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MASTER THESIS

In Science We Trust, Through Ideology We Look: Explaining Climate Change Attitudes in Norway

Mari Skåra Helliesen

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Abstract

This thesis explores climate change attitudes among the Norwegian public. While previous research on public opinion on climate change to a large degree has focused on scepticism, this thesis focuses on climate change acceptance, belief and support. In addition, previous research has included many and various measures of climate change attitudes as one concept. I have instead made a division between the aspects that lie closely to the scientific knowledge conveyed by the Intergovernmental Panel of Climate Change (IPCC), and aspects that to a larger degree concern political issues, assuming that we are dealing with two main dimensions of climate change attitudes. The aspects that were measured were trend and attribution acceptance and overall threat perception for the scientific dimension and personal threat perception, efficacy belief, and oil policy support for the political dimension.

The expectation was to find a divide between the scientific dependent variables and the political dependent variables. The argument was that those aspects of climate change attitudes that lie closer to the scientific findings communicated by the IPCC should be influenced by trust in scientists. On the other hand, the aspects of climate change attitudes that are more in the political sphere should be influenced by political orientation.

To test this I used logistic regression analysis with individual data from the Norwegian Citizen Panel (NCP). The results indicate that there is no clear division between the scientific related issues and political issues of climate change. In addition, political orientation is, in general, an important predictor of climate change attitudes in Norway. Trust in scientists also explains climate change attitudes, though not as much as political orientation. People who place themselves to the left on the political scale are more likely to believe in anthropogenic climate change, perceiving climate change as a threat, believing something can be done to prevent harmful climate changes as well as wanting Norway to decrease oil production. The same can be said for people who trust scientists.

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Abbreviations

AR – Assessment Report

COP – Conference of the Parties

FrP – Fremskrittspartiet (Norwegian Progress Party)

IPCC – Intergovernmental Panel on Climate Change

NCP – Norwegian Citizen Panel

WG – Working Group

1 Introduction

"Climate change at its core embraces both science and society, both knowledge and culture" (Hulme, 2013:back cover).

1.1 Climate change and public opinion

While climate change as a scientific phenomenon has been measured for decades, climate change research in the social science fields is a relatively new trend still under development. Climate change affects everyone and as Bernauer (2013:422) argues it is "caused to a substantial degree by humanity (…) and also affects humanity, it raises questions that are of great interest to social as well as natural scientists".

Although scientific evidence of climate change is getting stronger and more manifold by the minute, international climate policies have been moving at a slow pace. In 2015, the United Nations Climate Change Conference (COP21) will be held in Paris with aim to achieve a universal legally binding agreement on climate. According to leading scientists in the latest report from the Intergovernmental Panel on Climate Change (IPCC) there is a need of immediate action if we are to avoid serious consequences. However, climate change governance on a global level has almost been at a standstill since the signing of the Kyoto protocol in 1997. Therefore, it has been argued that it would be beneficial to change approach to bottom-up dynamics and focus more on driving forces such as the public opinion (Bernauer 2013). Considering politicians tend to highlight policy areas that the people are interested in and desire action on, if the general public opinion is concerned about climate change, it should be difficult to avoid climate politics.

It has been argued that one of the main issues that need to be tackled regarding climate change is making people understand the scope and seriousness of it. If people are sceptical to climate change, it is harder to promote and take action. Furthermore, widespread climate change scepticism among the public can create strong political and cultural barriers (Engels, Hüther,

Schäfer, & Held, 2013:2). In order for people to call for climate change policies they need to accept the occurrence and consequences of climate change.

Norway is a peculiar case. The country wants to be a promoter of international climate policies, and has large green energy resources (water and wind power). At the same time, Norway is highly dependent on the petroleum industry, and a substantial amount of the country's work force is affiliated to this particular industry. A recent debate in the Norwegian public forum following the IPCC's latest reports has brought forward scientists, including members of the petroleum science community.

In the majority of the previous research on public opinion on climate change, the *focus* has been on scepticism, which is a contested concept. Another way to look at climate change attitudes is to focus on acceptance and policy support. In the existing literature, dimensions of climate change are measured without any clear distinction. These dimensions include vast aspects that likely can be explained by different (and separate) factors. In this thesis I will make a division between aspects that are closely related to scientific knowledge and aspects that are more political (oriented). Because these dimensions measure different aspects of climate change, it can be expected that they be explained by different factors.

Can climate change attitudes in Norway be explained through a division between aspects closely related to scientific knowledge and political aspects?

The aim of the thesis is to analyse different aspects of climate change attitudes in Norway and to compare the explanatory power of the factors influencing climate change acceptance. The expectation is that attitudes concerning scientific knowledge to a large degree can be explained by trust in scientists while attitudes more concerned with political aspects can mainly be explained by political orientation.

1.2 Justifying the thesis

In the existing literature on public opinion on climate change there has rarely been made any distinction between different aspects. Thus scholars have discussed everything as if it was one issue, and this stir has impaired the possibility for cross-country comparisons. This thesis will investigate whether distinguishing between different dimensions of climate change attitudes, as well as provide for a possible distinction is beneficial.

Most of the research on climate change attitudes has been done on Anglo-Saxon countries[1]. Only a few studies have been conducted on Norway. This thesis will increase the research on climate change attitudes in Norway, which differs from the Anglo-Saxon countries to a large extent.

1.3 Structure of the thesis

Chapter two will present the theoretical framework. The chapter is divided in three parts. The first part presents the scientific basis of climate change as communicated through the IPCC. In the second part the concept of climate change acceptance with its different aspects and dimensions will be discussed. The third part of the chapter focuses on factors influencing dimensions of climate change acceptance, which I use to form my hypotheses.

In chapter three I discuss the climate change debate in Norway, before presenting and discussing the data used in the thesis. In addition, descriptive statistics for the dependent variables are presented and discussed. I discuss my methodological choices in chapter four, as well as operationalizing the independent variables. Following, I conduct regression models for each of the dependent variables and interpret the results individually. In chapter five I discuss the results and compare the findings across the dependent variables. The hypotheses formed in chapter two are discussed, as well as the general question. I conclude the chapter by discussing the implications of my findings and provide suggestions for further research.

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[1] Anglo-Saxon countries refer to English-speaking nations with similar cultural heritage originating form the nations of the British Isles. These countries are also known as the Anglosphere.

[2] Festinger's cognitive dissonance theory suggests that people have an inner drive to hold all attitudes and beliefs

2 Theoretical framework

This chapter will look closer at climate change attitudes, through theoretical contributions and previous empirical findings. I have divided the chapter into three parts. The first part looks into the scientific knowledge, focusing on reports from the Intergovernmental Panel on Climate Change (IPCC). The second part focuses on the conceptualization of climate change attitudes, what it is, which dimensions and distinctions there are, what has been done previously in the literature. In addition to that I will also construct and divide climate change attitudes in this thesis. The third part concentrates on factors influencing climate change attitudes, which factors have been discussed and tested in the previous literature, and which explanations I will focus on. The theoretical framework is concluded by forming hypotheses explaining climate change attitudes, and discussing expectations for the analysis.

2.1 The scientific basis of climate change

Before discussing climate change attitudes, it is necessary to understand the problem of climate change, and comprehend the scientific knowledge. We need to establish what people are or are not accepting. After all, they *accept* what has become evident through science. There is a disproportionate relationship between scientific knowledge and political agreement. In the scientific community, there is virtually consensus regarding climate change (Cook et al., 2013; Doran & Zimmerman, 2009). Somehow, this is neither being transferred to the political nor to the public arena. Some scholars are attempting to change this by highlighting the facts that are actually known, proven and agreed upon. Still, in the public opinion on climate change research, this is not always done as explicitly.

Climate science plays a fundamental role in the climate change problem (Dryzek, Norgaard, & Schlosberg, 2011), and scientists were extremely influential in the original design of the climate change problem (Jamieson, 2011). Climate change knowledge has been accumulating at high speed, since the discovery of previous ice ages proving that the climate could change on its own, and possibly even on a global scale (Steffen, 2011). Scientific proof of anthropogenic (human caused) climate change accumulated from the 1970s, although initial concerns were raised already in the 1930s (Weart, 2011). Since the 1970s, the perception that

unlimited emissions of greenhouse gases (GHG) into the atmosphere will lead to significant changes in climate conditions, has been embraced by the majority of climate change scientists (von Storch, Bunde, & Stehr, 2011). Swedish physical chemist, Svante Arrhenius, first suggested the theory in 1896, but it took a long time to gather scientific evidence to support this theory (von Storch et al., 2011). In the 1990s, anthropogenic climate change became the dominant subject in climate science (von Storch et al., 2011). There is no longer any doubt that GHG emissions, mainly carbon dioxide, from burning fossil fuels lies at the heart of the climate change problem (Steffen, 2011). These facts are, however, contested in political and public debates.

In literature concerning public opinion on climate change, scholars tend to neglect scientific knowledge, purely focusing on peoples' response to it. This may be problematical in different ways. Conceptually, because defining climate change acceptance should relate to what we actually can know with certainty, and the aspects that are to a degree uncertain in themselves. Climate knowledge is by all means affected by uncertainty, even though the development has been positive, and the research field is more certain and confident now than at the beginning. The development in the assessment reports of the IPCC indicates this, with the first report characterized by a higher degree of uncertainty than the newest. However, some degree of uncertainty will always be present, as science never can be 100 per cent certain.

2.1.1 The IPCC

The Intergovernmental Panel on Climate Change (IPCC) is the leading international scientific body in the work of assessing climate change. It was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) (IPCC, 2014a). The purpose of the panel is to provide the world with a clear scientific view on the current state of knowledge in climate change, as well as its potential environmental and socio-economic impacts. The IPCC does not itself conduct research, but reviews the most recent and relevant scientific, technical and socio-economic information worldwide (IPCC, 2014a). Governments take part in reviewing, accepting, adopting and approving reports. The authority of the scientific content is acknowledged by endorsing the reports. Hence, the work of the organization is "policy-relevant and yet policy-neutral, never

policy-prescriptive" (IPCC, 2014a). Thus the IPCC's task is to produce climate change knowledge to help politicians make decisions, without telling them what measures to use.

In 1985, experts gathered to assess recent research, and the first report was published in 1990 (Weart, 2011). The IPCC was established to let science carry climate politics, as well as to curb the activism that grew in the science community (Jamieson, 2011). The assessment reports are central to and document the changes. The IPCC gathers scientific knowledge and scientists in a broad scope. The reports are authoritative and the foundation for dealing with climate change. The IPCC has achieved high recognition and received the Nobel's Peace Prize in 2007 (Jamieson, 2011).

Authority representatives from the 195 member states take part in deciding the content of the summaries for policy makers. This has led to criticism against the IPCC, for being driven by political interests. However, this criticism mainly comes from communities that wish to cast doubt on the integrity and validity of the panel and its conclusions (Bjørnæs 2014). Also, the summaries are necessarily built on the main reports, which are not political. Thus, the political involvement is limited to selecting what the summaries for policy makers should highlight. Summary negotiations are based on consensus, consequently, states can block content from political interests (Bjørnæs 2014). Nevertheless, what ends up making the cut should accordingly gain high legitimacy after getting past the scrutiny.

2.1.2 The Fifth Assessment Report

The Fifth IPCC Assessment Report (AR5) was published in 2013 and 2014, and is a revised edition of previous reports. The report is divided into four parts, with a summary for policy makers for each part. The four parts are *The Physical Science Basis* (Working Group (WG) I), *Impacts, Adaptations, and Vulnerability* (WG II)*, Mitigation of Climate Change* (WG III)*,* and *Synthesis Report* (summarizing). This is approximately the same structure that has been from the start of the IPCC's work. The most important findings related to understanding and accepting climate change will be presented here.

The degree of certainty in the findings builds on evaluations of underlying scientific understanding by the authors. It is expressed as a qualitative level of confidence, from very

low to very high, and, when possible, probabilistically with a quantified likelihood, from exceptionally unlikely to virtually certain. According to the IPCC (2014d:4), confidence in the validity builds on the type, amount, quality, and consistency of evidence, as well as the degree of agreement.

The first part from WG I to AR5 considers new climate change evidence based on numerous independent scientific analyses, from observations of the climate system, paleo climate archives, theoretical studies of climate processes, as well as simulations using climate models (IPCC, 2013:4). Climate system observations are based on direct measurements and remote sensing from satellites and other platforms (IPCC, 2013:4). WG I states that "the atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentration of greenhouse gases have increased" (IPCC, 2013:4). In addition, "(e)ach of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850" (IPCC, 2013:5). Concentrations of carbon dioxide, methane, and nitrous oxide in the atmosphere have increased to levels unprecedented in at least the last 800 000 years. Since pre-industrial times, carbon dioxide concentrations increased by 40 per cent, primarily from fossil fuel emissions and secondarily from net land use change emissions (IPCC, 2013:11). The report shows that human influence on the climate system is clear. "This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system" (IPCC, 2013:15). The report states that it is "extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century" (IPCC, 2013:17). Moreover, "(c)ontinued emissions of greenhouse gases will cause further warming and changes in all components of the climate system, limiting climate change will require substantial and sustained reductions of greenhouse gas emissions" (IPCC, 2013:19).

WG II assesses impacts, adaptation, and vulnerability of climate change in the second part. Patterns of risks and potential benefits shifting due to climate change are evaluated. It also considers how impacts and risks related to climate change can be reduced and managed through the process of adaptation and mitigation. When discussing impacts and actions regarding climate change, adaptation and mitigation are common concepts. Adaptation is defined as "(t)he process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In

some natural systems, human intervention may facilitate adjustment to expected climate and its effects" (IPCC, 2014c:5). Mitigation is the area of WG III. Vulnerability consists of a variety of concepts and elements including sensitivity or susceptibility to harm. Lack of capacity to cope and adapt is also a part of the vulnerability term (IPCC, 2014c:5). Impacts refer to the effects on natural and human systems. In the report, the term is used primarily with regards to the effects of extreme weather and climate events, and of climate change (IPCC, 2014c:5). Risk is defined as "(t)he potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values". (IPCC, 2014c:5). The term primarily refers to climate change risks in the report.

The IPCC report states that the climate system is interfered by human activity, and climate change poses risks for both human and natural systems. Changes in climate have, in recent decades, caused impacts on natural and human systems on all continents and across the oceans. The report focuses on risk, which is a new contribution. "People and societies may perceive or rank risks and potential benefits differently, given diverse values and goals" (IPCC, 2014c:3). The reports stated that, at all levels of governance, adaptation planning and implementation are contingent on social values, objectives, and risk perceptions. Recognising diverse interests, circumstances, social-cultural contexts, and expectations can be beneficial for decision-making processes (IPCC, 2014c:26).

In AR5, WG III assesses contributions to literature on the scientific, technological, environmental, economic and social aspects of mitigation of climate change. In addition, the report assesses mitigation options at different levels of governance and in different economic sectors, as well as the societal implications of different mitigation policies, but does not recommend any particular option for mitigation (IPCC, 2014d:4). Mitigation is defined as "a human intervention to reduce the sources or enhance the sinks of greenhouse gases" (IPCC, 2014d:4). According to the report, effective mitigation will not be achieved if individual agents advance their own interests independently, because "(c)limate change has the characteristics of a collective action problem at the global scale" (IPCC, 2014d:5), with a common objective. Thus, international cooperation is required to effectively mitigate GHG emissions and address other climate change issues, according to the report. Moreover, "research and development in support of mitigation creates knowledge spillovers" (IPCC, 2014d:5).

According to the IPCC, "(m)any areas of climate policy-making involve value judgements and ethical considerations" (IPCC, 2014d:5). An example is the question of how much mitigation is needed to prevent dangerous interference with the climate system, or choices among specific policies for mitigation or adaptation. Risk perception influences design of climate policy (IPCC, 2014d:5-6).

The report states that "emission growth is expected to persist driven by global population growth and economic activities" (IPCC, 2014d:9) if no additional efforts to reduce GHG emissions will take place. Without additional mitigation, the baseline scenarios result in global mean surface temperature increases between 3.7 and 4.8 degrees in 2100, compared to pre-industrial levels (IPCC, 2014d:9). There has been a considerable increase in national and sub-national mitigation plans and strategies since the previous assessment report in 2007. Since then, cap and trade systems for GHG emissions have been established in a number of countries and regions. However, as a result of loose caps or caps that have not proved to be constraining, the short-run environmental effect has been limited (IPCC, 2014d:28-29).

The Synthesis Report is the final part of the AR5. It is based on the reports of the three Working Groups of the IPCC, and provides an integrated view of climate change. According to the report, "(h)uman influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history" (IPCC, 2014b:1). The impacts on human and natural systems have been widespread. Warming of the climate system is reported as unequivocal. The atmosphere and ocean have both warmed, the amounts of snow and ice have diminished, and sea level has risen (IPCC, 2014b:1). Anthropogenic emissions are largely driven by economic and population growth, and are now higher than ever, according to the IPCC report.

The report stresses that "(c)ontinued GHG emissions will cause further warming and long-lasting changes in all components of the climate system" (IPCC, 2014b:8). Accordingly, the likelihood of severe, pervasive and irreversible impacts for people and ecosystems will increase. Limiting climate change requires substantial and sustained reductions in GHG emissions. Together with adaptation these actions can limit climate change risks (IPCC, 2014b:8). Climate change will, according to the report, reinforce existing risks, as well as

create new risks for both natural and human systems. “Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development” (IPCC, 2014b:13). Even if anthropogenic GHG emissions are stopped, “(m)any aspects of climate change and associated impacts will continue for centuries” (IPCC, 2014b:16). With increasing magnitude of the warming, “the risks of abrupt or irreversible changes also increase” (IPCC, 2014b:16). Adaptation and mitigation are “complementary strategies for reducing and managing the risks of climate change” (IPCC, 2014b:17).

The key messages from the report are that human influence on the climate system is clear; the more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts; and we have the means to limit climate change and build a more prosperous, sustainable future (IPCC, 2014b). It is necessary to act and initiate drastic measures to reach the two degrees goal, according to the report. In addition, the longer we wait with implementing these measures, the more drastic they will have to be (IPCC, 2014b).

2.2 Climate change attitudes

This part will focus on conceptualizing climate change attitudes. There are many aspects of climate change attitudes, and in the previous literature these aspects have been discussed and analysed as if it were all one concept. However, I believe that it is appropriate to make a division between climate change attitudes that are closely related to scientific knowledge, as communicated by the IPCC, and political related perceptions of climate change. The attitudes that are related to science can be conceptualized as climate change acceptance, while the additional attitudes with a larger distance to science can be viewed as political climate change perceptions. The science related aspects of climate change have been the most discussed and developed in the field of public opinion on climate change. I base this dimension of climate change acceptance on the theoretical framework developed by Rahmstorf. The more scientifically distanced dimension has as of yet played a lesser part in the academic discourse. This thesis will present the limited existing literature on political related perceptions of climate change and attempt to develop this dimension further.

2.2.1 Climate change

The IPCC defines *climate change* as "a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer" (IPCC, 2014c:5). Accordingly, the term 'climate change' may refer to changes due to both natural and anthropogenic processes and influences. However, the Framework Convention on climate Change (UNFCCC) defines climate change differently. The UNFCCC is the main multilateral forum focused on addressing climate change (IPCC, 2014d:30). It defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods", in its Article 1. Thus, the UNFCCC makes a distinction between climate change caused by human activities, and natural caused climate alterations. In this thesis, the definition from the IPCC will be used, distinguishing between natural and anthropogenic climate change.

