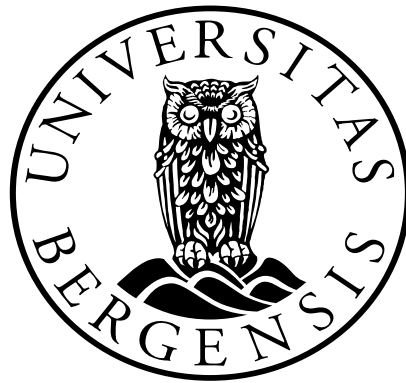


***Environmental Risks: Framing effects of Scope and  
Responsibility on Policy Support***

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## Abstract

The nature of global environmental risks (e.g. climate change) are often complex and thereby difficult to understand through human sensory reception. The perception of these risks will therefore often come from communications from experts and the public discourse. How people evaluate this communication, and how they act in associated decision-making processes are crucial because it leads to environmentally relevant behaviour. The present study examined the effect of framing (psychological distance and moral responsibility) of messages about environmental risks on environmentally relevant policy support. Using an experimental design, 183 participants were randomly assigned into one of four conditions in two fictitious environmental risk scenarios: a local risk with a focus on collective moral responsibility (N= 32), a global risk with a focus on collective moral responsibility (N = 53), a local risk with an individual focus on moral responsibility (N = 52), or a global risk with a focus on individual moral responsibility (N = 49). The results showed no effect of framing on policy support, but all the included types of policy supports were predictable from values (biospheric, altruistic and egoistic) and emotions (ethic related and consequence related). This indicates that framing of the type used in this experiment, do not affect people's moral considerations in relation to environmental risk related policies.

*Keywords:* environmental risk evaluation, morality, framing, psychological distance, responsibility

## Sammendrag

Globale miljørisikoer er ofte komplekse av natur, og følgelig vanskelige å forstå gjennom menneskelig persepsjon. Oppfatningen av denne type risiko vil derfor ofte komme fra kommunikasjon fra eksperter og den offentlige diskurs. Hvordan folk evaluerer denne kommunikasjonen, og hvordan de responderer i tilknyttede beslutningsprosesser er avgjørende fordi det fører til ulike typer miljøatferd. Dette studiet undersøkte effekten av innramming (psykologisk avstand og moralsk ansvar) av budskap om miljørisiko på miljøpolitisk støtte. Gjennom å bruke et eksperimentelt design, ble 183 deltakere tilfeldig tildelt én av fire scenario i to ulike fiktive miljørisikoscenarier: en lokal risiko med fokus på kollektivt moralsk ansvar (N = 32), en global risiko med fokus på kollektivt moralsk ansvar (N = 53), en lokal risiko med et individuelt fokus på moralsk ansvar (N = 52), eller en global risiko med fokus på individuelt moralsk ansvar (N = 49). Resultatene viste ingen innvirkning av innramming på politisk støtte, men alle inkluderte typer miljøpolitisk støtte var mulig å predikere gjennom verdier (biosfæriske, altruistiske og egoistiske) og emosjoner (etisk relaterte og konsekvens relaterte). Dette indikerer at innramming av typen som ble brukt i dette eksperimentet, ikke påvirker folks moralske hensyn i forhold til ulike typer miljøpolitisk støtte.

*Nøkkelord:* miljørisiko evaluering, moralitet, innramming, psykologisk distanse, ansvarlighet

## Acknowledgement

Research on the psychological aspects of environmental global change, has been my main interest throughout my Master`s degree. I am convinced that the contribution from my field of psychological science is very important in the transformation to a low carbon society. Psychological research offers frames for understanding the human mind in ways that will make the transition faster and easier. To get the chance to immerse in the field of cognitive psychology with a heavy element of applied value, was very rewarding.

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Bergen, 5<sup>th</sup> of December 2017

*Annika Rødeseike*

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### Introduction

Global environmental problems and climate change are some of the biggest threats humanity is facing. Human impact on the natural environment, such as increased CO<sup>2</sup>-emissions, challenges our livelihoods (IPCC, 2014). Due to an increase in average temperatures, sea level rise and extreme drought, consequences for both the ecology, economy and public health will be severe (National Research Council, 2010). In the Paris agreement, 175 countries have agreed to aim at keeping the global temperature rise this century well below 2 degrees Celsius (above pre-industrial levels), preferably further to 1,5 degrees Celsius (Morgan, Dagnet & Tirpak, 2014). During the last two decades, possible solutions to better mitigate and adapt to environmental risks, have been heavily debated in the public discourse, as well as in the social and natural sciences.

The need for a transition from fossil energy dependence is clearly present, considering that it is the biggest source of CO<sup>2</sup> emissions on earth today (Metz, Davidson, De Coninck, Loos, & Meyer, 2005). Policies that are needed to reach the goals of the Paris agreement and change the energy system are, in addition to research and innovation, dependent on public support and engagement. In the context of policy support, framing (filters) of communications concerning environmental risks is an unavoidable reality, as our evaluations and decisions never are formed or drawn in a vacuum (Nisbet, 2009). A central question when communicating environmental risks is: who is causing the risks and who will suffer the consequences? Within psychology there is literature arguing that people's moral considerations, as well as emotional reactions and personal values, are very important in the evaluation of responsibility in climate and environmental contexts (Stern, Dietz, & Kalof, 1993; Groot & Steg, 2007). In addition, there is evidence showing that the complex structure of environmental risk may prevent people from detecting the causal structure, and thereby not

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evaluate environmental risks as a moral imperative. Thus, it is reasonable to look closer at the psychology behind human perception, evaluation and behaviour connected to environmental risk. Exploring the communicational triggers for specific policy support could in turn contribute to better the communication of environmental issues.

Research shows that despite an increasing amount of evidence indicating increased environmental risk caused by anthropogenic environmental changes over the last decades, the overall public concern and perceived importance of these issues have in many countries declined (Pidgeon, 2012). This is particularly the case in wealthy western countries (Kohut, 2013). In the context of climate change, some call this the ‘climate paradox’ (Stoknes, 2014; Nordgaard, 2011), and this could be considered an example of moral failure. The discrepancy between the increased scientific knowledge and decreased public concern has been investigated through a large amount of psychological literature (Swim et al., 2011; Sterman, 2008; Weber, 2006; Doherty & Cayton, 2011). Some would claim that environmental risks, like climate change, can be challenging for our moral judgement systems to fully understand and engage in. As a result, we might evaluate environmental risks morally different than for example terror, fraud, or forced marriage (Markowitz & Shariff, 2012). Böhm and Pfister (2000; 2005; 2017) proposes a model that seeks to investigate how people evaluate environmental risks. The model includes both moral, cognitive and emotional components, and forms the basis of a mental model approach. This model is helpful when trying to understand why people perceive and evaluate environmental risks the way they do, because it looks at causal evaluation with a step-by-step approach.

Two aspects that have been proposed as potential barriers for the moral activation when evaluating environmental risks is the lack of communicated risk proximity and a clear moral responsibility (Markowitz & Shariff, 2012; Markowitz, 2012b; Gardiner 2006; Jamieson, 2007). This thesis will use experimental methods to explore participant`s risk

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perception and policy evaluation when exposed to different framings of distance and moral responsibility in environmental risks scenarios. The prediction is that it is possible to trigger people's moral thinking in such a way that it is reflected in specific political support. In addition to this, emotional reactions and personal values will be examined as possible contributing factors in the evaluation process.

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### **Theoretical and Empirical Foundations**

This section will give an overview of the existing literature that is relevant for this thesis. It will start by looking at why morality is central to environmental risk perception and evaluation. This is followed by an overview of environmental risk characteristics, which will clarify the psychological complexity of environmental risks and how this relates to distance and morality. Further, the process of environmental risk perception and evaluation will be explored through the mental model approach. Finally, this is followed by an introduction to human values, and its importance in understanding moral responsibility in conjunction with risk perception and evaluation. In this thesis, climate and environmental issues will be used without major differentiation. Most of the literature about the psychological aspects of climate change is applicable when talking about environmental risks in general.

#### **Morality.**

Haidt (2001) states that morality is the driver to human (social) behaviour, and that the way we interpret and evaluate potential moral issues in conjunction with environmental risks are crucial (Haidt, 2001; Sjöberg, 2000; Feinberg & Willer, 2013; Böhm & Pfister, 2000, 2005). For several moral philosophers, environmental issues, like climate change, are to be considered a fundamentally moral issue (Jamieson, 2010; Singer, 2006; Gardiner 2006). This is because of the negative outcomes climate change will have for humans and animals, and because the earth's atmosphere, that provides us with 'life sustaining services' and therefore considered a public good, has limited resources (Singer, 2006). In addition to this, Jamieson (2010) highlights the moral aspect of injustice, stating that the rich take more of the global public goods than the poor, and harm the poor additionally by contributing to global change (which in the main will affect the poorest parts of the world). Haidt (2001) supports the assumption that environmental issues are a morally laden problem, by emphasizing how

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moral intuitions and emotions become intertwined when attitudes are anchored in moral thinking. This is because humans seem to have an innate disposition to care deeply about right and wrong, and thereby about other people's intentions. The visceral responses that often occur when faced with attitudes that challenge one's own view in conjunction with moral judgements, further supports this (Damasio, as cited in Forgas, 2012; Greene & Haidt, 2002).

It has been shown that morality influences political attitudes (Emler, 2003), but also people's attitudes and behaviour connected to climate change (Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Markowitz, 2012b). Studies that empirically combine these assumptions find that individuals that consider the ethical implications in environmental risks show greater support for pro-environmental policies (Shwom, Bidwell, Dan, & Dietz, 2010; Skitka, 2010, Markowitz, 2010a). There is also evidence from neuropsychological studies using FMRI showing that moral judgements correlate with different patterns of neural activity in emotionally related brain areas and therefore to the characteristics of the situation that people evaluate (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). Böhm and Pfister (2001) suggests that evaluation of risks that includes a consideration of potential harm to others, is highly relevant when talking about cognitive evaluation of environmental risks. These judgements clearly involve subsequent emotional reactions, which is something Böhm and Pfister point out as a very important factor in their work connected to environmental risk evaluation (Böhm & Pfister, 2001; Böhm 2005).

From the above findings, I derive that there seems to be a connection between the perception of climate change as caused by humans, and corresponding ethical considerations. The mapping of what or who is causing a risk, and what or who suffers the consequences, that some researchers call 'the causal structure' (Böhm & Pfister, 2001; Bostrom, 2017), appears somewhat to be a key factor for human ethical evaluation for environmental risks. However, it is important to have in mind that environmental risks are highly complex by nature, among

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other things because of its social dilemma structure and aggregated causation (Böhm and Pfister, 2000).

### **Environmental risk characteristics.**

In the following section, I will describe the difference between a risk and a perceived risk, followed by some selected characteristics of environmental risks. The highlighted characteristics are relevant for this thesis, because they are empirically shown to affect the perception and evaluation of moral responsibility of environmental risks. The term *risk* is traditionally used to describe an event, situation or activity that involves (a) a degree of loss (of something humans value) and (b) a degree of uncertainty of an outcome (Slovic, 1997). *Risk perception*, on the other hand, is the subjective evaluation of risk, which involves a personal assessment of the severity and characteristics of a risk. Supporting evidence shows that while risk is related to beneficial outcomes (e.g. financial decisions) in the world, in people`s minds and judgements, a risk is related to negative outcomes (e.g. low risk is associated with high benefits and vice versa) (Slovic & Peters, 2006). Research within the field of cognitive psychology also shows that risk perception is influenced by heuristics and biases, like the affect heuristic (Zajonc, 1980). This means that people not only judge a risk based on what they think about it, but also how they feel about it (Finucane, Alhakami, Slovic, & Johnson, 2000). These finding show that the term risk often used by laypeople as something dangerous and harmful, largely is due to social factors (such as social norms), the media (Böhm & Pfister, 2008), but also emotional reactions (Slovic & Peters, 2006).

According to the field of risk perception, it seems as if people judge problems that they perceive to possess an immediate effect on their everyday life, as more severe than for long-term problems that happen far away (Koger & Winter, 2011). Additionally, a study by Böhm and Pfister (2001) showed that lay people associate global environmental risks with

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negative consequences (loss) for humans, which also was evaluated as worse than negative consequences for nature (Böhm & Pfister, 2005). To get a better understanding of why these judgements occur, one could look closer at the structure of environmental risks.

Environmental risks tend to be complex by nature, and not easily comparable with other risks. A subject of interest for risk researchers within psychology, has been the *scope* of environmental risks (Pawlik, 1991; Klöckner, 2011; Koger & Winter, 2011). Climate change is an example of an environmental risk with a large scope, and because of the extraordinary character and complexity, people lack experience in dealing with it (Nordgaard, 2011). As a result, people may have the same “numbing” experience of dealing with climate change in the same way as is described about nuclear power: “being haunted by something we cannot see or even imagine” (Lifton, 1982). The discrepancy between personal resources (both emotional and cognitive) and the scope of this risk, is large and hard for people to deal with. This may lead to emotional reactions like the feeling of hopelessness or helplessness, or even anger and fear (Markowitz and Sheriff, 2012). This very same mechanism can also be used to explain why some people are in denial of environmental risks like climate change (Nordgaard, 2011). Because of the scope and complexity, environmental risks may provoke a *self-defensive bias* (Moser, 2010). This bias could be due to the public discourse that tends to tell people that their consumption and way of living is what is causing environmental damage, and may further provoke the feeling of guilt (or other negative emotions). As a consequence, this might lead to non-ameliorative reactions like the focus of costs of mitigation (Markowitz & Shariff, 2012; Doherty & Cayton, 2011). In fact, recent findings suggest that those most responsible for a great share of the harmful global effects are the people that would actively try to avoid feeling responsible for causing climate change. They do this in part by blaming others for their contributions and inaction to the problem (Stoll-Kleemann, O’Riordan, & Jaeger, 2001; Nordgaard, 2011; Markowitz & Shariff, 2012). This is problematic because it might hinder



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pro-environmental action. Research focusing on scope and the defensive bias response are relevant in the context of the environment and morality, as it contributes to the scientific understanding of both the climate paradox, rejection of climate change, and non-environmentally friendly actions (e.g. increased personal consumption).

Another feature characterizing environmental risks is the *social dilemma structure* (Vlek, 1996). A social dilemma structure, entails that while individual members of a group may have an incentive to follow an immediate personal interest (e.g. drive a car), it might not be beneficial for the group as a whole (humanity) in the long run (e.g. increased CO<sup>2</sup> emissions resulting in extreme weather). At the same time, if all cooperate, then all will benefit (Dawes and Messick, 2000). Based on the social dilemma structure, an environmental risk will, in some way, require a solution that does not necessarily satisfy the individual (e.g. stop driving a car), but that would be best to do based on ethical considerations (Böhm & Pfister, 2000). This idea also indicates that social belongingness is central in the context of risk perception, as in being close to or far away from where the environmental risk exhibits its consequences.

Even though climate change is the direct result of goal-directed behaviour (because nearly all activities that emit greenhouse gases are due to consumption or production of goods and services requested by humans), studies show that people often perceive these actions as unintentional (Markowitz & Shariff, 2012). This is possibly because (1) it is hard to detect a single agent (or even several) who may be responsible for the risky development and (2) people don't judge others to hold a lifestyle that causes harm intentionally (Pawlik, 1991; Markowitz & Shariff, 2012). Since unintentionally caused harms are judged less harshly than intentional ones, this might weaken the moral judgement of these types of risks (Markowitz & Shariff, 2012; Guglielmo, Monroe, & Malle, 2009). These mechanisms have been explained on the basis of that environmental risks are often a result of the aggregated actions of many

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people (Böhm & Pfister, 2001). The numbing and non-engaging notion of not knowing who is responsible for pollution or contamination can be prevented by clarifying who has done what and with what consequences.

Another feature of environmental risks, is *psychological distance*. A recognizable argument is that many people express a sense of distance to cause and/or consequences in connection with environmental risks (Spence, Poortinga, & Pidgeon, 2012). According to the Construal Level Theory (CLT), developed by Liberman and Trope (2008), there are four types of psychological distance: a geographical distance to the problem, a social distance (hard to culturally identifying with the people who suffer the consequences, because they often live far away) and a temporal distance (the long time-horizons, e.g. future temperature rise that will affect future generations). The CLT proposes that psychological distance is mentally represented in people`s minds in a way that is directly linked with the psychological distance to an object or event. Distant events or objects are mentally represented with abstract, decontextualized, high-level construals, while proximal events or objects are represented with low-level, concrete, and detailed construals. Furthermore, the theory imposes that the psychologically proximal and distant objects (or events) are represented in the similar mental space in people`s minds. This means that because each dimension of distance is interrelated, impact on one aspect of distance will influence the other (Liberman and Trope, 2008). Experimental studies show that when you ask people to focus on stimuli that is congruent (e.g. temporal uncertainty) with psychological distance (e.g. geographical distance), this will facilitate the processing of information given about the psychologically distant stimuli because they are cognitively associated (Bar-Anan, Liberman, Trope, & Algom, 2007). The decontextualized representation of psychological distance also influences the ability of performing abstraction tasks (Förster, Friedman, & Liberman, 2004), in the same way that the focus on psychological proximity improves the performance of tasks that requires focus on

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specific details (Wakslak, Trope, Liberman, & Alony, 2006).

For geographical distance, environmental risk studies have found that by highlighting a local focus to an environmental risk, emotional and cognitive engagement will arise (Lorenzoni & Pidgeon, 2006). This is explained as being due to the increased experience of salience (Lorenzoni et al., 2007). Research also shows that people who experience phenomena (e.g. floods) that they attribute to climate change, show increased perception of personal and local risk from climate change, as well as higher levels of concern and worry (Reser, Bradley, Glendon, Elul, & Callaghan, 2012; Akerlof, Maibach, Fitzgerald, Ceden, & Neuman, 2013)

Based on the presented literature, I draw the assumptions that there are characteristics about environmental risks that are important to consider when trying to understand people's emotional reactions, evaluations, and behaviours in relation to them. I interpret two components as being of special importance: (1) perceived risk severity (what is at stake), and (2) the ethicality (who is responsible), which is supported by cognitive risk researchers like Böhm and Pfister (2001). In conjunction with the literature on psychological distance, I see a need for communicating environmental risks at a more local level to reduce the perception of scope (and thereby the social distance), and thereby increase a sense of severity and urgency. This will in turn promote moral considerations when evaluating environmental risks. My conclusion further indicates that the manipulation and framing of these components might be crucial.

### **Environmental risk evaluation.**

To better understand the process of perception and evaluation of global environmental risks, Böhm and Pfister (2000; 2005) suggests a mental model approach. This type of approach is very helpful when looking at risk evaluation and moral responsibility, because it tells us what people see as cause and effect (which lays the foundation for moral judgements)

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and could potentially determine people`s action tendencies. This approach is also a useful tool when looking for framing effects in environmental risk evaluation, because it provides a framework for looking at causal evaluation with a step-by-step approach.

The model from Böhm and Pfister (2000; 2005) includes both moral, cognitive and emotional components. As Figure 1 shows, the model assumes that the starting point of an environmental risk, is a mental representation (*mental model*) of the risk situation. A mental model is a representation or a set of causal beliefs which occurs when people perceive the surrounding world (Bostrom, 2017). A person`s mental model can influence how the person learns, reacts to information, defines a problem, and makes decisions (Gentner & Stevens, 2014). Previous research on mental models and environmental risk perception suggests that the way people perceive and understand things like the climate system, shapes their beliefs and evaluations of environmental risk (Böhm & Pfister, 2001; Morgan, 2002; Sterman, 2008; Bostrom, 2017). The relationship between smoking and cancer has been used as an analogy to the phenomena of mental models (Newell & Pitman, 2010). Many would probably agree that it would be hard to explain the relationship with all the medical technical steps. At the same time, the fragmented knowledge about the relationship is sufficient to represent the risk in our minds. This is similar to the fragmented knowledge about the relationship between the increasing atmospheric CO<sup>2</sup> leading to global temperature rise, and the threat this temperature rise will impose.

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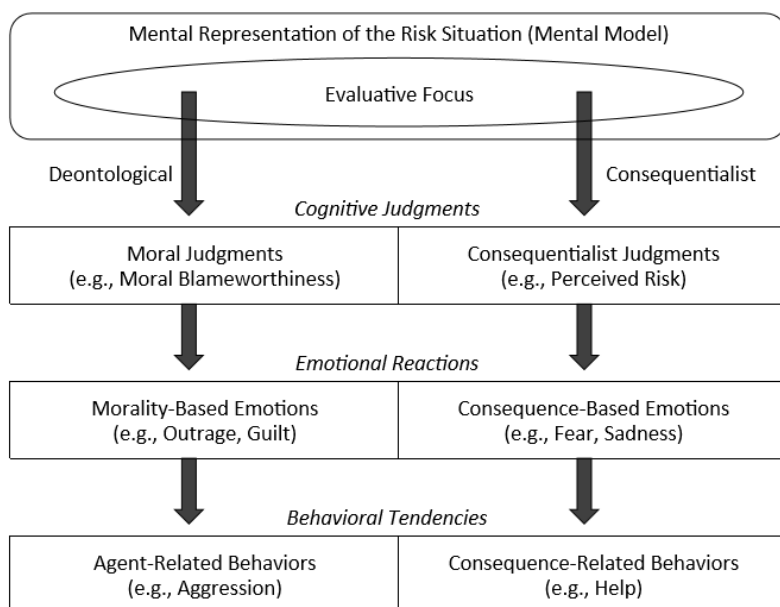


Fig. 1. Dual-Process model of risk evaluation (Böhm & Pfister, 2017).

