following research question of this thesis:

'How do residents in Schoorl perceive their wildfire protection motivation after the wildfires of 2009, 2010 and 2011?'

To answer this main question, I will first address the sub research questions. Firstly, I found residents in Schoorl do perceive the village they live in and the bordering dune and forest area as exposed and therefore believe it is vulnerable to wildfires. Especially after the wildfires of 2009, 2010 and 2011 they have learned that the area is prone to wildfires. However, they often do not perceive wildfire as a threat to themselves or their own house, which means there is a low individual threat appraisal. This is related to the fact that little participants perceived feelings of fear in regard to wildfire risk. Secondly, it was found that residents in Schoorl do believe that taking measures will help reduce the possible damages by wildfires. Furthermore, they believe they are capable of taking protective measures themselves. This would indicate a high coping capacity and a high personal preparedness. However, this is not the case. An explanation for this based on the perspective of the Protection Motivation theory is lacking. Yet, it can be explained by the fact that residents in Schoorl do not necessarily see it as their own responsibility to take measures or to seek information on which measures to take. They see this as the responsibility of official bodies such as Staatsbosbeheer, the municipality or the fire department. In this case this leads to a low personal preparedness. Finally, prior experience with wildfires did not lead to more protection motivation in Schoorl. Rather, it has led to more trust in official bodies and therefore a lower personal protection motivation.

So, resulting from the answers to the sub-questions it can be concluded that residents in Schoorl perceive low protection motivation as they have a low individual threat appraisal and do no not see it as their own responsibility to take protective measures.

Recommendations for further research that can be made as a result of this study are that trust and responsibility should be included when researching risk perception and personal preparedness. This research has shown the importance of these two concepts. Furthermore, combining both qualitative and quantitative methods makes sure that you gain a lot of data and can give in depth meaning to this data. Therefore, a mixed method approach is the preferred method when researching risk perception and personal preparedness as the two complement each other well. Moreover, interviews with additional stakeholders and not just your target group gives more comprehensive view of the context hazard management has to operate within. In my opinion this comprehensive view is needed when developing efficient wildfire management.

Finally, for upcoming research, it would be useful to look further into the long-term effects of disasters on risk perception and personal preparedness. This research shows that in the short-term, there is often more focus on a natural disaster, such as wildfires. However, this does not always translate into long-term protection motivation. Therefore, the long-term effects of disasters on protective behaviour should be further investigated. Additionally, it is useful to research if and how the concepts of responsibility and trust can be incorporated in the Protection Motivation Theory to make the theory more comprehensive.

7. Literature

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Appendix I: Survey

	Threat Appraisal				
Vraag #1	Wat zijn voordelen van wonen/vakantie houden dichtbij het Schoorlse Duingebied?				
Antwoord					
Vraag #2	Hoe waarschijnlijk is het dat delen van Schoorl in de komende 10 jaar worden getroffen door een grote natuurbrand?				
Antwoord	Heel waarschijnlijk	Tamelijk waarschijnlijk	Neutraal	Tamelijk onwaarschijnlijk	Heel onwaarschijnlijk
Vraag #3	In welke mate bent u het eens met de volgende stelling: 'Klimaatverandering zal ervoor zorgen dat grote natuurbranden in Schoorl vaker zullen voorkomen.'				
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens
Vraag #4	Hoe ver denkt u dat uw woning ongeveer van de rand van het Schoorlse duin- en bosgebied staat?				
Antwoord	Binnen 50 meter	50 - 100 meter	100 - 300 meter	300 - 500 meter	Verder dan 500 meter
Vraag #5	Hoe waarschijnlijk is het dat uw woning/verblijfplaats getroffen wordt wanneer er een natuurbrand is?				
Antwoord	Heel waarschijnlijk	Tamelijk waarschijnlijk	Neutraal	Tamelijk onwaarschijnlijk	Heel onwaarschijnlijk
Vraag #6	Wanneer een extreme natuurbrand zich voordoet in Schoorl, hoeveel ontwrichting zal dit volgens u tot gevolg hebben voor de samenleving in Schoorl?				
Antwoord	Heel veel ontwrichting	Tamelijk veel ontwrichting	Neutraal	Tamelijk weinig ontwrichting	Heel weinig ontwrichting
Vraag #7	Wanneer een extreme natuurbrand zich voordoet in Schoorl, hoe ontwrichtend zal dit zijn voor u?				
Antwoord	Heel veel ontwrichting	Tamelijk veel ontwrichting	Neutraal	Tamelijk weinig ontwrichting	Heel weinig ontwrichting
Vraag #8	Kunt u aangeven in hoeverre u gevoelens van angst ervaart, als u op dit moment denkt aan de mogelijkheid op een natuurbrand in Schoorl?				
Antwoord	Heel veel	Tamelijk veel	Neutraal	Tamelijk weinig	Heel weinig
Vraag #9	Kunt u aangeven in hoeverre u gevoelens van onrust ervaart, als u op dit moment denkt aan de mogelijkheid op een natuurbrand in Schoorl?				
Antwoord	Heel veel	Tamelijk veel	Neutraal	Tamelijk weinig	Heel weinig