In both academia and the public discourse, the terms 'climate change' and 'global warming' are frequently used interchangeably. Global warming refers to the increase in average global temperature, and represents only on aspect of climate change. In addition, precipitation, extreme weathers and other changes are included in the wider term climate change (EPA, 2014). According to Hamilton (2011:233), scientists often prefer to discuss 'climate change' rather than 'global warming'. This is because the former term better expresses the climate's complexity, variability and extreme events. However, in public discourse, the terms tend to be used interchangeably, most commonly 'global warming'. The use of the latter term may be more vulnerable to public scrutiny, as 'global warming' might be easier (falsely) dismissed when experiencing cold weather extremes. In a study on European's attitudes towards climate change, the impact of the terminological differences is measured. Climate change and global warming are experienced as equally serious problems, and the results show that the terminology has no significant effect on people's perceptions in the EU (Eurobarometer, 2009). In my analysis, I look at climate change in the general aspect, but I discuss previous research on global warming in the same aspect as climate change.

2.2.2 Dealing with climate change

Science and research first identified climate change as a problem. Today, however most emphasis lies on how it is perceived and received in and of society and authorities (Dryzek et al., 2011). Climate change is in first instance a scientific phenomenon, and acceptance is therefore a response to scientific facts. Nonetheless, climate change needs to be understood as "an idea situated in different cultural contexts" (Hulme, 2013:back cover), as well as a physical phenomenon. In *Merchants of Doubt*, Oreskes and Conway (2010) use a fittingly describing analogy to explain the reactions to climate change.

"Imagine a gigantic banquet. Hundreds of millions of people come to eat. They eat and drink to their hearts' content – eating food that is better and more abundant than at the finest tables in ancient Athens or Rome, or even in the palaces of medieval Europe. Then, one day, a man arrives, wearing a white dinner jacket. He says he is holding the bill. Not surprisingly, the diners are in shock. Some begin to deny that this is *their* bill. Others deny that there even *is* a bill. Still others deny that they partook of the meal. One diner suggests that the man is not really a waiter, but is only trying to get attention for himself or to raise money for his own projects. Finally, the group concludes that if they simply ignore the waiter, he will go away" (Oreskes & Conway, 2010:266).

This extraction highlights the problem of dealing with climate change. Denying that there ever was a bill refers to denying that the climate is changing. By denying that the bill is theirs, people refuse to accept that climate change is anthropogenic. Denying participation refers to the 'blame game'. Who bears the most responsibility for climate change: our forefathers, industrialized countries, or humanity? The suggestion that the messenger is not who he says shows the lack of trust in the scientific community, or even conspiracy thoughts. Ignoring the waiter and hoping that he will go away points to the inaction that has been taking place.

The literature on public climate change opinion tends to focus on scepticism. Being sceptical does not refer to just being cautious to information, but rather not believing or understanding the importance, seriousness and scope of climate change. Climate change scepticism contributes to prevent action, and is seen as one of the major problems in dealing with climate change (Skjetne, 2014). Is it fair to call people sceptical if they simple do not care? Does one have to change their lifestyle not to be a sceptic? In that case, the definition would entrap a lot

of people and enhance the problematic issue. Is passivity as problematic as working against agreement and action? If the term is not defined and conceptualized narrowly and clearly, the issue of scepticism among the public will likely be exaggerated. If too loosely termed, all scientists can be labelled sceptics due to the degree of uncertainty in science. In addition, scepticism is a normative and negatively charged term. Sceptics typically call themselves realists. Another question in the conceptual debate is whether there is a division between scepticism and denial.

The concept of climate change scepticism has been debated in the literature. Scholars use the term differently and apply different attributes to it. This affects how it has been measured, and what results are found. The conceptualization is an important step in regards to how to deal with the problem (Goertz, 2006). Scepticism is an inherent feature of science and a common characteristic of scientists. However, according to Dunlap (2013), many individuals actively involved in the denial campaign are not sceptical of climate science but are in full denial, and no amount of evidence will convince them of the reality of anthropogenic climate change. Without distinctive definition, scepticism is open for interpretation. Other scepticism-concepts, such as Euro scepticism, have also been highly debated.

To avoid these conceptual pitfalls, I will look at public opinion on climate change from another angle, by focusing on acceptance. In this thesis climate change acceptance will be seen in relation to the IPCC's conclusions. The problem of not accepting science is stressed by Oreskes and Conway (2010:272):

"The sociologist Michael Smithson has pointed out that all social relations are trust relations. We trust other people to do things for us that we can't or don't want to do ourselves. Even legal contracts involve a degree of trust, because the person involved could always flee to Venezuela. If we don't trust others or don't want to relinquish control, we can often do things for ourselves. We can cook our own food, clean our own homes, do our own taxes, wash our own cars, even school our own children. But we cannot do our own sciences."

2.2.3 The climate change acceptance dimension

Climate change attitudes that relate closely to science are in this thesis placed in a climate change acceptance dimension. As most of the conceptual debate on climate change opinion has focused on the term scepticism, the conceptualization of the term climate change acceptance will build on this debate.

Rahmstorf (2004) finds that scepticism is to loose of a concept, and lists three different sub types. Trend sceptics claim that climate change is not happening, that no significant climate warming is taking place. Attribution sceptics claim that climate change is real, but not anthropogenic. They typically claim that the atmospheric CO2 is released from the ocean by natural processes. Impact sceptics claim that climate change is harmless. Rahmstorf's framework has, amongst others, been used to analyse public climate change scepticism in Britain (Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011). Engels et al. (2013) add consensus (in climate science) scepticism to Rahmstorf's multidimensional construct, measuring public climate change scepticism in Germany.

In the book *States of Denial*, Cohen (2013) looks at denial and divides responses to events such as genocide into literal denial (it did not take place), interpretive denial (the facts are not denied, but given a different meaning) and implicatory denial (it happened, but has nothing to do with me/I cannot make a difference). Howe and Leiserowitz (2013) group climate change beliefs into concerned, cautious, disengaged, doubtful and dismissive. Ryghaug, Sørensen, and Næss (2011) view domestication of climate science knowledge, with four main outcomes: the acceptors, the tempered acceptors, the uncertain and the sceptics. This way, acceptance and scepticism is part of a graded concept. Public belief in climate change is by Whitmarsh (2011) defined as the opposite of scepticism.

In the climate change opinion literature, attitudes toward climate change have been both conceptualized and measured differently. By going through studies of public opinion on climate change, I have found a variety of dependent variables. Many studies have based their measurement on one item, rather than applying more robust multi-dimensional scales. With the framework of Rahmstorf in mind, as well as supplements from more recent studies, a combination of different attributes of climate change acceptance can be measured. Austgulen and Stø (2013) measure climate change scepticism in Norway with twelve different indicators

divided in to trend, attribution and impact scepticism. In this thesis climate change acceptance will be analysed on these three dimensions, building on Rahmstorf's framework and Austgulen and Stø's analysis. However, they will be combined into one scientific related dimension, in addition to another dimension with measures that to some degree also emerge in the literature.

Climate change trend

The IPCC review showed that there is clear scientific evidence that the climate is changing. Trend is usually the first aspect measured in climate change opinion. Table 2.1 presents previous research on trend in the literature on climate change attitudes.

Table 2.1: Literature on the trend aspect of climate change

Authors	Country	Concept	Question wording
Austgulen and Stø (2013)	Norway	Climate change scepticism	The evidence that the climate is changing is trustworthy I am certain that climate change is occurring Floods and heat waves do not increase in scope, it is just the media who report more on it We know enough today to say that climate change is a problem
Donner and McDaniels (2013)	USA	Belief in global warming	Do you believe that the earth is warming?
Engels et al. (2013)	Germany	Climate change scepticism	Climate change is currently occurring
Feldman, Maibach, Roser-Renouf, and Leiserowitz (2011)	USA	Global warming acceptance	Global warming certainty
Hobson and Niemeyer (2012)	Australia	Climate change scepticism	Is climate change real?

Howe and Leiserowitz (2013)	USA	Beliefs about global warming	If you had the opportunity to talk to an expert on global warming, which question would you ask? Is global warming really happening? Is global warming a hoax? How do you know that global warming is happening? Assuming global warming is happening, do you think it is…? …none of the above because global warming isn't happening.
Kahan, Jenkins-Smith, and Braman (2011)	USA	Belief in the existence of scientific consensus	Global temperatures are increasing
Leviston, Walker, and Morwinski (2013)	Australia	Opinion on climate change	Which of the following statements best describe your thoughts on climate change? I don't think that climate change is happening I have no idea whether climate change is happening or not
Li, Johnson, and Zaval (2011)	USA Australia	Belief in global warming	How convinced are you that global warming is happening?
Mayer, Adair, and Pfaff (2013)	USA	Opinion on climate change	Is the earth's climate changing?
McCright and Dunlap (2011a)	USA	Climate change denial	Timing of global warming
McCright and Dunlap (2011b)	USA	Belief and concern about global warming	Timing of global warming
Poortinga et al. (2011)	UK	Climate scepticism	Do you personally think the world's climate is changing or not? I am uncertain that climate change is really happening

Scruggs and Benegal (2012)	USA	Belief that warming is occurring	The effects of global warming have already begun to happen There is solid evidence that the earth is warming The world's temperature may have been going up over the last 100 years
Spence, Poortinga, Butler, and Pidgeon (2011)	UK	Perception of climate change	I am uncertain that climate change is really happening
Stevenson, Peterson, Bondell, Moore, and Carrier (2014)	USA	Climate change acceptance	Whether students believed global warming was happening
Tvinnereim and Austgulen (2014)	Norway	Attitudes towards climate change	I am certain that climate change is occurring Floods and heat waves do not increase in scope, it is just the media who report more on it
Whitmarsh (2011)	UK	Scepticism and uncertainty about climate change: The Scepticism scale	I am uncertain about whether climate change is really happening The evidence for climate change is unreliable There is too much conflicting evidence about climate change to know whether it is actually happening Floods and heat-waves are not increasing, there is just more reporting of it in the media these days

Most of the research has been conducted on Anglo-Saxon countries, and the USA in particular. Some studies have been done on European attitudes in recent years, including a few on Norway, which analyse climate change opinion according to Rahmstorf's framework. Although the concept that is measured varies in these articles, the question is in general similar. Most of the questions in table 2.1 concern belief that the climate is changing. Some questions also involve evidence for climate change. The trend aspect concerns the occurrence of climate change. The simplest questions that plainly ask whether one believes that the climate is changing might be the most precise and therefore the most suitable.

Climate change attribution

According to the IPCC, as previously reviewed, human influences on climate change are clear. Attribution presupposes trend, because for people to believe in anthropogenic climate change, they need to believe that the climate is changing. Measuring attribution is common in the literature on climate change attitudes. Previous measures of attribution in the literature are presented in table 2.2.

Table 2.2: Literature on the attribution aspect of climate change

Authors	Country	Concept	Question wording
Austgulen and Stø (2013)	Norway	Climate change scepticism	Climate change is largely anthropogenic Climate change is only natural variations in the earth's temperature Claims that human activity is changing the climate are exaggerated
Engels et al. (2013)	Germany	Climate change scepticism	Climate change is caused by humans
Feldman et al. (2011)	USA	Global warming acceptance	Belief in the human causes of global warming
Hobson and Niemeyer (2012)	Australia	Climate change scepticism	Is it human induced?
Howe and Leiserowitz (2013)	USA	Beliefs about global warming	If you had the opportunity to talk to an expert on global warming, which question would you ask? What causes global warming? How do you know that global warming is caused mostly by human activities, not natural changes in the environment? Assuming global warming is happening, do you think it is…? …Caused mostly by human activities …Caused mostly by natural changes in the environment
Kahan et al. (2011)	USA	Belief in the existence of scientific consensus	Human activity is causing global warming

Leviston et al. (2013)	Australia	Opinion on climate change	Which of the following statements best describe your thoughts on climate change? I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures I think that climate change is happening, and I think that humans are largely causing it
Lewandowsky, Gignac, and Oberauer (2013)	USA	Rejection of climate science	I believe that the climate is always changing and what we are currently observing is just natural fluctuation. I believe that most of the warming over the last 50 years is due to the increase in greenhouse gas concentrations. I believe that the burning of fossil fuels over the last 50 years has caused serious damage to the planet's climate. Human CO2 emissions cause climate change. Humans are too insignificant to have an appreciable impact on global temperature
Mayer et al. (2013)	USA	Opinion on climate change	Is climate change primarily because of human activities or natural causes?
McCright and Dunlap (2011a)	USA	Climate change denial	Primary cause of global warming
McCright and Dunlap (2011b)	USA	Belief and concern about global warming	Primary cause of global warming
Poortinga et al. (2011)	UK	Climate scepticism	Thinking about the causes of climate change which, if any of the following best describes your opinion? Climate change is… Entirely caused by natural processes, mainly caused by natural processes, partly caused by natural processes and partly caused by human activity, mainly caused by human activity, completely caused by human activity

Scruggs and Benegal (2012)	USA	Belief that warming is occurring	Emissions of CO2 have only a marginal impact on climate change
Stevenson et al. (2014)	USA	Climate change acceptance	Asking whether students whether they thought climate change was caused by humans
Tvinnereim and Austgulen (2014)	Norway	Attitudes towards climate change	Climate change is largely anthropogenic Claims that human activity is changing the climate are exaggerated
Whitmarsh (2011)	UK	Scepticism and uncertainty about climate change: The Scepticism scale	Claims that human activities are changing the climate are exaggerated Climate change is just a natural fluctuation in earth's temperatures

Most of the questions for measuring attribution attitudes are similar to each other. To a large degree, the questions consider human influences. Giving alternatives for natural and anthropogenic causes of climate change seems applicable. This way, attribution acceptance is measured while accounting for response set. If answer alternatives simply range between 'yes' and 'no' for charged questions, respondents might be affected to answering what they think is expected.

Climate change impact

The IPCC is also clear on the fact that climate change has caused impacts across the earth. The literature review presented in table 2.3 shows differences in impact measures.

Table 2.3: Literature on the impact aspect of climate change

Authors	Country	Concept	Question wording
Austgulen and Stø (2013)	Norway	Climate change scepticism	I am worried about the consequences climate change may have for us humans Overall I would say that the severity of climate change are exaggerated in the news It is too early to say whether climate change is a problem Too much attention is given to climate change
Bohr (2014)	USA	Dismissal of climate change dangers	In general, do you think that a rise in the world's temperature caused by climate change is extremely dangerous for the environment, very dangerous, somewhat dangerous, not very dangerous, or not dangerous at all for the environment?
Brulle, Carmichael, and Jenkins (2012)	USA	Public concern	Do you think global warming is an environmental problem that is causing a serious impact now, or do you think global warming isn't having a serious impact?
Donner and McDaniels (2013)	USA	Worry about global warming	How much do you worry about global warming?
Engels et al. (2013)	Germany	Climate change scepticism	Climate change is a serious problem
Feldman et al. (2011)	USA	Global warming acceptance	Concern about global warming impact
Hamilton (2011)	USA	Concern about climate change	Do you think that global warming will pose a serious threat to you or your way of life in your lifetime, or not?
Hobson and Niemeyer (2012)	Australia	Climate change scepticism	Is climate change a problem?

Howe and Leiserowitz (2013)	USA	Beliefs about global warming	If you had the opportunity to talk to an expert on global warming, which question would you ask? What harm will global warming cause When will global warming begin to harm people Will global warming harm people'
		Risk perception	Questions about whom, how much, and when global warming will harm
		Beliefs about current environmental impacts	Do you agree or disagree that global warming is already causing or making the following things worse, or do you not know
Kahan, Braman, Gastil, Slovic, and Mertz (2007)	USA	Climate change risk perception	Global warming poses a serious danger for the future of our planet
Kahan et al. (2012)	USA	Climate change risk perception	How much risk do you believe climate change poses to human health, safety or prosperity?
Li et al. (2011)	USA Australia	Belief in global warming	How much do you personally worry about global warming?
Mayer et al. (2013)	USA	Opinion on climate change	How serious a threat is climate change?
McCright and Dunlap (2011a)	USA	Climate change denial	Thinking about what is said in the news, in your view is the seriousness of global warming generally exaggerated, generally correct, or is it generally underestimated? How much do you personally worry about the greenhouse effect or global warming?
Poortinga et al. (2011)	UK	Climate scepticism	The seriousness of climate change is exaggerated It is uncertain what the effects of climate change will be
Scruggs and Benegal (2012)	Europe	Public concern	How serious a problem do you think climate change is at this moment? The seriousness of climate change has been exaggerated

Spence et al. (2011)	UK	Perception of climate change	How concerned, if at all, are you about climate change, sometimes referred to as 'global warming'? My local area is likely to be affected by climate change
Tvinnereim and Austgulen (2014)	Norway	Attitudes towards climate change	We know enough today to be able to say that climate change is a problem Too much attention is given to climate change
Whitmarsh (2011)	UK	Scepticism and uncertainty about climate change: The Scepticism scale	I do not believe climate change is a real problem It is too early to say whether climate change is really a problem Too much fuss is made about climate change

Table 2.3 illustrates how impact has been measured differently in climate change opinion research. There is particularly a division between concern and threat perception. Concern does not seem like a good measure, because not being concerned does not necessarily mean that you do not consider climate change a problem. The IPCC reports discuss threat perception explicitly, therefore the measure is somewhat grounded in the scientific basis and might be the better of the impact measures.

2.2.4 The political climate change perception dimension

In addition to the scientific related climate change attitudes, there are aspects concerning perceptions of climate change that are not based on scientific consensus. These aspects concern political perceptions, such as the ability to do something about climate change and policy measures to tackle climate change.

Personal threat

The IPCC states that the impacts on human and natural systems have been widespread. Science has not been able to tell who will be the most affected though. Consequently, a distinction can be made between overall impacts and personal threat perceptions. In the first dimension, impact acceptance was discussed. Some of the measures used in the previous literature have a more personal angle. Li et al. (2011) measured how much people personally

worried about global warming in the U.S. and Australia. Hamilton (2011) measures concern about climate change is the U.S. with the question 'do you think that global warming will pose a serious threat to you or your way of life in lifetime, or not'. Howe and Leiserowitz (2013) ask questions concerning personal aspects of climate change: 'how important is the issue of global warming to you personally?', 'how much had you thought about global warming before today?', 'how worried are you about global warming?', and 'I have personally experienced the effects of global warming'. McCright and Dunlap (2011a) measure climate change denial through assessing worry about global warming with the following Gallup question: 'how much do you personally worry about the greenhouse effect or global warming?'

Since threat perception has been measured both overall and personally, without any clear distinction in the previous literature, it should be interesting to measure them separately and in different dimensions of climate change attitudes.

Efficacy

There has been a considerable increase in national and sub-national mitigation plans and strategies since the previous assessment report in 2007. Since then, cap and trade systems for GHG emissions have been established in a number of countries and regions. According to the latest Synthesis Report, we have the means to limit climate change and build a more prosperous, sustainable future (IPCC, 2014b). Impacts and risks related to climate change can be reduced and managed through the process of adaptation and mitigation (IPCC, 2014c). In spite of this, the IPCC reports do not mention if and how individuals can help with reduction and prevention.

Efficacy has not been widely used in climate change opinion research. However, as part of global warming acceptance, Feldman et al. (2011:15) measure the valence of expectations regarding the outcomes of taking action on global warming among the U.S. public. Respondents were presented with a list of ten potential positive outcomes of taking national action on global warming (e.g., help free them from dependence on foreign oil, improve people's health, save many plant and animal species from extinction, prevent the destruction of most life on the planet) and six potential negative outcomes of taking action on global

warming (e.g., cost jobs and harm our economy, cause energy prices to rise). Respondents were asked to indicate all of the items that they thought were true.

Ding, Maibach, Zhao, Roser-Renouf, and Leiserowitz (2011:463) measure injunctive beliefs, "the belief that various societal actors should do more to address global warming". They asked whether respondents thought each of the following should be doing more or less to address global warming. The items were local government officials, state legislators, governors, the US Congress, the president, corporations and industry, and citizens themselves.

Climate change efficacy is not a widely used measure; therefore there is not much to review and chose from. Nonetheless, the core of the aspect is the belief that something can be done regarding climate change. This might be an important aspect when it comes to public opinion. If the public believes that something can be done, it could lead to a higher call for action, and if the public does not believe that there is anything that can be done, it will be problematic to place climate change policies on the agenda.