Norman (as cited in Bostrom, 2017) proposes four elements of mental model research that, put in the context of environmental risk perception, looks like this: (1) the target system (in this context that would be an environmental risk like climate change), (2) a conceptual model of the target system (a representation of the system of different concepts that are involved in the process of climate change), (3) the user's mental model of this target system, and the (4) the researcher's conceptualization of the user's mental model. This framework shows how the mental models of lay people are subject to interpretation from the researcher, due to their abstract nature. Yet, an international study focusing on mental models showed that perceived risk and causality of climate change corresponds with the support of different policy alternatives (Bostrom et.al., 2012). For example, people who think that carbon emissions are the cause of environmental harm, tend to support policies that focus on reducing carbon emissions, because they think of this as the most effective policy. Despite the researcher's defining role, this study shows the importance of studying mental models because it proves that people support what they think is efficient by relying on a perceived causal

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structure of an environmental risk. This is very important to consider in a climate policy context because it shows that even though climate change is overall a perceived risk, it is the causal thinking that guides the support for the various policies.

Through their model, Böhm and Pfister (2000; 2005) argue that when forming a mental representation of a risk, there are two evaluative aspects that are relevant: *deontological evaluations* and *consequentialist evaluations*. These two aspects involve specific cognitive evaluations, emotions, and different types of action tendencies (Böhm & Pfister, 2001) (See Fig.1). The consequentialist way of evaluation refers to consequences of potential loss, where the seriousness and uncertain negative consequences that might occur, will be weighed. Note that this type of focus also includes the evaluation of experienced outcomes, that refers to the ongoing processes of pollution and destruction, and negative as well as positive consequences (Böhm, 2003). The deontological way of evaluation, on the other hand, is about the ethical considerations of the actions themselves being more important than the consequences of actions. This mode of evaluation focuses more upon the potential violation of moral principles, and the focus therefore lies on the actors and the actions. This is related to what Baron and Spranca (1997) would call protected values. Their research indicates that people evaluate some actions to violate values that can't be traded off. For example, people will not let natural resources be destroyed or let people die for monetary gains. This is considered taboo and will elicit emotions like anger and rage (Böhm & Pfister, 2009).

As Figure 1 also shows, the model also includes an emotional aspect. Frijda (1986) claims that emotions have a guiding effect on action, and different psychological theorists have tried to clarify the role of affect in environmental risk perception (Nerb & Spada, 2001; Böhm & Pfister, 2000; Swim et al., 2011). It is an old assumption that emotions have a negative impact on decisions (Baumeister, Vohs, & Tice, 2012), and even though there is

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conflicting evidence, emotions seem nevertheless to be helpful for decision making (e.g. Damasio, as cited in Forgas, 2012). Some would claim that it is separate systems that work independently (Zajonc, 1984), while others would say that emotions include some sort of cognitive appraisal (Lazarus, 1982), which is the assumption of the presented model of Böhm and Pfister (2000; 2005). Either way, because a perceived risk is associated with negative emotional reactions, the valence of emotional stimuli is important for how we further experience and evaluate risk (Finucane, Alhakami, Slovic, & Johnson, 2000). This was shown in a study where people were induced with negative emotions, whereupon the overall experience of risk would increase (Johnson & Tversky, 1983). In addition, Meijnders, Midden, and Wilke (2001) showed that by inducing fear through a short emotional film about climate change, participants were more willing to lower their energy consumption.

Nevertheless, Böhm & Pfister`s (2008) research supports a much broader and multifunctional view on emotions. As outlined in their model, different emotions with the same valence can have different functions in a decision-making process. This highlights the importance of nuance when looking for effects of (or on) emotions. Böhm and Pfister`s model (2000; 2005) implies that cognitions precede different emotional responses, and that these emotions in turn will affect the person`s behavioural tendencies in an environmental risk context. In a study from 2003, Böhm analysed the emotional reactions to different environmental risks, using the model by Böhm and Pfister (2000; 2005). Participants were presented with environmental risks scenarios, which afterwards had to indicate how strongly they experienced different emotions. The result confirmed the model`s distinction between the two different types of emotions: *ethic-based* and *consequence-based*. The first type, ethic-based emotions, includes emotions like disgust, anger, disappointment, guilt or shame. These emotions are motivated seemingly by the participants judgement that there have been violations of ethical principles. The consequence-based emotions are motivated by evaluating

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(past or future) consequences. Supporting evidence show that anger and fear are both negative emotions, but while fear tends to result in helping behaviour, anger will cause a more aggression related behaviour (Böhm & Pfister 2000; Nerb & Spada, 2001).

When considering the role of emotions in an environmental risk context, Böhm (2003) further differentiate between two types of the suggested emotional modes: (1) prospective (anticipated), (2) retrospective (experienced) consequence-based emotions, (3) other- and (4) self-related ethics-based emotions. Her research shows that people seem to experience more of emotions like fear and worry when they think about things that might happen (1), and emotions like sadness or sympathy when evaluating events that already had taken place (2). The latter distinctions (3, 4) indicate that based on who is responsible for the risk (the individual or the collective), people experience different emotions. If one feels self-blame, emotions like shame and guilt arise, while emotions like anger and outrage occur if somebody else seems guilty of causing the risk. Based on an emotion intensity rating, results from the study by Böhm (2003), showed that prospective consequence-based emotions were rated to be the strongest, while ethic-based self-directed emotions were the weakest. Another study, by Harth, Leach, and Kessler (2013) also show that the feeling of anger and guilt would be elicited when participants is being told that they had the personal responsibility for environmental damage. The feeling of guilt would further predict behavioural intentions that concern the repairing of environmental damage, whereas anger would predict intentions involved around punishment.

As Figure 1 shows, the way in which the evaluative focus triggers both emotional reactions and actions tendencies is consistent with the mode of the evaluation. A deontological evaluation (e.g. oil spill) will trigger moral judgements (e.g. a company is to blame), that also trigger morality-oriented emotions (e.g. outrage). This may result in agent related behaviour (e.g. vote for a party who will punish companies who pollute). Bostrom



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(2017) further supports the assumption that causality is linked to the presentation of characteristics of risks, by referring to a study by McDaniels, Axelrod, and Slovic (1996). The results showed that deforestation was evaluated as more risky than global warming, and that energy production was viewed as less risky than both global warming and energy production. This shows that separate human activities are perceived as less risky than the actual consequences (pollution and emissions). This was further supported through a study by Böhm and Pfister (2005) that investigated the foundations for their dual-process model. By using a distinction between consequences for humans at the one hand, and consequences for the natural environment on the other hand, they found that risk types that involve negative consequences for humans were perceived riskier than risk types that affect only nature.

What I specifically draw from review on emotion is that the emotional reactions in some risk literature might lack nuance (Böhm, 2003), and therefore needs to be investigated more thoroughly by using different emotions of the same valence. That is because the different emotions are considered important factors in risk judgement and behaviour, that again are closely connected to moral consideration and behaviour (Böhm, 2003; Nerb & Spada, 2001; Harth, Leach, & Kessler, 2013). The assumption that there are two emotion types (consequence based and ethic based emotions) that show different types of action tendencies, emphasizes this connection even further (Böhm & Pfister, 2000). Another conclusion would be that the specific emotions that could play a motivating role in getting people to think of environmental risk as something that is threatening to themselves and that they are responsible for causing (e.g. guilt), might seem hard to activate (Böhm, 2003). I would argue that this is connected to the perceived direction of the relationship between environmental risk and certain emotions. This perception seems to depend on the person's knowledge about the risk. In addition to this, the distinction of consequence based and ethic based emotions probably would play an important role in environmental risk evaluation when

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exposed to certain framings, as previously shown by Harth, Leach, and Kessler (2013). I interpret the above findings to be closely related to specific contextual factors, including framing, which is possible to manipulate for communicational purposes. An interesting question to ask when considering morality, framing effects, and the structure of mental models, is whether people will respond to environmental risks differently when risk is framed as something caused by one as an individual or the world community. It is plausible that manipulated information about agency will result in different outcome measures, when the risk is being presented with a clear causal structure indicating a detectable moral responsibility.

### **Responsibility.**

In the further search for risk research that can explain what triggers the feeling of personal moral responsibility when evaluating an environmental risk, frameworks within the value theory domain offers useful input. Personal values are shown to be indirectly related to pro-environmental behaviour (Stern, 2000). Schwartz defines a value as “a desirable trans-situational goal varying in importance, which serves as a guiding principle in the life of a person or other social entity” (1992, p. 21). Schwartz’s conceptualization of values is a good way at looking at broad subdivisions of different values connected to pro-environmental attitudes and actions. His 56 universal values can be placed into a two-dimensional space, where the values that are close to each other in the circumplex are compatible. The two dimensions are: self-transcendence (which includes altruism, forgiveness, loyalty) vs. self-enhancement (which includes power, ambition and hedonism), and openness to change (which includes self-direction and stimulation) vs. conservation (which includes security, conformity and tradition).

Despite the strong position that Schwartz has in conceptualizing human values in

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social psychology (Corner, Marowitz, & Pidgeon, 2014), there are other researchers that have developed scales which have proven useful in an environmental risk context. There are three types of values that seem to play an important role when looking for environment relevant behaviour tendencies (Stern, Dietz & Kalof, 1993; De Groot & Steg, 2007): *altruistic values*, *biospheric values* and *egoistic values*. Based on Schwartz's values system, the values reflect the distinction between self-transcendence and self-enhancement dimension. The altruistic and biospheric values are represented in the self-transcendence dimension (e.g. universalism) and the egoistic values in the self-enhancement dimension (e.g. power). Even though altruistic and biospheric values, unsurprisingly enough, are highly correlated, the difference between altruistic values and biospheric values is that the first reflects a special concern for human welfare, while the latter one reflects a concern for the nature and environment. Egoistic values in this context reflects the self-interest connected to environmental protection. A well-known example here is the NIMBY ("not in my backyard") statement, where environmental concern increases when threat to one self or one's family is recognized (Stern, Dietz, & Kalof, 1993). Several studies support the use of and the distinction between altruistic values, biospheric values, and egoistic values by showing that pro-environmental attitudes and actions often are higher for people that show higher scores on self-transcendence oriented values, compared to self-enhancement oriented values (Stern & Dietz, 1994; Nordlund & Garvill, 2002; Bardi & Schwartz, 2003).

An example of a theory that explores this relationship between these values types and environmental behaviour, is the Value-Belief-Norm Theory (VBN), which is an extension of The Norm Activation Theory (NAT) by Schwartz (1977). Put simply, NAT proposes that pro-environmental actions follow from the activation of personal norms because it reflects the feeling of moral obligation to act in a certain way. This activation is due to the following situational factors: (1) the awareness of the problem (what are the consequences of not

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acting), (2) the feeling of responsibility as a result of being aware of the negative consequences, (3) the identification of actions to reduce environmental problems and (4) one's ability to contribute to hinder the negative consequences. The VBN theory (Stern et al. 1999; Stern, 2000) serves as an extension to the NAT theory, by assuming that these situational factors additionally are dependent on personal values, which include biospheric values, altruistic values and egoistic values. This means that these values are activated in people who believe that environmental issues pose a threat to the biosphere, to people and species, and one self. Thus, the theory implies that the strength of this activation will determine further assessment of moral responsibility concerning pro-environmental actions. Empirical evidence shows that every variable in the VBN model is significantly related to the next variable in the causal chain. Only the biospheric values were directly related to the sense of obligation to act pro-environmental, when other variables were controlled for. This implies that biospheric values have great explanatory power in the context of environmental risk evaluation. Supporting evidence for the VBN theory comes from studies that have focused on a variety of general pro-environmental actions (e.g. Nordlund & Garvill, 2002), and some more specific, like explaining environmental citizenship (Stern, Dietz, Abel, Guagnano, & Kalof, 1999), acceptability of various energy policies influencing households (Steg, Dreijerink, & Abrahamse, 2005), willingness to reduce car use (Nordlund & Garvill, 2003), and policy acceptability (Eriksson, Garvill & Nordlund, 2006, 2008).

Further studies show that people may react negatively when asked to make choices that includes moral considerations, such as "putting a price" on nature (Tetlock, 2003). This is most likely due to the individual evaluation that some values are more important than others. Our values seem to be organized in a system where competing choices are based on the most important values (Keeney & Raiffa, 1976). Both biospheric values and altruistic values tend to be positively related to pro-environmental behaviour, but when people are forced to choose

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between the two, the difference between altruistically and biospherically oriented people becomes apparent (De Groot & Steg, 2008; Stern, 2000). As mentioned when describing the VBN theory, different situations can activate specific values when the situation is relevant for a value that is central to our self-concept. This means that situations can trigger specific values by, for instance, enhancing one's self focus (ask people which values matters the most) or to provide cognitive support to activate the value system (ask people to provide a reason for their values) (Verplanken & Holland, 2002).

From the above literature preview, I draw the assumption that the VBN theory offers a good contribution to the explanation on where morality is coming from, and how one could explain the process of individual evaluation on environmental risk. As shown in the VBN theory (Stern et al. 1999; Stern, 2000), the individual's moral consideration would originate from his/her personal value system. Since the activation of biospheric, altruistic, and egoistic values are dependent on situational triggers that are linked to a person's self-concept and supported by cognitive reasons (e.g. damage to the environment or people, or saving money by using switching to solar power), these triggers are a subject of interest. Despite this, the activation of values might overrun the effect of framing or the perceived causal structure of a risk (situational factors), and show of as higher levels of ethic related policy support. This would especially be the case for biospheric values (Stern, 2000; De Groot & Steg, 2008). Such findings would support the assumption that personal values are crucial in terms of the activation of moral responsibility in climate and environmental contexts (Groot and Steg, 2007).

### **Framing.**

Communication is powerful in the way that it can alter the impact on a recipient's decisions, depending on how the message is framed. Hulme (2009) argues that it is impossible

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to present information about climate change without some sort of context, thus making framing paramount. Framing, as a concept or area of research, concerns several social science disciplines. Frames are “interpretive storylines that set a specific train of thought in motion, communicating why an issue might be a problem, who or what might be responsible for it, and what should be done about it” (Nisbet, 2009, pp.15). Framing is often used with the aim to “trim” information in a way that gives greater weight to certain aspects and elements than others, but this is not to be mistaken with telling a lie, or leaving out important information (Nisbet, 2009).

In the context of climate change, there are many types of empirically different frames that are being used (for review see Levin, Schneider, & Gaeth, 1998). Examples of framing could be *outcome framing* (based on the prospect theory by Kahneman and Tversky, 1979) or *attribute framing*. The last one implies focusing on a specific aspect, which is commonly used in political debates. One example of this is how Republican supporters often emphasize the aspect of uncertainty when they talk about climate change (Nisbet & Mooney, 2009).

Communicators have been using frames like national security, health, and economic wellbeing to reach the public awareness about environmental risks, and more recently, as a moral issue (Moser, 2010; Wardekker, Petersen, & Van Der Sluijs, 2009). Al Gore`s movie ‘An inconvenient truth’ or a campaign called ‘What Would Jesus Drive?’ (The Guardian, 2002) are both examples on framings that aim at motivating people to think about the moral aspects of global environmental change. This exemplifies how frames link two concepts (e.g. morality and religion) so that people, after exposure to this linkage, accepts this connection and use this as a basis for further evaluations and decisions. At the same time, Nisbet (2009) stresses that this type of specific frame will be ineffective if it`s not relevant for people`s pre-existing interpretations. In connection to the example of morality and religion, this probably would not be relevant for people who weren`t religious.

*The framing of location and responsibility in environmental risks.* As previously mentioned, people see climate change as a risk that is distant and that have geographically and temporally distant impacts for people and places (Leizerowitz, 2005; Räthzel & Uzzell, 2009). Swim et al. (2011) argue that the exposure most people tend to have to climate change has been very much impersonal, which means that people only have virtual representation through movies, documentaries and news media of what may seem like a “remote” area of the world. Spence and Pidgeon (2010) use the attribute of “distance” as means to increase personal relevance, by arguing that risk communicating should focus on making environmental risk “closer”. This includes framing climate change as a proximal and relevant “here-and-now” event. When a local focus is highlighted, both an emotional and cognitive engagement will arise due to the increased experience of salience (Lorenzoni & Pidgeon, 2006; Lorenzoni et al., 2007). Rayner and Malone (1997) supports this by claiming that by highlighting local impacts of climate change, actions to mitigate it becomes more tangible. The same way in which location of a risk is shown to affect risk evaluations, the different framings of responsibility are also relevant. The mental model approach by Böhm and Pfister (2001; Böhm, 2003) implies that when people evaluate risks to be moral blameworthy (with associated feelings and behavioural tendencies), this could be due to framing effects. In an experiment done based on their model, the evaluative focus (attention to morality of actions) was shown to co-vary with the risk type. When a risk was framed as human caused, (instead of naturally) the persuasiveness of morally-based arguments increases (Böhm & Pfister, 2017).

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**Research aim**

The aim of the thesis is to use experimental methods to investigate how people's environmental risk perception and following evaluations vary when exposed to different frames about the risk. This will be done by using an experimental design to manipulate contextual framings in a fictitious environmental risk scenario and thereby measure the potential effect on different types of environmentally related policy support. In addition to this, a measure of scenario-specific emotions will be included in order to test whether they will mediate the relationship between perceptions, cognitive judgements, and behavioural tendencies. Furthermore, the use of three distinct value types (biospheric, altruistic, and egoistic) will be measured to look at the effect of people's personal value dispositions on policy support.

The contextual framings will be manipulated using two types of dimensions: *risk location* and *moral responsibility focus*. The experiment will manipulate the level location of a potential risk, using either: a local or a global focus in a fictitious risk scenario, assuming this will induce the feeling of high or low severity. Moral responsibility will be manipulated using two types of moral focus: either an individual or a collective moral focus. The policy support measurements will differentiate between four aggression related and four different help related policy supports. Here, aggression related policies correspond to morality oriented behavioural tendencies, and help related policy supports correspond to consequence related behavioural tendencies. This distinction is adopted from the mental model approach by Böhm and Pfister (2000; 2005). (See Fig.1).

It is reasonable to believe that these conditions will show that a risk scenario framed as local with a personal moral responsibility, will elicit morality oriented (aggression related) policy support. This expectation is based on previous research showing that when a risk is perceived as a proximal, salient and severe risk (Lorenzoni & Pidgeon, 2006; Lorenzoni et al.,



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2007), and to have a clear structure of cause and effect indicating an individual moral responsibility (Böhm & Pfister, 2017), this will give rise to more moral thinking. In addition to this, it is also rational to believe that morality-oriented emotions will mediate this relationship, as it has appeared to be a very strong predictor in environmental risk perception and evaluations (Böhm, 2003). Lastly, people`s value dispositions are predicted to influence when evaluating policy support.

## Method

### Pilot study

A pre-test with a student dominated sample (N = 10) was conducted to clarify whether the scenarios that were made would be considered plausible and an appropriate manipulation for risk severity and moral responsibility in environmental risk scenarios. Participants were randomly assigned to one of the treatments. These treatments were identical to the ones that were used in the main study. The only difference was that the participants had to answer 11 questions after every scenario, aimed at identifying the trustworthiness and appropriateness of the scenarios. Examples of questions with open text boxes would be: “What was the text about?” and “Do you experience what you just read to be a problem/something risky? (If yes/no; why?)”. Examples of questions with a scale ranging from 1 (*not at all*) to 7 (*to a large extent*), are: “While reading the text, I could imagine what was described.”, “The story affected me emotionally”, and “I became engaged while reading the text”. Examples of questions measuring the manipulation were: “Where does this risk take place? (1 - *locally* to 7 - *globally*), “If anyone, who is responsible for this risk? (*The individual (you and me) – the community/world’s population – no one*)”, and one example with a forced choice question: “If you had to choose, who would you say were responsible? 1 (*the individual*) 2 (*the community/the world’s population*).” A complete list of all the questions is attached in Appendix A. Results of the pre-study revealed that the content of both scenarios, and the additional questions seemed appropriate to use in a main study. Table 1 shows that those individuals who were in the *local* conditions judged the scenario to happen more on a local level than a global level, and vice versa. Table 2 shows that those who got the *individual condition* judged the moral responsibility to be more on the individual than the collective, and vice versa.

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Table 1.