	Coping Appraisal					
Vraag #10	Wie is volgens u verantwoordelijk voor het nemen van maatregelen ter bestrijding van natuurbranden?					
Antwoord	De staat	De gemeente	De brandweer	Staatsbosbeheer	Bewoners van Schoorl	Anders
Vraag #11	Kunt u aangeven met welk type maatregelen ter bestrijding van natuurbranden u bekend bent? (Zowel algemene maatregelen, als maatregelen die u zelf kunt nemen)					
Antwoord						
Vraag #12	Welke van de maatregelen, die u bij vraag 11 heeft genoemd, is/zijn volgens u effectief?					
Antwoord						
Vraag #13	In welke mate bent u het eens met de volgende stelling: 'In het algemeen kunnen schade en slachtoffers van grote natuurbranden voorkomen worden door het nemen van voorzorgsmaatregelen.'					
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens	
Vraag #14	In welke mate bent u het eens met de volgende stelling: 'Wanneer ik zelf voorzorgsmaatregelen zou treffen, neemt de kans op schade aan mijn woning/verblijfsplaats en bezittingen af.'					
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens	

Vraag #15	In welke mate bent u het eens met de volgende stelling: 'Wanneer ik zelf voorzorgsmaatregelen zou treffen, neemt de kans op schade aan Schoorl af.'				
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens
Vraag #16	In welke mate acht u zich lichamelijk in staat om maatregelen te nemen om schade door natuurbranden te voorkomen of te beperken?				
Antwoord	Totaal niet in staat	Niet in staat	Neutraal	In staat	Volledig in staat
Vraag #17	In welke mate acht u zich financieel in staat om maatregelen te nemen om schade door natuurbranden te voorkomen of te beperken?				
Antwoord	Totaal niet in staat	Niet in staat	Neutraal	In staat	Volledig in staat
Vraag #18	Ik welke mate bent u het eens met de volgende stelling: 'Ik vind dat de kosten die gepaard gaan met het nemen van voorzorgsmaatregelen tegen het risico van een natuurbrand het waard zijn.'				
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens

	Previous experience				
Vraag #19	Heeft u eerdere ervaringen met natuurbranden? Zo nee ga verder naar vraag 25.				
Antwoord	Ja			Nee	
Vraag #20	In welke mate heeft u ervaring met natuurbranden?				
Antwoord	Heel weinig ervaring	Tamelijk weinig ervaring	Neutraal	Tamelijk veel ervaring	Heel veel ervaring
Vraag #21	In welke mate bent u het eens met de volgende stelling: 'Sinds de vorige natuurbrand heb ik het idee dat natuurbranden vaker zullen voorkomen.'				
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens
Vraag #22	In welke mate bent u het eens met de volgende stelling: 'Ik heb de vorige natuurbranden als een wake-up call ervaren.'				
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens
Vraag #23	Heeft u sinds uw ervaring met natuurbranden voorzorgsmaatregelen genomen? Zo nee, ga verder naar vraag 25.				
Antwoord	Ja			Nee	
Vraag #24	Als u ja heeft geantwoord bij vraag 23, welke voorzorgsmaatregelen heeft u genomen?				
Antwoord					

	Protection Motivation				
Vraag #25	In welke mate bent u het eens met de volgende stelling: 'Ik heb het voornemen om zelf voorzorgsmaatregelen te treffen tegen natuurbranden.'				
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens
Vraag #26	In welke mate bent u het eens met de volgende stelling: 'Ik neem geen voorzorgsmaatregelen tegen natuurbranden, want ik geloof niet dat het mij zal overkomen.'				
Antwoord	Volledig oneens	Oneens	Neutraal	Eens	Volledig eens

	Characteristics	
Vraag #27	Bent u permanent woonachtig in Schoorl? Zo nee, ga verder naar vraag 31.	
Antwoord	Ja	Nee
Vraag #28	Sinds wanneer woont u in Schoorl?	
Antwoord		
Vraag #29	Sinds wanneer woont u in uw huidige huis?	