Policy

According to the IPCC, International cooperation is required to effectively mitigate GHG emissions and address other climate change issues (IPCC, 2014d:5). It is necessary to act and initiate drastic measures to reach the two degrees goal. The longer we wait with implementing these measures, the more drastic they will have to be (IPCC, 2014b). Adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change (IPCC, 2014b:17).

Ding et al. (2011) measure policy support by asking respondents how much they supported or opposed specific policies. Krosnick and MacInnis (2012) also measured public opinion on climate change through policy endorsements. They measured endorsement of ten policies intended to reduce future global warming and constructed a summary index using all of these measures. The respondents were asked whether they favoured or opposed the specific policies as ways for the federal government to try to reduce future global warming. They were also asked whether the government should require some measures by law, encourage with tax breaks but not require, or stay out of entirely.

The IPCC does not say which policy measures should be used in adaptation and mitigation, as they are not policy-prescriptive. Perhaps including 'policy' in the climate change perception dimension is especially appropriate in the Norwegian case. Earlier studies and public opinion polls show that scepticism is not particularly widespread in Norway, but far from all Norwegians accept climate change (Austgulen & Stø, 2013; Gallup, 2014; Hellevik, 2010). This mainly concerns trend and attribution measures, as well as impact, to some extent. But what about policy support? Most Norwegians might believe that the climate is changing (trend), that it is caused by human activity (attribution) and that it poses a serious threat (impact). However, when it comes to GHG emission reductions, the Norwegian people are very divided when it comes to actual oil and gas extraction. Thus, a policy measure with questions on oil would be really interesting. This way, the Norwegian paradox (of oil and climate change) can be incorporated into the dependent variable, and not just as a factor with influence on acceptance.

It should be interesting to analyse how the public perceives climate change in regards to personal impacts, the possibility of doing something, as well as what should be done. Therefore, personal threat perception, efficacy belief and policy support are included as a second dimension in my thesis.

2.3 Factors influencing climate change attitudes

In the climate change opinion literature, different factors have been tested for influencing attitudes on climate change. Now that I have divided climate change attitudes into two dimensions, the assumption is that these issues can be separated and thus explained by different factors. I will focus on two main factors explaining the two dimensions respectively. I include some of the dominating explanations from Anglo-Saxon and European studies, as well as one case-specific explanation for Norway. In addition, some demographic factors that also may play parts in explaining climate change attitudes will be outlined.

2.3.1 Trust in scientists

According to Kellstedt, Zahran, and Vedlitz (2008:115-6) trust is an important factor in influencing risk interpretation and support for policy choices in the face of risk. Risk perception might thus be related to individual levels of trust in the experts on the subject.

Poortinga and Pidgeon (2003) stress the importance of trust as a necessary construct in understanding risk perceptions, while examining the dimensions of trust and their relationship to risk regulation in five policy areas, including climate change. Krosnick, Holbrook, Lowe, and Visser (2006) argue that people minimally trusting of scientists, the primary informants about climate change, are not persuaded by information provided by scientists, but instead derive their opinions simply from their personal experiences with weather changes. Among people more trusting of scientists, exposure to new information should increase belief in the existence of climate change. Trust plays an important role in communicating information about risks to the public (Krosnick et al., 2006:38).

Krosnick and MacInnis (2012) found that a decline among Americans, who wanted government to take specific actions to mitigate the effects of global warming in 2010 and 2012, was concentrated among people who did not trust environmental scientists. Kellstedt et al. (2008) found that respondents with high confidence in scientists feel less responsible for global warming, and also show less concern for global warming. Krosnick et al. (2006:28) found that greater television exposure was associated with an increase in belief in the existence of global warming only among people who trusted scientists and who were highly educated. Mayer et al. (2013) found that those who are more trusting express greater support across policy alternatives.

H1: Trust in scientists has a positive effect on climate change attitudes

2.3.2 World-view

According to Wood and Vedlitz (2007:556), "people process information about issues through a filter containing a range of variables relating to their predispositions" when they have limited knowledge of an issue and are exposed to ambiguous information. One of the important predisposed variables is their political orientation. This assumption is called the information processing theory (Hamilton, 2011). Political orientation appears to play such a dominant role in structuring how an individual reacts to scientific knowledge (Bohr, 2014). The fact that people have become less concerned and more sceptical towards climate change while the scientific evidence on climate change becomes stronger, make researchers look to differences in worldview as an explanation of public opinion on climate change (Austgulen &

Stø, 2013). Zia and Todd (2010:5) argue that because individuals and groups make decisions on adaptation strategies based on political beliefs, acceptance of climate policy depends on ideology. Political ideology influences citizen concern about policy issues such as global warming, more than educational background does, according to Zia and Todd (2010:13).

Kellstedt et al. (2008:115) argue that world-views are "highly correlated with risk perceptions of various technological and ecological dangers". The left-right dimension influences a lot of how we perceive political events and choices (Kellstedt et al., 2008:115). Individualistic values have been found to influence climate change opinion with more scepticism. According to Corner (2012), people with in individualistic values dislike political interference in decision-making, and are more prone to be sceptical towards climate change. Individuals with conservative ideologies tend to discount anthropogenic climate change (Dunlap & McCright, 2008). Research has found that conservative respondents are more sceptical towards climate change than others (Dunlap & McCright, 2008; Eurobarometer, 2009; McCright & Dunlap, 2011a, 2011b; Whitmarsh, 2011; Zia & Todd, 2010). Zia and Todd (2010) find a decreasing concern for global warming decreases with citizens' ideology shifting from liberal to conservative.

H2: Political orientation towards the right has a negative effect on climate change attitudes

2.3.3 Main explanations for the dimensions of climate change attitudes

The climate change attitudes discussed in this thesis is divided into two dimensions. The first dimension, climate change acceptance, is closely related to scientific knowledge. The second dimension, climate change perception, is related to political issues. This division leads to the assumption that different factors explain the two separate dimensions.

Because climate change acceptance is so closely related to scientific knowledge as communicated by the IPCC, I expect that trust in scientists is the factor with most explanatory power for the aspects in the first dimension. Political factors should not have that large an influence whether scientific consensus is accepted or rejected, because they are not political issues, but scientific issues.

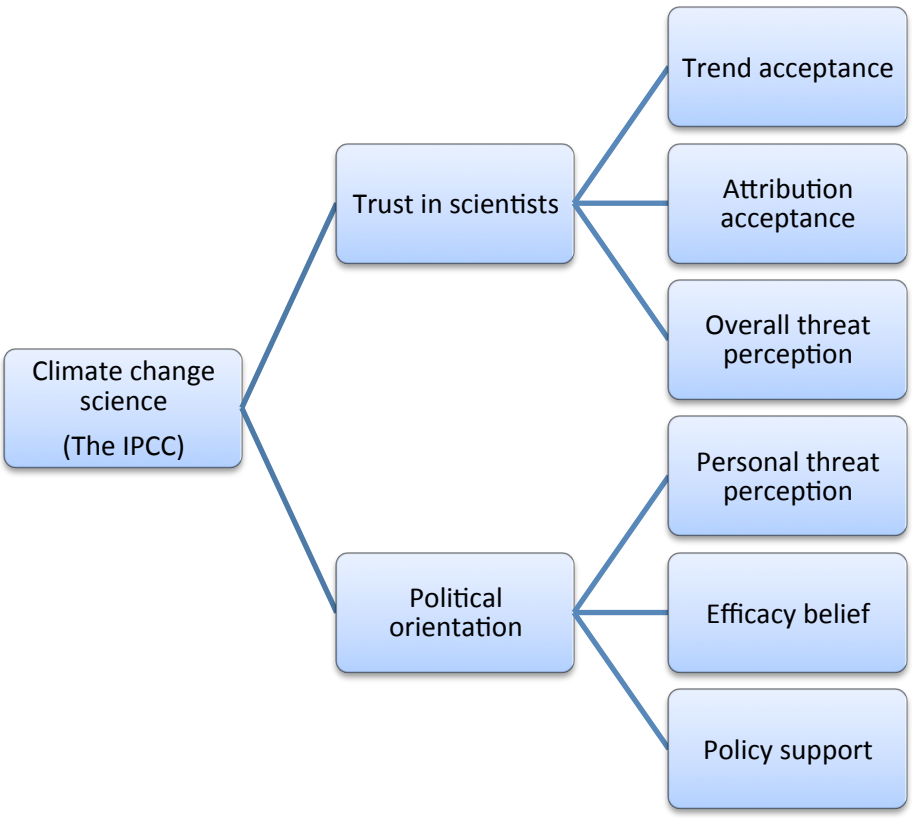
H3: Trust in scientists is more important for explaining the scientific related aspects of climate change attitudes, than political orientation

Perceptions of political aspects of climate change, on the other hand, need not be influenced by scientific factors. Belief in personal consequences, ability for prevention and support for measures to deal with the consequences of climate change should be closer affiliated with political and ideological predispositions.

H4: Political orientation is more important for explaining the political related aspects of climate change attitudes, than trust in scientists

Figure 2.1 illustrates the theoretical assumptions of explaining the two dimensions of climate change attitudes.

Figure 2.1: Factors explaining climate change attitudes



2.3.4 Alternative explanations

In addition the main factors that are expected to explain the two dimensions of climate change attitudes, other explanations have been viewed as important factors in the climate change public opinion research field.

Party affiliation

Party identification may reflect different types of desired social solidarity, such as collectivism versus individualism (Bohr, 2014). A significant ideological and partisan polarization has occurred on the issue of climate change in the USA over the last years (McCright & Dunlap, 2011b). Dunlap and McCright (2008) find party affiliation to predict beliefs about climate change in the American public. A decline in the proportion of people favouring government action on mitigation was greater among Republicans than among Democrats and Independents from 2010 to 2012, according to Krosnick and MacInnis (2012). Feldman et al. (2011) report that Republicans are less attentive to and knowledgeable about climate change relative to Democrats.

According to Austgulen and Stø (2013), climate change attitudes are less correlated with party vote in the Norwegian multi-party system, than in the British and American two-party system. Nonetheless, FrP-voters are the most sceptical. Olofsson and Öhman (2006) found that political affiliation has a strong relationship with environmental concern in Norway and Sweden, with low levels for the right. Karlstrøm and Ryghaug (2014) found that party preference is connected to attitudes towards renewable energy sources and technologies in Norway.

Knowledge

A dominating assumption in the social science field of climate change resource has been that a lack of knowledge has been the cause of climate change scepticism among the public (Austgulen & Stø, 2013). The information deficit model is used to explain lack of public climate support and sceptical attitudes (Brulle et al., 2012). Increased dissemination about climate change is considered as a solution to this problem. The assumption here is that providing information about climate change will lead to increased public concern and willingness to act (Kellstedt et al., 2008). Thus, the reason for the public not demanding action is not because they do not care enough about climate change, but because they do not

know enough about it. The more people know about climate change, the more they will feel personally responsible for it (Kellstedt et al., 2008). If this approach is true, then respondents with higher education and climate change knowledge should be more accepting of climate change than others.

Knowledge can be acquired through education (Franzen & Meyer, 2010), and education is therefore often used as an indirect measure of climate change knowledge. According to Krosnick et al. (2006:14) people with greater cognitive skills are "best equipped to see flaws in messages they receive from informants, and these individuals are able to retain new information in their memories over longer time periods".

Austgulen and Stø (2013) found that higher education decreased the level of scepticism in Norway. Olofsson and Öhman (2006) found a strong positive relationship between education and environmental concern in Norway, Sweden, Canada and the USA. Krosnick et al. (2006) measured cognitive skills via number of years of formal education, to explain climate change opinion. Among people who trusted scientists, acceptance of their claims was most likely among people who were highly cognitively skilled. People exposed to news about scientific controversy and with low cognitive skills were the most climate change sceptical (Krosnick et al., 2006:30). McCright and Dunlap (2011a) found that lesser educated adults were more likely than their more highly educated counterparts to believe human activities are not the primary cause of recent warming and that there is no scientific consensus.

Yet, not all research supports this theory. Hamilton (2011) found no significant effect of education on climate change attitudes in his study on American concern. According to Kellstedt et al. (2008:115) people that are knowledgeable of the causes, properties, and effects of climate change have lower levels of risk perception. Kellstedt et al. (2008:122) argue that the knowledge-deficit model is inadequate for understanding mass attitudes about scientific controversies in the USA. Compared to the rest of the world, the United States has average knowledge levels about global warming, despite being among the best-educated countries in the world. According to Kellstedt et al. (2008), it is possible that a similar pattern of findings can be found in Europe. However, the information effects reported in that article were limited to self-reported information.

Personal and economic interests

Economic interests have also been recognized as a factor influencing individual political preferences. In Norway, oil and gas extraction is a significant industry and an important source to GDP (Eika, Prestmo, & Tveter, 2010). According to Norgaard (2011), Norwegian climate change scepticism can be explained by the importance of oil and gas extraction for the Norwegian economy.

Tvinnereim and Austgulen (2014:319) argue that, by working closely related to production or consumption of fossil fuels, the main source for anthropogenic climate change, it is probable that this personal economic interest influences climate change perception and the interpretation of climate science. If you work close to fossil fuel production or consumption, you might hope that climate change is not so serious a threat, because climate change policies reducing extraction and production will influence the marked value and thus job opportunities. Also, the psychological effect of cognitive dissonance[2] might be larger for people working in the sector (Tvinnereim & Austgulen, 2014:320). Tvinnereim and Austgulen (2014) find that being employed in the oil and gas industry has a significant effect on climate change attitudes in Norway.

Demographic factors

In addition to these explanations, there are also demographic factors that may influence climate change opinion and are normally included in analyses. Gender is thought to have a significant effect on climate change acceptance. Research consistently shows that women are more accepting and fearful of the risks of climate change (Bord, Fisher, & O'Connor, 1998; Feldman et al., 2011; Hamilton, 2011; Kahan et al., 2007; Kellstedt et al., 2008; McCright & Dunlap, 2011a). Females in general appear to be more concerned about every public issue (Zia & Todd, 2010). Considering the Norwegian case, Austgulen and Stø (2013) also found a negative effect of female on scepticism.

[2] Festinger's cognitive dissonance theory suggests that people have an inner drive to hold all attitudes and beliefs in harmony and avoid dissonance. Dissonance creates psychological discomfort that motivates to reduce dissonance and achieve consistency. This leads people to actively avoiding situations and information that is likely to increase dissonance (Festinger, 1962).

Another demographic variable is age. Many studies have found that older respondents stand out (Bohr, 2014; Hamilton, 2011; Heath & Gifford, 2006). Dunlap and McCright (2008) found that age has a negative impact on global warming beliefs. Age generally has no effect on climate change denial, but older adults are more likely than younger adults to believe there is no scientific consensus, according to McCright and Dunlap (2011a). Feldman et al. (2011) found no effect of age on global warming acceptance in the USA. Austgulen and Stø (2013) found a positive effect of age on scepticism in Norway.

Income is a socioeconomic factor that may also influence climate change acceptance. Franzen and Meyer (2010) found that income has a positive effect on environmental concern, on the individual level. Dunlap and McCright (2008) found that income has a negative effect on seriousness of global warming. Feldman et al. (2011) found no effect of income on global warming acceptance in the USA. Income and the support for climate change policies on the other hand were not correlated in Germany (Dietz, Dan, & Shwom, 2007; Engels et al., 2013). Increased income predicts a higher probability of dismissing climate dangers among Republican-leaning individuals when compared with Independents and Democrats, according to Bohr (2014). This indicates that income only predicts climate change beliefs in the presence of certain political orientations (Bohr, 2014). Austgulen and Stø (2013) argue that their individualism index works as an intermediate variable for income, but income is not significant on its own.

2.4 Summarizing the theoretical framework

In this chapter, I have gone through the scientific knowledge on climate change as communicated by the IPCC reports. I have argued that climate change attitudes cover various aspects, and discussed the need for a new way of organizing these aspects. My suggestion has been to divide climate change attitudes into two dimensions, one scientific related, and one political related. The expectation is that these two dimensions are explained by different factors.

Table 2.1 illustrates the expected influences of the two main explanatory factors. The assumption is that trust in scientists explains the climate change acceptance dimension, consisting of trend acceptance, attribution acceptance and overall threat perception. On the other hand, the assumption is that political orientation explains the second dimension, consisting of personal threat perception, efficacy belief and policy support.

Table 2.4: Expected influences of trust in scientists and political orientation

	Trust in scientists	Political orientation
Trend acceptance	X	
Attribution acceptance	X	
Overall threat perception	X	
Personal threat perception		X
Efficacy belief		X
Policy support		X

3 Climate change attitudes in Norway at the individual level

This chapter will focus on the dependent variables on climate change acceptance in Norway. First, the climate change debate and public opinion in Norway will be outlined. Second, the data used in this thesis will be presented. Following, the dependent variables will be operationalized. Descriptive statistics with distributions of the variables will be presented, before comparing and correlating the variables. The aim of this chapter is to look at how climate change acceptance unfolds among the Norwegian public.

3.1 Climate change opinion in Norway

The results on climate change opinion vary accordingly with the different conceptualizations and measurements. At the same time, findings differ across countries. Notably, the Anglo-Saxon countries, USA, UK, Canada and Australia, have a similar cultural heritage, and the Anglo-Saxon public are in general sceptical. The largest part of the literature has been based on these countries, but more studies on European countries have entered the fields in recent years.

The Anglo-Saxon countries are all high up on the list of oil production in the world, especially the USA and Canada. They all outnumber the European mainland by far (IEA, 2014). The U.S. public is less likely to believe that climate change is occurring and that it poses a problem, than do citizens in most other wealthy nations (Marquart-Pyatt et al., 2011). In the US, public belief in and concern about climate change has fallen since 2008. Mayer et al. (2013) find that 50 per cent of Americans are convinced that climate change is now occurring, and an additional 34 per cent think it is probably occurring.

Using Rahmstorf's framework, Poortinga et al. (2011) found that climate change scepticism is not widespread in Britain. Although uncertainty and scepticism about the potential impacts of climate change were fairly common, both trend and attribution scepticism were much less prevalent. It further showed that the different types of scepticism are strongly interrelated.

The EU as a whole is the second highest producer of renewable energy sources in the world (after China) (IEA, 2014). Germany has the highest level of the EU countries, and is currently undergoing a large transition – *Energiwende*. Engels et al. (2013) analyse public climate change scepticism in Germany. They stress that few studies have analysed whether there has been a growth in climate change scepticism outside of the Anglo-Saxon world. They draw distinction between Anglo-Saxon countries and Germany, where their findings suggest that there is no evident decline in public concern in Germany, as opposed to other countries.

According to Leiserowitz (2007) the public and elites in Europe have a much higher level of concern about climate change and basic acceptance of climate science than the American public and elites. Scruggs and Benegal (2012:512) find that the magnitude of the decline in opinion in the EU during the economic recession was very similar to what was observed in the USA.

Norway is a different and interesting case. Like Germany, Norway is ahead when it comes to renewable energy sources, and follows Germany as the second highest renewable energy producer in Europe, and eight highest in the world (IEA, 2014). The country is also eager to be a driving force in international climate politics. However, Norway's wealth is to a high degree due to its large oil resources, and the Norwegian economy is dependent on the oil industry. Norway ranks as number 14 on a list of countries by oil production, while as number 118 over countries by population (IEA, 2014). Austgulen and Stø (2013) found that denial of climate change is not widespread in Norway, but that scepticism about its impact and seriousness are fairly common. The study showed that trend scepticism in Norway is weak, but the results of the other attribution and impact scepticism were more complex. The results showed that climate change scepticism within the Norwegian population seems to be higher than previously reported in studies mainly measuring attribution scepticism. In addition, climate change scepticism seemed high compared to other European countries (Austgulen & Stø, 2013).