*Group Differences for the Local and Global Condition in the CCS Scenario and Plastic Scenario*

| Location | CCS      |           |              |          | Plast    |           |              |          |
|----------|----------|-----------|--------------|----------|----------|-----------|--------------|----------|
|          | <i>M</i> | <i>SD</i> | <i>t</i> (4) | <i>p</i> | <i>M</i> | <i>SD</i> | <i>t</i> (4) | <i>p</i> |
| Local    | 5.00     | 2.74      | 4.08         | .015     | 5.20     | 1.30      | 8.91         | .001     |
| Global   | 5.80     | 1.09      | 11.84        | .000     | 5.80     | 1.64      | 7.89         | .001     |

Table 2

*Group Differences for the Individual and collective Condition in the CCS Scenario and Plastic Scenario*

| Responsibility | CCS      |           |              |          | Plast    |           |              |          |
|----------------|----------|-----------|--------------|----------|----------|-----------|--------------|----------|
|                | <i>M</i> | <i>SD</i> | <i>t</i> (4) | <i>p</i> | <i>M</i> | <i>SD</i> | <i>t</i> (4) | <i>p</i> |
| Individual     | 1.40     | 0.54      | 5.71         | .005     | 1.40     | 0.54      | 5.71         | .005     |
| Collective     | 1.80     | 0.45      | 9.00         | .001     | 1.60     | 0.54      | 6.53         | .003     |

**Main Study****Participants.**

The sample consisted of 183 participants, with 63,9% ( $N = 117$ ) female and 36,1% ( $N = 66$ ) men. 90,7 % ( $N = 166$ ) of the participants were full-time students and were aged between 18 and 42 years, with a mean age of 24 years ( $SD = 3.3$ ). In the sample, there were 8,8% ( $N = 16$ ) who had a full-time job and 17,1% ( $N = 31$ ) who did not work (either full-time or part-time). 43,1% ( $N = 79$ ) had a high school degree, while 42,6% ( $N = 78$ ) held a Bachelor's degree, and 13,7% ( $N = 25$ ) with a Master's degree. Nearly 75% of the participants responded between 1-6 on a 12-point scale, with 0 indicating 'left wing' and 12 'right wing'. ( $M = 4.98$ ,  $SD = 2.37$ , Range 10)

The recruitment of participants was made using an existing pool held by DIGSSCORE (The Digital Social Science Core Facility, an infrastructure for social science data collection at the University of Bergen), Facebook and personal appeal (mainly at the Faculty of Psychology). The DIGSSCORE-pool consisted of about one thousand participants who were

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mainly students, but with a broad range of study affiliations and educational degrees. As one might expect from the recruitment, there are some deviations from the general population, in respect to gender, age, and education: young people, females and persons with higher educations are overrepresented.

**Design.**

The two independent variables, *risk location* and *moral focus*, were manipulated using a 2 x 2 scenario-based design. The scenarios manipulated for (i) risk location, varied on a *local* and *global* level and in (ii) moral focus, with the two levels: *individual* and *collective*. This resulted in four different scenarios: 1. A *local risk* with a focus on *collective* moral responsibility ( $N= 32$ ), 2. *global risk* with a focus on *collective* moral responsibility ( $N = 53$ ); 3. A *local risk* with an *individual* focus on moral responsibility ( $N = 52$ ); 4. A *global risk* with a focus on *individual* moral responsibility ( $N = 49$ ).

Two fictitious scenarios were made, with inspiration from issues that had been mentioned in both national, as well as international media. The first scenario was about carbon capture and storage (CCS). The text described what CCS is, what the risks associated with taking advantage of this technology would be, and what other consequences that could occur; both if we used it and if we didn't. The other scenario was about the problems with plastic. It described the great risk of increased plastic in the sea, as well as the danger with micro plastic. The two scenarios will be referred to as the *CCS scenario* and the *plastic scenario*. The two independent variables *location* and *moral focus* were varied in the two scenarios using the words *local/global* and *individual/collective*, but additional adjustments of the text were made to make the scenarios coherent.

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**Measures.*****Manipulation check.***

After reading the scenario, the participants were told to answer *where* the risk was taking place, and *who* had the moral responsibility. The response category was a forced choice between: a *local* or *global* level and *the individual* or *the world`s population*. This was measured twice (once for every scenario exposure), similar to the next two variables

***Emotions.***

Emotions were measured using a list of 11 emotions. Four of them were ethic-based emotions (anger, contempt, rage, indignation), and five of them were consequence-based emotions (sympathy, sadness, fear, worry, sorrow). The last two were resignation-based emotions (helplessness, hopelessness). All the emotions were selected based on a factor analysis by Böhm and Pfister (2005), as also supported by other studies (Ortony et al., 1988; Böhm & Pfister, 2000, Harth, Leach, & Kessler, 2013). The question asked was: “When you think about the scenario you just read, how intensely do you feel...?” The rating scale went from 1 (*not at all*) to 7 (*very strongly*).

***Policy support.***

A sample of eight policies were presented for the participants, and for each of them they had to indicate to what extent they supported these policies. This was done by using a scale ranging from 1 (*not at all*) to 7 (*very strongly*). The two types of policy support measurements were *aggression* related (e.g. ‘I would boycott products /services involved in this issue’) and *help* related (e.g. ‘To a large extent replace fossil fuels with renewable energy’). The aggression related policies correspond to ethical related emotions and behavioural tendencies (See Fig. 1), while help related policy support correspond to consequence related emotion and behavioural tendencies. The eight policy support

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measurements were used in both scenarios, with adjustments to fit the context. A complete list is included in the questionnaire in Appendix B. The list of policy support measurements was selected on basis of the theoretical foundation of moral versus consequence-based outcomes, established by Böhm and Pfister (2000), and of material used by Bostrom et al. (2012). However, adjustments were made to fit the context.

The following variables were only measured once, after the manipulation exposure and the measures of policy support and emotions<sup>1</sup>.

### *Values.*

This measure was meant to represent people's value orientations. The value scales that were used were adopted from De Groot and Steg (2007). Their scale is based on the original scale from Schwartz (1992), but with two extra biospheric value items included (because of underrepresentation in Schwartz's original scale). The scale is used to measure three different value orientations: egoistic (social power, wealth, authority, influence), altruistic (equality, world peace, social justice, helpfulness), and biospheric (preventing pollution, respecting the earth, unity with nature, protecting the environment) value orientations. The respondents had to indicate on a 9-point scale ranging from -1 (*opposed to my values*), 0 (*not important*) to 7 (*extremely important*), where they had to consider to what extent each value was "a guiding principle in your life" (De Grot & Steg, 2008). In the description (as in the work of Schwartz; 1977) they were asked to vary their responses, and not to rate more than two values as extremely important. The word 'values' was not mentioned.

### *Demographic items.*

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<sup>1</sup> *Global citizenship* (Reysen, Pierce, Katzarska-Miller & Nesbit, 2013) and *moral environmental concern* (Steenjens et.al, 2017) were also measured, but not further processed in this thesis.

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The participants were asked to complete six items regarding their age, gender, student status, employment status, and marital status, their highest acquired degree of education, as well as their political orientation. Age was answered with an open field, gender had the option “man,” “women,” and “other” with the latter including an open field to write in. The student status was answered by clicking either “Yes, fulltime,” “Yes, part time” or “No.” The following answer options were given to describe their employment status: “Fulltime,” “Part time,” “Self-employed (fulltime),” “Self-employed (part time),” “Extra help/call substitute,” “Other forms of paid work,” “Currently unemployed,” or “Disability benefits.” The following answer options were given to describe their marital status: “Single,” “Boy/girlfriend,” “Cohabitant,” “Partnership,” “Married,” “Separated,” “Divorced,” or “Widow/Widower.” To answer the question about their highest acquired degree of education, they were given the options: “Primary school,” “High school (general specialisation),” “High school (occupational),” “Bachelor`s degree,” “Master`s degree,” or “Doctor`s degree.” The last demographic measure was meant to give an indication of what political “wing” participants sympathised the most with. The question was: “In politics you often hear people talk about the ‘left wing’ and the ‘right wing.’ Below is a scale where 0 represents those who stand to the far political left, and 10 represent those who stand to the far political right. How would you place yourself on such a scale?” The scale ranged from 0 (*left*) to 10 (*right*), and was translated from the Norwegian Citizen Panel, Wave 7 (2016).

### **Procedure**

The study was run in the DIGSSCORE lab at the university, with groups consisting of approximately ten to thirty people. Each participant was randomly assigned to a personal desk with a computer, placed in a cubicle that were separated by partition walls placed on the sides and the front of each desk. The order of the scenarios was cross balanced. After being

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presented with general information (how long it would take, that there are no right and wrong answers, etc.) from the experiment leader, the participants were presented with the two scenarios: either first the plastic scenario and then CCS scenario ( $N = 93$ ), or the vice versa ( $N = 93$ ).

In the introduction, the participants were told to imagine reading the text in a paper, and were encouraged to imagine the situations as vivid as possible. After each scenario, the manipulations check, emotions, and policy support were measured. The final part of the questionnaire consisted of measures of values, global citizenship, moral concern, political orientation, and demographic variables. All the dependent variables were randomly presented for each participant, and the two scenarios (CCS and plastic) belonged to the same condition with respect to both the independent variables 'location' and 'moral focus.' The reason for using two scenarios, was to increase reliability and generalizability.



## Results

This section will give an overview of the results from the data analyses.

### Manipulation check

To test whether the manipulations in the experiment worked, the four groups (local and individual, local and collective, global and individual, or global and collective) were split into two dichotomous variables: *location* and *moral focus*. An independent samples t-test was conducted to compare the level of experienced moral responsibility in the individual and collective conditions. The same was done to compare the level of experienced location in the global and local conditions. The test was conducted both for the CCS scenario and the plastic scenario. The significance threshold was set at .01.

The t-test was found to be statistically significant  $t(182) = -3.5, p < .001; d = 0.52$ . The effect size for this analysis ( $d = 0.52$ ) corresponded to Cohen's convention for medium effect ( $d = .50$ ) (Cohen, 1992). The results indicate that participants in the *individual group* ( $M=1.33, SD=0.47$ ) judged the moral responsibility to be more on the individual than the collective group ( $M=1.58, SD=0.50$ ), and vice versa. The results also indicate that individuals in the *local group* ( $M=1.72, SD=0.45$ ) judged the risk to take place on a more local level than global level, compared to the global group ( $M=1.92, SD=0.27$ ). The t-test was found statistically significant  $t(182) = -3.7, p < .001; d = 0.53$ . The effect size for this analysis ( $d = 0.53$ ) was found to correspond to Cohen's convention for a medium effect ( $d = .50$ ).

For the other scenario, the t-test was also found to be statistically significant,  $t(182) = -3.8, p = .001; d = 0.57$ . The effect size for this analysis ( $d = 0.57$ ) represents a medium-sized effect. These results suggest that the *individual group* ( $M=1.56, SD=0.50$ ) also judged the moral responsibility to be more on the individual than the collective group ( $M=1.82, SD=0.387$ ). The test also revealed that the *local group* ( $M=1.56, SD=0.50$ ) judged the risk to

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take place on a more local level than global level, compared to the global group ( $M=1.82$ ,  $SD=0.387$ ). The test was also found to be statistically significant,  $t(182)=-3.9$ ,  $p < .001$ ;  $d = 0.58$ . The effect size for this analysis ( $d = 0.58$ ) represents a medium-sized effect.

### **Cross balance.**

To control for order effects, an independent-samples t-test was conducted. There was no significant difference in the scores for experienced moral responsibility and the level of experienced location,  $t(182)=958$ ,  $p > .001$ , when comparing the (i.) *first CCS then plastic* ( $M = 1.79$ ,  $SD = 0.41$ ), and (ii.) *first plastic then CCS* ( $M = 1.85$ ,  $SD = 0.36$ ) conditions. These results suggest that the order the participants read the scenarios did not matter for the outcome.

### **Manipulation effects**

#### **Policy support.**

A two-way ANOVA was conducted to examine the effect of the focus of responsibility and the level of location on policy support. All eight policy support measurements were entered as dependent variables, while location and moral focus were entered as fixed factors. There was found no significant interaction effect between the two independent variables (responsibility and location) in either the plastic scenario nor the CCS scenario. There were also no significant simple main effects to be found. See Table 3 and Table 4.

#### **Emotions.**

Like with the latter analysis of policy support, a two-way ANOVA was conducted to

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examine the effect of the manipulation of location and moral focus on emotional reactions.

The three types of emotions (ethical, consequence and resignation based) were entered as dependent variables, while location and moral focus were entered as fixed factors. There was no significant effect of the two independent variables, nor an interaction effect (See Table 5).

This gave no reason to proceed looking for a mediation effects.

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Table 3

*Two-Way (Location and responsibility) Analysis of Variance for the four Aggression Related Policy Support measurements in the CCS scenario and Plastic scenario*

| Dependent variable                     | <u>CCS scenario<sup>c</sup></u> |      |          | <u>Plastic scenario<sup>d</sup></u> |      |          |
|--|---------------------------------|------|----------|-------------------------------------|------|----------|
|  | MS                              | F    | <i>p</i> | MS                                  | F    | <i>p</i> |
| Aggression related                     |                                 |      |          |                                     |      |          |
| Support politics that punish polluters |                                 |      |          |                                     |      |          |
| Location (loc) <sup>a</sup>            | 3.79                            | 2.07 | .152     | 3.78                                | 2.07 | .152     |
| Responsibility (res) <sup>b</sup>      | 1.14                            | 0.62 | .431     | 0.03                                | 0.02 | .884     |
| Loc x res                              | 1.19                            | 0.65 | .420     | 1.19                                | 0.65 | .420     |
| Boycott products and services          |                                 |      |          |                                     |      |          |
| Location                               | 0.48                            | 0.18 | .671     | 0.48                                | 0.18 | .671     |
| Responsibility                         | 3.89                            | 1.46 | .228     | 1.13                                | 0.62 | .431     |
| Loc x res                              | 0.87                            | 0.33 | .568     | 0.87                                | 0.33 | .568     |
| Increase tax on fossil fuels           |                                 |      |          |                                     |      |          |
| Location                               | 2.17                            | 0.61 | .435     | 2.17                                | 0.61 | .435     |
| Responsibility                         | 1.86                            | 0.53 | .470     | 3.89                                | 0.53 | .470     |
| Loc x res                              | 5.06                            | 1.43 | .233     | 5.06                                | 1.43 | .233     |
| Limit populasjon growth                |                                 |      |          |                                     |      |          |
| Location                               | 4.57                            | 1.84 | .177     | 4.57                                | 1.84 | .177     |
| Responsibility                         | 0.11                            | 0.05 | .832     | 0.11                                | 0.53 | .470     |
| Loc x res                              | 11.13                           | 4.48 | .050     | 11.13                               | 4.48 | .036     |

<sup>abcd</sup>*df* = 1,180

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Table 4

*Two-Way (Location and responsibility) Analysis of Variance for the four Help Related Policy Support measurements in the CCS scenario and Plastic scenario*

| Dependent variable                   | <u>CCS scenario<sup>c</sup></u> |      |          | <u>Plastic scenario<sup>d</sup></u> |      |          |
|--------------------------------------|---------------------------------|------|----------|-------------------------------------|------|----------|
|                                      | MS                              | F    | <i>p</i> | MS                                  | F    | <i>p</i> |
| Help related                         |                                 |      |          |                                     |      |          |
| Donate money to environmental org.   |                                 |      |          |                                     |      |          |
| Location <sup>a</sup>                | 5.71                            | 1.78 | .183     | 5.71                                | 1.79 | .183     |
| Responsibility <sup>b</sup>          | 5.90                            | 1.85 | .176     | 5.91                                | 1.85 | .176     |
| Loc x res                            | 0.02                            | 0.01 | .939     | 0.02                                | 0.01 | .939     |
| Consume and buy less                 |                                 |      |          |                                     |      |          |
| Location                             | 0.68                            | 0.22 | .639     | 0.68                                | 0.22 | .639     |
| Responsibility                       | 0.78                            | 0.25 | .616     | 0.78                                | 0.25 | .616     |
| Loc x res                            | 0.94                            | 0.30 | .581     | 0.94                                | 0.31 | .581     |
| Promote environmental education      |                                 |      |          |                                     |      |          |
| Location                             | 0.09                            | 0.07 | .791     | 0.09                                | 0.07 | .791     |
| Responsibility                       | 1.03                            | 0.82 | .368     | 1.03                                | 0.82 | .368     |
| Loc x res                            | 0.60                            | 0.48 | .492     | 0.60                                | 0.48 | .492     |
| Replace fossil fuels with renewables |                                 |      |          |                                     |      |          |
| Location                             | 0.03                            | 0.02 | .884     | 1.14                                | 0.62 | .431     |
| Responsibility                       | 0.03                            | 0.03 | .874     | 0.03                                | .003 | .874     |
| Loc x res                            | 3.60                            | 2.63 | .107     | 3.50                                | 0.48 | .107     |

<sup>abcd</sup>*df* = 1,180

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Table 5

*Two-Way (Location and responsibility) Analysis of Variance for the Three Types of Emotional Reactions in the CCS scenario and the Plastic scenario*

| Dependent variable   | <u>CCS scenario</u> |                   |          | <u>Plastic scenario</u> |                   |          |
|----------------------|---------------------|-------------------|----------|-------------------------|-------------------|----------|
|                      | MS                  | F                 | <i>p</i> | MS                      | F                 | <i>p</i> |
| Ethic related        |                     |                   |          |                         |                   |          |
| Location (loc)       | 0.96                | 0.04 <sup>a</sup> | .844     | 49.78                   | 1.79 <sup>a</sup> | .183     |
| Responsibility (res) | 27.87               | 1.13 <sup>a</sup> | .290     | 12.75                   | 0.46 <sup>a</sup> | .499     |
| Loc x res            | 16.23               | 0.66 <sup>a</sup> | .419     | 7.20                    | 0.26 <sup>a</sup> | .611     |
| Consequence related  |                     |                   |          |                         |                   |          |
| Location             | 8.65                | 0.22 <sup>b</sup> | .643     | 48.38                   | 1.30 <sup>c</sup> | .257     |
| Responsibility       | 58.13               | 1.45 <sup>b</sup> | .230     | 2.31 <sup>c</sup>       | 0.06 <sup>c</sup> | .804     |
| Loc x res            | 12.79               | 0.32 <sup>b</sup> | .573     | 2.34                    | 0.06 <sup>c</sup> | .803     |
| Resignation related  |                     |                   |          |                         |                   |          |
| Location             | 1.67 <sup>b</sup>   | 0.17              | .679     | 0.19 <sup>c</sup>       | 0.02              | .884     |
| Responsibility       | 1.06                | 0.11              | .741     | 14.63                   | 1.67              | .198     |
| Loc x res            | 6.40                | 0.66              | .418     | 4.79                    | 0.55              | .461     |

<sup>a</sup>*df* = 1,177, <sup>b</sup>*df* = 1,179, <sup>c</sup>*df* = 1,18

### **Regressing policy support on emotions and values**

Based on the findings that indicate that the manipulations in the experiment did not have a significant effect on either policy support measurements or emotional response, I wanted to proceed with an exploratory approach to try to identify predictors for different policy supports. A multiple regression analysis was run to predict the two types of policy support (four aggression related and four help related<sup>2</sup>) from values (biospheric, altruistic and egoistic) and scenario-specific emotions (ethical, consequence and resignation based). The single items for all the values were aggregated into three groups: altruistic values ( $\alpha = .65$ ), biospheric values ( $\alpha = .84$ ), and egoistic values ( $\alpha = .62$ ). This was also done with all the single items of emotions: ethic-related emotions (CCS:  $\alpha = .81$ , plast:  $\alpha = .82$ ), resignation-related emotions (CCS:  $\alpha = .77$ , plast:  $\alpha = .85$ ), and consequence-related emotions (CCS:  $\alpha = .81$ , plast:  $\alpha = .80$ ). The analysis was run 8 x 2 times, using one of the eight policy supports from each of the two scenarios as dependent variable at the time. The mentioned variables were entered as predictors. Preliminary analysis was conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity (Field, 2013). The correlation matrix is shown in Appendix C.

#### **Values and emotions in the CCS scenario.**

In the CCS scenario the multiple regression model, with all the mentioned predictors, significantly predicted all the aggression related policy supports and the help related policy supports. For the CCS scenario, the total variance explained for ‘support politics that punish polluters’ was 6.5%,  $F(6, 174) = 3.09, p = .012$ , for ‘boycott products and services’ it was 20%,  $F(6, 174) = 8.74, p < .001$ , for ‘increase tax on fossil fuels’ it was 22%,  $F(6, 174) =$

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<sup>2</sup> The policy support measurements had not a good enough internal consistency to aggregate into help related and aggression related policy supports, showing a range of  $\alpha = .56$  to  $\alpha = .65$

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9.77,  $p < .001$ , for ‘limiting population growth’ it was 6%,  $F(6, 174) = 3.04$ ,  $p = .007$ , for ‘donate money to environmental organisations’ it was 22%,  $F(6, 174) = 9.64$ ,  $p < .001$ , for ‘consume and buy less’ it was 34%,  $F(6, 174) = 16.65$ ,  $p < .001$ , for ‘promote environmental education’ it was 9.5%,  $F(6, 174) = 4.15$ ,  $p = .001$ , and for ‘replace fossil fuels with renewables’ it was 18%,  $F(6, 174) = 7.61$ ,  $p < .001$ .