Antwoord						
Vraag #30	Wat voor soort woning heeft u?					
Antwoord	Huurwoning			Koopwoning		
Vraag #31	In welke leeftijdscategorie valt u?					
Antwoord	18-28	29-40	41-50	51-65	66-75	75+
Vraag #32	Wat is uw geslacht?					
Antwoord	Vrouw		Man		Anders	
Vraag #33	Wat is het door u hoogst genoten opleidingsniveau?					
Antwoord	Voortgezet onderwijs	MBO		HBO	WO	
Vraag #34	Wat is het geschatte jaarlijkse bruto inkomen van uw huishouden? (Modaal inkomen is €38.000 bruto per persoon per jaar)					
Antwoord	Ruim onder modaal inkomen	Onder modaal inkomen	Modaal inkomen	Boven modaal inkomen	Ruim boven modaal inkomen	Ik houd dit liever voor mijzelf.

Consent		
Geeft u toestemming om deze survey te gebruiken in het onderzoek?	Ja	Nee

Interview	
Zou u voor het onderzoek mee willen werken aan een interview? Tijdens dit interview wordt er dieper in gegaan op het onderwerp. Informatie uit dit interview wordt alleen voor dit onderzoek gebruikt, is vertrouwelijk en wordt geanonimiseerd. Wilt u hieraan meewerken, vul dan hieronder uw naam, e-mail en/of uw telefoonnummer in.	
Naam	
E-mail	
Telefoonnummer	

Appendix II: Code Tree

Living in Schoorl	*Moving*
	Advantages
Vulnerability	*Climate change*
	Vulnerability area
	Vulnerability dune edge
	Vulnerability Groet
	Vulnerability Schoorl
	Vulnerability individual
	Vulnerability feelings
	House location
Measures official bodies	Warning signs
	Increased awareness
	Enforcement
	Fire prohibited
	Controlled fire
	Diversity
	Water wells
	Practice
	Deciduous trees
	Forest maintenance
	Special vehicles
Measures individual	Evacuate
	Water
	No smoking
	No thatched roof
	Don’t litter
	Address people
	No open fires
	Be alert
	Vegetation
	Get a shovel
	Invest measures
	No measures
Communication	Conversations wildfires
	Information obtained through …
Autonomy	Trust
	Responsibility
Experience wildfires	Wildfires 2009/10/11
	Wildfires Schoorl
	Wild fires Europe
	Wildfires World
	History of wildfires
	No experience

Appendix III: Correlation Calculations

In this Appendix interesting correlations across different themes of the Protection Motivation Theory and the previous experience with wildfires will be discussed. To measure the correlation between different variables the Spearman's Rho calculation is used. This is the preferred method for ordinal variables with a non-parametric distribution. The values of Spearman's Rho can range from -1 to +1. A positive correlation means that a high score on variable X, also means a high score on variable Y. A negative correlation means that a high score on variable X, means a low score on variable Y. The closer Spearman's Rho is to a value of -1 or +1 the stronger the correlation between the two variables. In table 3, the directive on the strength of correlation is presented. Within this chapter only variables that have a medium to large correlation will be presented.

Table 3 Strength of correlation

	Positive	Negative
Weak correlation	0.1 to 0.3	-0.1 to -0.3
Medium correlation	0.3 to 0.5	-0.3 to -0.5
Large correlation	0.5 to 1.0	-0.5 to -1.0

Furthermore, the statistical significance also of importance when calculating the Spearmans Rho. For this research the significance level of 0.05 will be used. When the significance level is below 0.05 it means that the Spearmans Rho has less than 5% chance of being by chance. Within this chapter, only variables that have a significance level of 0.05 will be presented.

In the tables 4, 5, 6 and 7 the medium and large correlations of significance across different variables are presented.