Duarte and Yagodin (2012) analysed Norwegian press coverage after Climategate[3]. They found that sceptics are not excluded from media discourse on climate change, but endowed with sensible symbolic value. Climate science played a secondary role throughout the coverage, giving way to politics. After Climategate, there seemed to be an increase in sceptical voices in the climate coverage in the Norwegian press. The largest genre reflecting scepticism in the climate coverage was not the news articles, but rather the letters to the editor, demonstrating public involvement in the debate. Climate sceptics or deniers wrote a large proportion of the letters to the editor (Duarte & Yagodin, 2012).

Recently, the debate on climate change opinion has increased in the Norwegian scientific community. The media has played a large part here, with numerous newspaper articles. Head of the department of petroleum technology at the University of Stavanger (UiS), Hans Borge, made a stir by stating that he did not believe in the IPCC conclusion that climate change has anthropogenic causes (Borge, 2014). Borge was very critical to the structure and working methods of the IPCC. As head of a scientific community, this kind of statement undermines the strong scientific consensus. At the same time, it is interesting that this sceptical view came from the petroleum community, which plays a significant role in CO2 emissions. In fact, he stated that there should be a bigger focus and commitment to oil research (Larsen & Hetland, 2014).

According to Borge (2014), The IPCC is both a scientific and political body. He questioned the relationship between science and politics. He claimed that Norwegian press is far less critical than foreign press, when it comes to climate issues. The IPCC's work methods, power structures, financial transactions, commercial implications and influence from lobbyists should, according to Borge (2014), be as interesting to journalists as the conclusions in the reports. The dean at the faculty of science, Øystein Lund Bø, joined the debate after the University, in particular the science community, received a lot of criticism and people took distance from the statements. The dean expressed his agreement with the scientific consensus, but stressed the fact that Borge has his own opinions, and that it does not represent an official

[3] Climategate refers to the hacking of a server at the Climatic Research Unit (CRU) at the University of East Anglia (UEA) in November 2009, weeks before the Copenhagen Summit on Climate Change (COP 15). Sceptics and deniers argued that the leaked emails showed that climate change was a scientific conspiracy.

stand from the university. He emphasized the importance of scientific freedom, and of not silencing employees with opinions that differ from popular view, or that appear politically incorrect (Bø, 2014).

In addition to the debate in the scientific community, sceptical attitudes towards climate change have been present in the political debate. Finance minister and FrP leader Siv Jensen stated in an interview that she is uncertain about anthropogenic causes of climate change (Gjerde, Ørstavik, & Barstad, 2015). Thus, sceptical attitudes are present in the public discourse on climate change.

3.2 Data

My research question concerns public opinion and attitudes, consequently survey data and a quantitative approach are appropriate. Research on climate change attitudes in Norway is limited, and it is therefore purposeful to study this in more depth and on micro level. The data used in this thesis is derived from The Norwegian Citizen Panel (NCP). The NCP is a web-based survey public opinion on important societal and political matters in Norway (Ivarsflaten et al., 2014). One of the main focus areas of the NCP is climate and environment, thus the data on climate change is extensive. The data are individual units on micro level consisting of Norwegian citizens above the age of 18. Respondents are recruited randomly from the Norwegian population register, and encouraged to participate over time. The first round of the survey was fielded in the fall of 2013 and is carried out twice a year.

The data used in this thesis consists of 4905 respondents from the first round in 2013. I have chosen the first round because of the questions included as well as the N. It should be noted that all the questions from the citizen panel are asked and answered in Norwegian, but have been translated to English after the data collection. Accordingly, the question wording presented in this thesis might, to some degree, differ to the actual wording from the conducted survey. There will always be a possibility of some inaccuracy when it comes to translation. This can lead to different interpretations, but should not have large consequences for the results.

3.3 Descriptive statistics of the dependent variables

Based on the aspects discussed in the theoretical framework, my analysis will be based on six different dependent variables. Table 3.1 presents the six dependent variables. The data have been weighted to compensate for observed bias, based on the demographic variables, age, gender, geography and education. I have organized all the variables on a 0-1 scale for comparison purposes, where higher levels indicate higher acceptance. The mean in a dummy variable is the same as the distribution on the 1-value, while the confidence intervals indicate an estimation of uncertainty. Two of the variables, trend and attribution acceptance, are dummies, while the four remaining are ordinal. Personal and overall threat perception have five values, while efficacy belief has four, and policy support three. Missing values (no answer) are removed from the analysis. The N ranges from a little over 2300 for the split sample variables measuring threat, to 4701 for the dummy variables measuring trend and attribution. Thus the sample varies between the different variables. However, as they are randomized and, in the descriptive statistics, weighted, this should not pose any interpretation problems for comparisons.

Table 3.1: Descriptive statistics for the dependent variables

Variable	N	Mean	Std.Err.	95% Confidence interval		Min	Max
Trend acceptance	4701	.92	.01	.91	.93	0	1
Attribution acceptance	4701	.66	.01	.65	.68	0	1
Overall threat perception	2335	.7	.01	.69	.71	0	1
Personal threat perception	2379	.45	.01	.44	.46	0	1
Efficacy belief	4412	.43	.00	.42	.44	0	1
Policy support	4665	.67	.01	.66	.69	0	1

Source: The Norwegian Citizen Panel (round 1) 2013

3.3.1 Trend acceptance

Trend is the most basic dimension in the analysis, and is measured with belief that the climate is changing. The question utilized by the NCP asks which of the following statements best describes the respondents' viewpoint on climate change. The alternatives presented in the survey are: "I think that the climate is not changing", "I don't know whether the climate is changing or not", "I think that the climate is changing, but it is only to a small extent linked to

human influences", and "I think that the climate is changing, and that it is largely a result of human influences". Table 1 shows the distribution of the question in its original form.

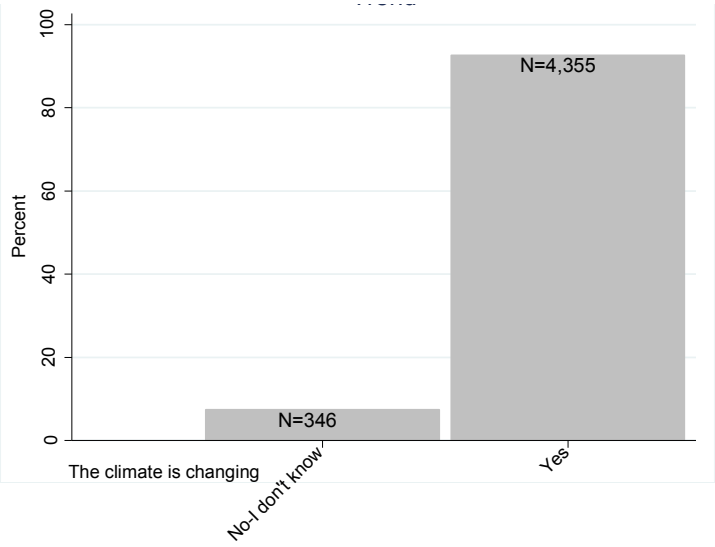
Table 3.2: Trend and attribution

Statement fits view on climate change	Frequency (N)	Per cent (weighted)
I believe that the climate is not changing	35	1
I don't know whether the climate is changing or not	311	7
I believe that the climate is changing, but that it has little to do with human action	1,056	26
I believe that the climate is changing, and that it to a large extent is due to human action	3,299	66
Total	4,701	100

Source: The Norwegian Citizen Panel (round 1) 2013. Question w01_km4

While considering trend, I am only interested in whether the respondents believe that climate change is happening, and not whether it is caused by human action. Therefore, I combine the two answers that agree that the climate is changing but disagree on human influences. I create a dummy variable where the two other alternatives of decline and uncertainty are combined and valued 0, while acceptance is valued 1. Figure 1 illustrates the distribution on the values.

Figure 3.1: Trend acceptance: belief that climate change is happening



N=4,701. Source: The Norwegian Citizen Panel (round 1) 2013. Question w01_km4

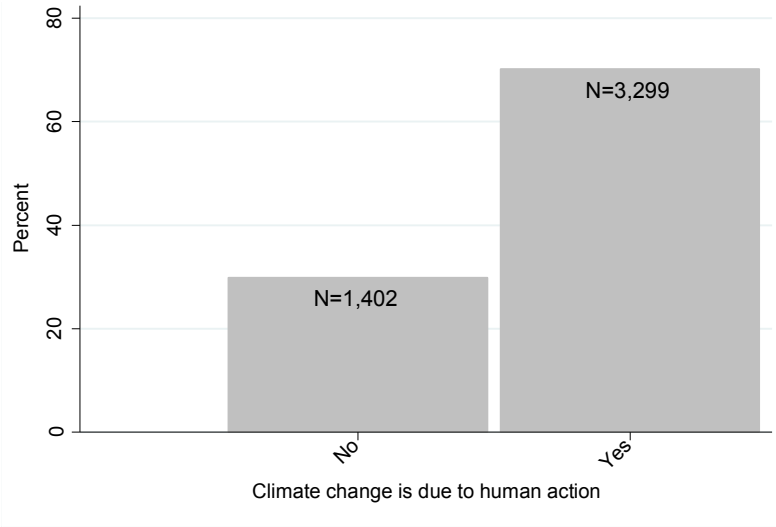
The figure shows that there is an overwhelming majority that believes that the climate is changing, which indicates a high level of trend acceptance in Norway. 92 per cent believe that the climate is changing, and only eight per cent are uncertain or dismiss it. Thus, we can hardly speak of any trend scepticism in Norway. There is a 95 per cent certainty that the mean is between .91 and .93 in the population. This result is high compared to the USA, where Mayer et al. (2013) found that 84 per cent believed the climate is changing or probably changing, the highest reported result the last years. Only 78 per cent of British respondents believed that climate change is occurring in a survey in 2010 (Poortinga et al., 2011). The results are similar to those in Germany based on a research by Engels et al. (2013). Though measuring scepticism and not acceptance. According to the research by Austgulen and Stø (2013), about 82 per cent of Norwegians are certain that the climate is changing. Thus, my results are higher. However, the values and construction of the variables differ, so they are not completely comparable.

3.3.2 Attribution acceptance

To measure attribution acceptance, I use the same question as for trend (see table 3.2). I create a dummy variable where the belief that climate change is largely a result of human influence is valued 1, and the belief that it is only to a small extent linked to human influences is valued 0. In addition, the belief that the climate is not changing and uncertainty whether the climate is changing are also valued 0. Attribution acceptance presupposes trend acceptance in this question. This should not pose a problem, because respondents would hardly answer that they believe climate change is human caused if they did not believe that the climate is changing.

As shown in figure 3.2, the majority of the respondents, 66 per cent, believe that climate change is human caused. This indicates high levels of attribution acceptance, although not as high as seen for trend. The 34 per cent that represent uncertainty or denial also include respondents who have not taken a position on human causes, but nonetheless do not accept climate change attribution. The mean, .66, is relatively high and close to 1 and full acceptance. According to the confidence intervals, there is a 95 per cent certainty that the mean in the population lies somewhere between .65 and .68.

Figure 3.2: Attribution acceptance: belief that climate change is anthropogenic



N=4,701. Source: The Norwegian Citizen Panel (round 1) 2013. Question w01_km4

This result is higher than those for the USA and Britain, and slightly higher than for Germany. Mayer et al. (2013) found that 54 per cent of Americans believe that climate change is primarily caused by human activity. Only 31 per cent of the British public believed that climate change was mainly or entirely caused by human activities, but a plurality believed it to be caused by both natural processes and human activity (Poortinga et al., 2011). 63 per cent of the German public agree that climate change is anthropogenic (Engels et al., 2013), which is similar to my findings for the Norwegian case. According to Austgulen and Stø (2013), 69 per cent of Norwegians believe that climate changes are mostly caused by human action, similar to my results.

3.3.3 Overall threat perception

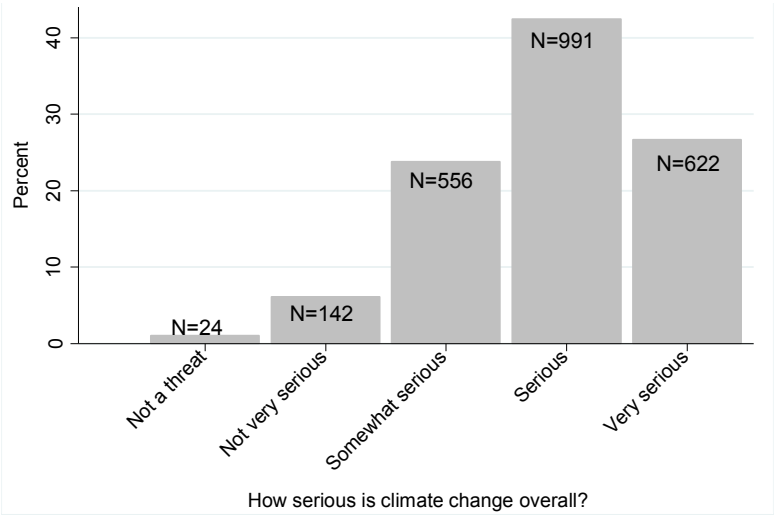
In the literature on climate change opinion, impact has been measured as both concern and threat. The data from the NCP includes questions on both. Concern is slightly indistinct and can be thought of as dependent on personality. It is possible that concern measures other aspects than climate change attitudes, and that people who are generally concerned are accordingly concerned about climate change. The IPCC reports discuss risk perception (IPCC, 2014c, 2014d), which can be considered a better and more concrete measure of the impact

concept. Threat perception is a form of impact acceptance, because by perceiving climate change as a threat, one believes that there are impacts that are threatening.

There are two different questions on threat perception in the NCP survey, one that concerns personal threat, and another concerning general threat. Personal threat can be considered more concrete, while overall threat is more inclusive. Personal threat might influence how serious one considers the issue, while overall threat is more in line with the view that climate change is a global problem. These two questions were randomized into two groups in the survey, so that the respondents were asked one of the two questions. Therefore, the respondents have not compared the two alternatives with each other, and the samples are different.

For overall threat, respondents are asked how serious a threat climate change is overall. The five alternative answers range from 'not a threat' to 'very serious'. Figures 3.3 illustrate the frequency for overall threat perception.

Figure 3.3: Overall threat perception



N=2,335. Source: The Norwegian Citizen Panel (round 1) 2013. Question w01_km5

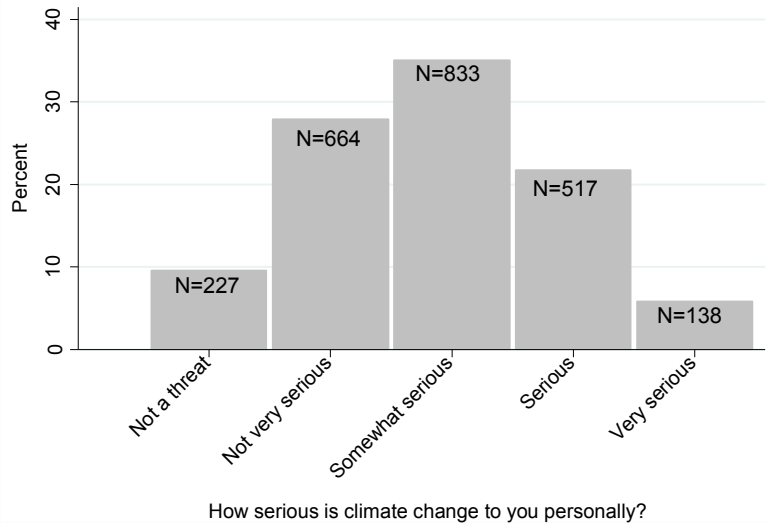
Only one per cent of all respondents did not perceive climate change as an overall threat, while seven per cent found it not very serious. Around 26 per cent perceived climate change as a somewhat serious threat and 42 per cent answered 'serious'. 24 per cent of respondents perceived climate change as a 'very serious' overall threat. In general, the distribution of

overall threat leans towards the higher values to the right. The highest response rate is for serious, and the mean is .7, which indicates a high level of acceptance of climate change impact.

3.3.4 Personal threat perception

Respondents are asked how serious a threat climate change is to them personally. The five alternative answers are identical to those for overall threat and range from 'not a threat' to 'very serious'. Figure 3.4 illustrates personal threat perception in Norway. Eleven per cent did not perceive climate change as a personal threat, while 29 per cent believed climate change to be a not very serious personal threat. 35 per cent believed that climate change is somewhat serious to them personally, and around 20 per cent find it serious. Only 5 per cent perceived climate change as a very serious personal threat.

Figure 3.4: Personal threat perception



N=2,379. Source: The Norwegian Citizen Panel (round 1) 2013. Question w01_km6

The highest frequency for personal threat is on the middle value, 'somewhat serious'. Personal threat perception is more centred, than overall threat, but leans a little to the left. The largest divide between the two threat measures is found for 'not very serious' with 29 per cent of the respondents on personal threat, compared to only seven per cent on overall threat. The mean for personal threat is .45, which is slightly lower than halfway to full perception, and

significantly lower than overall threat perception. This indicates a higher threat perception concerning the world than oneself, thus accepting that climate change has worldwide impacts. This result is interesting, though not that surprising, as prognoses indicate that the highest impacts of climate change will be experienced by poorer countries (IPCC, 2014b). Still, these results imply that Norwegians do view climate change as a serious threat, although they do not themselves feel particularly threatened. This finding indicates that the form of threat we discuss matters, and it is necessary to distinguish between the different forms.

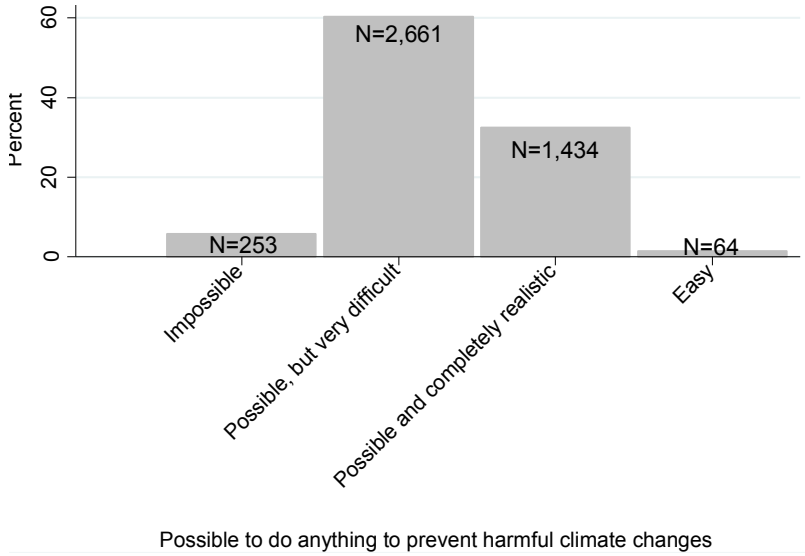
In addition, the finding is in line with the argument of Lorenzoni and Pidgeon (2006:80) from other studies, that "although most Europeans are aware of the potential risks of climate change world-wide and the adverse consequences that may befall societies in general, they tend to attenuate the risks to themselves personally". Mayer et al. (2013) found in their study that 38 per cent of Americans view climate change as a very serious threat and an additional 46 per cent as a somewhat serious threat. According to the Eurobarometer (2011) 68 per cent of EU citizens view climate change as a very serious problem with a mean of 7.4 on 1-10 scale. Though different measures and not completely comparable, it is interesting to note that this level is very similar to the mean of overall threat (.7 on a 0-1 scale). Engels et al. (2013) showed that 65 per cent of the German repsondents believed that climate change is a serious problem, and an additional 18 per cent believe it to be very serious. Austgulen and Stø (2013) found a significant proportion of the Norwegian public to be uncertain of the seriousness and potential consequences of climate change. Between 29 and 43 per cent of the respondents express impact scepticism through different measures. My results show that 29 per cent of respondents do not view climate change as a serious threat to them personally, so there are some similarities in my and Austgulen and Stø's findings.