To identify the degree each predictor effected the outcome if the effect of all other predictors is held constant, I examined the beta coefficients for each predictor in the CCS scenario provided by the regression analysis (See Table 6 and Table 7). The beta values showed that biospheric values made a significant contribution to almost every model (both the aggression related and the help related policy supports), by contributing with a range from 17% and 42%. The exceptions were: ‘support politics that punish polluters’ and ‘replace fossil fuels with renewables’ (See table 6). In the latter exception (‘replace fossil fuels with renewables’), altruistic values made a greater contribution to the model than biospheric values. Furthermore, the consequence related emotions, ethical related emotions, and egoistic values contributed significantly to predict the model (in addition to biospheric values) for support for ‘increase tax for fossil fuels.’ Resignation related emotions contributed more than the two latter ones, both of which indicated a negative relationship. This means that when ethical related emotions and egoistic values decreases, the support for ‘increase tax for fossil fuels’ increases. This negative relationship was also found between altruistic values and support for ‘limiting population growth.’ Furthermore, the analysis showed that the support for ‘consuming and buying less’ (apart from biospheric values) is significantly due to altruistic values, but also ethic related emotions (non-significant). Egoistic values contribute with a negative sign, stating that people who have low scores on egoistic values, supports this type of policy. In essence, the analysis for the CCS scenario showed that biospheric values seem to be the most important predictor when trying to predict why some individuals support



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some policies more than others.

### **Values and emotions in the plastic scenario.**

In the plastic scenario, the models were also of statistical significance, implying that all models successfully could predict all the policy support measurements. For the plastic scenario, the total variance explained for ‘support politics that punish polluters’ was a bit higher with 17%,  $F(6, 173) = 5.73, p < .001$ , compared to the CCS scenario. The rest of the coefficients were quite close to the ones in the CCS scenario. For ‘boycott products and services’ it was 24%,  $F(6, 173) = 10.42, p < .001$ , for ‘increase tax on fossil fuels’ it was 20%,  $F(6, 173) = 8.40, p < .001$ , for ‘limiting population growth’ it was 7%,  $F(6, 173) = 3.35, p = .004$ , for ‘donate money to environmental organisations’ it was 16%,  $F(6, 173) = 6.82, p < .001$ , for ‘consume and buy less’ it was 25%,  $F(6, 173) = 10.73, p < .001$ , for ‘promote environmental education’ it was 13%,  $F(6, 173) = 5.44, p < .001$ , and for ‘replace fossil fuels with renewables’ it was 15%,  $F(6, 173) = 6.21, p < .001$ .

To identify to which degree each predictor effected the outcome, if the effect of all other predictors are held constant, I examined the beta coefficients for each predictor in the plastic scenario provided by the regression analysis (See Table 8 and Table 9). In this scenario, the results were much the same as in the CCS scenario. All models showed that the biggest significant contribution came from biospheric values (with a range from 19% to 35%), except for ‘support politics that punish polluters’ and ‘replace fossil fuels with renewables.’ The ‘support politics that punish polluters’ model also showed a large contribution coming from ethic related emotions. Like the CCS scenario, egoistic values contributed negatively to the prediction of ‘increase tax for fossil fuels.’ Unlike the other scenario, support for ‘boycott products and services,’ ‘promote environmental education,’ and ‘replace fossil fuels with

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renewables' showed a significant contribution coming from high scores on consequence related emotions.

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Table 6

*Regression analysis Summary for Value and Emotion Variables Predicting Aggression Related Policy Support Measurements in the CCS scenario.*

|             | Aggression related policy support      |          |          |                               |          |          |                              |          |          |                         |          |          |
|-------------|--|----------|----------|-------------------------------|----------|----------|------------------------------|----------|----------|-------------------------|----------|----------|
|             | Support politics that punish polluters |          |          | Boycott products and services |          |          | Increase tax on fossil fuels |          |          | Limit population growth |          |          |
|             | B                                      | <i>t</i> | <i>p</i> | $\beta$                       | <i>t</i> | <i>p</i> | B                            | <i>t</i> | <i>p</i> | $\beta$                 | <i>t</i> | <i>p</i> |
| Bios value  | .13                                    | 1.52     | .128     | .30                           | 3.88     | .000***  | .32                          | 4.23     | .000***  | .19                     | 2.23     | .023*    |
| Altru value | .08                                    | 0.97     | .332     | .09                           | 1.21     | .225     | .07                          | 0.94     | .346     | -.17                    | -2.12    | .035*    |
| Ego value   | -.10                                   | -1.40    | .164     | -.10                          | -1.60    | .109     | -.16                         | -2.40    | .023*    | .14                     | 1.87     | .064     |
| Ethic emo   | .09                                    | 0.94     | .349     | .12                           | 1.33     | .186     | -.20                         | -2.29    | .023*    | .16                     | 1.65     | .100     |
| Resi emo    | .12                                    | 1.32     | .830     | .01                           | 0.15     | .879     | .10                          | 1.10     | .273     | .02                     | 0.17     | .861     |
| Cons emo    | -.02                                   | -0.21    | .189     | .09                           | 0.99     | .320     | .26                          | 2.69     | .008**   | .00                     | 0.03     | .977     |

\**p* < .05. \*\* *p* < .01. \*\*\**p* < .001.

Table 7

*Regression analysis Summary for Value and Emotion Variables Predicting Aggression Related Policy Support Measurements in the CCS scenario*

|             | Help related policy support |          |          |                      |          |          |                        |          |          |                                      |          |          |
|-------------|-----------------------------|----------|----------|----------------------|----------|----------|------------------------|----------|----------|--------------------------------------|----------|----------|
|             | Donate money to env.org     |          |          | Consume and Buy Less |          |          | Promote Env. Education |          |          | Replace fossil fuels with renewables |          |          |
|             | $\beta$                     | <i>t</i> | <i>p</i> | $\beta$              | <i>t</i> | <i>p</i> | $\beta$                | <i>t</i> | <i>p</i> | $\beta$                              | <i>t</i> | <i>p</i> |
| Bios value  | .34                         | 4.48     | .000***  | .42                  | 5.90     | .000***  | .17                    | 2.13     | .034*    | -.07                                 | -0.85    | .395     |
| Altru value | .08                         | 1.08     | .282     | .18                  | 2.68     | .008**   | .08                    | 0.98     | .320     | .41                                  | 5.39     | .000***  |
| Ego value   | -.08                        | -1.14    | .254     | -.18                 | -2.94    | .004**   | -.10                   | -1.38    | .168     | -.12                                 | -1.57    | .118     |
| Ethic emo   | .03                         | 0.32     | .750     | .14                  | 1.77     | .078     | -.09                   | -0.99    | .322     | -.20                                 | -2.19    | .030*    |
| Resi emo    | .03                         | 0.38     | .704     | -.02                 | -.33     | .743     | .08                    | 0.96     | .338     | .08                                  | 0.92     | .358     |
| Cons emo    | .15                         | 1.56     | .120     | -.02                 | -.26     | .794     | .18                    | 1.77     | .078     | .13                                  | 1.34     | .179     |

\**p* < .05. \*\* *p* < .01. \*\*\**p* < .001.

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Table 8

*Regression analysis Summary for Value and Emotion Variables Predicting Aggression Related Policy Support Measurements in the Plastic Scenario.*

|             | Aggression related policy support      |       |            |                               |       |         |                              |       |        |                         |       |        |
|-------------|--|-------|------------|-------------------------------|-------|---------|------------------------------|-------|--------|-------------------------|-------|--------|
|             | Support politics that punish polluters |       |            | Boycott products and services |       |         | Increase tax on fossil fuels |       |        | Limit population growth |       |        |
|             | $\beta$                                | $t$   | $P$        | $\beta$                       | $t$   | $p$     | $\beta$                      | $t$   | $p$    | $\beta$                 | $t$   | $p$    |
| Value bios  | .13                                    | 1.62  | .107       | .31                           | 3.97  | .000*** | .23                          | 2.87  | .005** | .22                     | 2.60  | .010** |
| Value altru | .08                                    | 1.04  | .299       | .13                           | 1.72  | .088    | .15                          | 1.97  | .051   | -.16                    | -1.95 | .053   |
| Value ego   | -.10                                   | -1.39 | .165       | -.08                          | -1.25 | .214    | -.14                         | -2.11 | .036*  | .11                     | 1.48  | .141   |
| Emo ethic   | .27                                    | 2.76  | .006*<br>* | .25                           | 2.73  | .007**  | .04                          | 0.37  | .711   | .15                     | 1.53  | .128   |
| Emo resign  | .09                                    | 1.16  | .249       | .05                           | 0.62  | .542    | .04                          | 0.55  | .585   | .14                     | 1.68  | .095   |
| Emo conse   | -.03                                   | -0.33 | .742       | -.06                          | -0.59 | .559    | .16                          | 1.62  | .107   | -.11                    | -1.10 | .272   |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Table 9

*Regression analysis Summary for Value and Emotion Variables Predicting Help Policy Related Support Measurements in the Plastic Scenario.*

|             | Help related policy support |       |       |                      |       |         |                        |       |        |                                      |       |         |
|-------------|-----------------------------|-------|-------|----------------------|-------|---------|------------------------|-------|--------|--------------------------------------|-------|---------|
|             | Donate money to env.org     |       |       | Consume and buy less |       |         | Promote env. Education |       |        | Replace fossil fuels with renewables |       |         |
|             | $\beta$                     | $t$   | $p$   | $\beta$              | $t$   | $p$     | $\beta$                | $t$   | $p$    | $\beta$                              | $t$   | $p$     |
| Value bios  | .19                         | 2.34  | .021* | .36                  | 4.73  | .000*** | .21                    | 2.59  | .010** | -.04                                 | -0.52 | .603    |
| Value altru | .08                         | .10   | .320  | .11                  | 1.52  | .129    | .02                    | 0.27  | .789   | .37                                  | 4.69  | .000*** |
| Value ego   | -.03                        | -.48  | .628  | -.11                 | -1.71 | .089    | -.10                   | -1.47 | .144   | -.08                                 | -1.18 | .238    |
| Emo ethic   | .13                         | 1.40  | .164  | -.00                 | -0.02 | .987    | -.15                   | -1.51 | .133   | -.22                                 | -2.29 | .023*   |
| Emo resign  | -.08                        | -1.09 | .275  | -.00                 | -0.02 | .985    | .02                    | 0.25  | .803   | .03                                  | 0.43  | .669    |
| Emo conse   | .21                         | 2.15  | .033* | .15                  | 1.58  | .116    | .31                    | 3.09  | .002** | .20                                  | 2.05  | .042*   |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

## **Discussion**

The overall objective of the present study was to investigate the effects of location and responsibility framings, and the role of emotions and values on environmental risk evaluation by measuring policy support. The analyses showed no significant framing effects on policy support or emotions, despite at the successful manipulation. Nevertheless, the support for the various policies were significantly predicted based on values and emotions. In the following section, possible explanations of the null-findings, as well as the exploratory analysis will be included in a general discussion in light of relevant theory. It will also present limitations and strengths associated with methodology and design, as well as implications and suggestions for the direction of future studies.

### **Manipulation effects**

Stating that the manipulation check was significant indicates that even though the individual participant perceived the scenarios in line with the manipulations (local vs global location and individual vs collective moral responsibility), this perception did not significantly affect the participants' evaluations of policy support, nor their emotional reactions. The reason for why the experimental manipulation did not have an effect on the outcome variables can be for a number of reasons. I will now present a selection of explanatory factors that I believe could contribute to explain the outcome of the study.

The reason for highlighting the following characteristic of the sample, is the possibility of a bias similar to a 'ceiling effect.' In statistical terms, a ceiling effect is a measurement limitation that happens when the independent variable reaches the highest or next to highest level of measure possible, so that the true influence on the dependent variable is hard to detect (Salkind, 2010). The rationale behind this assumption in conjunction to the findings in the current study is that the effect of the high proportion of young people, students,

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and women, will altogether make the sample occupied by climate- and environmentally relevant issues above average. Further, the effect of the manipulations might, therefore, not be significantly effective.

As shown in the method section, the sample was somewhat skewed. The sample largely consisted of students (<90%), participants that were rather young ( $M^{\text{age}} = 24$ ), and over 50% held either a Bachelor`s degree, a Master`s degree, or a PhD. These demographic factors may affect the outcome to a fairly large extent, especially in an environmental relevant context. A suggested reason for this could be that (university) students tends to be more environmentally lit, concerned, and aware than the average lay person (Van Liere & Dunlap, 1980), and thereby indicating that higher levels of education have a positive effect on environmentalism (Arcury & Christianson, 1990). McMillan, Hoban, Clifford, and Brant (1997) also state that younger people are considered less integrated into society, and thus are more frequent to criticise governmental and industrial policies. On the other hand, academia in general is said to be overrepresented with people with left-wing and liberal orientations. In British academics, less than 12% that supports a right-wing or conservative party (Carl, 2015), and in the US, it is under 10% (Knowles, Holton, & Swanson, 2014). One of the explanations for why this is happening is that the longer someone remains in a “biased” environment (university), the more likely they are to adopt the philosophy and values of their peers or/and professors. This is supported by the fact that the number of left-wing party supporters in academia correlates positively with years of higher education (Knowles, Holton, & Swanson, 2014). The general explanation for this relationship is that education exposes a person to a broad range of ideas and beliefs that might cause a more liberal-minded orientation (Milbrath, 1984).

In Norway, approximately 57% of the members in the Norwegian Researcher Association said they would vote for one of the left-wing parties (Labour party, Red party,

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Socialist Left Party) at the next parliamentary elections, while 10% would vote for one of the right-wing parties (Conservative Party, Progress Party) (Svarstad, 2017). There are some informal non-representative surveys among students at educational institutions in Bergen that also confirms this as a trend among students in Norway. In one survey, the majority of first-year students studying subjects like psychology, social studies, and humanities, said they would vote for left-wing parties in at the next parliamentary elections in 2017 (Sorge, 2017). Note that this was first-year students, and that this would challenge the previous assumption that a socialization processes would make people pull one way or another politically, especially after a long period of time. The fact that they are first-year students most likely indicates that people with a certain type of political orientation and with certain values and attitudes are drawn to certain studies. Another point worth highlighting in this context is that because so many of the participants were students, under 10% of the sample had a full-time job. This may further support the political skewness, while workers may support other policies than non-workers. Based on the above findings, the current study could be affected by the outcomes due to the sample having an predominance of both young people and non-working students.

In addition to this, considering that nearly 65% of the sample were women may also have had an effect. Previous studies state that women tend to report stronger environmental attitudes and behaviour than men (McMillan, Hoban, Clifford & Brant, 1997). One study showed the same effect across age and across 14 countries (Zelezny, Chua, & Aldrich, 2000). Socialization theory would claim that the reason for this is that women are socialized to be more caregiving, nurturing, independent, cooperative, helpful, and have stronger “ethic of care” (Beutel & Marini, 1995; Chodorow, Rosaldo, & Lamphere, 1974) than men, and thereby also more concerned about environmental hazards (Davidson & Freudenburg, 1996). Another study also found that women tend to be more environmentally conscious in their

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consumption intentions than men (Banerjee & McKeage, 1994). In Norway, a representative study supports that women, students, and highly educated people overall tend to be more concerned for climate change, rank environmental protection as more important than economic growth, and highly supports that the Norwegian pension fund should withdrawal from coal investments (Norwegian Citizen Panel Wave 7, 2016). As a last point, the invitation-email promoting the study was named “Invitation to a study about climate and environment,” which might have attracted more environmentally conscious people. These paragraphs highlight that the results might have been different with a more representative and diverse sample, due to the presented biases above.

Another aspect that would be reasonable to look at as an explanatory factor for the null-findings, is the features of the experimental design. Not only could one argue that the types of risks that the scenarios presented could have been different, but also the content and the format. Despite the indications from the pilot-study, participants might have found what they read neither engaging, relatable, or even reliable. Additionally, as noted by Nisbet (2009), a specific type of frame will be ineffective if it's not relevant for people's pre-existing interpretations. This might be the case here. Additionally, for many people everyday life is often full of impressions and stimuli from different technological and non-technological sources. This might make the different wordings in a small paragraph about climate change insufficient to reach people's attention and awareness the way that was predicted. A short movie or another form of visual stimuli and imagery could have been more effective in this context, as also supported by O'Neill and Hulme (2009) and Hulme (2009). A previously mentioned study by Harth, Leach, and Kessler (2013) also looked at judgements of scenario-based environmental risks, but unlike the present study, they used a technique by Neumann (2000) to increase the salience of the manipulation. This technique involves getting the participants to summarize the content in the scenario they had just read, through performing a



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so-called sentence-completion task. There could have been an advantage to have used this in the present study.

Furthermore, if the results were to be interpreted in a way where the somewhat skewed sample had no impact, one could argue that a framing effect might be hard to detect in studies like the present one. There are several reasons for that, but I will highlight two. First, the issue of climate and environmental issues is for most people (at least among people where the study was conducted), well known. As a consequence, framing that only involves re-wordings will not be a strong enough manipulation to influence or control political support. The present results show that (a) people do not differentiate between the severity of environmental risks happening “home” and “away,” and that (b) “We” and “I” have the same moral responsibility for the same risks. This could then indicate that people might read the scenarios and think of it as something risky, negative, and wrong, independent of the different framings. By stating that climate and environmental issues is well known and therefore not affected by the suggested framings, the counter argument would then be that less known risks would be easier to frame and thereby influence people's action tendencies. My rationale behind this is that less known risks are also often less debated and less rigid, and therefore easier to change through (re)framing people's representations (mental models) of the problem. Further, this might challenge the view of mental models and framing effects. As a reference to the smoking and cancer analogy and mental representations, one could say (based on the current findings) that if one's mental representation of a risk is clear enough, one would not be affected by attributional framing effects. One would simply not think that one as an individual do not have a moral responsibility for climate change, even if the scenario frames it as a collective moral responsibility. The same goes for locality, one would not think that environmental issues do not happen on a global level just because the scenario highlights proximity.

Second, the effect of political orientation might have overrun the effect of framing in

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the current study, considering that the action tendency measures may touch upon political ideology (e.g. “increase tax in fossil fuel”). Dietz, Dan, and Shwom (2007) looked at people’s preferences for climate change mitigation policies and contributing factors, and found great support for the effect of political orientation, though indirectly through other variables. Being more politically liberal predicted greater environmental trust, through variables concerned with people’s values and worldviews. Such findings are also evident in other literature (e.g. Dunlap, Wiao, & McCright, 2001).

When trying to understand how the manipulation worked in the present study, one could also look for contradictory literature of the psychological distance hypothesis on geographical proximity. As mentioned in the theory section, several studies suggest that pro environmental action tendencies will increase when communicating environmental risks as proximal and personally relevant. Nevertheless, other theorists conclude that proximity does not promote environmental concern, or at least only under certain conditions (Brügger, Dessai, Devine-Wright, Morton, & Pidgeon, 2015). Several studies show that personal risk is judged lower than societal risk (Leiserowitz, 2005; Lorenzoni, 2003; Böhm, 2003), and additionally that local problems are viewed as less serious than global environmental problems (Uzzell, 2000). This line of argument could have influenced the current study, in the way that people might have judged the global risk just as serious as (or more serious than) the local risk. A suggested reason that if you interpret the CLT theory a bit differently, focusing on distance would help people make choices that promote self-control, because the choices are more in line with their long-term, abstract, and core personal reflections and values (Brügger et al, 2015). Thus, distance could lead to people making more clear evaluations and better choices about the future that are more in line with their core values (Lieberman & Trope, 2008). Brügger and colleagues (2015) additionally claim that people who hold altruistic and biospheric values would much less be affected by proximity in this context.

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They say that proximity could decrease those people`s pro-environmental action tendencies because their attention gets drawn away from their core values. In line with these arguments, framing environmental risks as local in the current study might have made the respondents focus less on significant aspects of the risk, which might have resulted in a decrease in overall perceived severity of the issue, as a whole. These alternative claims about psychological proximity might challenge the assumptions about distance and environmental evaluations made in this thesis, as well as provide a deliberate explanation to the null findings.

As a last point in the discussion of the lack of framing effects, it is appropriate to inform the audience that the current study is suffering from an experimental error. In the randomization process, participants were unequally distributed in the four conditions, due to a programming error. This might weaken the results due to the conditions not being homogenous, which is an important assumption when comparing groups. Despite this, I chose to precede because of the relatively large sample size within each condition ( $N < 30$ ).

### **Exploratory approach**

When I could not detect a significant effect of the manipulations on the different participants` behavioural tendencies, there was no reason to look for following effects on people`s emotions. What I did find, was an effect of emotions on policy support. Together with values, some emotions (more than others) worked as predictors for the different policy supports. It was also possible to detect a form of pattern, where ethic related emotions were better at predicting aggression related policy support, and consequence related emotions better at predicting help related policy support. The component model by Böhm and Pfister (2001; Böhm, 2003), also shows this connection. This means that when people experience, for example, the feelings of anger or outrage, they are more prone to support policies like tax

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raise and voting for parties that want to punish polluters. Similarly, when experiencing consequence related emotions, like guilt and shame, one would be more willing to support policies like donating money to environmental organizations or reducing one's consumption.