Correlation Calculations Analysis

In this sub-section the correlation calculations will be discussed. The calculations of the correlations are done across the different variables. This is done to see if there are relationships between variables. The main findings are:

- Most of the correlation calculations in this research were weak correlations. Often stronger correlations were expected. For example, there is a weak correlation between how likely respondents think it is that their house will be affected in a wildfire and how far they estimate their house is from the forest edge. It was expected that the closer the respondents estimated their house from the forest edge, the more likely they thought their house would be affected in a wildfire. Yet, it becomes clear from the correlation calculations, see table 4, that respondents who estimate that their house is closer to the forest edge also believe in higher individual disruption when a wildfire hits.
- From the medium correlations presented in the tables 4, 5, 6 and 7 there are a few that stand out. Firstly, it is interesting to see that emotions of fear and worry correlate with different questions. For example, when respondents believe in a higher individual disruption when a wildfire hits Schoorl, they tend to also experience higher feelings of worry and fear, see table 4. Secondly, what stands out is that respondents who have experienced previous wildfires as a wake up-call also tend to have a higher intention of taking preventative measures themselves, see table 5. Finally, an interesting correlation is that respondents who feel like costs associated with taking measures against wildfires are worth it, often believe that taking measures will prevent damage and casualties. Furthermore, these respondents also believe themselves to be financially and physically able to perform these measures themselves.

- In this research two large correlations were found. Firstly, a large correlation was found between a question on the variable of Self-Efficacy and a question on the variable of Protection Motivation, see table 5. This correlation shows that respondents who feel like taking measures themselves will reduce the damages to their own homes often also have the behavioural intent to take protective measures themselves. The second large correlation was found between a question on the variable of Protection Motivation and Previous Experience, see table 7. This correlation shows that respondents who feel like wildfires will happen more often since they have had previous experiences with them are also more likely to take protective measures because they think a wildfire might happen to them. The direction of these effects, the effect of which variable on which variable, cannot be determined from these correlations.

Table 4 Correlation Calculations

	Variable: Vulnerability: It is probable that Schoorl will be hit by a large wildfire in the coming 10 years	Variable: Protection Motivation: Not taking measures because they do not think it will happen to them	Variable: Severity: Much individual disruption when a wildfire hits Schoorl	Variable: Previous Experience: Experienced previous wildfires as a wake up call
Variable: Vulnerability: Climate change will cause wildfires to become more frequent in Schoorl	Spearman's Rho: 0.327 Significance: 0.003	Spearman's Rho: -0.313 Significance: 0.006		
Variable: Characteristics: How far do respondents think their house is from the dune and forest edge of Schoorl			Spearman's Rho: 0.327 Significance: 0.003	
Variable: Emotional Feelings: Experiences fear when thinking about a wildfire hitting Schoorl			Spearman's Rho: 0.429 Significance: 0.001	Spearman's Rho: 0.361 Significance: 0.015
Variable: Emotional Feelings: Experiences unrest when thinking about a wildfire hitting Schoorl		Spearman's Rho: -0.312 Significance: 0.006	Spearman's Rho: 0.425 Significance: 0.001	

Table 5 Correlation Calculations

	Variable: Self-Efficacy: Taking measures myself will reduce the damages to my own home	Variable: Self-Efficacy: Taking measures myself will reduce the damages to Schoorl.	Variable: Previous Experience: Experienced previous wildfires as a wake up call
Variable: Protection Motivation: The intent to take measures themselves	Spearman's Rho: 0.524 Significance: 0.001	Spearman's Rho: 0.419 Significance: 0.001	Spearman's Rho: 0.465 Significance: 0.001

Table 6 Correlation Calculations

	Variable: Response Efficacy: Damage and casualties of wildfires can be prevented by taking measures	Variable: Self-Efficacy: Physically able to take measures themselves	Variable: Self-Efficacy: Financially able to take measures themselves
Variable: Response Costs: Costs associated with taking measures are worth it	Spearman's Rho: 0.352 Significance: 0.002	Spearman's Rho: 0.347 Significance: 0.001	Spearman's Rho: 0.377 Significance: 0.002

Table 7 Correlation Calculations

	Variable: Protection Motivation: Not taking measures because they do not think it will happen to them	Variable: Protection Motivation: Has the intent to take measures themselves	Variable: Previous Experience: Has taken measures since previous experience with wildfire	Variable: Previous Experience: Experienced previous wildfires as a wake up call
Variable: Previous Experience: Since the previous experience with wildfires I feel like wildfires will happen more often	Spearman's Rho: -0.579 Significance: 0.001	Spearman's Rho: 0.392 Significance: 0.008	Spearman's Rho: 0.387 Significance: 0.009	Spearman's Rho: 0.349 Significance: 0.019
Variable: Previous Experience: Experienced previous wildfires as a wake up call	Spearman's Rho: -0.327 Significance: 0.032			