3.3.5 Efficacy belief

The previous results show that, in general, Norwegians think climate change is happening, that it is mainly caused by human activity and that it is a serious threat overall, which are all based on science. How about action? Do they believe that something can be done? I measure efficacy belief using a question that asks the respondents to what extent they think it is possible to do anything in order to prevent harmful climate change. The alternatives are: 'it is

not possible', 'it is possible, but very difficult', 'it is possible and entirely realistic', and 'it is easy to prevent harmful climate change'.

Figure 3.5: Efficacy: belief in prevention



N=4,412. Source: The Norwegian Citizen Panel (round 1) 2013. Question w01_km7

Figure 3.5 shows that most people think it is possible to prevent harmful climate change, but a majority of 60 per cent considers it very difficult. 32 per cent think it is completely realistic. About six per cent think it is impossible, and only two per cent view it as easy. The mean of .43 is closer to 0 than to 1, which indicates a relatively low level of belief and some resistance. However, only seven per cent believe prevention is impossible, so there is not a high degree of scepticism. The 60 per cent that consider it very difficult to do anything to prevent harmful climate changes pull down the mean, as this option is valued .33. Still, it is important to note that they do consider it possible, so they do accept that something can be done.

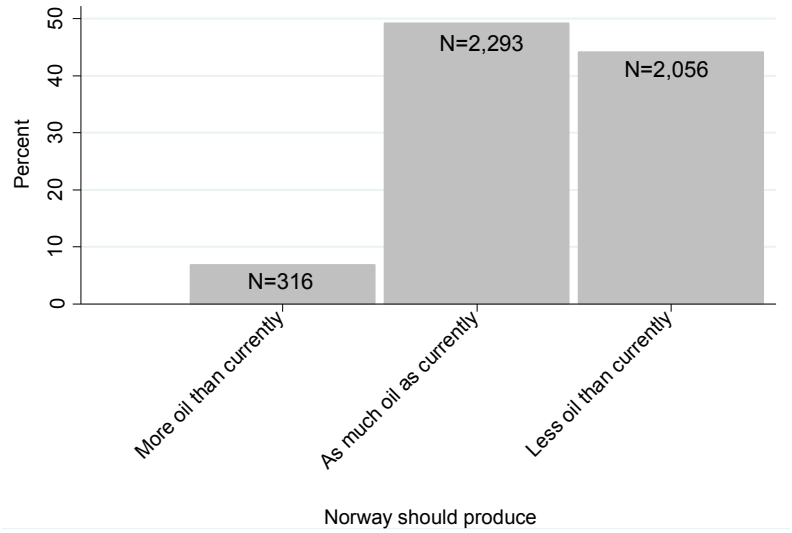
3.3.6 Policy support

The IPCC is not policy-prescriptive (IPCC, 2014a), but the reports stress that mitigation and adaptation is necessary (IPCC, 2014b). The debate on whether reduction in oil extraction in Norway is the right measure is on going. Some claim that it is better that the world's energy

use is supplied by Norwegian oil than oil from other countries, as it is cleaner. Others believe that we need to move on to renewable energy sources nevertheless.

When it comes to policies and measures, the Norwegian case is a paradox. Norway is highly dependent on the oil industry, while simultaneously aspiring to be a leading country on green energy sources and a frontrunner in the global fight to tackle climate change. This makes it interesting to measure levels of policy support regarding the oil industry. I measure Policy support with a question asking respondents which of the following statements they agree with the most. Norway should continue to produce 'as much oil as we currently do', 'less oil than we currently do', or 'more oil than we currently do'. This question is central and controversial in the Norwegian debate on climate change.

Figure 3.6: Policy support: oil extraction



N=4,665. Source: The Norwegian Citizen Panel (round 1) 2013. Question w01_km37

Figure 3.6 shows that there is a slight majority of 51 per cent in favour of maintaining oil production at current levels. Only seven per cent think that Norway should produce more oil than currently, and 42 per cent answer that Norway should produce less oil. The variable is organized such that less oil has the highest value and more oil the lowest, interpreting less oil as more policy accepting. The mean, .67, shows a relative high degree of policy support, though the measure can be thought to cover other issues than climate change. Still, the

measure is interesting in the Norwegian context, where the public is divided in regards to dealing with the oil issue.

3.4 Comparing the climate change dimensions

The data indicate that trend acceptance is very high, attribution acceptance and policy support are relatively high, while efficacy belief is somewhat low. Threat perception is more complicated with high levels concerning overall threat, but low levels of personal threat perception. The next step is to combine the six variables to analyse their correlations. As they are all measures of climate change attitudes, I expect positive correlations. Trend, attribution and overall threat are theoretically and scientifically grounded, while personal threat, efficacy and policy are more debatable. Poortinga et al. (2011) find in their study that the different types of scepticism are strongly interrelated. "Although this may suggest that the general public does not clearly distinguish between the different aspects of the climate debate, there is a clear gradation in prevalence along the Rahmstorf typology" (Poortinga et al., 2011:2).

Table 3.3: Correlation between the six climate change attitude variables

	Trend	Attribution	Overall threat	Personal threat	Efficacy	Policy
Trend	1.0000					
Attribution	0.4324*	1.0000				
Overall threat	0.2066*	0.5522*	1.0000			
Personal threat	0.1613*	0.4045*	X	1.0000		
Efficacy	0.0686*	0.2008*	0.1637*	0.1554*	1.0000	
Policy	0.1139*	0.3087*	0.4137*	0.3420*	0.1218*	1.0000

*p-value<.001

All the variables are positively correlated and significant on a 1-per cent level. There are no data for the correlation between the two different types of threat, because the respondents were randomized and asked only one of the questions. The trend and attribution variables are

generated from the same question. The correlations are not problematically high, as collinearity is problematic mainly when the correlation exceeds .6 (Skog, 2004:288).

The highest correlations are found between overall threat and attribution, overall threat and policy, and personal threat and attribution. The lowest correlation, on the other hand, is between trend and efficacy. In general, attribution, overall threat and policy correlate highly with the other variables, while trend and efficacy have much lower correlations. The weak correlation between trend and efficacy indicates that whether climate change is happening and whether it is possible to do something about it, does not necessarily have that much to do with each other. The general weak correlations with trend could be connected with the uneven distribution of the values on the variable. For efficacy, a weakness and explanation for low correlations might be that the two values with largest frequencies are difficult to divide from each other for respondents, as they both indicate possibility for prevention, and only differ in difficulty. Thus, there might not be that large of a divide between which respondents answer the one or other. The variances between the correlations of personal and overall threat with the other variables seem to differ in level, though not structurally. They both correlate highest with attribution, and second highest policy. They also both correlate lowest with efficacy and second lowest with trend.

To get a closer look at the correlations, the variables that are highest correlated with each other will be cross tabulated, and analysed the pair wise. The findings from cross tabulating attribution and personal threat, seen in table 3.4, are as expected. Most of the people who think that climate change is not a threat do not believe it is human caused. On the other four values on personal threat, most of the respondents believe that climate change is caused by human action. Of the respondents that do not accept attribution, a plurality view climate change as not very serious a threat to them personally. Among the respondents that accept attribution, a plurality thinks that climate change is somewhat serious.

Table 3.4: Cross tabulation of personal threat and attribution

Personal threat	Attribution		
	No	Yes	Total
Not a threat	144 20.6 %	81 4.9 %	225 9.5 %
Not very serious	313 44.7 %	344 20.7 %	657 27.8 %
Somewhat serious	199 28.4 %	629 37.9 %	828 35 %
Serious	37 5.3 %	478 28.8 %	515 21.8 %
Very Serious	7 1 %	130 7.8 %	137 5.8 %
Total	700 100 %	1,662 100 %	2,362 100 %

N=2319. Source: The Norwegian Citizen Panel (round 1) 2013

Table 3.5 shows that the relationship between overall threat and attribution is, not surprisingly, similar to that between personal threat and attribution. A large majority of respondents who perceive climate change as 'not a threat' and 'not very serious', do not accept attribution. Even among those who believe climate change is 'somewhat serious', the majority does not believe that humans cause climate change. The respondents who regard climate change as serious and very serious mostly accept attribution. The largest share of the respondents who reject attribution perceive climate change as somewhat serious, while the largest share of the attribution acceptors view it as serious. This indicates that those who do not believe that climate change is caused by human action do not view it as a threat. Thus not only denying the cause of human action, but the problem in general.

Table 3.5: Cross tabulation of overall threat and attribution

Overall threat	Attribution		
	No	Yes	Total
Not a threat	23 3.3 %	1 0.1 %	24 1 %
Not very serious	131 18.9 %	10 0.6 %	141 6 %
Somewhat serious	306 44 %	243 14.9 %	549 23.7 %
Serious	216 31 %	770 47.4 %	986 42.5 %
Very Serious	19 2.7 %	600 36.7 %	619 26.7 %
Total	695 100 %	1,624 100 %	2,319 100 %

N=2319. Source: The Norwegian Citizen Panel (round 1) 2013

The relationship between overall threat and policy shows an expected trend in table 3.6. Focusing on respondents that think Norway should produce less oil than currently, the share increases as we move from no threat to a very serious threat. The same goes for those who think that Norway should produce as much oil as currently up until 'serious'. Respondents who think that the country should produce more oil than currently also increase by moving to the right, but drop again after the middle point of 'somewhat serious'. The plurality of respondents who opt for less oil views climate change as a very serious threat. Among the respondents who are satisfied with the current oil production, a plurality perceive climate change as serious, while most of the respondents who want to produce more oil think that climate change is somewhat serious. By looking at overall threat, most of the respondents who think that climate change is not a threat, think that we should produce as much or more oil than currently. Of those who view climate change as not very serious, somewhat serious and serious, a majority think that we should continue to produce as much oil as currently. Almost three fourths of those who perceive climate change as a very serious threat believe that we should produce less oil than currently. This indicates that people who perceive climate change as a threat overall support policies to deal with the threat.

Table 3.6: Cross tabulation of policy and overall threat

Policy	Overall threat					
	Not a threat	Not very serious	Somewhat serious	Serious	Very serious	Total
Less oil than currently	4 16.7 %	16 11.4 %	128 23.4 %	412 42.4 %	457 74 %	1,017 44.2 %
As much oil as currently	10 41.7 %	96 68 %	362 66 %	507 52.2 %	151 24.5 %	1,126 48.9 %
More oil than currently	10 41. 7 %	29 20.6 %	58 10.6 %	52 5.4 %	9 1.5 %	158 6.9 %
Total	24 100 %	141 100 %	548 100 %	971 100 %	617 100 %	2,301 100 %

N=2301. Source: The Norwegian Citizen Panel (round 1) 2013

3.5 Summarizing the dependent variables

In this chapter, I have presented and discussed climate change attitudes in Norway. In general, climate change acceptance levels are high regarding trend, attribution and overall threat. 92 per cent of the respondents believe that the climate is changing and 66 per cent believe that it is mainly caused by human action. There is a distinction for threat perception with higher levels for overall threat perception than for personal threat perception. 24 per cent of the respondents perceive climate change as a very serious threat overall, compared to only five per cent as a personal threat. When it comes to taking action, 60 per cent of the respondents think that it is possible, but very difficult to do anything to prevent harmful climate change. 51 per cent think that Norway should continue to produce as much oil as currently. The six dependent variables are all significantly and positively correlated. The highest correlations are found between attribution and personal and overall threat, respectively, as well as for overall threat and policy. The descriptive statistics do not necessarily support the assumption that these six dependent variables can be divided into two dimensions, as the strongest correlations are found across these dimensions. However, the acceptance levels of the first dimension are all high, while the results of the second dimension are more debatable. In addition, the factors influencing climate change attitudes need to be analysed to look further at the division of the dependent variables.

4 Factors influencing climate change attitudes

In this chapter, I will explain the methodological approach to my research question. Following, I will operationalize the independent variables that will be used in the regression analyses and present the descriptive statistics. Finally, I will conduct regression analyses for each dependent variable.

4.1 Logistic regression

The methodological approach for my research is quantitative, because it is a large-N study. In addition, a quantitative approach is necessary to measure effects across a large sample of observations and to be able to generalize (George & Bennett, 2005). When dependent variables are categorical or dichotomous, a regular linear regression is insufficient, because the outcome is non-linear. A dichotomous dependent variable violates many of the assumptions for linear regression. The error term does not satisfy the assumptions of normality. In addition, the variance of a dichotomous variable is not constant, creating instances of heteroscedasticity (Skog, 2004:360). Since two of my dependent variables are dichotomous and the remaining four are ordinal, I will apply logistic regression in the analysis[4].

[4] When dependent variables are categorical, logistic regression and probit regression are the most used statistical techniques. The approaches are very similar, and differences in results are very small. The way of transforming the dependent variable and the forms of the regression curve are slightly different. However, the two models most often give similar results (Skog, 2004:390). Thus, selecting logistic regression ahead of probit regression should not affect the results of this thesis.

Figure 4.1: Illustration of linear versus non-linear relationship

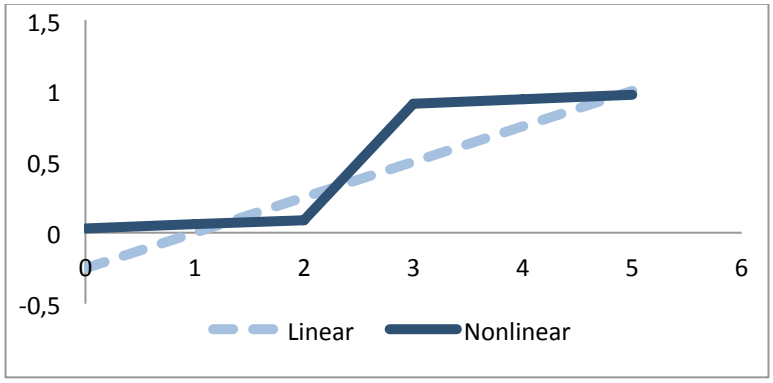


Figure 4.1 illustrates the curvilinear relationship of the logistic regression model and the linear relationship of the ordinary least squares regression model. The dotted line represents the linear model, while the S-shaped curvilinear line represents the logistic model. This curve represents the probability of an event occurring (Hair, Black, Babin, Anderson, & Tatham, 2006), and moves between values 0 and 1, but without reaching them.

The implications of nonlinearity are fundamental to the proper interpretation of categorical regression models. The nonlinearity makes it more difficult to interpret the effects of the independent variables on the probability of an event occurring. The effect of a change in a variable depends on the value of all other variables in the nonlinear model (Long & Freese, 2006:113-116). The results from logistic regressions can be estimated either as odds ratios or as logged odds. However, because the logistic regression model is nonlinear, no approach to interpretation can fully describe the relationship between a variable and the outcome (Long & Freese, 2006:157). The results in this thesis will instead be presented as predicted probabilities calculated from the logged odds.

4.1.1 The binary model

The logistic regression model with a binary outcome has a curvilinear S-shaped relationship. When the dependent variable is dichotomous and coded 0 and 1, the mean value will also be equal to the percentage with value 1 (Long & Freese, 2006). In this thesis, trend and attribution acceptance are dichotomous variables with binary outcomes.

Formally, the binary logit model can be written as

$$Pr(y = 1 \mid x) = \frac{exp(\alpha + \beta x)}{1 + exp(\alpha + \beta x)}$$

In this equation, ε (error term) is assumed to be logistically distributed with Var(ε) = π2/3. For the binary regression model, Var(ε) must be assumed because the dependent variable is unobservable, unlike for the linear regression model. The value assumed for Var(ε) does not affect the value of the probability. Changing the assumed variance affects the spread of the distribution but not the proportion of the distribution above or below the threshold (0 and 1) (Long and Freese 2006: 134).

4.1.2 The ordinal model

When dependent variables are ordinal, normal logistic regression models are insufficient because they rely on S-shaped outcomes. Therefore, an ordinal logistic regression is necessary. In variables with ordinal outcomes, number of values is restricted, the categories can be ordered, but the distances between the categories are unknown (Long & Freese, 2006:183). With ordinal outcomes it is applicable to use models that avoid the assumption that the distances between categories are equal. The ordinal regression model is nonlinear, and the magnitude of the change in the outcome probability for a given change in one of the independent variables depends on the levels of all the independent variables (Long & Freese, 2006:183). In this theses, personal and overall threat perception, efficacy belief, and policy support are all variables with ordinal outcomes.

The standard formula for the predicted probability in the ordinal regression model can be written as

$$\Pr(y = m \mid \chi) = F(\tau m - \chi\beta) - F(\tau m{-}1 - \chi\beta)$$

Where F is the cdf for ε. In ordinal logit, F is logistic with Var(ε) = π2/3. For y = 1, the second term on the right drops out because F (-∞- χβ) = 0, and for y = J, the first term equals F (∞- χβ) = 1.

One difference between the binary and ordinal regression models is that an intercept or constant is reported for the binary model, while the constant is replaced by a cut point in the ordinal model (Long & Freese, 2006:187). The ordinal cut point is equal but of opposite sign (direction) from the binary constant. This difference is due to how the models are identifies. However, the predicted probabilities are the same under either parameterization (Long & Freese, 2006:187).

4.1.3 Model estimation

Logistic regression uses maximum likelihood (ML) to estimate the models. ML estimates are the values of the parameters that have the maximum likelihood of generating the observed sample of data if the assumptions of the model are true. A likelihood function calculates "how likely it is that we would observe the data we actually observed if a given set of parameter estimates were the true parameters" (Long & Freese, 2006:76). In logistic regression analysis, the model estimation fit is measured by estimating the value of -2 times the log of the likelihood value (-2LL). The minimum value of -2LL is zero and refers to a perfect model fit. Thus, low values indicate that the model fits well, while large values indicate that the model fits poorly (Hair et al., 2006). In this thesis, likelihood ratio value (LR) will be presented. The LR test is based on the likelihood value of the model that has been estimated and a model based on the null hypothesis (H0). H0 claims that the probability of Y=1, in this case climate change attitudes, is the same regardless of the values on the independent variables (Long & Freese, 2006:88). A significant LR test indicates that the effect of the independent variable being equivalent to zero can be rejected. Another test for the null hypothesis is the Wald test. In this thesis, the Wald test is used for the separate blocks of variables in a three-block model in each regression model, while LR is used for the model as a whole.

In addition to the likelihood tests, pseudo R2 and Akaike's information criterion (AIC) are presented as measures of model fit. Pseudo R2 is also based on the -2LL and ranges from 0 to 1, where 1 represents perfect fit (Hair et al., 2006). In this thesis, Mc Fadden's R2 is used. This measure is known as the LR index and compares a model with just the intercept to a model with all the parameters (Long & Freese, 2006:109). AIC is calculated using the likelihood of the model and the number of parameters in the model. The model with the

lowest AIC, all else being equal, is considered the model with the best fit (Long & Freese, 2006:112).

Hypothesis tests of regression coefficients can be conducted through Wald or Likelihood Ratio (LR) tests. Statistical theory is unclear whether the LR or Wald test is to be preferred in models for categorical outcomes (Long & Freese, 2006:145). The *z*-test used in this thesis is a Wald test. The probability levels ordinarily reported are for two-tailed tests. The results in two-tailed tests correspond to the area of the curve that is either greater than the reported z or less than –z. When previous research or theory implies the sign of the coefficient, a one-tailed test can be used, and H0 is rejected only when z is in the expected tail. Only when the estimated coefficient is in the expected direction should P > *z* be divided (Long & Freese, 2006:141).

4.1.4 Assumptions and tests

There are some assumptions necessary for the logistic regression models. For the binary model, the relationship between the variables must be S-shaped. The form of the regression curve can be calculated statistically by using the Hosmer-Lemeshow (H-L) test. A significant H-L test indicates that there are significant differences between actual and predicted values, and that the model is not S-shaped (Hair et al. 2005:372; Skog 2004:383-385). None of the binary variables in this thesis have a significant H-L test, so the curvilinear regression assumption is intact.