As shown in the VBN theory, values are also considered strong predictors of pro-environmental actions. The VBN theory has been used empirically to explain e.g. non-activist environmental support (e.g. consumer behaviour or policy support), by posing that these types of social movements are rooted in particular human values (Stern et al., 1999). In the light of these findings, as well as the present study, this means that when politicians or organizations want to promote global environmental change, they must highlight the values (e.g. biospheric, egoistic and altruistic values) that are shown to be connected to pro environmental attitudes. In addition, they must highlight the threats we face (e.g. sea rise or pollutions in cities) and ways to fight the threats (e.g. decrease consumption of fossil fuel), to clarify the causal structure (Reese & Jacob, 2015).

In summary, the regression analysis suggests that both values and emotions are strong predictors for different environmentally related policy supports. In line with previous assumptions (Stern et al., 1999; De Groot & Steg, 2007; Böhm, 2003), the current study supports the empirical findings that highlights the power of values and emotions in conjunction with environment related action tendencies. In conclusion (for both scenarios), the selected values and emotions had an explained shared variance of between 6% and 43% for the aggression related policy supports, and around 7% to 25% for the help related policy supports. The largest explained variance was shown for support for help related policies concerning consuming and buying less products and services (in conjunction with the scenario). The second largest explained variance was for the aggression related policies concerning increasing tax on fossil fuels and boycotting products. In line with previous findings, the current results support that biospheric values are the most important values when

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it comes to predicting environmentally relevant policy support, followed by altruistic values and then egoistic values. For the emotions, it seems that ethic related emotions are better at predicting aggression related policy support, and that consequence related emotions are better at predicting help related policy support (See Table 6 and Table 7). This is in line with the findings based on the mental model approach by Böhm and Pfister (2001; 2005; Böhm, 2003). These findings are of interest because values and emotions have different roots: one is a cognitive concept and the other one not.

### **Theoretical implications**

The following paragraphs will consider the use of mental models as an approach in the context of environmental issues and potential limitations of mental models in light of the present findings.

As mentioned in the theoretical part, Norman (as cited in Bostrom, 2017) presents four elements of mental model research. In the same work, he also puts forward ways to study mental models based on these elements. One way would be to investigate people`s mental models by comparing it to the conceptual model (element 2). This element could be considered the “objective” composition, and therefore a good reference (in e.g. interviews) for comparison. Another way would be to investigate and present mental models descriptively. A common way of carrying out both these methods is by making use of survey responses. A potential challenge within this approach is that it is hard to detect the coherence and usefulness of the mental models from the data because of the difficulty of interpreting the answers. Another problem is that the participants do not always know how to describe their mental models, or that they change their answers due to social desirability bias. Another method he mentions is to study mental models using explicit problem solving or decision-making tasks (Bostrom, 2017).

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This range of exploratory methods show that the choice of method in the current study could be considered appropriate because it made use of explicit problem decision-making tasks. In turn, the potential sources of error (like researcher interpretation) was reduced when combining it with framing manipulations. On the other hand, by using scenarios that informed the participants about e.g. pros and cons about an environmental risk, there might have been interference with the participants existing mental models. A mental model interview about CCS or plastic pollution would not have had the interference because it allows respondents to express their views without limitations. This is highlighted by the authors of a mental model interviews study about CCS, stating that due to the open format (open-end questions) they could detect the lack of knowledge and uncertainty related to the theme (Palmgren, Morgan, Bruine de Bruin, & Keith, 2004). This type of insight was not detectable in the current study.

Despite the methodological precautions for avoiding error, arguments by Norman (as cited in Bostrom, 2017) states that people`s mental models can be incomplete, unstable, and often neglect details. In addition, they tend to get confused with other mental models or similar systems, and have fuzzy boundaries. For example, Leiserowitz and Smith (2010) show that people are mixing climate change with the destruction of the ozone layer. Neibert and Gropengeisser (2014) on the other hand, suggest that mental models influence how a person interprets and makes use of new information, and due to the “stickiness” of mental models, people tend to keep their existing mental models and not replace them with new ones (Neibert & Gropengeisser, 2014; Moxnes & Assuad, 2012). This has also been proven evident for mental models of climate change (Bostrom, 2017). If this “stickiness” of pre-existing mental models was the case for the participants in the current study, it could potentially explain why the nuances provided by the framing manipulations did not work.

**Practical implications**

Based on the current study, the following evidence occurs: (a.) People do not differentiate between injustice here and there (local/global), thus making the feeling of responsibility for home just as strong as away, and that (b.) “We” and “I” have the same moral responsibility (individual/collective) for the environmental risks caused by plastic consumption and CCS. These findings have implications for the understanding of the conditions for public support for energy transition. These paragraphs will dwell on the implications of the findings in relation to the specific scenarios, and about the practical implications drawn from the current study for communication campaigns.

The scenario about carbon capture and storage (CCS) was presented as objective as possible in the current study. Nevertheless, a study by Palmgren and colleagues (2004) shows that CCS is perceived by lay persons as a controversial and even less desirable than nuclear power when asked to rank the willingness to pay for different technologies (this including a selection including solar-, hydro- and wind power, natural gas, energy efficiency, nuclear power, geological disposal (CCS on land) and biomass). This indicates that there is strong resistance against CCS. Even so, the article concludes by saying that the way the public becomes informed about these types of technologies and the way the public debate gets framed, both shape the public perceptions about CCS. The current study somehow contradicts this by stating that the framing does not matter, and that emotional reactions and personal values are the most crucial factors. At the same time, the findings from Palmgren and colleagues (2004) could support the heavy influence of the skewed sample.

As for the other scenario, plastic pollution is a very different risk compared to CCS, and is also involved around a different public discourse, at least in Norway. In April 2017, a whale was found dead in the western part of Norway, (probably) due to the plastic found in its stomach. This news got international media attention and was highlighted as a visible proof of

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human`s destructive consumption of plastic (Thompson, Moore, Vom Saal, & Swan, 2009; UiB, 2017). Following the argument by Palmgren and colleagues (2004), and the theoretical support for framing presented in the theoretical part, the “availability” through the media`s attention should have been detectable through significantly different scores on the manipulation checks between the different scenarios. As they did not differentiate significantly, one could suggest that this supports the general finding in this thesis, that framing (e.g. availability, location eca.) in the context of environmental risks, does not seem to matter as much as one could think.

The scenarios provided in the current study holds a good ecological validity by using scenarios that are very diverse, and in addition very similar to what one might read in a newspaper or a magazine. It is therefore reasonable to insinuate practical implications of the current findings. Examples of both types of framings occurring in news articles in popular media or pictures seen in conjunction with demonstrations or street activism (or examples, see Appendix D). The types of messages or campaigns that try to communicate an urgency and severity of environmental risks by using proximity, and individual morality-based framings, could not expect an increased support of ethical related policies, based on the current findings. This is in comparison with messages using distance, and collectively morality-based framings.



### **Conclusions and Future Directions**

The current study has investigated how people perceive and evaluate environmental risk, when framing is manipulated. The implications of the study contribute with empirical findings to the field of climate psychology and risk perception in general, but also specifically for climate communication. It is important that messages about energy transition and hazardous environmental risks (like plastic pollution) are being understood and acted upon. Studies like this are important in order to get a better insight in how people understand environmental risk, so that we can acquire increased knowledge about how to reach them with messages about interventions and measures needed to eliminate harmful environmental degradation and greenhouse gas emissions in the future.

Based on the literature on mental models, it is tempting to conclude that it is the amount of knowledge about climate change and environmental risks and the way it is framed, that drive perceptions, evaluations, and behaviour tendencies. But based on the current findings and the literature on values and emotions, this assumption seems not to be the case (Stern et al. 1999; Stern, 2000, Böhm, 2003, De Groot & Steg, 2007). Instead of assuming framing as a decisive factor, the role of personal values and emotions should be taken more into account. Because, if policy makers, activists, and the general media follow the motivations from the citizens, this could support pro-environmental actions tendencies to a much greater extent (Reese & Jacob, 2015). In the end, people support the policy they think is most efficient (Bostrom, et.al, 2012).

Based on elements from the discussion, an area of improvement for these types of studies would be to ensure the representativeness of the sample in order to avoid the potential biases. The sample should have a greater proportion of men, elderly, non-students, workers, and right-wing oriented participants. The design of the study could be reconsidered in terms of the use of stimuli, and be deliberate on the format that is being used.

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The fact that environmental issues is much discussed (even in early childhood), and a “well-known” theme, contributes to a potential preconditioned frame that one should be aware of when trying to look for framing effects. I think the present study supports that the public discourse and the media has a powerful effect on shaping people’s mental models and, thereby, also environmental risk evaluations. In addition to continuous exploration of this challenge through studies, further research should also look into the effect of other personal predispositions in conjunction with environmental risk perception and evaluations, using similar frameworks to the VBN-theory, but including other types of measurements.

### **Ethics**

Since the study did not concern any health-related questions or gathered any sensitive information from the participants, an application to NSD (Norwegian Centre for Research Data) was not considered necessary. In terms of ethical considerations, necessary information was given in advance. This included information about confidentiality, rights to withdrawal, voluntariness, that there were no right and wrong answers, and a short explanation of the purpose and procedure of the study. The participants were also willingly informed about the aim of the study when they were paid their incentive after finishing the questionnaire.

### References

- Akerlof, K., Maibach, E. W., Fitzgerald, D., Ceden, A. Y., & Neuman, A. (2013). Do people “personally experience” global warming, and if so how, and does it matter?. *Global Environmental Change*, 23(1), 81-91.
- Arcury, T. A., & Christianson, E. H. (1990). Environmental worldview in response to environmental problems: Kentucky 1984 and 1988 compared. *Environment and Behavior*, 22(3), 387-407.
- Banerjee, B., & McKeage, K. (1994). How green is my value: exploring the relationship between environmentalism and materialism. *Association for Consumer Research*, 21, 147-152.
- Bar-Anan, Y., Liberman, N., Trope, Y., & Algom, D. (2007). Automatic processing of psychological distance: evidence from a Stroop task. *Journal of Experimental Psychology: General*, 136(4), 610.
- Bardi, A., & Schwartz, S. H. (2003). Values and behavior: Strength and structure of relations. *Personality and Social Psychology Bulletin*, 29(10), 1207-1220.
- Baron, J., & Spranca, M. (1997). Protected values. *Organizational behavior and human decision processes*, 70(1), 1-16.
- Baumeister, R.F, Vohs, K.D & Tice, D.M. (2012). Emotional Influences on Decision Making. In J.P. Forgas (Ed.), *Affect in social thinking and behavior* (pp. 143-189). Psychology Press.
- Beutel, A. M., & Marini, M. M. (1995). Gender and values. *American sociological review*, 436-448.
- Bostrom, A., O'Connor, R. E., Böhm, G., Hanss, D., Bodi, O., Ekström, F., ... & Rosentrater, L. (2012). Causal thinking and support for climate change policies: International survey findings. *Global Environmental Change*, 22(1), 210-222.  
doi: 10.1016/j.gloenvcha.2011.09.012
- Bostrom, A. (2017). Mental Models and Risk Perceptions Related to Climate Change. *Oxford Research Encyclopedia of Climate Science*. Retrieved 29 Nov. 2017, from <http://climatescience.oxfordre.com/view/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e->
- Brügger, A., Dessai, S., Devine-Wright, P., Morton, T. A., & Pidgeon, N. F. (2015). Psychological responses to the proximity of climate change. *Nature climate change*, 5(12), 1031-1037.

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Böhm, G. (2003). Emotional reactions to environmental risks: Consequentialist versus ethical evaluation. *Journal of Environmental Psychology, 23*(2), 199-212.
- Böhm, G. & Pfister, H.-R. (2000). Action tendencies and characteristics of environmental risks. *Acta Psychologica, 104*, 317–337.
- Böhm, G. & Pfister, H.-R. (2001). Mental representation of global environmental risks. *Research in Social Problems and Public Policy, 9*, 1–30.
- Böhm, G. & Pfister, H.-R. (2005). Consequences, morality, and time in environmental risk evaluation. *Journal of Risk Research, 8*(6), 461-479.
- Böhm, G., & Pfister, H.R. (2009). Antinomies of environmental risk perception: cognitive structure and evaluation. In Casimir M.J. (Ed.), *Culture and the Changing Environment: Uncertainty, Cognition, and Risk Management in Cross-Cultural Perspective* (pp. 61-77). Berghahn Books.
- Böhm, G., & Pfister, H. R. (2017). The perceiver's social role and a risk's causal structure as determinants of environmental risk evaluation. *Journal of Risk Research, 20*(6), 732-759.
- Carl, N. (2015) Why Do Academics Lean Left? Nuffield College, Oxford. Retrieved 29 Nov. 2017, from <https://static1.squarespace.com/static/56eddde762cd9413e151ac92/t/58b5a7cd03596ec6631d8b8a/1488299985267/Left+Wing+Bias+Paper.pdf>
- Chodorow, N., Rosaldo, M. Z., & Lamphere, L. (1974). Women, culture and society. *Woman, Culture, and Society*.
- Cohen, J. (1992). Statistical power analysis. *Current Directions in Psychological Science, 1*(3), 98-101.
- Corner, A., Markowitz, E., & Pidgeon, N. (2014). Public engagement with climate change: the role of human values. *Wiley Interdisciplinary Reviews: Climate Change, 5*(3), 411-422.
- Davidson, D. J., & Freudenburg, W. R. (1996). Gender and environmental risk concerns: A review and analysis of available research. *Environment and Behavior, 28*(3), 302-339.
- Dawes, R. M., & Messick, D. M. (2000). Social dilemmas. *International Journal of Psychology, 35*(2), 111-116.
- De Groot, J. I., & Steg, L. (2007). Value orientations and environmental beliefs in five countries: Validity of an instrument to measure egoistic, altruistic and biospheric value orientations. *Journal of Cross-Cultural Psychology, 38*(3), 318-332.

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- De Groot, J. I., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior*, 40(3), 330-354.
- Dietz, T., Dan, A., & Shwom, R. (2007). Support for climate change policy: Social psychological and social structural influences. *Rural Sociology*, 72(2), 185-214.
- Doherty, T. J., & Clayton, S. (2011). The psychological impacts of global climate change. *American Psychologist*, 66(4), 265-276.
- Dunlap, R. E., Xiao, C., & McCright, A. M. (2001). Politics and environment in America: Partisan and ideological cleavages in public support for environmentalism. *Environmental Politics*, 10(4), 23-48.
- Eriksen, S. (2006, 11.october). Norge uforberedt på klimaendringer. *Dagbladet*. Retrieved from <https://www.dagbladet.no/kultur/norge-uforberedt-pa-klimaendringer/66261772>
- Eriksson, L., Garvill, J., & Nordlund, A. M. (2006). Acceptability of travel demand management measures: The importance of problem awareness, personal norm, freedom, and fairness. *Journal of Environmental Psychology*, 26(1), 15-26.
- Eriksson, L., Garvill, J., & Nordlund, A. M. (2008). Acceptability of single and combined transport policy measures: The importance of environmental and policy specific beliefs. *Transportation Research Part A: Policy and Practice*, 42(8), 1117-1128.
- Feinberg, M., & Willer, R. (2013). The moral roots of environmental attitudes. *Psychological Science*, 24(1), 56-62.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.
- Finucane, M. L., Alhakami, A., Slovic, P., & Johnson, S. M. (2000). The affect heuristic in judgments of risks and benefits. *Journal of Behavioral Decision Making*, 13(1), 1.
- Forgas, J.P. (Ed.) (2012). *Affect in social thinking and behaviour*. Psychology Press.
- Frijda, N.H. (1986). *The emotions*. Cambridge, England: Cambridge University Press.
- Förster, J., Friedman, R. S., & Liberman, N. (2004). Temporal construal effects on abstract and concrete thinking: consequences for insight and creative cognition. *Journal of personality and social psychology*, 87(2), 177.
- Gardiner, S. M. (2006). A perfect moral storm: climate change, intergenerational ethics and the problem of moral corruption. *Environmental Values*, 397-413.
- Gentner, D., & Stevens, A. L. (Eds.) (2014). *Mental models*. Psychology Press.
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, 293(5537),

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

2105-2108.

- Greene, J., & Haidt, J. (2002). How (and where) does moral judgment work?. *Trends in Cognitive Sciences*, 6(12), 517-523.
- Guglielmo, S., Monroe, A. E., & Malle, B. F. (2009). At the heart of morality lies folk psychology. *Inquiry*, 52(5), 449-466.
- Haidt, J. (2001). The emotional dog and its rational tail: a social intuitionist approach to moral judgment. *Psychological review*, 108(4), 814.
- Harth, N. S., Leach, C. W., & Kessler, T. (2013). Guilt, anger, and pride about in-group environmental behaviour: Different emotions predict distinct intentions. *Journal of Environmental Psychology*, 34, 18-26.
- Hulme, M. (2009). *Why we disagree about climate change: Understanding controversy, inaction and opportunity*. Cambridge University Press.
- IPCC (2014). Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151. Available from: <http://www.ipcc.ch/report/ar5/syr/>
- Jamieson, D. (2007). The moral and political challenges of climate change. *Creating a climate for change: Communicating climate change and facilitating social change*, 475-482
- Jamieson, D. (2010). Climate change, responsibility, and justice. *Science and Engineering Ethics*, 16(3), 431-445.
- Johnson, E.J., and Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal of Personality and Social Psychology*, 45(1983), 20-31.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the Econometric Society*, 263-291.
- Keeney R.L., & Raiffa, H. (1976). *Decisions with Multiple Objectives*. New York: John Wiley.
- Kloeckner, C. A. (2011). Towards a psychology of climate change. *The economic, social and political elements of climate change* (pp. 153-173). Springer, Berlin, Heidelberg.
- Knowles, M. S., Holton III, E. F., & Swanson, R. A. (2014). *The adult learner: The definitive classic in adult education and human resource development*. Routledge.
- Koger, S. M., & Winter, D. D. (2011). *The Psychology of Environmental Problems: Psychology for Sustainability*. Psychology press.

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Kohut, A., & Pew Research Center. (2013). *Climate change and financial instability seen as top global threats*. Washington, DC: Pew Research Center.
- Lazarus, R. S. (1982). Thoughts on the relations between emotion and cognition. *American psychologist*, 37(9), 1019.
- Leiserowitz, A. A. (2005). American risk perceptions: Is climate change dangerous?. *Risk Analysis*, 25(6), 1433-1442.
- Leiserowitz, A., & Smith, N. (2010). Knowledge of climate change across global warming's six Americas. *Yale University, New Haven CT: Yale Project on Climate Change Communication*. Available at: [environment.yale.edu/climate/files/Knowledge\\_Across\\_Six\\_Americas.pdf](http://environment.yale.edu/climate/files/Knowledge_Across_Six_Americas.pdf).
- Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organizational behavior and human decision processes*, 76(2), 149-188.
- Lieberman, N., & Trope, Y. (2008). The psychology of transcending the here and now. *Science*, 322(5905), 1201-1205.
- Lifton, R.J., & Falk, R. (1982). *Indefensible Weapons: the political and psychological case against nuclearism*. United States: Basic Books, Inc., New York, NY.
- Liere, K. D. V., & Dunlap, R. E. (1980). The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. *Public Opinion Quarterly*, 44(2), 181-197.
- Lorenzoni, I. (2003). *Present Choices, Future Climates: A cross-cultural study of perceptions in Italy and in the UK* (Doctoral dissertation). University of East Anglia, Norwich.
- Lorenzoni, I., & Pidgeon, N. F. (2006). Public views on climate change: European and USA perspectives. *Climatic Change*, 77(1), 73-95.
- Lorenzoni, I., Nicholson-Cole, S., & Whitmarsh, L. (2007). Barriers perceived to engage with climate change among the UK public and their policy implications. *Global Environmental Change*, 17(3), 445-459.
- Markowitz, E. M. (2012a). Is climate change an ethical issue? Examining young adults' beliefs about climate and morality. *Climatic Change*, 114(3-4), 479-495.
- Markowitz, E. M. (2012b). *Affective and Moral Roots of Environmental Stewardship: The Role of Obligation, Gratitude and Compassion* (Doctoral dissertation). University of Oregon, Oregon.



## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Markowitz, E. M., & Shariff, A. F. (2012). Climate change and moral judgement. *Nature Climate Change*, 2(4), 243-247
- McDaniels, T., Axelrod, L. J., & Slovic, P. (1996). Perceived ecological risks of global change: A psychometric comparison of causes and consequences. *Global Environmental Change*, 6(2), 159–171.
- McMillan, M., Hoban, T. J., Clifford, W. B., & Brant, M. R. (1997). Social and demographic influences on environmental attitudes. *Southern rural sociology*, 13(1), 89-107.
- Meijnders, A.L., Midden, C.J., & Wilke, H.A. (2001). Role of negative emotion in communication about CO2 risks. *Risk Analysis*, 21(5), 955-955.
- Metz, B., Davidson, O., De Coninck, H., Loos, M., & Meyer, L. (2005). *IPCC special report on carbon dioxide capture and storage*. Intergovernmental Panel on Climate Change, Geneva (Switzerland). Working Group III.
- Milbrath, L. W. (1984). *Environmentalists: Vanguard for a New Society*. Albany, NY: State University of New York Press.
- Morgan, M. G. (2002). *Risk Communication: A Mental Models Approach*. Cambridge University Press.
- Morgan, J., Dagnet, Y., & Tirpak, D. (2014). Elements and ideas for the 2015 Paris agreement. *Washington, DC: Agreement for Climate Transformation*.
- Moser, S.C. (2010). Communicating climate change: history, challenges, process and future directions. *Wiley Interdisciplinary Reviews: Climate Change*, 1(1), 31-53.
- Moxnes, E., & Assuad, C. S. (2012). GHG taxes and tradable quotas, experimental evidence of misperceptions and biases. *Environmental Economics*, 3(2), 44–56.
- National Research Council. (2010). *Driving and the Built Environment: The Effects of Compact Development on Motorized Travel* (Energy Use, and CO2 Emissions-- Special Report 298). National Academies Press. Retrieved from: <https://books.google.no/books?id=pnM3h72wQEC&lpg=PR1&ots=uCNuASoHBk&dq=National%20Research%20Council%2C%202010%20environment&lr&hl=no&pg=PR1#v=onepage&q=National%20Research%20Council,%202010%20environment&f=false>
- Nerb, J., & Spada, H. (2001). Evaluation of environmental problems: A coherence model of cognition and emotion. *Cognition & Emotion*, 15(4), 521-551.
- Neumann, R. (2000). The causal influences of attributions on emotions: A procedural priming approach. *Psychological Science*, 11(3), 179-182.

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Newell, B.R., & Pitman, A. J. (2010). The psychology of global warming: Improving the fit between the science and the message. *Bulletin of the American Meteorological Society*, 91(8), 1003-1014.
- Nisbet, M.C. (2009). Communicating climate change: Why frames matter for public engagement. *Environment: Science and Policy for Sustainable Development*, 51(2), 12-23.
- Nisbet, M. C., & Mooney, C. (2009). Framing science. *Science*, 316.
- Nordlund, A. M., & Garvill, J. (2002). Value structures behind pro environmental behavior. *Environment and Behavior*, 34(6), 740-756.
- Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology*, 23(4), 339-347.
- Norgaard, K. M. (2011). *Living in Denial: Climate change, Emotions, and Everyday Life*. Massachusetts: The MIT Press.
- Norwegian Citizen Panel Wave 7, 2016. Data collected by Ideas2evidence for Elisabeth Ivarsflaten et.al., The University of Bergen. First NSD edition, Bergen 2017.
- O'Connor, R.E., Bord, R.J. & Fisher, A. (1999). Risk Perceptions, General Environmental Beliefs, and Willingness to Address Climate Change. *Risk Analysis*, 19(3), 461-471.
- O'Neill, S. J., & Hulme, M. (2009). An iconic approach for representing climate change. *Global Environmental Change*, 19(4), 402-410.
- Palmgren, C. R., Morgan, M. G., Bruine de Bruin, W., & Keith, D. W. (2004). Initial public perceptions of deep geological and oceanic disposal of carbon dioxide. *Environmental Science & Technology*, 38(24), 6441-6450.
- Pawlik, K. (1991) The psychology of global environmental change: Some basic data and an agenda for cooperative international research, *International Journal of Psychology*, 26, 547-6.
- Pidgeon, N. (2012). Public understanding of, and attitudes to, climate change: UK and international perspectives and policy. *Climate Policy*, 12(sup01), S85-S106.
- Reese, G., & Jacob, L. (2015). Principles of environmental justice and pro-environmental action: A two-step process model of moral anger and responsibility to act. *Environmental Science & Policy*, 51, 88-94.
- Reser, J. P., Bradley, G. L., Glendon, A. I., Ellul, M. C., & Callaghan, R. (2012). *Public risk perceptions, understandings and responses to climate change and natural disasters in*

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Australia, 2010 and 2011* (p. 246). Gold Coast, QLD, Australia: National Climate Change Adaptation Research Facility.
- Reysen, S., & Katzarska-Miller, I. (2013). A model of global citizenship: Antecedents and outcomes. *International Journal of Psychology, 48*(5), 858-870.
- Räthzel, N., & Uzzell, D. (2009). Changing relations in global environmental change. *Global Environmental Change, 19*(3), 326-335.
- Salkind, N. J. (Ed.). (2010). *Encyclopedia of Research Design* (Vol. 1). Sage.
- Schwartz, S. H. (1977). Normative influences on altruism. *Advances in Experimental Social Psychology, 10*, 221-279.
- Schwartz, S.H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology, 25*, 1-65.
- Shwom, R., Bidwell, D., Dan, A., & Dietz, T. (2010). Understanding US public support for domestic climate change policies. *Global Environmental Change, 20*(3), 472-482.
- Singer, P. (2006). Ethics and climate change: A commentary on MacCracken, Toman and Gardiner. *Environmental Values, 15*(3), 415-422.
- Sjöberg, L. (2000). Factors in risk perception. *Risk Analysis, 20*(1), 1-12.
- Skitka, L. J. (2010). The psychology of moral conviction. *Social and Personality Psychology Compass, 4*(4), 267-281.
- Slovic, P. (1997). Trust, emotion, sex, politics, and science. *Environment, Ethics, and Behavior, 277-313*.
- Slovic, P., & Peters, E. (2006). Risk perception and affect. *Current Directions in Psychological Science, 15*(6), 322-325.
- Sorge, M. (2017, 10. October). Måling: På NHH ville Erna hatt flertall alene. *Studvest*. Retrieved from <https://www.studvest.no/maling-pa-nhh-og-bi-ville-erna-hatt-flertall-alene/>
- Spence, A., & Pidgeon, N. (2010). Framing and communicating climate change: The effects of distance and outcome frame manipulations. *Global Environmental Change, 20*(4), 656-667.
- Steentjes, K., Pidgeon, N. F., Poortinga, W., Corner, A. J., Arnold, A., Böhm, G., ... & Sonnberger, M. (2017). *European Perceptions of Climate Change (EPCC): Topline findings of a survey conducted in four European countries in 2016*. Retrieved from <http://orca.cf.ac.uk/98660/7/EPCC.pdf>

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Sterman, J. D. (2008). Risk communication on climate: mental models and mass balance. *Science*, 322(5901), 532-533.
- Stern, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and behavior*, 25(5), 322-348.
- Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, 50 (3), 65-84.
- Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human ecology review*, 81-97.
- Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of social issues*, 56(3), 407-424
- Stoknes, P. E. (2014). Rethinking climate communications and the “psychological climate paradox”. *Energy Research & Social Science*, 1, 161-170.
- Stoll-Kleemann, S., O’Riordan, T., & Jaeger, C. C. (2001). The psychology of denial concerning climate mitigation measures: evidence from Swiss focus groups. *Global environmental change*, 11(2), 107-117.
- Svarstad, J. (2017, 31. March). Slik stemmer norske forskere. Retrieved from <http://www.forskerforum.no/slik-stemmer-norske-forskere/>
- Swim, J. K., Stern, P. C., Doherty, T. J., Clayton, S., Reser, J. P., Weber, E. U., ... & Howard, G. S. (2011). Psychology's contributions to understanding and addressing global climate change. *American Psychologist*, 66(4), 241.
- Tetlock, P. E. (2003). Thinking the unthinkable: Sacred values and taboo cognitions. *Trends in Cognitive Sciences*, 7(7), 320-324.
- The Guardian (2002, 24. November). What would Jesus drive? A disciple carrier, of course. Retrieved 27.09.17 from <https://www.theguardian.com/world/2002/nov/24/usa.edvulliamy>
- Thompson, R. C., Moore, C. J., Vom Saal, F. S., & Swan, S. H. (2009). Plastics, the environment and human health: current consensus and future trends. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 364(1526), 2153-2166..
- UiB (2017, 08.March). Retrieved 25.November 2017 from <http://www.uib.no/aktuelt/106082/historien-om-hvalen-med-plast-i-magen-blir-utstilling>

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Uzzell, D. L. (2000). The psycho-spatial dimension of global environmental problems. *Journal of Environmental Psychology, 20*(4), 307-318.
- Verplanken, B., & Holland, R. W. (2002). Motivated decision making: effects of activation and self-centrality of values on choices and behavior. *Journal of Personality and Social Psychology, 82*(3), 434.
- Vlek, C. A. (1996). Collective risk generation and risk management: The unexploited potential of the social dilemmas paradigm. In *Frontiers in Social Dilemmas Research*, 11-38.
- Wakslak, C. J., Trope, Y., Liberman, N., & Alony, R. (2006). Seeing the forest when entry is unlikely: probability and the mental representation of events. *Journal of Experimental Psychology: General, 135*(4), 641.
- Wardekker, J.A., Petersen, A.C., & van Der Sluijs, J.P. (2009). Ethics and public perception of climate change: Exploring the Christian voices in the US public debate. *Global Environmental Change, 19*(4), 512-521.
- Weber, E. U. (2006). Experience-based and description-based perceptions of long-term risk: Why global warming does not scare us (yet). *Climatic Change, 77*(1), 103-120.
- Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist, 35*(2), 151-175. doi: 10.1037/0003-066X.35.2.151
- Zajonc, R. B. (1984). On the primacy of affect. *American Psychologist, 39*(2), 117-123. Doi: 10.1037/0003-066X.39.2.117
- Zelezny, L. C., Chua, P. P., & Aldrich, C. (2000). New ways of thinking about environmentalism: Elaborating on gender differences in environmentalism. *Journal of Social Issues, 56*(3), 443-457.

## Appendix

### Appendix A - Pilot study questions

1. Hva handlet teksten om? What was the text about? (*tekstbox*)
2. Var det noe du reagerte på I teksten? Was it something that you found odd in the text? (*tekstbox*)
3. opplever du det du leste som et problem/noe risikofylt? Do you experience what you just read to be a problem/something risky? (If yes/no; why?) (*tekstbox*)
4. Jeg opplevde teksten som troverdig. I experienced the text as trustworthy. *Scale 1 (not at all) to 7 (to a large extent)*
5. Mens jeg leste teksten kunne jeg forestille meg det som ble beskrevet. While reading the text, I could imagine what was described. *Scale 1 (not at all) to 7 (to a large extent)*
6. Jeg ble engasjert mens jeg leste teksten; I became engaged while reading the text. *Scale 1 (not at all) to 7 (to a large extent)*
7. Historien påvirket meg følelsesmessig; the story accepted me emotionally. *Scale 1 (not at all) to 7 (to a large extent)*
8. Hvor truende finner du denne situasjonen? How threatening do you find this situation? *Scale 1 (not at all) to 7 (to a large extent)*
9. Hvor finner denne risikoen sted? Where does this risk take place? *1 (lokalt) til 7 (globalt) / 1 (locally) to 7 (globally)*
10. Hvis noen; hvem er ansvarlige for denne risikoen? If anyone, who is responsible for this risk? (*Individet (du og meg) – felleskapet/verdensbefolkningen – ingen*) *1-7 (The individual (you and me) – the community/world`s population – no one)*
11. Hvis du måtte velge, hvem ville du sagt var ansvarlig? If you had to choose, who would you say were responsible? *1 (the individual) 2 (the community/the world`s population)*

**Appendix B - The main study questionnaire**

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**Start of Block: Intro**

Q1 *Velkommen!*

*Denne studien er en del av et mastergradsprosjekt for Annika Rødeseike ved Det psykologiske fakultet. Hensikten med prosjektet er å få en bedre forståelse av hvordan folk tenker rundt ulike klima- og miljøsituasjoner.*

*Det finnes ikke noe riktig eller feil svar på spørsmålene. Vi er kun interessert i din personlige mening, og dine svar vil forbli anonyme. Hvis du har svart feil, eller vil se spørsmålet igjen kan du trykke tilbakepilen. Du vil også kunne følge med på en fremdriftslinje underveis.*

*Du er nå klar til å starte. Det vil ta ca. 15-20 minutter å besvare spørsmålene, men du kan selvsagt bruke lenger tid. Deltakelsen er frivillig, og du står fritt til å trekke deg fra undersøkelsen dersom du ønsker det.*

*Deltakelsen din vil bli kompensert med kr 100.*

*Vi setter stor pris på at du deltar. Takk for ditt bidrag!*

**End of Block: Intro**

---

**Start of Block: Intro\_scenarios**

Q76 Du vil nå bli presentert for to ulike scenarioer. Etter at du har lest hvert av dem, vil du måtte ta noen avgjørelser. Deretter vil studien fortsette med andre spørsmål.

**End of Block: Intro\_scenarios**

---

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Start of Block: CCS\_glob\_coll

## RANDOMIZATION

Q111 Vennligst forestill deg at du leser følgende tekst i en avis. Prøv å sette deg godt inn i den nevnte situasjonen og se den for deg så levende du kan. Vi vil relatere oss til denne teksten heretter.

---

Q112

Karbonfangst- og lagring (Carbon capture and storage, CCS) er under stadig utvikling i verden. Eksempler på store CCS prosjekter er olje- og gassreservoarene i Salah i Algerie og Saskatchewan i Canada. CCS er et teknologisk bidrag for å fange karbondioksid (CO<sub>2</sub>) og lagre det for å forhindre at det slippes ut i atmosfæren der det bidrar til global oppvarming. Geofysisk forskning viser midlertidig at det foreligger en svært høy risiko ved å sprøyte CO<sub>2</sub> inn i geologiske formasjoner, fordi en ikke har god nok kunnskap, ei heller garanti, om at lageret ikke vil sprekke. Hvis lageret sprekker, vil store mengder CO<sub>2</sub> lekke ut. Dette vil føre til en forsurening av verdenshavene som kan skade alle marine livsformer, fra bakterier, skalldyr og fisk, til pattedyr. Resultatet kan bli utryddelse av mange dyre- og plantearter. Analyser gjort av Institutt for Samfunn og Velferd viser at CCS er helt nødvendig for å dekke dagens etterspørsel etter energi i verden, uten at det fører til ytterligere global oppvarming. Samtidig konkluderer de samme forskerne med at hvis menneskeheten hadde klart å redusere sine høye CO<sub>2</sub>-utslipp, som kommer av f.eks. industriproduksjon, jordbruk og avskoging, ville karbonfangst- og lagring trolig ikke blitt vurdert som et alternativ.

End of Block: CCS\_glob\_coll

---

Start of Block: CCS\_glob\_ind

Q117 Vennligst forestill deg at du leser følgende tekst i en avis. Prøv å sette deg godt inn i den nevnte situasjonen og se den for deg så levende du kan. Vi vil relatere oss til denne teksten heretter.



Q118

Karbonfangst- og lagring (Carbon capture and storage, CCS) er under stadig utvikling i verden. Eksempler på store CCS prosjekter er olje- og gassreservoarene i Salah i Algerie og Saskatchewan i Canada. CCS er et teknologisk bidrag for å fange karbondioksid (CO<sub>2</sub>) og lagre det for å forhindre at det slippes ut i atmosfæren der det bidrar til global oppvarming. Geofysisk forskning viser midlertidig at det foreligger en svært høy risiko ved å sprøyte CO<sub>2</sub> inn i geologiske formasjoner, fordi en ikke har god nok kunnskap, ei heller garanti, om at lageret ikke vil sprekke. Hvis lageret sprekker, vil store mengder CO<sub>2</sub> lekke ut. Dette vil føre til en forsuring av verdenshavene som kan skade alle marine livsformer, fra bakterier, skalldyr og fisk, til pattedyr. Resultatet kan bli utryddelse av mange dyre- og plantearter. Analyser gjort av Institutt for Samfunn og Velferd viser at CCS er helt nødvendig for å dekke dagens etterspørsel etter energi i verden, uten at det fører til ytterligere global oppvarming. Samtidig konkluderer de samme forskerne med at hvis den enkelte nordmann hadde klart å redusere sine høye CO<sub>2</sub>-utslipp, som kommer av f.eks. flyreiser, høyt energiforbruk og høyt konsum av bruksartikler, ville karbonfangst- og lagring trolig ikke blitt vurdert som et alternativ.

End of Block: CCS\_glob\_ind

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Start of Block: CCS\_loc\_coll

Q112 Vennligst forestill deg at du leser følgende tekst i en avis. Prøv å sette deg godt inn i den nevnte situasjonen og se den for deg så levende du kan. Vi vil relatere oss til denne teksten heretter.

---

Q116

Karbonfangst- og lagring (Carbon capture and storage, CCS) er under stadig utvikling i Norge. Eksempler på store CCS prosjekter er testsenteret på Mongstad og Sleipnerfeltet i Nordsjøen. CCS er et teknologisk bidrag for å fange karbondioksid (CO<sub>2</sub>) og lagre det for å forhindre at det slippes ut i atmosfæren der det bidrar til global oppvarming. Geofysisk forskning viser midlertidig at det foreligger en svært høy risiko ved å sprøyte CO<sub>2</sub> inn i geologiske formasjoner, fordi en ikke har god nok kunnskap, ei heller garanti, om at lageret ikke vil sprekke. Hvis lageret sprekker, vil store mengder CO<sub>2</sub> lekke ut. Dette vil føre til en forsurening av det norske havet som kan skade alle marine livsformer, fra bakterier, skalldyr og fisk, til pattedyr. Resultatet kan bli utryddelse av mange dyre- og plantearter. Analyser gjort av Institutt for Samfunn og Velferd viser at CCS er helt nødvendig for å dekke dagens etterspørsel etter energi i Norge, uten at det fører til ytterligere global oppvarming. Samtidig konkluderer de samme forskerne med at hvis menneskeheten hadde klart å redusere sine høye CO<sub>2</sub>-utslipp, som kommer av f.eks. industriproduksjon, jordbruk og avskoging, ville karbonfangst- og lagring trolig ikke blitt vurdert som et alternativ.

End of Block: CCS\_loc\_coll

---

Start of Block: CCS\_loc\_ind

Q4 Vennligst forestill deg at du leser følgende tekst i en avis. Prøv å sette deg godt inn i den nevnte situasjonen og se den for deg så levende du kan. Vi vil relatere oss til denne teksten heretter.

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## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Q4a

Karbonfangst- og lagring (Carbon capture and storage, CCS) er under stadig utvikling i Norge. Eksempler på store CCS prosjekter er testsenteret på Mongstad og Sleipnerfeltet i Nordsjøen. CCS er et teknologisk bidrag for å fange karbondioksid (CO<sub>2</sub>) og lagre det for å forhindre at det slippes ut i atmosfæren der det bidrar til global oppvarming. Geofysisk forskning viser midlertidig at det foreligger en svært høy risiko ved å sprøyte CO<sub>2</sub> inn i geologiske formasjoner, fordi en ikke har god nok kunnskap, ei heller garanti, om at lageret ikke vil sprekke. Hvis lageret sprekker, vil store mengder CO<sub>2</sub> lekke ut. Dette vil føre til en forsurening av det norske havet som kan skade alle marine livsformer, fra bakterier, skalldyr og fisk, til pattedyr. Resultatet kan bli utryddelse av mange dyre- og plantearter. Analyser gjort av Institutt for Samfunn og Velferd viser at CCS er helt nødvendig for å dekke dagens etterspørsel etter energi i Norge, uten at det fører til ytterligere global oppvarming. Samtidig konkluderer de samme forskerne med at hvis den enkelte nordmann hadde klart å redusere sine høye CO<sub>2</sub>-utslipp, som kommer av f.eks. flyreiser, høyt energiforbruk og høyt konsum av bruksartikler ville karbonfangst- og lagring trolig ikke blitt vurdert som et alternativ.

End of Block: CCS\_loc\_ind

---

Start of Block: Man\_check\_CCS

Q72 Når du tenker på scenarioet du nettopp leste, hvor vil du si at dette foregår?

|     | Lokalt (1)            | Globalt (2)           |
|-----|-----------------------|-----------------------|
| (1) | <input type="radio"/> | <input type="radio"/> |

---

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Q73 Når du tenker på scenarioet du nettopp leste, hvem vil du si har det moralske ansvaret?

|     | Individet (1)         | Verdensbefolkningen (2) |
|-----|-----------------------|-------------------------|
| (1) | <input type="radio"/> | <input type="radio"/>   |

End of Block: Man\_check\_CCS

---

Start of Block: CCS\_emotions

Q105 Når du tenker på scenarioet du nettopp leste, hvor intenst opplever du hver av disse spesifikke følelsene?

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

|                     | Ikke i<br>det hele<br>tatt (1) | (2)                   | (3)                   | (4)                   | (5)                   | (6)                   | Veldig<br>sterkt (7)  |
|---------------------|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Sinne (1)           | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Forrakt (2)         | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Sympati (3)         | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Tristhet (4)        | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Frykt (5)           | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Bekymring<br>(6)    | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Hjelpsløshet<br>(7) | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Raseri (8)          | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Sorg (9)            | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Håpløshet<br>(10)   | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Indignasjon<br>(11) | <input type="radio"/>          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

End of Block: CCS\_emotions

Start of Block: CCS\_policy

Q106 Vennligst ta stilling til følgende tiltak, og indiker i hvilken grad du støtter hvert av tiltakene.



## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Jeg ville ha donert  
penger til en  
miljøorganisasjon  
som tar ansvar for  
å forhindre denne  
type situasjoner  
(f.eks. lobbierer  
mot CCS) (5)

Jeg ville ha kjøpt  
og brukt mindre  
tjenester/produkter  
som involverer  
olje (f.eks. fly  
mindre) (6)

Satse på  
miljøundervisning  
(f.eks. i skolen, på  
jobb) (7)

I stor grad erstatte  
fossilt brensel med  
fornybar energi  
(8)

End of Block: CCS\_policy

---

Start of Block: Plastic\_glob\_coll

RANDOMIZATION



## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Q24 Vennligst forestill deg at du leser følgende tekst i en avis. Prøv å sette deg godt inn i den nevnte situasjonen og se den for deg så levende du kan. Vi vil relatere oss til denne teksten heretter.

---

Q69

En FN-rapport anslår at det i 2050 vil være mer plast enn fisk i verdenshavene, hvis vi fortsetter med det nivået av marin forøpling som vi har nå. Tusenvis av sjøfugler, marine pattedyr, samt et ukjent antall fisk og andre dyr blir skadet eller drept av marint avfall i verden hvert år. Det har for eksempel blitt funnet og avlivet syke og underernærte hvaler med magen full av plastikk. Dyrene forveksler plast med mat, eller setter seg fast i garn og tau. Dette skjer over hele verden, for eksempel i Stillehavet. En nylig analyse gjort av en gruppe forskere ved Senter for Samfunnsutvikling viser at den aller fremste løsningen på dette problemet vil være hvis verdensbefolkningen slutter å kaste fra seg avfall som kan ende i havet. Dette gjelder også i stor grad mikroplast (plast mindre enn 5 mm), som det finnes mye av i forbindelse med f.eks. ubehandlet kloakk, industri og turisme, som verdensbefolkningen dumper ut i havet hver eneste dag.

End of Block: Plastic\_glob\_coll

---

Start of Block: Plastic\_glob\_ind

Q23 Vennligst forestill deg at du leser følgende tekst i en avis. Prøv å sette deg godt inn i den nevnte situasjonen og se den for deg så levende du kan. Vi vil relatere oss til denne teksten heretter.

---

Q23a

En FN-rapport anslår at det i 2050 vil være mer plast enn fisk i verdenshavene, hvis vi fortsetter med det nivået av marin forurensning som vi har nå. Tusenvis av sjøfugler, marine pattedyr, samt et ukjent antall fisk og andre dyr blir skadet eller drept av marint avfall i verden hvert år. Det har for eksempel blitt funnet og avlivet syke og underernærte hvaler med magen full av plastikk. Dyrene forveksler plast med mat, eller setter seg fast i garn og tau. Dette skjer over hele verden, for eksempel i Stillehavet. En nylig analyse gjort av en gruppe forskere ved Senter for Samfunnsutvikling viser at den aller fremste løsningen på dette problemet vil være hvis du og jeg slutter å kaste fra oss avfall som kan ende i havet. Dette gjelder også i stor grad mikroplast (plast mindre enn 5 mm), som det finnes mye av i f.eks. noen typer tannpasta, hudpleieprodukter og treningsklær, som du og jeg skyller ned avløpet og ut i havet hver eneste dag.

End of Block: Plastic\_glob\_ind

---

Start of Block: Plastic\_loc\_coll

Q22 Vennligst forestill deg at du leser følgende tekst i en avis. Prøv å sette deg godt inn i den nevnte situasjonen og se den for deg så levende du kan. Vi vil relatere oss til denne teksten heretter.

---

Q68

En FN-rapport anslår at det i 2050 vil være mer plast enn fisk i norske hav, hvis vi fortsetter med det nivået av marin forurensning som vi har nå. Tusenvis av sjøfugler, marine pattedyr, samt et ukjent antall fisk og andre dyr blir skadet eller drept av marint avfall i Norge hvert år. Det har for eksempel blitt funnet og avlivet syke og underernærte hvaler med magen full av plastikk. Dyrene forveksler plast med mat, eller setter seg fast i garn og tau. Dette skjer her, langs den norske kyst. En nylig analyse gjort av en gruppe forskere ved Senter for Samfunnsutvikling viser at den aller fremste løsningen på dette problemet vil være hvis verdensbefolkningen slutter å kaste fra seg avfall som kan ende i havet. Dette gjelder også i stor grad mikroplast (plast mindre enn 5 mm), som det finnes mye av i forbindelse med f.eks. ubehandlet kloakk, industri og turisme, som verdensbefolkningen dumper ut i havet hver eneste dag.

End of Block: Plastic\_loc\_coll

---

Start of Block: Plastic\_local\_ind

Q20 Vennligst forestill deg at du leser følgende tekst i en avis. Prøv å sette deg godt inn i den nevnte situasjonen og se den for deg så levende du kan. Vi vil relatere oss til denne teksten heretter.

---

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Q21a

En FN-rapport anslår at det i 2050 vil være mer plast enn fisk i norske hav, hvis vi fortsetter med det nivået av marin forurensning som vi har nå. Tusenvis av sjøfugler, marine pattedyr, samt et ukjent antall fisk og andre dyr blir skadet eller drept av marint avfall i Norge hvert år. Det har for eksempel blitt funnet og avlivet syke og underernærte hvaler med magen full av plastikk. Dyrene forveksler plast med mat, eller setter seg fast i garn og tau. Dette skjer her, langs den norske kyst. En nylig analyse gjort av en gruppe forskere ved Senter for Samfunnsutvikling viser at den aller fremste løsningen på dette problemet vil være hvis du og jeg slutter å kaste fra oss avfall som kan ende i havet. Dette gjelder også i stor grad mikroplast (plast mindre enn 5 mm), som det finnes mye av i f.eks. noen typer tannpasta, hudpleieprodukter og treningsklær, som du og jeg skyller ned avløpet og ut i havet hver eneste dag.

End of Block: Plastic\_local\_ind

Start of Block: man\_check\_plastic

Q119 Når du tenker på scenarioet du nettopp leste, hvor vil du si at dette foregår?

|     | Lokalt (1)            | Globalt (2)           |
|-----|-----------------------|-----------------------|
| (1) | <input type="radio"/> | <input type="radio"/> |

Q120 Når du tenker på scenarioet du nettopp leste, hvem vil du si har det moralske ansvaret?

|     | Individet (1)         | Verdensbefolkningen (2) |
|-----|-----------------------|-------------------------|
| (1) | <input type="radio"/> | <input type="radio"/>   |

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

End of Block: man\_check\_plastic

---

Start of Block: Plastic\_Emotion\_ratings



## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

End of Block: Plastic\_Emotion\_ratings

---

Start of Block: Plastic\_policy

Q36 Vennligst ta stilling til følgende tiltak, og indiker i hvilken grad du støtter hvert av tiltakene.





## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Jeg ville ha donert  
penger til en  
miljøorganisasjon  
som tar ansvar for  
å forhindre denne  
type situasjoner  
(f.eks. plukker  
plast langs kysten)  
(5)

Jeg ville kjøpt og  
brukt mindre  
produkter som er  
laget av eller  
inneholder  
mikroplast (f.eks.  
treningsklær) (6)

Satse på  
miljøundervisning  
(f.eks. i skolen, på  
jobb) (7)

I stor grad erstatte  
fossilt brensel med  
fornybar energi  
(8)

End of Block: Plastic\_policy

---

Start of Block: Glob\_cit

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Q2 Jeg vil beskrive meg selv som en verdensborger.

|     | Svært<br>uenig (1)    | Uenig<br>(2)          | Litt<br>uenig (3)     | Verken<br>enig eller<br>uenig (4) | Litt enig<br>(5)      | Enig (6)              | Svært<br>enig (7)     |
|-----|-----------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|
| (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

Q3 Jeg identifiserer meg sterkt med verdensborgere.

|     | Svært<br>uenig (1)    | Uenig<br>(2)          | Litt<br>uenig (3)     | Verken<br>enig eller<br>uenig (4) | Litt enig<br>(5)      | Enig (6)              | Svært<br>enig (7)     |
|-----|-----------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|
| (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

End of Block: Glob\_cit

---

Start of Block: moral

Q18 Noen mennesker har moralske bekymringer om miljø- og klimaendringer. For eksempel fordi de tror at det er mest sannsynlig at de skadelige virkningene vil påvirke fattige land,

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

eller fordi de føler et moralsk ansvar overfor kommende generasjoner. I hvor stor grad har du eller har du ikke moralske bekymringer om klimaendringer?

|                             | Ikke i<br>noen grad<br>(1) | I liten<br>grad (2)   | I noen<br>grad (3)    | I stor grad<br>(4)    | I veldig<br>stor grad<br>(5) | Vet ikke<br>(6)       |
|-----------------------------|----------------------------|-----------------------|-----------------------|-----------------------|------------------------------|-----------------------|
| Moralsk<br>bekymring<br>(1) | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>        | <input type="radio"/> |

End of Block: moral

Start of Block: Values

Q37

Vi vil nå stille deg noen spørsmål som har til hensikt å undersøke hvilke faktorer som er viktige i livet ditt. Det er ikke noen svar som er "riktig" eller "galt". Informasjonen vil bli behandlet konfidensielt.

Det vil bli beskrevet 13 aspekter, hvor forklaringer for disse er gitt i parentes. Her skal du angi i hvor stor grad hver av disse aspektene **fungerer som en rettesnor i livet ditt**.

Dette betyr tallene:

0 betyr at aspektet **ikke er viktig** i det hele tatt, og ikke fungerer som en guide for deg.

3 betyr at aspektet er **viktig**.

6 betyr at aspektet er **svært viktig**.

-1 tilsier at aspektet er **uforenlig** med prinsipper som er veiledende for deg i livet ditt.

7 tilsier at aspektet er **av største betydning** for deg som veiledende i livet ditt (vanligvis er det ikke mer enn to slike aspektvurderinger).

Desto høyere tall (0, 1, 2, 3, 4, 5, 6), desto større er viktigheten av hvert aspekt som en

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

veileder i LIVET DITT. Prøv å skille så mye som mulig på dem, gjennom å bruke forskjellige tall.

Q38 Vennligst angi i hvor stor grad hver av disse verdiene fungerer som en rettesnor i livet ditt.



## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

|  |   |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|---|
| INNFLYTELSE (ha<br>innflytelse på andre<br>mennesker og være i stand<br>til å påvirke hva som skjer)<br>(10) | C | C | C | C | C | C | C | C | C |
| HJELPSOMHET (for å<br>jobbe for andres trivsel)<br>(11)  | C | C | C | C | C | C | C | C | C |
| MOTVIRKE<br>MILJØFORURENSING<br>(beskytte de naturlige<br>ressursene) (12)                                   | C | C | C | C | C | C | C | C | C |
| AMBISIØS<br>(hardtarbeidende, målrettet)<br>(13)   | C | C | C | C | C | C | C | C | C |

End of Block: Values

---

Start of Block: left\_right\_wing

Q39 I politikken snakker man ofte om "venstresiden" og "høyresiden". Nedenfor er en skala der 0 representerer de som står helt til venstre politisk, og 10 representerer de som står helt til høyre politisk.

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Hvordan vil du plassere deg selv på en slik skala?

|     | Venstre<br>(0)        | (1) | (2)                   | (3)                   | (4)                   | (5)                   | (6)                   | (7)                   | (8)                   | (9)                   | (10)                  | (11)                  | Høyre<br>(10)<br>(12) |
|-----|-----------------------|-----|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| (1) | <input type="radio"/> |     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

End of Block: left\_right\_wing

---

Start of Block: Demographics

Q40 Alder

---

Q41 Kjønn

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Kvinne (1)
- Mann (2)
- Andre (spesifisèr) (3) \_\_\_\_\_

Q42 Er du for tiden student?

- Ja, fulltid (1)
- Ja, deltid (2)
- Nei (3)

Q43 Hvilken av de følgende beskriver best ditt arbeidsforhold

- Fulltid (1)
- Deltid (2)
- Selvstendig næringsdrivende (heltid) (3)
- Selvstendig næringsdrivende (deltid) (4)
- Ekstrahjelp/ringevikar (5)
- Andre former for betalt arbeid (6)
- For øyeblikket arbeidsledig (7)
- Uføretrygdet (8)

Q42 Hva er din sivile status?

- Singel (1)



## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

- Kjæreste (2)
- Samboer (3)
- Partnerskap (4)
- Gift (5)
- Separert (6)
- Skilt (7)
- Enke/enkemann (8)

Q43 Hva er din høyest oppnådde utdanningsgrad?

- Grunnskoleutdanning (1.-10.) (1)
- Vidergående (studiespesialiserende) (2)
- Vidergående (yrkesfag) (3)
- Bachelorgrad (4)
- Mastergrad (5)
- Doktorgrad (6)

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

**Appendix C - Correlation matrix from regression analysis**

Table 10.

*Means, Standard Deviations, and Intercorrelations for Support politics that Punish Polluters and Emotion, Value and Manipulation Check Predictor Variables in the CCS scenario*

| Variable                               | <i>M</i> | <i>SD</i> | 1      | 2      | 3       | 4      | 5      | 6      |
|--|----------|-----------|--------|--------|---------|--------|--------|--------|
| Support politics that punish polluters | 3.59     | 1.66      | .215** | .18**  | -.119** | .18**  | 0,18** | .15**  |
| Predictor variable                     |          |           |        |        |         |        |        |        |
| 1. Bios values                         | 25.25    | 5.58      | -      | .45*** | -.08*   | .32*** | .22**  | .33*** |
| 2. Altru values                        | 29.14    | 4.39      | .45*** | -      | -.03*   | .19**  | .22*   | .32*   |
| 3. Ego values                          | 23.35    | 5.47      | -.08*  | -.03*  | -       | .06**  | -.01** | .07**  |
| 4. Ethic values                        | 12.54    | 4.96      | .32*** | .19**  | .06*    | -      | .47*** | .64*** |
| 5. Resig values                        | 8.70     | 3.07      | .22**  | .22**  | -.01*   | .47*** | -      | .55*** |
| 6. Conseq values                       | 20.39    | 6.28      | .33*** | .32*** | .07*    | .64*** | .55*** | -      |

\*p < .05. \*\* p < .01. \*\*\*p < .001.

Table 11.

*Means, Standard Deviations, and Intercorrelations for Boycott Products and Services and Emotion and Value Predictor Variables in the CCS scenario*

| Variable                      | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|-------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Boycott products and services | 3.77     | 1.82      | .42*** | .29*** | -.13* | .29*** | .20**  | .29*** |
| Predictor variable            |          |           |        |        |       |        |        |        |
| 1. Bios values                | 25.25    | 5.58      | -      | .45*** | -.08* | .32*** | .22**  | .33*** |
| 2. Altru values               | 29.14    | 4.39      | .45*** | -      | -.03* | .19**  | .22*   | .32*   |
| 3. Ego values                 | 23.35    | 5.47      | -.08*  | -.03*  | -     | .06**  | -.01** | .07**  |
| 4. Ethic values               | 12.54    | 4.96      | .32*** | .19**  | .06*  | -      | .47*** | .64*** |
| 5. Resig values               | 8.70     | 3.07      | .22**  | .22**  | -.01* | .47*** | -      | .55*** |
| 6. Conseq values              | 20.39    | 6.28      | .33*** | .32*** | .07*  | .64*** | .55*** | -      |

\*p < .05. \*\* p < .01. \*\*\*p < .001.

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Table 12.

*Means, Standard Deviations, and Intercorrelations for Increase Tax on Fossil Fuels and Emotion and Value Predictor Variables in the CCS scenario*

| Variable                     | <i>M</i> | <i>SD</i> | 1      | 2      | 3      | 4      | 5      | 6      |
|------------------------------|----------|-----------|--------|--------|--------|--------|--------|--------|
| Increase tax on fossil fuels | 5.08     | 1.80      | .40*** | .28*** | -.18** | .11*   | .22**  | .29*** |
| Predictor variable           |          |           |        |        |        |        |        |        |
| 1. Bios values               | 25.25    | 5.58      | -      | .45*** | -.08*  | .32*** | .22**  | .33*** |
| 2. Altru values              | 29.14    | 4.39      | .45*** | -      | -.03*  | .19**  | .22*   | .32*   |
| 3. Ego values                | 23.35    | 5.47      | -.08*  | -.03*  | -      | .06**  | -.01** | .07**  |
| 4. Ethic values              | 12.54    | 4.96      | .32*** | .19**  | .06*   | -      | .47*** | .64*** |
| 5. Resig values              | 8.70     | 3.07      | .22**  | .22**  | -.01*  | .47*** | -      | .55*** |
| 6. Conseq values             | 20.39    | 6.28      | .33*** | .32*** | .07*   | .64*** | .55*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Table 13.

*Means, Standard Deviations, and Intercorrelations for Limit Population Growth and Emotion and Value Predictor Variables in the CCS scenario*

| Variable                | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|-------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Limit population growth | 2.04     | 1.57      | .16*   | -.06*  | .13*  | .20*   | .09*   | .13*   |
| Predictor variable      |          |           |        |        |       |        |        |        |
| 1. Bios values          | 25.25    | 5.58      | -      | .45*** | -.08* | .32*** | .22**  | .33*** |
| 2. Altru values         | 29.14    | 4.39      | .45*** | -      | -.03* | .19**  | .22*   | .32*   |
| 3. Ego values           | 23.35    | 5.47      | -.08*  | -.03*  | -     | .06**  | -.01** | .07**  |
| 4. Ethic values         | 12.54    | 4.96      | .32*** | .19**  | .06*  | -      | .47*** | .64*** |
| 5. Resig values         | 8.70     | 3.07      | .22**  | .22**  | -.01* | .47*** | -      | .55*** |
| 6. Conseq values        | 20.39    | 6.28      | .33*** | .32*** | .07*  | .64*** | .55*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Table 14.

*Means, Standard Deviations, and Intercorrelations for Donate Money to Environmental Organisations and Emotion and Value Predictor Variables in the CCS*

*scenario*

| Variable                      | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|-------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Donate money to envir.<br>org | 3.72     | 1.88      | .45*** | .29*** | -.09* | .26*** | 0.23** | .32*** |
| Predictor variable            |          |           |        |        |       |        |        |        |
| 1. Bios values                | 25.25    | 5.58      | -      | .45*** | -.08* | .32*** | .22**  | .33*** |
| 2. Altru values               | 29.14    | 4.39      | .45*** | -      | -.03* | .19**  | .22*   | .32*   |
| 3. Ego values                 | 23.35    | 5.47      | -.08*  | -.03*  | -     | .06**  | -.01** | .07**  |
| 4. Ethic values               | 12.54    | 4.96      | .32*** | .19**  | .06*  | -      | .47*** | .64*** |
| 5. Resig values               | 8.70     | 3.07      | .22**  | .22**  | -.01* | .47*** | -      | .55*** |
| 6. Conseq velues              | 20.39    | 6.28      | .33*** | .32*** | .07*  | .64*** | .55*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Table 15.

*Means, Standard Deviations, and Intercorrelations for Consume and Buy Less and Emotion and Value Predictor Variables in the CCS scenario*

| Variable             | <i>M</i> | <i>SD</i> | 1      | 2      | 3      | 4      | 5      | 6      |
|----------------------|----------|-----------|--------|--------|--------|--------|--------|--------|
| Consume and buy less | 4.82     | 1.86      | .54*** | .39*** | -.22** | .28*** | .15**  | .23**  |
| Predictor variable   |          |           |        |        |        |        |        |        |
| 1. Bios values       | 25.25    | 5.58      | -      | .45*** | -.08*  | .32*** | .22**  | .33*** |
| 2. Altru values      | 29.14    | 4.39      | .45*** | -      | -.03*  | .19**  | .22*   | .32*   |
| 3. Ego values        | 23.35    | 5.47      | -.08*  | -.03*  | -      | .06**  | -.01** | .07**  |
| 4. Ethic values      | 12.54    | 4.96      | .32*** | .19**  | .06*   | -      | .47*** | .64*** |
| 5. Resig values      | 8.70     | 3.07      | .22**  | .22**  | -.01*  | .47*** | -      | .55*** |
| 6. Conseq velues     | 20.39    | 6.28      | .33*** | .32*** | .07*   | .64*** | .55*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Table 16.

*Means, Standard Deviations, and Intercorrelations for Promote Environmental Education and Emotion and Value Predictor Variables in the CCS scenario*

| Variable                        | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|---------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Promote environmental Education | 6.10     | 1.22      | .27*** | .22**  | -.11* | .13*   | .20**  | .25*** |
| Predictor variable              |          |           |        |        |       |        |        |        |
| 1. Bios values                  | 25.25    | 5.58      | -      | .45*** | -.08* | .32*** | .22**  | .33*** |
| 2. Altru values                 | 29.14    | 4.39      | .45*** | -      | -.03* | .19**  | .22*   | .32*   |
| 3. Ego values                   | 23.35    | 5.47      | -.08*  | -.03*  | -     | .06**  | -.01** | .07**  |
| 4. Ethic values                 | 12.54    | 4.96      | .32*** | .19**  | .06*  | -      | .47*** | .64*** |
| 5. Resig values                 | 8.70     | 3.07      | .22**  | .22**  | -.01* | .47*** | -      | .55*** |
| 6. Conseq velues                | 20.39    | 6.28      | .33*** | .32*** | .07*  | .64*** | .55*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Table 17.