For the ordinal model, the assumption of the parallel regression is implicit (Long & Freese, 2006:197). Also known as the proportional odds assumption, it assumes that the slope coefficients are identical across each regression for each outcome. Probability curves thus differ only in being shifted to the left or right, but with the same form. An approximate LR test is used, comparing log likelihood from ordinal logistic regression with that from pooling binary models fitted with logistic regression. The proportionality of odds across response categories are LR tested. The parallel regression assumption cannot be rejected for the ordinal variables in this thesis.

The second assumption concerns the error term, which should have independent variation (Skog, 2004:380). In most cases, this assumption is satisfied if the data have been selected

through random sample. The data in this thesis has been selected through random sample.

The third assumption considers spuriousness. The relationship between dependent and independent variables should not be caused by underlying factors (Skog 2004: 380). The most important remedy for spuriousness is a solid theoretical foundation and operationalization of the variables included in the analysis. In addition to this, a multivariate model increases the reliability that the results are not spurious.

4.2 Independent variables

In this part, the independent variables that were chosen based on previous literature and studies on factors influencing climate change opinion will be operationalized and presented. All variables are from the first round (2013) of the Norwegian Citizen Panel (NCP).

4.2.1 Trust in scientists

Climate change is a complex phenomenon, and in addition to being a social and political issue, it is to a large degree built on science and facts. The public is being conveyed these scientific facts, and one prerequisite for accepting them might be trust in the scientific community Krosnick et al. (2006). I have used a question that asks respondents which level of confidence they have to the scientists (in general). The scale runs from very high mistrust to very high confidence on a seven-point scale restructured to vary from 0 to 1. Respondents who answered that they do not know, or who did not answer are left out of the analysis. The mean is .71, which indicates a relatively high degree of confidence in scientists among Norwegians.

4.2.2 Political orientation

The conceptualization of a political left in opposition to a political right is central in most democratic societies (Huber and Inglehart, 1995; Knutsen, 1995: 63; van Eijk et al., 2005), placing state-centred socialist parties on the left and market-centred conservative parties on the right. Normally, people who identify themselves with individualistic values, as opposed to collectivistic values, place themselves more to the right. The left-right axis is also a measure for the public-private dimension (Aardal, 2011). Political orientation on the left-right axis is used as a measure for worldview. Respondents were informed, “in politics one often speaks of the “left wing” and “right wing.”” They were then asked to place themselves on a scale from 0 to 10, from far left to far right, where the higher the value, the more to the right. The variable thus measures political orientation towards the right. I have restructured this variable to go from 0 to 1 for comparison reasons. The mean is .53, thus leaning slightly to the right. A majority of the respondents place themselves around the middle.

4.2.3 Party vote: FrP

Party vote is another measure of political orientation and ideology. The Progress Party or Fremskrittspartiet (FrP) is the furthest to the right in the Norwegian multi-party system, and has since 2013 been in government together with the largest conservative right-wing party, Høyre (H). FrP-voters have in previous research been characterized differently than other Norwegian voters (Austgulen & Stø, 2013), and FrP is the only party in Parliament (Stortinget) to officially be uncertain about climate change (Tjernshaugen, Aardal, & Gullberg, 2011:339). The party has shifted slightly in their view on climate change the recent years, by stating that science shows anthropogenic climate change in the party program for 2013-2017 (FrP, 2013). However, FrP stresses that there is great uncertainty about how much of the climate changes are due to human action, compared to natural climate variability.

Austgulen and Stø (2013) found that FrP-voters are the most climate change sceptical among Norwegian respondents. To test this, I will use a question asking respondents what party they voted for in the last election (2013). I constructed a dummy variable with FrP voters valued 1, and all other party voters valued 0. Because FrP is the furthest to the right in the Norwegian political context, and identifies with a right-wing individualistic ideology, this variable will control for what effect FrP voters have, while testing the left-right axis. The mean is .13, indicating that about 13 per cent of the respondents voted for FrP in 2013. In the election, FrP got 16.3 per cent of the votes (KMD, 2013), so the sample deviates slightly from the population.

4.2.4 Employment in the oil and gas industry

The unique context of the Norwegian case is the dominant role played by the oil and gas industry, both in society and for the economy. About eight per cent of Norwegian jobs are directly or indirectly connected to the demand from the oil and gas sector (Eika et al., 2010). Fossil fuel dominates the country's energy sector (Tvinnereim & Austgulen, 2014:323). Tvinnereim and Austgulen (2014) analysed how close affiliation to this industry through work influences attitudes towards climate change. They found that working in the oil and gas industry has an effect on climate change opinion with oil and gas workers being more likely to form sceptical opinions on climate change. This effect remained when controlling for the

demographic variables age, gender, education and income, as well as for ideology (Tvinnereim & Austgulen, 2014:326).

For my analysis, I will use a question asking respondents whether their workplace is in the oil and gas sector, or closely related to it. I created a dummy variable where respondents who answer that their workplace is in or closely related to the oil and gas industry are valued 1, and those who answer no are valued 0. The mean is .1, indicating that about ten per cent of the respondents work closely affiliated to the oil and gas industry. About half of these stated that they work in the oil and gas sector, and half that they work closely related to the sector. They are, still, all affiliated and interact with the oil and gas sector, so it should not pose a problem to combine them. The expectation that working closely to the industry influences climate change opinion should apply to both.

4.2.4 Higher education

Education is used as an indirect measure of knowledge (Franzen & Meyer, 2010). Education is in this thesis measured in three categories (elementary, high school, and college/university) and tested for significance against each other. Higher education is the category which holds effect, and is therefore used as a dummy variable for education in the analysis. This supports the theoretical foundation outlined previously. Higher education is valued 1, while all lower levels or no education is valued 0. The mean is .53, indicating that around half of the respondents have achieved some form of higher education.

4.2.5 Demographic variables

In addition to these independent variables, it is necessary to control for the effect of common demographic variables. Gender is one of these control variables. In previous research, men have been found to be more sceptical and less fearful towards climate change than women (Kahan et al., 2007; Kellstedt et al., 2008; McCright & Dunlap, 2011a). I created a dummy variable for gender, giving the value 1 for female and 0 for male, thus measuring the effect of being female on climate change attitudes. The mean is .5, indicating that women and men are equally represented.

Age is measured as categories to test for the generation effect. After testing the categories against each other, it is evident that it is the oldest age category that has any effect on climate change attitudes, which is consistent with previous research. I construct a dummy variable called senior, valuing respondents who are 60 and older as 1, and the rest as 0. The mean is .25, indicating that about one fourth of the respondents are seniors.

Income is tested as a continuous variable. Income is measured through asking respondents to state their current (individual) income. The values range from 0 to 850 000 NOK, but are recoded to count as 100 thousands, thus ranging from 0 to 85. The mean is 4.6, indicating that the average respondent has an income of 460 000 NOK.

Table 4.1: Descriptive statistics of the independent variables

Variable	N	Mean	Std.Err.	Min	Max
Senior	4905	.25	.01	0	1
Female	4905	.5	.01	0	1
Higher education	4469	.53	.01	0	1
Oil and gas employment	2866	.1	.01	0	1
Income in 100 000	4126	4.6	.06	0	85
Trust in scientists	4536	.71	.00	0	1
Political Orientation	4576	.53	.00	0	1
FrP	4140	.13	.01	0	1

Source: The Norwegian Citizen Panel (round 1) 2013

Table 4.1 summarizes the descriptive statistics of the independent and control variables. The N ranges from 2866 for oil and gas employment to 4905 for age and gender. All variables, except for income, are measured with minimal values 0 and maximum values 1.

4.3 Regression models

The logistic regression models in this thesis are organized step wise, with the independent and control variables divided into three blocks. The division and order are based on causation with a natural order. The first block consists of the socioeconomic variables age, gender, education, employment in the oil and gas industry and income. The two following blocks consists of political variables on the one hand, and trust in scientists on the other hand. For the scientific related dependent variables trend and attribution acceptance and overall threat perception, trust in scientists is in the second block and political orientation and FrP vote is in the third block. For the political dependent variables personal threat perception, efficacy belief and policy support, the political variables are in the second block and trust in the third block. Each dependent variable is tested in three models with the same N. The first model contains the first block, while the second model includes the second block, as well as the first. The third model consists of all three blocks. I report the results of significance and direction of effect on the independent variables, as well as the significance and explanatory power of the three blocks and models for each dependent variable through Wald and LR tests.

Because the coefficients in logistic regressions do not tell us much other than the direction of the effects, predicted probabilities will be used to interpret the effects of the main independent variables, political orientation and trust in scientists. The predicted probabilities are based on the regression models that include all independent and control variables, holding all variables, except for the one predicting probabilities, at mean levels. For the dependent variables with only one outcome (dummy variables), the predicted probabilities are measured for the outcome (1). On the ordinal variables with different outcomes, predicted probabilities are measured for all outcomes, but illustrated graphically for the outcome of value 1, which indicates full acceptance or highest positive attitudes on all dependent variables.

4.3.1 Trend acceptance

It is clear from the descriptive statistics that trend acceptance in Norway is high, with 92 per cent of respondents believing that the climate is changing. Accordingly there is little variation to explain on this variable. Thus, I expect not to find any strong effects of the independent variables.

Table 4.2: Factors explaining trend acceptance

	Model 1	Model 2	Model 3
Senior	.58	.62*	.61
	(.31)	(.31)	(.31)
Female	.27	.24	.22
	(.19)	(.19)	(.19)
Higher education	.35	.31	.3
	(.18)	(.19)	(.19)
Oil and gas (employment)	.04	.02	.06
	(.28)	(.28)	(.28)
Income (100 000)	-.04**	-.04*	-.04*
	(.02)	(.02)	(.02)
Trust in scientists		1.02*	.97(*)
		(.02)	(.5)
Political orientation (left-right)			-.65
			(.44)
FrP			.18
			(.29)
Constant	2.56***	1.97***	2.23***
	(.18)	(.37)	(.47)
Wald chi2 block	15.94**	4.32	2.19*
LR chi2 model	15.59**	19.73**	21.92**
Pseudo R2	.0153	.0194	.0215

N=2179. Standard errors reported in parentheses.[5] ***p-value<.001; **p-value<.01; *p-value<.05; (*)p-value<.05 in one-tailed test

As expected, there are little significant effects on trend acceptance in the regression model in table 4.2. Trust in scientists has an effect on the 5 per cent-level in model two. When the political variables are controlled for, the effect is only significant in a one-tailed test[6]. The Wald chi-square test indicates that the first, socioeconomic, block is significant and explains the most. The second, political, block is insignificant and the third, trust, block is only significant at the lowest level. The models are all significant, but the first block explains the most, according to the LR chi-square test.

[5]Standard errors higher than 2 can indicate multicollinearity between the independent variables. None of the standard errors are high enough to be problematic, and will thus not be discussed further.

[6]The effect is insignificant in a two-tailed test, but significant in a one-tailed test. One-tailed tests can be conducted if the theoretical assumptions of the direction of the effect of the independent variable is strong(Long & Freese, 2006:141). In this thesis, significant one-tailed tests will be reported for the main independent variables when the effect is insignificant in a two-tailed test.

These results indicate that political orientation does not explain trend acceptance in Norway, while trust in scientists has some explanatory power. The socioeconomic control variables, except for income, do also not explain the variation. This might be due to the small variance on the trend variable, as there are not a lot of respondents who do not believe the climate is changing, and thus not that many to be accounted for with explanations.

4.3.2 Attribution acceptance

The distribution for attribution acceptance, as seen in the descriptive statistics, was more varied. In line with the theoretical framework, I expect that trust in scientists explain most of attribution acceptance.

Table 4.3: Factors explaining attribution acceptance

	Model 1	Model 2	Model 3
Senior	-.04	.04	.03
	(.15)	(.15)	(.16)
Female	.74***	.69***	.58***
	(.11)	(.11)	(.12)
Higher education	.99***	.93***	.78***
	(.1)	(.11)	(.11)
Oil and gas	-.42**	-.48**	-.22
	(.15)	(.16)	(.16)
Income (100 000)	-.03*	-.03*	-.02
	(.01)	(.01)	(.01)
Trust in scientists		2.28***	1.93***
		(.29)	(.31)
Political orientation (left-right)			-2.98***
			(.28)
FrP			-.53**
			(.16)
Constant	.36**	-1.21***	.81**
	(.11)	(.19)	(.29)
Wald chi2 block	170.55***	60.18***	164.36***
LR chi2 model	187.23***	248.39***	434.10***
Pseudo R2	.0736	.0977	.1707

N=2179. Standard errors reported in parentheses. ***p-value<.001; **p-value<.01; *p-value<.05

The results from the regression in table 4.3 show a lot more effects on attribution acceptance than found on trend. In the first model with the socioeconomic variables, all variables have significant effects on attribution acceptance, except for senior. Female and higher education have a highly significant positive effect. Oil and gas and income, on the other hand, have negative significant effects on attribution. In model 2, trust in scientists is included. The effects of the socioeconomic variables remain significant when accounting for trust. Trust in scientists, for its part, has a highly significant positive effect on attribution acceptance. Hence, people who are more trusting of scientists are more likely to accept anthropogenic climate change. Political orientation and FrP vote are included in the third model. Both political variables have negative effects on attribution acceptance that are highly significant. This indicates that as people place themselves more to the right on the left-right axis, they become less likely to accept anthropogenic climate change. Voting for FrP also decreases the likelihood of accepting attribution. When including the political variables, the effect of oil and gas employment and income becomes insignificant. All three blocks and models are highly significant, but the second block of trust in scientists explains the least. This block does, however, only consist of one variable. To be able to compare the effects of trust in scientists and political orientation, the predicted probabilities for the outcome (attribution acceptance=1) to occur are presented.

Figure 4.2: Predicted probabilities for trust in scientists on attribution acceptance (95% Cls)

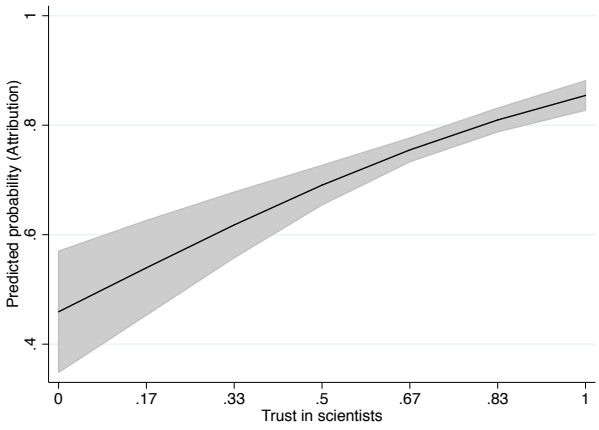
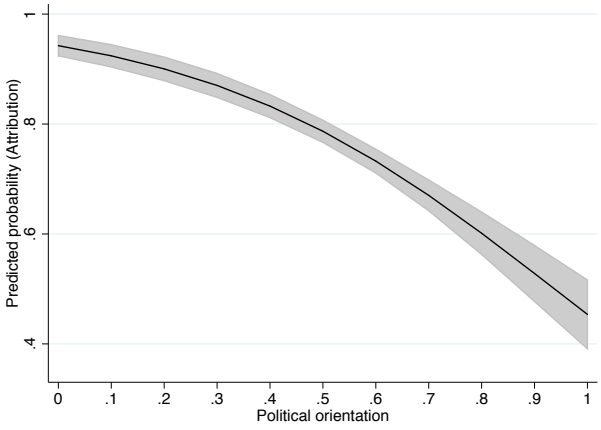


Figure 4.3: Predicted probabilities for political orientation on attribution acceptance (95% Cls)



Figures 4.1 and 4.2 illustrate the predicted probabilities for trust in scientists, on the left, and political orientation, on the right, on attribution acceptance. The figures demonstrate the distribution from the lowest (0) to the highest (1) values on the independent variables. The graph for trust in scientists moves upwards the left to right, while the graph for political orientation moves downwards from left to right. This means that the probability of accepting attribution increases with an increase in value on trust in scientists, but decreases with an increase in value on political orientation. Said in different words, the probability of believing that climate change is mostly caused by human action is higher the more people trust scientists, as well as the more to the left people place themselves on the political scale.

Though the directions of the graphs are opposite, the variations of the distributions are approximately the same. However, the graph for political orientation goes slightly higher, and the confidence intervals (the grey area) are larger for trust in scientists. These probabilities should be seen in light of the previous finding that 66 per cent of respondents accept anthropogenic climate change.

In figure 4.1, the predicted probabilities of accepting attribution range from 45.9 to 85.4 per cent, varying with around 40 percentage points. Thus trust in scientists explains a great deal of the variance on attribution. The predicted probabilities for political orientation presented in figure 4.2 range from 45.4 to 94.3 per cent, varying with about 50 percentage points. The variance of political orientation is even larger than the variance of trust. Hence, although trust in scientists and political orientation explain a lot of the variance of attribution, political orientation explains the most. It should be noted though, that the variables are slightly different from one another with eleven values for political orientation and seven values for trust in scientists.

The confidence intervals show the dispersion of probability on the values of the independent variables with 95 per cent certainty. For trust in scientists, the confidence interval ranges from 35 to 57 per cent on value 1 (46 per cent), which is 22 percentage points. For political orientation, the largest confidence interval is found on value 1, ranging from 39 to 51 per cent, only half the size of the largest interval for trusts in scientists.

The lower half of trust in scientists represents degrees of mistrust, while the upper half is degrees of confidence. .5 is neither mistrust nor confidence. The probabilities for mistrust lie between 46 and 62 per cent, while the probabilities for confidence lie between 75 and 85 per cent. Hence, the variation of probability is larger within the degrees of mistrust, than within the degrees of trust.

For political orientation, if the values are divided in two halves, the lower half is left and the upper half is right. The probabilities for left vary between 83 and 94 per cent, while the variation of probabilities for right goes from 45 to 73 per cent. Thus, the variation is a lot larger on the values for right than for left. This indicates that how far left people place themselves on the political scale does not matter that much for the probability of accepting anthropogenic climate change, but it matters that they place themselves more to the left than to the right. However, how far to the right people place themselves does matter for the probability of accepting anthropogenic climate change, in addition to being on the right hand side in general. On an eleven point scale, being on the eleventh point, the furthest to the right, decreases the probability of accepting attribution with eight percentage points from the second furthest (the tenth point). This indicates that there is a larger variation on the right than on the left.

4.3.3 Overall threat perception

Overall threat perception is the third dependent variable in the first, scientific related dimension. In contrast to the previously tested climate change variables, overall threat perception has ordinal outcomes. The results of the ordinal regression are presented in table 4.4.

Table 4.4: Factors explaining overall threat perception

	Model 1	Model 2	Model 3
Senior	-.13	-.01	-.07
	(.16)	(.17)	(.17)
Female	.4**	.36**	.23
	(.12)	(.12)	(.12)
Higher education	.82***	.76***	.61***
	(.12)	(.12)	(.13)
Oil and gas	-.66***	-.66***	-.38*
	(.18)	(.18)	(.19)
Income (100 000)	-.01	-.01	.00
	(.02)	(.02)	(.02)
Trust in scientists		2.24***	1.82***
		(.35)	(.35)
Political orientation (left-right)			-2.93***
			(.3)
FrP			-.4
			(.21)
Wald chi2 block	88.97***	41.49***	122.27***
LR chi2 model	92.07***	263.41***	263.41***
Pseudo R2	.0334	.0488	.0956

N=1101. Standard errors reported in parentheses. ***p-value<.001; **p-value<.01; *p-value<.05

In the first model with socioeconomic and demographic variables, female, higher education and oil and gas employment have significant effects on overall threat perception. Female and higher education have positive effects, while oil and gas employment has a negative effect. When including the trust variable in the second model, the effects remain significant. Trust in scientists has a highly significant positive effect on overall threat perception. Respondents who report higher levels of trust in scientists are more likely to perceive climate change as a serious threat.

Political variables are included in the third model. Political orientation has a highly significant negative effect on overall threat, but FrP does not have a significant effect. This indicates that people placing themselves more to the right on the left-right axis are less likely to perceive climate change as a serious threat overall. All three blocks and models are highly significant, however the third block with political orientation explain the most of the variance on overall

threat. To compare the effects of trust in scientists and political orientation on overall threat perception, I use predicted probabilities.

Figure 4.4: Predicted probabilities for trust in scientists on overall threat (95% Cls)

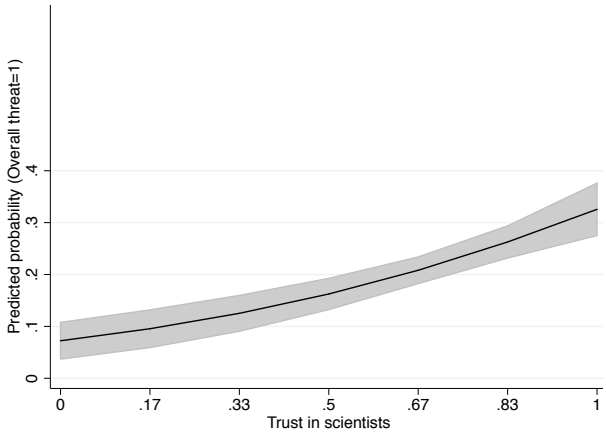
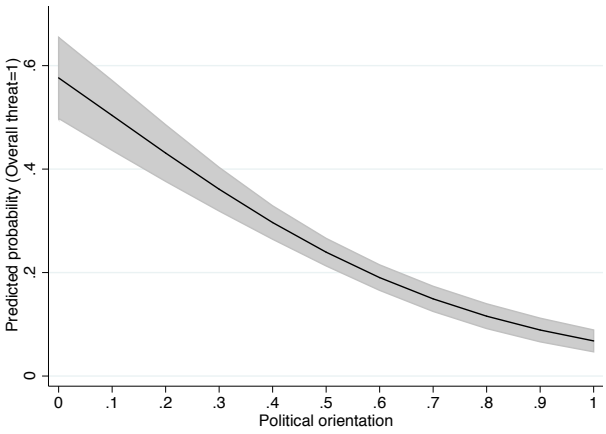


Figure 4.5: Predicted probabilities for political orientation on overall threat (95% Cls)



The predicted probabilities presented in figure 4.3 and 4.4 demonstrate the distribution of trust in scientists and political orientation, respectively, from the lowest (0) to the highest values (1) when overall threat=1. As for attribution, the graphs go in opposite directions. The probability of overall threat perception increases with increase in trust level, and decreases with values more to the right on the political scale. The predicted probabilities of overall threat perception at the highest value range from 7.2 to 32.6 per cent for trust in scientists. For political orientation, the predicted probabilities of overall threat perception at the highest value range from 6.8 to 57.6 per cent. Accordingly, the variation is larger for political orientation than for trust in scientists.

As illustrated in the descriptive statistics in the previous chapter, 24 per cent of respondents perceive climate change as a 'very serious' overall threat (1). The further the probabilities vary from these results, the more they explain of the variation in the dependent variable. High confidence is the value for trust in scientists that lies closest to 24 per cent probability. Thus, respondents with mistrust (further away from high confidence) stand the most out. For political orientation, the middle value consists of 24 per cent probability. However, the

distance to the probabilities for the left values is larger than the distance to the right values' probabilities, indicating that the left values explain the most.

Because overall threat perception is a variable with ordinal outcomes, I have included predicted probabilities for all five outcomes on the lowest (0) and highest (1) values of trust in scientists and political orientation. Only one per cent of all respondents believed it were not a threat (0), while seven per cent found it not very serious (.25). Around 26 per cent perceived climate change as a somewhat serious threat (.5) and 42 per cent answered as serious (.75).

Table 4.5: Predicted probabilities for trust in scientists on overall threat

Overall threat	Trust in scientists=0	Trust in scientists=1
0	1.2 %	.2 %
.25	13.2 %	2.4 %
.5	44.8 %	16.3 %
.75	33.6 %	48.5 %
1	7.2%	32.6 %

Table 4.5 shows the predicted probabilities for trust in scientists on all five values of overall threat. The difference in predicted probabilities between the lowest and highest values of trust in scientists ranges from one to 25.4 percentage points, thus explaining a great deal of the variance. The probability of perceiving overall threat as not a threat (0) is closer to the percentage of the general distribution for respondents on the lowest value of trust, than for those on the highest value of trust. When climate change is perceived as not very serious (.25) the predicted probabilities for the lowest and highest values of trust in scientists are about the same distance from the distribution independent of other factors. The probability of perceiving climate change as a somewhat serious threat (.5), is closer to the statistics when trust in scientists is at the highest level. When climate change is perceived as serious (.75) the probability for the highest level of trust is closer to the overall distribution, than the probability for the lowest level of trust. Thus, the mistrust value stands out the most and explains a lot of the variance in overall threat perception.

Table 4.6: Predicted probabilities for political orientation on overall threat

Overall threat	Left=0	Right=1
0	.1 %	13 %
.25	.9 %	13.9 %
.5	6.7 %	45.5 %
.75	34.7 %	32.5 %
1	57.6%	6.8 %

Table 4.6 shows the predicted probabilities for political orientation on all five values of overall threat. The difference in predicted probabilities between the lowest and highest values of political orientation ranges from 12.9 to 50.8 percentage points, explaining a lot of the variance. The probability of perceiving overall threat as not a threat (0) is closer to the percentage of the general distribution for respondents on the value furthest to the left, than for those furthest to the right. When climate change is perceived as not very serious (.25) the predicted probabilities for the lowest and highest values of political orientation are about the same distance from the distribution independent of other factors. The probability of perceiving climate change as a somewhat serious threat (.5), is also about the same distance from the statistics for both values. When climate change is perceived as serious (.75) the probability for left is closer to the overall distribution, than the probability for right. Thus, the left and right values both stand out and explain a lot of the variance, on different values of overall threat perception.

After interpreting the predicted probabilities, it seems that political orientation explains most of the variances of overall threat perception. Trust in scientists also explains a great deal. In general, the highest variances were found among those who perceived overall threat as a very serious threat.

4.3.4 Personal threat perception

Personal threat perception is the first dependent variable in the political dimension. The expectation for this dimension is that political orientation has a significant effect on the climate change attitudes, and is thus placed in the second block, with trust in scientists following in order and importance.

Table 4.7: Factors explaining personal threat perception

	Model 1	Model 2	Model 3
Senior	.22	.26	.27
	(.16)	(.16)	(.16)
Female	.68***	.63***	.61***
	(.12)	(.12)	(.12)
Higher education	.5***	.27*	.26*
	(.12)	(.12)	(.12)
Oil and gas	-.14	.01	-.02
	(.19)	(.19)	(.19)
Income (100 000)	.02	.04*	.04*
	(.02)	(.02)	(.02)
Political orientation (left-right)		-1.77***	-1.76***
		(.27)	(.27)
FrP		-.72***	-.68***
		(.19)	(.19)
Trust in scientists			.67(*)
			(.35)
Wald chi2 block	63.04***	80.81***	3.73
LR chi2 model	64.53***	148.12***	151.85***
Pseudo R2	.0211	.0485	.0497

N=1090. Standard errors reported in parentheses. ***p-value<.001; **p-value<.01; *p-value<.05
(*)p-value<.05 in one-tailed test

In the first model including socioeconomic factors, female and higher education are the only two variables with significant and positive effects on personal threat perception. The two political variables included in the second model have highly significant negative effects on personal threat perception. This indicates that respondents with political orientation towards the right, as well as FrP voters are less likely to perceive climate change as a personal threat. When the political variables are included in the model, income has a borderline significant positive effect on personal threat perception. Female and higher education are still significant in the second model, although the significance level for higher education's effect has decreased. The third model includes trust in scientists, which only has a significant effect on personal threat perception in a one-tailed test. The effects from the second model stay unchanged in regards to significance. The third block is insignificant in the chi-square test, but the first and second blocks are highly significant, as well as all three models. The political block explains the most, according to the Wald test.

Figure 4.6: Predicted probabilities for political orientation on personal threat (95% Cls)

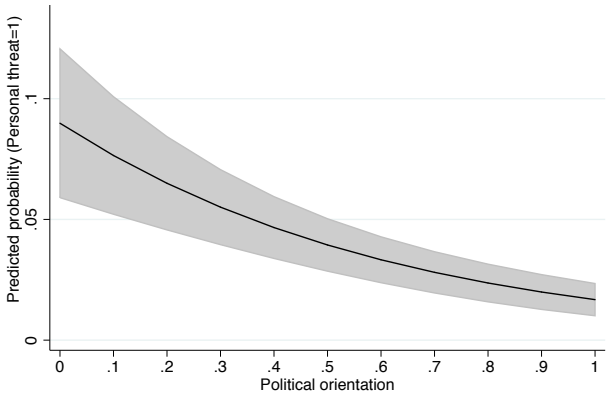
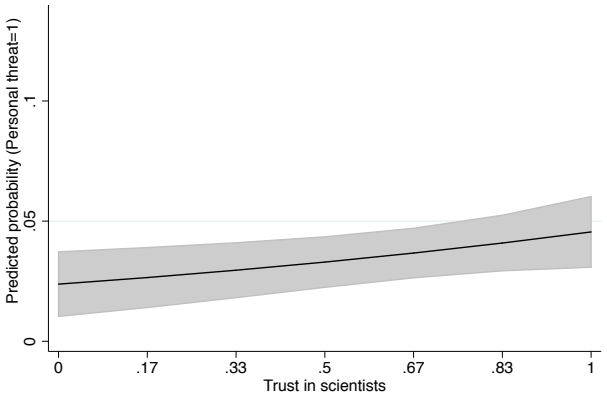


Figure 4.7: Predicted probabilities for trust in scientists on personal threat (95% Cls)



The predicted probabilities presented in figure 4.5 demonstrate the distribution for political orientation from the left (0) to the right (1) when personal threat=1. The predicted probability of personal threat perception at the highest value ranges from 1.7 to nine per cent. On the other hand, figure 4.6 shows that the predicted probabilities for trust in scientists on personal threat only vary between two and five per cent. Since trust in scientists only was significant in a one-tailed test, the difference in variation in the two graphs is not surprising. The difference in direction of the graphs remains the same as seen for the previous dependent variables, with political orientation going downward and trust in scientists upward.

Only five per cent of the respondents believed climate change to be a 'very serious' (1) personal threat. Around 20 per cent found it serious (.75), while 35 per cent believed it as somewhat serious (.5). 29 per cent believed climate change to be 'not very serious' (.25), and eleven per cent did not think it was a threat (0). Table 4.8 shows the predicted probabilities for political orientation on all five values of personal threat.

Table 4.8: Predicted probabilities for political orientation on personal threat

Personal threat	Political orientation=0	Political orientation=1
0	2.7 %	14 %
.25	15.6 %	42.6 %
.5	38 %	31.6 %
.75	34.6 %	10.1 %
1	9 %	1.7 %

The largest variance of around 27 percentage points is found when personal threat is perceived as not very serious (.25). The difference in predicted probabilities between the lowest and highest value of political orientation ranges from 7.3 to 27 percentage points, thus explaining some of the variance. In general, the far left value stands most out at thus explains more than the far right.

Table 4.9: Predicted probabilities for trust in scientists on personal threat

Personal threat	Trust in scientists=0	Trust in scientists=1
0	10.2 %	5.5 %
.25	37.5 %	26.3 %
.5	36.3 %	41 %
.75	13.7 %	22.7 %
1	2.4 %	4.6 %

The variances of the predicted probabilities for trust in scientists are, as seen in table 4.9, much smaller than those for political orientation. The difference in predicted probabilities between the lowest and highest value of trust in scientists ranges from 4.7 to 11.2 percentage points.

Comparing the predicted probabilities between political orientation and trust in scientists has illustrated that trust in scientists has a small effect on personal threat perception, while political orientation has a larger effect. The largest variance is found when personal threat is perceived as not very serious.

4.3.5 Efficacy belief

The second dependent variable on the political dimension is belief in the possibility of prevention, efficacy. The expectation is that political orientation has a large effect and explains more of the variation than does trust in scientists.

Table 4.10: Factors explaining efficacy belief

	Model 1	Model 2	Model 3
Senior	.01	.02	.05
	(.13)	(.13)	(.13)
Female	.48***	.44***	.42***
	(.09)	(.09)	(.09)
Higher education	.25**	.17	.15
	(.1)	(.1)	(.1)
Oil and gas	-.49**	-.41*	-.43**
	(.16)	(.16)	(.16)
Income (100 000)	-.03*	-.02	-.02
	(.01)	(.01)	(.01)
Political orientation (left-right)		-.68**	-.64**
		(.22)	(.22)
FrP		-.37*	-.33
		(.17)	(.17)
Trust in scientists			.87**
			(.28)
Wald chi2 block	66.31***	20.69***	9.61**
LR chi2 model	68.09***	89.18***	98.89***
Pseudo R2	.0190	.0249	.0276

N=2087. Standard errors reported in parentheses. ***p-value<.001; **p-value<.01; *p-value<.05

In the first model, all demographic and socioeconomic variables except for senior have significant effects on efficacy belief. Female and higher education have positive effects, while oil and gas employment and income have negative effects on efficacy belief. When the political variables are included in the second model, higher education and income lose their significant effects. Political orientation and FrP both have significant negative effects on efficacy belief. This indicates that people who place themselves to the right on the left-right axis, and people who vote FrP, are less likely to believe that something can be done to prevent climate change impacts. In the third model, trust in scientists is included with a positive

significant effect on efficacy belief. Thus, trusting scientists increases the likelihood of accepting that something can be done. FrP loses the significant effect in the third model, while the other variables' effects remain. The first two blocks are highly significant, while the third is significant on a lower level. All models are highly significant. The first block, with the socioeconomic variables, explain the most on efficacy belief. The second, political, block explains more than the third block, according to the Wald tests. To compare the effects of the two main independent variables more thoroughly, the predicted probabilities are reported.

Figure 4.8: Predicted probabilities for political orientation on efficacy belief (95% Cls)

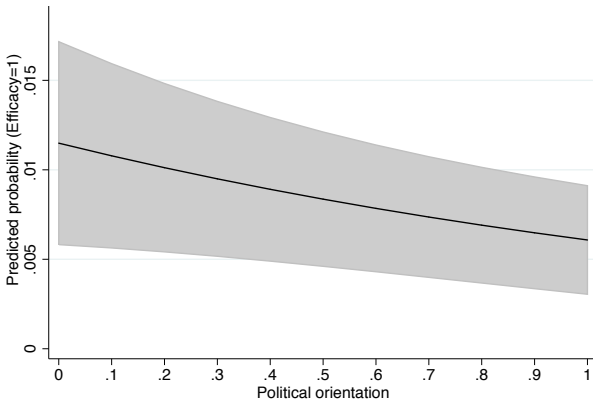
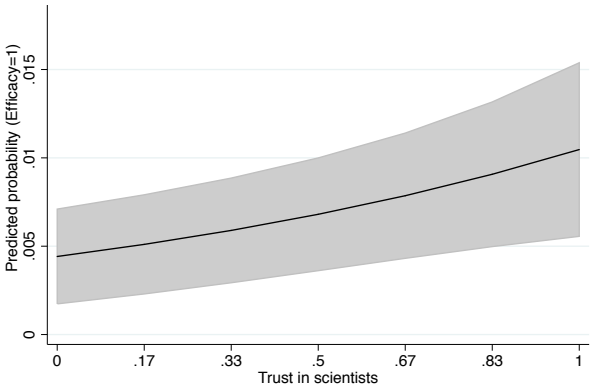


Figure 4.9: Predicted probabilities for trust in scientists on efficacy belief (95% Cls)



The predicted probabilities presented in figure 4.7 demonstrate the distribution for political orientation from left (0) to right (1) when efficacy belief=1. The predicted probabilities presented in figure 4.8 demonstrate the distribution for trust in scientists from the lowest (0) to the highest (1) values when efficacy belief=1. The graphs have the same directions as previously seen for the other dependent variables. However, the difference in the steepness of the two graphs is small. The predicted probabilities for political orientation range from .6 to 1.1 per cent, while the predicted probabilities for trust in scientists range from .4 to one per cent. Thus, the probability of respondents believing that it is easy to do something to prevent harmful climate change (1) is around one per cent regardless of the placement on the left-right axis and the degree of trust in scientists.

It is necessary to bear in mind that only around two per cent of the respondents, when controlled for demographic variables, believed efficacy to be easy. 32 per cent believed it to be possible and completely realistic (.67), 60 per cent believed it to be possible, but very difficult (.33) and six per cent believed it to be impossible to do something (0). Thus it should be interesting to discuss the predicted probabilities for political orientation and trust in scientists on efficacy belief on the other outcomes, as well.

Table 4.11: Predicted probabilities for political orientation on efficacy belief

Efficacy belief	Left=0	Right=1
0	3.3 %	6 %
.33	56.1 %	67.5 %
.67	39.5 %	25.8 %
1	1.1 %	.6 %

Table 4.11 shows the predicted probabilities for political orientation on all four values of efficacy belief. The largest variance of around 14 percentage points is found when efficacy is seen as possible and completely realistic (.67). The difference in predicted probabilities between left and right ranges from .5 to 13.7 percentage points, explaining some of the variance. Respondents who place themselves towards the right on the left-right axis are less likely to believe that it is easy or completely realistic and more likely to believe that it is very difficult or impossible to prevent harmful climate changes, compared to those who place themselves towards the left. The far left value deviates the most from the statistics of respondents who view efficacy as impossible. The far right value deviates the most from the general distribution for possible, but completely realistic as well as easy. The distance to the statistics for possible, but very difficult is about the same for both the far left and far right values.

Table 4.12: Predicted probabilities for trust in scientists on efficacy belief

Efficacy belief	Trust in scientists=0	Trust in scientists=1
0	8.1 %	3.6 %
.33	71.2 %	58.1 %
.67	20.3 %	37.3 %
1	.4 %	1 %

Table 4.12 shows the predicted probabilities for trust in scientists on all four values of efficacy belief. The largest variance of 17 percentage points is found when efficacy is seen as possible and completely realistic (.67). The difference in predicted probabilities between the lowest and highest values on trust in scientists ranges from .6 to 17 percentage points, explaining a little more of the variance, than political orientation. Respondents who trust scientists are more likely to believe that something can be done to prevent harmful climate changes.

After interpreting the predicted probabilities, it seems that political orientation and trust in scientists explain parts of the variances of efficacy belief. In general, the highest variances were found among those who believe it is possible and completely realistic to do something to prevent harmful climate changes. Trust in scientists have more varied probabilities, but the difference is marginal, so it is not possible to rank them.

4.3.6 Policy support

The last dependent variable on the second dimension of climate change attitudes is policy support. The expectation is that political orientation has a significant effect and explains more than trust in scientists. The results are presented in table 4.13.

Table 4.13: Factors explaining policy support

	Model 1	Model 2	Model 3
Senior	.31*	.36**	.4**
	(.13)	(.13)	(.13)
Female	.54***	.45***	.43***
	(.09)	(.09)	(.09)
Higher education	.66***	.45***	.42***
	(.09)	(.1)	(.1)
Oil and gas	-1.12***	-.89***	-.92***
	(.15)	(.15)	(.15)
Income (100 000)	-.03**	-.01	-.01
	(.01)	(.01)	(.01)
Political orientation (left-right)		-3.42***	-3.39***
		(.23)	(.23)
FrP		-.22	-.16
		(.16)	(.16)
Trust in scientists			1.13***
			(.27)
Wald chi2 block	195.43***	262.48***	17.23***
LR chi2 model	208.46***	502.43***	519.77***
Pseudo R2	.0538	.1296	.1341

N=2177. Standard errors reported in parentheses. ***p-value<.001; **p-value<.01; *p-value<.05

In the first model, all the demographic and socioeconomic variables have significant effects on policy support. Senior, female and higher education have positive effects on policy support. Oil and gas employment and income, on the other hand, have negative significant effects on policy support. When including the political variables in the second model, the effect of income loses significance, but the other variables remain significant. Political orientation has a negative significant effect on policy support, which indicates that the more to the right respondents affiliate themselves, the less likely they are to want Norway to produce less oil. FrP has no significant effect on policy support. In the third model, trust in scientists is included in the regression. Trust in scientists has a positive significant effect on policy support, indicating that the more respondents trust scientists, the more likely they are to accept a reduction in oil production. The other variables remain significant in the third model, after including trust in scientists. Every block and model is highly significant, with the second, political, block holding the highest explanation.