*Means, Standard Deviations, and Intercorrelations for Replace Fossil Fuels with Renewables and Emotion and Value Predictor Variables in the CCS scenario*

| Variable                             | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|--------------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Replace fossil fuels with renewables | 6.42     | .983      | .12*   | .41*** | -.12* | -.02*  | .14*   | .15*   |
| Predictor variable                   |          |           |        |        |       |        |        |        |
| 1. Bios values                       | 25.25    | 5.58      | -      | .45*** | -.08* | .32*** | .22**  | .33*** |
| 2. Altru values                      | 29.14    | 4.39      | .45*** | -      | -.03* | .19**  | .22*   | .32*   |
| 3. Ego values                        | 23.35    | 5.47      | -.08*  | -.03*  | -     | .06**  | -.01** | .07**  |
| 4. Ethic values                      | 12.54    | 4.96      | .32*** | .19**  | .06*  | -      | .47*** | .64*** |
| 5. Resig values                      | 8.70     | 3.07      | .22**  | .22**  | -.01* | .47*** | -      | .55*** |
| 6. Conseq velues                     | 20.39    | 6.28      | .33*** | .32*** | .07*  | .64*** | .55*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Table 18.

*Means, Standard Deviations, and Intercorrelations for Support Politics that punish Polluters and Emotion and Value Predictor Variables in the Plastic Scenario*

| Variable                               | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|--|----------|-----------|--------|--------|-------|--------|--------|--------|
| Support politics that punish polluters | 5.85     | 1.35      | .27*** | .21**  | -.08* | .33*** | .22**  | .26*** |
| Predictor variable                     |          |           |        |        |       |        |        |        |
| 1. Bios values                         | 25.26    | 5.59      | -      | .45*** | -.08* | .35*** | .25*** | .39*   |
| 2. Altru values                        | 29.14    | 4.40      | .45*** | -      | -.03* | .22**  | .21**  | .30*** |
| 3. Ego values                          | 23.37    | 5.48      | -.08*  | -.03*  | -     | .11*   | .05*   | .04*   |
| 4. Ethic values                        | 16.17    | 5.25      | .35*** | .22**  | .11*  | -      | .41*** | .68*** |
| 5. Resig values                        | 8.80     | 2.95      | .25*** | .21**  | .05*  | .41*** | -      | .43*** |
| 6. Conseq values                       | 24.01    | 6.08      | .39*** | .30*** | .04*  | .68*** | .43*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Table 19.

*Means, Standard Deviations, and Intercorrelations for Boycott Products and Services and Emotion and Value Predictor Variables in the Plastic Scenario*

| Variable                      | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|-------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Boycott products and services | 5,01     | 1,63      | .44*** | .31*** | -.08* | .35*** | .21**  | .28*** |
| Predictor variable            |          |           |        |        |       |        |        |        |
| 1. Bios values                | 25.26    | 5.59      | -      | .45*** | -.08* | .35*** | .25*** | .39*   |
| 2. Altru values               | 29.14    | 4.40      | .45*** | -      | -.03* | .22**  | .21**  | .30*** |
| 3. Ego values                 | 23.37    | 5.48      | -.08*  | -.03*  | -     | .11*   | .05*   | .04*   |
| 4. Ethic values               | 16.17    | 5.25      | .35*** | .22**  | .11*  | -      | .41*** | .68*** |
| 5. Resig values               | 8.80     | 2.95      | .25*** | .21**  | .05*  | .41*** | -      | .43*** |
| 6. Conseq values              | 24.01    | 6.08      | .39*** | .30*** | .04*  | .68*** | .43*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Table 20.

*Means, Standard Deviations, and Intercorrelations for Increase tax on Fossil Fuels and Emotion and Value Predictor Variables in the Plastic Scenario*

| Variable                     | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Increase tax on fossil fuels | 4.94     | 1.87      | .39*** | .31*** | -.15* | .24*** | .19**  | .31*** |
| Predictor variable           |          |           |        |        |       |        |        |        |
| 1. Bios values               | 25.26    | 5.59      | -      | .45*** | -.08* | .35*** | .25*** | .39*   |
| 2. Altru values              | 29.14    | 4.40      | .45*** | -      | -.03* | .22**  | .21**  | .30*** |
| 3. Ego values                | 23.37    | 5.48      | -.08*  | -.03*  | -     | .11*   | .05*   | .04*   |
| 4. Ethic values              | 16.17    | 5.25      | .35*** | .22**  | .11*  | -      | .41*** | .68*** |
| 5. Resig values              | 8.80     | 2.95      | .25*** | .21**  | .05*  | .41*** | -      | .43*** |
| 6. Conseq values             | 24.01    | 6.08      | .39*** | .30*** | .04*  | .68*** | .43*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Table 21.

*Means, Standard Deviations, and Intercorrelations for Limit Population Growth and Emotion and Value Predictor Variables in the Plastic Scenario*

| Variable                | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|-------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Limit population growth | 2.09     | 1.60      | .18**  | -.03*  | .10*  | .18**  | .18**  | .09*   |
| Predictor variable      |          |           |        |        |       |        |        |        |
| 1. Bios values          | 25.26    | 5.59      | -      | .45*** | -.08* | .35*** | .25*** | .39*   |
| 2. Altru values         | 29.14    | 4.40      | .45*** | -      | -.03* | .22**  | .21**  | .30*** |
| 3. Ego values           | 23.37    | 5.48      | -.08*  | -.03*  | -     | .11*   | .05*   | .04*   |
| 4. Ethic values         | 16.17    | 5.25      | .35*** | .22**  | .11*  | -      | .41*** | .68*** |
| 5. Resig values         | 8.80     | 2.95      | .25*** | .21**  | .05*  | .41*** | -      | .43*** |
| 6. Conseq values        | 24.01    | 6.08      | .39*** | .30*** | .04*  | .68*** | .43*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Table 22.

*Means, Standard Deviations, and Intercorrelations for Donate Money to Environmental Organisations and Emotion and Value Predictor Variables in the Plastic Scenario*

| Variable                   | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|----------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Donate money to envir. org | 4.64     | 1.80      | .33*** | .23**  | -.03* | .32*** | .12*   | .36*** |
| Predictor variable         |          |           |        |        |       |        |        |        |
| 1. Bios values             | 25.26    | 5.59      | -      | .45*** | -.08* | .35*** | .25*** | .39*   |
| 2. Altru values            | 29.14    | 4.40      | .45*** | -      | -.03* | .22**  | .21**  | .30*** |
| 3. Ego values              | 23.37    | 5.48      | -.08*  | -.03*  | -     | .11*   | .05*   | .04*   |
| 4. Ethic values            | 16.17    | 5.25      | .35*** | .22**  | .11*  | -      | .41*** | .68*** |
| 5. Resig values            | 8.80     | 2.95      | .25*** | .21**  | .05*  | .41*** | -      | .43*** |
| 6. Conseq velues           | 24.01    | 6.08      | .39*** | .30*** | .04*  | .68*** | .43*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Table 23.

*Means, Standard Deviations, and Intercorrelations for Consume and Buy Less and Emotion and Value Predictor Variables in the Plastic Scenario.*

| Variable             | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|----------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Consume and buy less | 5.16     | 1.75      | .48*** | .32*** | -.13* | .23**  | .16*   | .31*** |
| Predictor variable   |          |           |        |        |       |        |        |        |
| 1. Bios values       | 25.26    | 5.59      | -      | .45*** | -.08* | .35*** | .25*** | .39*   |
| 2. Altru values      | 29.14    | 4.40      | .45*** | -      | -.03* | .22**  | .21**  | .30*** |
| 3. Ego values        | 23.37    | 5.48      | -.08*  | -.03*  | -     | .11*   | .05*   | .04*   |
| 4. Ethic values      | 16.17    | 5.25      | .35*** | .22**  | .11*  | -      | .41*** | .68*** |
| 5. Resig values      | 8.80     | 2.95      | .25*** | .21**  | .05*  | .41*** | -      | .43*** |
| 6. Conseq velues     | 24.01    | 6.08      | .39*** | .30*** | .04*  | .68*** | .43*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .



## ENVIRONMENTAL RISK EVALUATION, FRAMING EFFECTS

Table 24.

*Means, Standard Deviations, and Intercorrelations for Promote Environmental Education and Emotion and Value Predictor Variables in the Plastic Scenario*

| Variable                        | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|---------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Promote environmental Education | 6.20     | 1.12      | .30*** | .18**  | -.12* | .13*   | .13*   | .29*** |
| Predictor variable              |          |           |        |        |       |        |        |        |
| 1. Bios values                  | 25.26    | 5.59      | -      | .45*** | -.08* | .35*** | .25*** | .39*   |
| 2. Altru values                 | 29.14    | 4.40      | .45*** | -      | -.03* | .22**  | .21**  | .30*** |
| 3. Ego values                   | 23.37    | 5.48      | -.08*  | -.03*  | -     | .11*   | .05*   | .04*   |
| 4. Ethic values                 | 16.17    | 5.25      | .35*** | .22**  | .11*  | -      | .41*** | .68*** |
| 5. Resig values                 | 8.80     | 2.95      | .25*** | .21**  | .05*  | .41*** | -      | .43*** |
| 6. Conseq velues                | 24.01    | 6.08      | .39*** | .30*** | .04*  | .68*** | .43*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Table 25.

*Means, Standard Deviations, and Intercorrelations for Replace Fossil Fuels with Renewables and Emotion and Value Predictor Variables in the Plastic Scenario*

| Variable                             | <i>M</i> | <i>SD</i> | 1      | 2      | 3     | 4      | 5      | 6      |
|--------------------------------------|----------|-----------|--------|--------|-------|--------|--------|--------|
| Replace fossil fuels with renewables | 6.23     | 1.17      | .13*   | .36*** | -.10* | -.01*  | .08*   | .14*   |
| Predictor variable                   |          |           |        |        |       |        |        |        |
| 1. Bios values                       | 25.26    | 5.59      | -      | .45*** | -.08* | .35*** | .25*** | .39*   |
| 2. Altru values                      | 29.14    | 4.40      | .45*** | -      | -.03* | .22**  | .21**  | .30*** |
| 3. Ego values                        | 23.37    | 5.48      | -.08*  | -.03*  | -     | .11*   | .05*   | .04*   |
| 4. Ethic values                      | 16.17    | 5.25      | .35*** | .22**  | .11*  | -      | .41*** | .68*** |
| 5. Resig values                      | 8.80     | 2.95      | .25*** | .21**  | .05*  | .41*** | -      | .43*** |
| 6. Conseq velues                     | 24.01    | 6.08      | .39*** | .30*** | .04*  | .68*** | .43*** | -      |

\* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

## Appendix D - Examples of environmental risk related media content with specific framings



The image shows a screenshot of a news article from the Norwegian newspaper Dagbladet. The article is titled "Norge uforberedt på klimaendringer" (Norway unprepared for climate change). The author is Siri Eriksen, a researcher and sociologist. The article discusses the need for Norway to be better prepared for climate change, mentioning the need for more knowledge and planning. It also notes that climate change is progressing faster than expected, with more extreme weather events and sea level rise. The article is dated 11. oktober 2006, kl. 7.40.

**Dagbladet** INNHOLD ▾ VIDEO PLUSS ▾ SNARVEIER ▾ BLINDERN ☁ 2°C >

KULTUR Kunst Tegneserier Scene SE.no Musikk Film Litteratur TV/Medier Arkivglimt

# Norge uforberedt på klimaendringer

Vi kan ikke velge mellom å tilpasse oss eventuelle endringer eller å redusere klimagassutslipp. Vi må gjøre begge deler.

11. OKTOBER 2006 KL. 7.40 [DEL PÅ FACEBOOK](#)

Av Siri Eriksen Forsker og samfunnsgeograf, Institutt for sosiologi og samfunns-geografi, UiO

**DET FINNES IKKE** dårlig vær, bare dårlige klær. Men kanskje blir det ikke tilstrekkelig å ha gode klær i framtiden? I sin kronikk i Dagbladet 22. september påpekte Forskningsrådets Arvid Hallén behovet for kunnskap om klimaendringer. Det er slående at Norge verken kunnskapsmessig eller planleggingsmessig er forberedt på å tilpasse seg klimaendringer. Norge er i ferd med å bli rammet av klimaendring. På grunn av menneskeskapt global oppvarming, er disse endringene raskere og mer dramatiske enn vi har opplevd før. Andre steder i verden har hetebølger og ekstremvær blitt knyttet direkte til global oppvarming. I tillegg kan global oppvarming føre til oversvømmelse av lavtliggende kystområder og øyer, tørke forskjellige steder i verden, mer intens nedbør og flom i andre, samt kraftigere sykkloner i nær framtid. Det er ikke slik at vi kan velge mellom å tilpasse oss eventuelle endringer eller å redusere klimagassutslipp. Vi må gjøre begge deler. Utslippene må reduseres for å unngå enda større klimaendringer. Men uansett klimatiltak vil tidligere utslipp føre til at klimaet endrer seg ubønnhørlig de

Figure 2. News article from «Dagbladet» by Eriksen, S. (2006, 11.october). Retrieved from <https://www.dagbladet.no/kultur/norge-uforberedt-pa-klimaendringer/66261772>

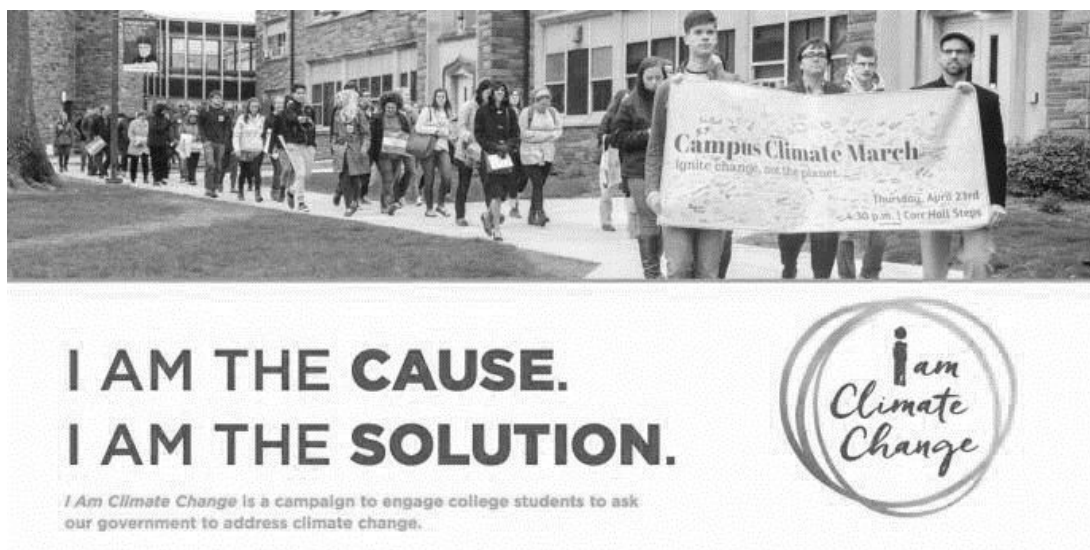


Figure 3. Campaign from Catholic Relief Service, 2016 (<http://www.conversationsmagazine.org/web-features/2016/10/21/cry-of-the-earth-cry-of-the-poor-laudato-si-and-jesuit-higher-education>) ©2017 Catholic Relief Services

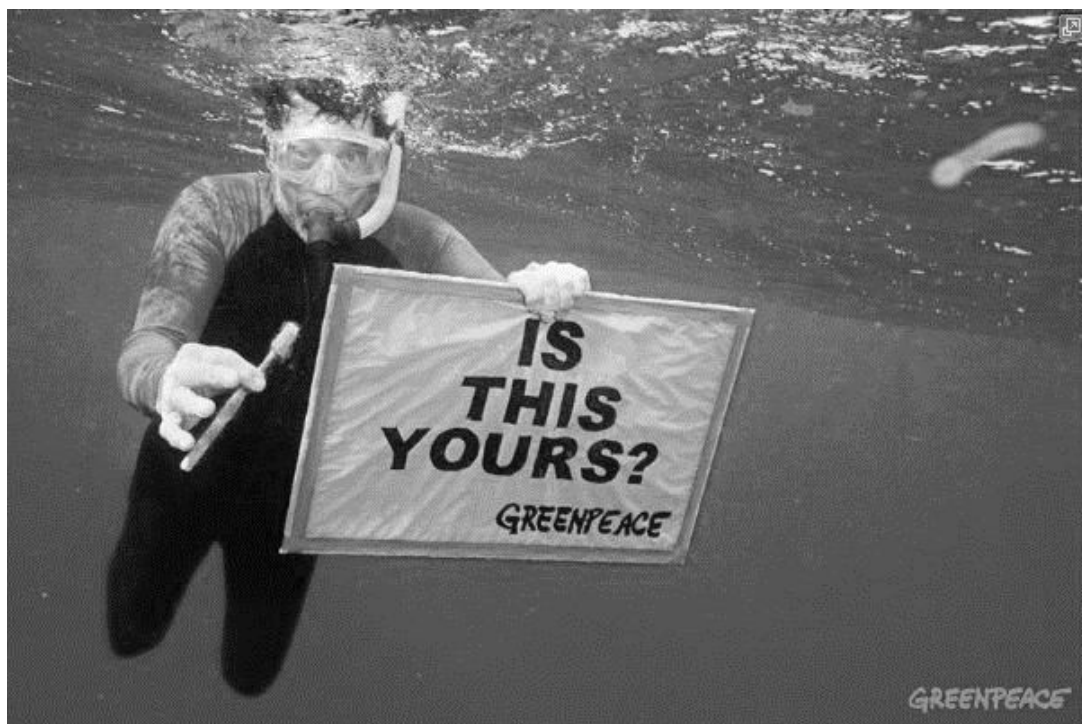


Figure 4. Campaign from Greenpeace, 2016 (<https://simpleandinteresting.files.wordpress.com/2012/09/14.jpg>)



## Slik påvirkes Norge av klimaendringene

Her får du listen over hvordan klimaendringene kan påvirke oss.



Astrid Rommetveit  
@rommetveit

Oppdatert 31.08.2009, kl.  
14:03



Artikkelen er  
flere år  
gammel.

Figure 5 «Yr.no» by Rommetveit, S. (2009, 31.August). Retrieved from <http://www.yr.no/artikkel/klimaendringer-i-norge-1.6751278>

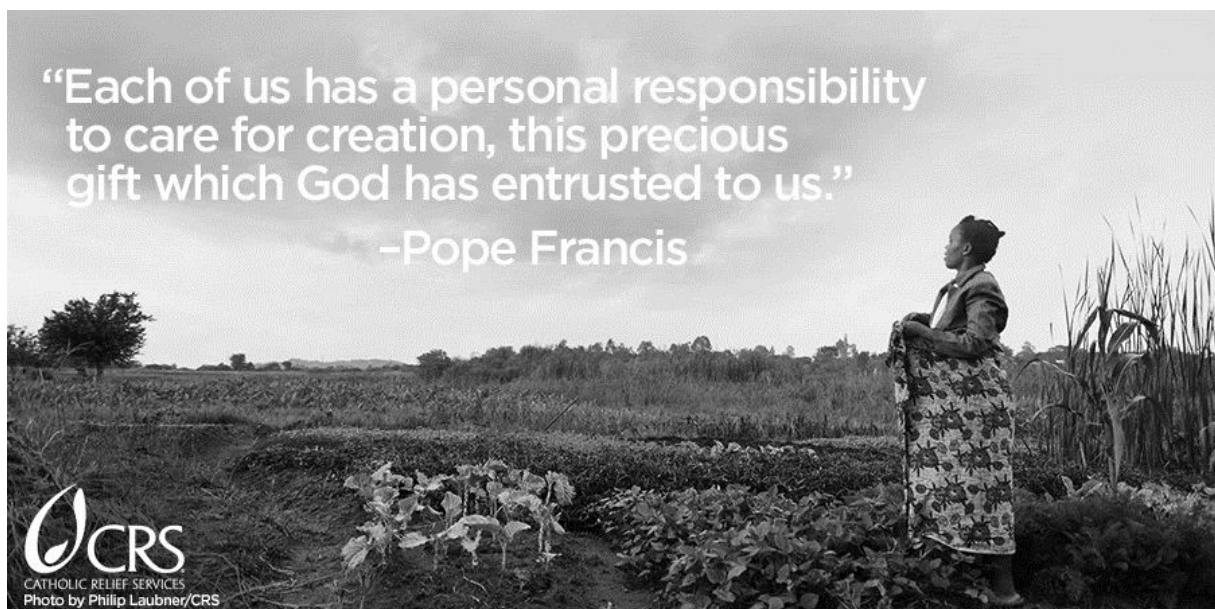


Figure 6.. From Catholic Relief Service, 2016 (<http://www.conversationsmagazine.org/web-features/2016/10/21/cry-of-the-earth-cry-of-the-poor-laudato-si-and-jesuit-higher-education>) ©2017 Catholic Relief Services