Figure 4.10: Predicted probabilities for political orientation on policy support (95% Cls)

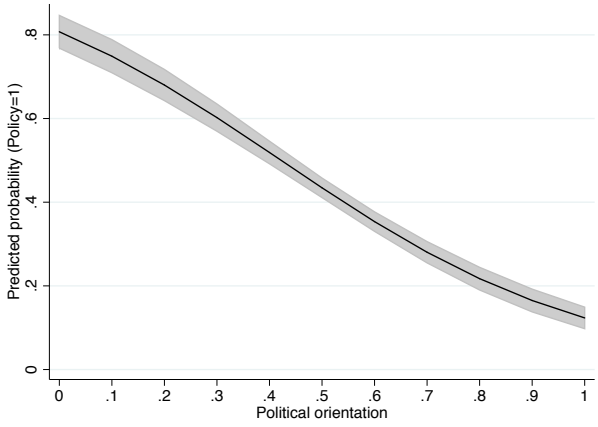


Figure 4.11: Predicted probabilities for trust in scientists on policy support (95% Cls)

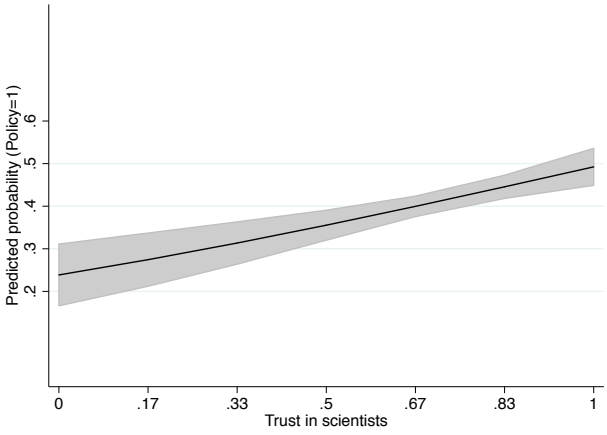


Figure 4.9 and 4.10 demonstrate the predicted probabilities for political orientation from left (0) to right (1) and trust in scientists from the lowest (0) to the highest (1) values when policy support is at the highest value (1). As for the other climate change variables, the graph for political orientation goes downwards from left to right, while trust in scientists goes upwards. The predicted probabilities of wanting Norway to produce less oil range from 12.3 to 80.7 per cent for political orientation and 23.9 to 49.2 per cent for trust in scientists. This illustrates a larger effect of political orientation, as the probabilities vary more between the values than for trust in scientists.

The descriptive statistics in chapter 3 showed that 42 per cent of the respondents answered that Norway should produce less oil than currently (1). For the trust variable, the predicted probabilities of the higher values of confidence are closer to the 42 per cent, than are mistrust values. For political orientation, the middle value is the closest to the overall 42 per cent. The distance from the probability at the middle level is larger to the far left value than to the far right level, indicating that the left values have the largest effects. For the other values on policy support, 51 per cent thought Norway should maintain current levels (.5) and seven per cent thought Norway should increase production (0).

Table 4.14: Predicted probabilities for political orientation on policy support

Policy support	Left=0	Right=1
0	.8 %	18.4 %
.5	18.5 %	69.2%
1	80.7 %	12.3 %

Table 4.14 shows the predicted probabilities for political orientation on all three values of policy support. The predicted probabilities for the far left value is furthest away from the general public for the middle value of policy (.5), wanting to produce as much oil as currently. For increase in oil production (0), the predicted probability for the far right value stands the most out from the general distribution. The largest variance of about 68 percentage points is found for the highest value (1) of less oil. The difference in predicted probabilities between the lowest and highest values on political orientation ranges from 17.6 to 68.4 percentage points, explaining a lot of the variance.

Table 4.15: Predicted probabilities for trust in scientists on policy support

Policy support	Trust in scientists=0	Trust in scientists=1
0	9.2 %	3.2 %
.5	66.9 %	47.6%
1	23.9 %	49.2 %

Table 4.15 shows the predicted probabilities for trust in scientists on all three values of policy support. This illustrates how the ranges of the predicted probabilities are smaller for trust in scientists than for political orientation on all three outcomes of policy support. The largest variance of about 25 percentage points is found for a decrease in oil production (1). The respondents who trust scientists have a predicted probability that lies closer to the statistics for all three values of policy support. Thus, respondents who do not trust scientists are the ones who explain the most of the variance. The difference in predicted probabilities between the lowest and highest values on trust in scientists ranges from 6 to 25.3 percentage points, explaining a good deal of the variance. However, it is clear that political orientation explains more of policy support, than does trust in scientists.

5 Discussion

In this chapter, I will discuss the results outlined in the former chapter and compare the effects on the different dependent variables. The hypotheses formed in chapter 2 will be answered based on the results. Lastly, I will draw conclusions to the thesis, and discuss impacts of my thesis through contributions and future research.

5.1 Comparing the results of the dependent variables

The aim of my thesis is not only to analyse the effects of the independent variables on climate change attitudes, but also to discuss and compare different aspects of climate change attitudes, which are measured as six dependent variables divided into two dimensions. Each dependent variable was measured in independent regression models in the previous chapter. Because the dependent variables differ in the number and composition of respondents, as well as in regards to outcomes, the six regression models can only be compared through the direction and significance of the effects of the independent variables, and not on model estimations. However, the predicted probabilities for the two main independent variables, trust in scientists and political orientation, on the dependent variables have been presented. Through the predicted probabilities, I am able to discuss which of the two independent variables explain the most of the variance on each dependent variable.

Table 5.1: Results of influences of trust in scientists and political orientation

	Trust in scientists	Political orientation
Trend acceptance	X[7]	
Attribution acceptance	X	**X**
Overall threat perception	X	**X**
Personal threat perception	X[8]	**X**
Efficacy belief	X	X
Policy support	X	**X**

Table 5.1 illustrates the main findings from the regression analyses.[9] The expectation, as illustrated in table 2.1 in the theoretical framework, was that trust in scientists would be the main explanatory factor in the first dimension consisting of trend, attribution, and overall threat. These dependent variables are closely connected to the scientific knowledge as expressed through the IPCC. On the other hand, I expected that political orientation would have the strongest explanatory power on the second dimension including personal threat, efficacy and policy. These dependent variables concern more political aspects of climate change. However, as shown in table 5.1, the results are not consistent with the expectations. There is no clear division between the first three variables and the last three variables in the table.

Trust in scientists had a significant positive effect on trend acceptance in a one-tailed test. Political orientation did not have a significant effect. Nor did the socioeconomic variables, except for income. This was however, not as surprising after presenting the descriptive statistics in chapter 3 which indicated that 92 per cent of the respondents believe that the climate is changing. Thus, there is little variance to be explained, and the few eight per cent who are uncertain or deny it, might be coincidental.

[7] Significant only in a one-tailed test

[8] Significant only in a one-tailed test

[9] To strengthen the robustness of the results, the ordinal variables have also been tested through ordinary least square (OLS) regression. The effects of the main independent variables, trust in scientists and political orientation, are consistent with the logistic regressions.

Both trust in scientists and political orientation had significant effects on attribution acceptance. Trust in scientists had a positive effect on accepting attribution, while political orientation towards the right had a negative effect. The Wald chi-square tests indicated that the political variables explained more than the trust variable. The predicted probabilities showed that both trust in scientists and political orientation explained a lot of the variance on attribution acceptance. However, political orientation explained the most of the two explanatory factors.

Also for overall threat perception, the two independent variables had significant effects. The effect of trust in scientists is in a positive direction, while the effect of political orientation is negative. The Wald tests indicated that the political block explained the most of the variation. The predicted probabilities confirmed this, and illustrated that political orientation explains a lot of the variance on overall threat perception, as well as more than trust in scientists does.

Political orientation had a significant negative effect on personal threat perception, while trust in scientists had a positive significant effect in a one-tailed test. The predicted probabilities illustrated the effects and showed that political orientation explains some of the variance on personal threat perception. However, the probabilities varied only about half the percentage points compared to political orientation on overall threat perception, which has the same outcomes.

Both political orientation and trust in scientists had significant effects on efficacy belief. Political orientation towards the right has a negative effect, while trust in scientists has a positive effect. The political block seems to explain the most according to the Wald test, but the difference in the chi-square test is small. The predicted probabilities show that both variables explain parts of the variance of efficacy belief. The percentage points between the predicted probabilities of the smallest and largest values are a little larger for trust in scientists than political orientation, but with such small margins that it is difficult to say which actually explain the most of the variance. What can be said though, is that both trust in scientists and political orientation explain some of the variance of efficacy belief.

For policy support, political orientation and trust in scientists both had significant effects. The effect of political orientation towards the right is negative, while trust in scientists has a

positive effect. The Wald tests indicated that the political block explains a lot more than the science block. Illustrating the predicted probabilities confirmed this. The variance between the predicted probabilities on the lowest and highest values was more than double for political orientation, compared to trust in scientists. Hence, political orientation and trust in scientists both have effects on policy support, but political orientation has the largest explanatory power.

There is no clear division between the two dimensions. Trust in scientists has significant positive effects on all six climate change attitudes, and political orientation has a significant negative effect on all, except for trend. Political orientation seems to have more explanatory power than trust in scientists on four of the dependent variables, distributed in both dimensions. It thus seems that climate change attitudes are not explained by dividing aspects into dimensions. This finding suggests that it is possible that other explanations than those I have analysed need to be considered. It seems as ideological predispositions run so deep that they even interfere in receiving information and accepting science. The nature of the problem of climate change may play a part here. Climate change is a collective problem, thus it is plausible that individualistic values are not compatible in dealing with the problem. Maybe individualists, who place themselves to the right on the political scale, tend to not accept climate change and not perceive it as serious, and thus do not think of doing anything about it, because it is not seen as a individual problem. Maybe collectivists are more likely to accept climate change and perceive it as a serious problem, and thus think of doing something about it, because they are more likely to view it as a collective problem.

In addition to political orientation, which had a significant effect on all dependent variables except for trend acceptance, FrP vote had a significant negative effect on attribution acceptance and personal threat perception. This indicates that even when controlling for individualistic attitudes and the placement to the right, voting for FrP has a negative effect on accepting anthropogenic climate change and believing that climate change is a serious personal threat.

Oil and gas employment had a significant negative effect on overall threat perception, efficacy belief and policy support. Being of older age only has a significant positive effect on policy. Being female has a significant positive effect on all climate change attitude variables

except from trend and overall threat. Having higher education has significant positive effects on all climate change attitude variables except from trend and efficacy. Income has a significant effect only on trend and personal threat. The direction varies with a negative effect on trend, but a positive effect on personal threat.

5.2 Answering the hypotheses

In this section I will answer each of the hypotheses in light of the results. The first hypotheses concern the two main independent variables and their general effect on climate change attitudes. The following hypotheses concern the division of the dependent variables into two dimensions and compare and compete the effects of the two independent variables.

H1: *Trust in scientists has a positive effect on climate change attitudes*

In the literature, trust in scientists has been argued to be an important explanation for risk perception and climate change acceptance (Kellstedt et al., 2008; Krosnick et al., 2006; Mayer et al., 2013; Poortinga & Pidgeon, 2003). Krosnick et al. (2006) argue that people who have minimal trust in scientists, the primary informants about climate change, are not persuaded by information provided by scientists, but instead derive their opinions simply from their personal experiences. Among people who have more trust in scientists, exposure to new information should increase belief in the existence of climate change. Thus, trust should play an important role when information about climate change is increasing and improving.

The results in this thesis support the assumption of the importance of trust in scientists on climate change attitudes to some degree. Trust in scientists had a significant positive effect on trend acceptance, attribution acceptance, overall threat perception, personal threat perception, efficacy belief and policy support. The results support the hypotheses H1: trust in scientists has a positive effect on climate change attitudes.

H2: *Political orientation towards the right has a negative effect on climate change attitudes*

Previous research has emphasized the importance of political orientation in forming climate change attitudes (Austgulen & Stø, 2013; Bohr, 2014; Corner, 2012; Dunlap & McCright,

2008; Hamilton, 2011; Kellstedt et al., 2008; Zia & Todd, 2010). According to Wood and Vedlitz (2007:556), "people process information about issues through a filter containing a range of variables relating to their predispositions" when they have limited knowledge of an issue and are exposed to ambiguous information. One of the important predisposed variables is their political orientation. The fact that people have become less concerned and more sceptical towards climate change while the scientific evidence on climate change becomes stronger, make researchers look to differences in worldview as an explanation of public opinion on climate change (Austgulen & Stø, 2013). The left-right dimension is a way to measure world view (Kellstedt et al., 2008). Individualistic values have been found to influence climate change opinion with more scepticism. According to Corner (2012), people with individualistic values dislike political interference in decision-making, and are more prone to be sceptical towards climate change. People with individualistic values typically place themselves to the right, while people who place themselves to the left have more collective values. Previous research has found that conservative respondents are more sceptical towards climate change than others (Dunlap & McCright, 2008; Eurobarometer, 2009; McCright & Dunlap, 2011a, 2011b; Whitmarsh, 2011; Zia & Todd, 2010). Thus, the expectation was that political orientation towards the right has a negative effect on climate change attitudes.

The results in this thesis support the assumption of the importance of political orientation. Political orientation had a significant effect on all dependent variables, except for trend acceptance. Hence, political orientation towards the right has a significant negative effect on attribution acceptance, overall threat perception, personal threat perception, efficacy belief, and policy support in Norway. There was no significant effect of trust in scientists on trend acceptance. However, the descriptive statistics showed that trend acceptance is very high in Norway, which means that there is little variance to be explained. Overall, the results support the hypotheses H2: political orientation towards the right has a positive effect on climate change attitudes.

H3: *Trust in scientists is more important for explaining the scientific related aspects of climate change attitudes, than political orientation*

Because scientific related aspects of climate change are more related to information and communication, trust in scientists should be more important in explaining climate change acceptance, than political orientation. The results of this thesis contradict this assumption. For both attribution acceptance and overall threat perception, political orientation explains more than trust in scientists does. Trust in scientists explains trend acceptance, while political orientation does not. However, the small variance of trend leads to small effects. It can be concluded that the first dimension is mostly explained by political orientation. The results do not support H3.

H4: *Political orientation is more important for explaining the political related aspects of climate change attitudes, than trust in scientists*

Because the political related aspects are more individually assessed and not grounded in science, political orientation should be more important in explaining political climate change attitude, than trust in scientists. The results of this analysis are consistent with this assumption. Political orientation explains more than trust in scientists for personal threat perception and policy support. However, the effect of political orientation and trust in scientists is about the same for efficacy belief. Thus efficacy belief stands out from the second dimension, but overall, political orientation explains the most. H4 is, at least partly, supported.

5.3 Conclusion

The aim of this thesis has been to explain climate change attitudes in Norway, and to analyse whether aspects of climate change can be divided into two dimensions, one science related and one political related. The assumption was that science related factors should explain science related attitudes and political factors should explain political related attitudes. The analysis has been conducted with data from the NCP through logistic regression.

This conclusion has two parts. First, I will summarize the most important findings on climate change attitudes in Norway, as well as give an answer to the general research question. Second, I will argue how my findings are important for the research of public opinion on climate change, before giving some suggestions for future research.

5.3.1 Dimensions of climate change attitudes

Trend acceptance in Norway is very high, with 92 per cent believing that the climate is changing, and the variance is thus difficult to explain. Attribution acceptance is also high, though not to the same degree as trend acceptance. A majority of Norwegians, 66 per cent, believe that climate change is caused mostly by human action. Overall threat perception in Norway is somewhat high, with 24 per cent perceiving climate change as a very serious threat overall, and 42 per cent as serious. In Norway, personal threat perception is lower than overall threat perception. Only five per cent perceive climate change as a very serious personal threat and 20 per cent believe climate change to be a serious personal threat. Only two per cent of Norwegians believe it is easy to do something to prevent harmful climate change, while 32 per cent believe it to be possible and completely realistic. When it comes to oil production, 42 per cent think Norway should produce less oil than the country is currently producing.

The literature has to a large extent discussed all aspects of climate change attitudes as if it were one large dimension or concept. In this thesis I have analysed six different aspects as individual dependent variables, as well as aiming to divide these aspects into two dimensions. Trend and attribution acceptance as well as overall threat have been analysed as a scientific related dimension, while personal threat perception, efficacy belief and policy support has been analysed as a political related dimension.

The expectation for the first dimension was that trust in scientists should have a significant effect on climate change acceptance, and that the effect should be stronger than that of political orientation. The results are not quite as expected. Trend acceptance is explained by trust in scientists. Attribution acceptance and overall threat perception are explained by both trust in scientists and political orientation, but mostly by political orientation.

The expectation for the second dimension was that political orientation should have a significant effect on climate change attitudes, and that the effect should be stronger than trust in scientists. The results are too some degree as expected. Personal threat is explained by trust in scientists, but mostly by political orientation. This is in accordance to the expected findings. Efficacy belief is explained by both political orientation and trust in scientists, but the effects cannot be ranked. Policy support is explained by both political orientation and trust in scientists, but mostly by political orientation. Thus, all three dependent variables in the

second dimension are explained by political orientation, and except for on efficacy belief, political orientation has the most explanatory power.

Trust in scientists had a significant positive effect on trend acceptance, attribution acceptance, overall threat perception, personal threat perception, efficacy belief, and policy support in Norway. Political orientation towards the right had a significant negative effect on attribution acceptance, overall threat perception, personal threat perception, efficacy belief, and policy support in Norway.

It is clear that trust in scientists and political orientation are important explanatory factors for different aspects of climate change attitudes in Norway. However, considering the general research question, I have not found a clear division between scientific related and political aspects of climate change. The results indicate that political orientation holds the largest explanatory power on both dimensions. These results are not as expected, and it is thus possible that other explanations than those I have analysed need to be considered.

5.3.2 Contributions and future research

The contribution of this thesis to public opinion on climate change has primarily been regarding conceptualization and division of climate change attitudes. Even though my results do not support the division of climate change attitudes into a scientific and a political dimension, it is an important step in organizing the vast issue of climate change. In addition, this division has shown how important political orientation is, in explaining various aspects of climate change attitudes.

This thesis has also contributed to the small field of research on public opinion on climate change in Norway. For instance, the descriptive results suggest that the focus should be shifted past trend to attribution acceptance, because the vast majority of Norwegians believe that the climate is changing. In addition to the importance of political orientation and trust in scientists in explaining climate change attitudes, this thesis has touched upon case specific explanatory factors such as oil and gas employment and FrP vote. For future research on Norwegian climate change attitudes, it should be interesting to analyse the effect of oil and

gas employment more thoroughly. It should also be applicable to do more research on the effect of voting for FrP, an attribution sceptic party.

The dependent variable measuring policy support is very specific and concerns a controversial and contested case-specific issue, regarding oil production. A possible future approach to build on this research could be to test support for different specific policy measures on climate change and compare the effects of explanatory factors to see whether the effects are policy specific or explain general support for action.

With time more data from the NCP will be available, and it would be interesting to do time-series and panel data analyses on the development and changes in climate change attitudes. It should also be possible to conduct a cross-country analysis, comparing climate change attitudes and explanations across Europe. There is some EU research, but Norway is for obvious reasons not included.

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