

The social dilemma structure of climate change mitigation: individual responses and effects on action

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Abstract

Climate change mitigation constitutes a social dilemma, a conflict between personal and collective outcomes. Behaviours that result in personal benefits (e.g. travelling quickly, conveniently and cheaply by plane) also result in a collective cost in the form of climate change. Behavioural theories and evidence suggest this social dilemma structure significantly influences behaviour. This thesis aims to understand how the social dilemma structure of climate change mitigation affects people's personal actions to address climate change. The first empirical study explores whether people perceive decisions with emission consequences as social dilemmas. Findings show that making salient the effected collective or the pro-social nature of the decision increases awareness of the social dilemma structure. A second set of empirical studies, using quantitative and qualitative methods, further demonstrate that there are two sets of considerations to the climate change mitigation dilemma: 1) non-cooperative considerations (e.g. a focus on immediate personal benefits or a temptation to free-ride) which are linked to a decrease in actions on climate change, and 2) cooperative considerations (e.g. a focus on outcomes for others or fairness considerations) which are linked to an increase in actions on climate change. Results also show that people apply cognitive strategies to counteract the discouraging effect of non-cooperative considerations. A third set of empirical studies tested whether communication massages based on cooperative considerations can increase personal actions to address climate change. Findings suggest that especially framing a message based on the collective outcome can increase actions, but careful consideration of the audience and the situation is required. Overall, this thesis makes the important contribution of demonstrating that the social dilemma structure of climate change mitigation does not necessarily discourage actions to address climate change, but also offers an encouraging perspective through a focus on the collective outcome.

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1. Introduction

1. Introduction

Climate change mitigation has widely been acknowledged as a pressing global issue. Leaders from different parts of the world express a clear urgency and responsibility with regards to climate change and climate change mitigation (Cameron, 2014, Ki-moon, 2014, Obama, 2014). This is underpinned by the latest science. The IPCC's fifth assessment confirms the pressing need for actions based on the knowledge that humans are contributing to the observed changes in our climate (IPCC, 2013, IPCC, 2014a, IPCC, 2014b). The assessment report specifically names individual changes in behaviour as one of the essential factors to enable successful climate change mitigation. Behavioural changes are key in order to reduce energy demand in areas like homes and transport systems (IPCC, 2014b). Dietz and colleagues (2009) calculated the potential emission savings resulting from individual behaviour changes in homes and non-business travel in the US (e.g. changing to a fuel efficient vehicle, carpooling, reducing thermostats, and line drying instead of tumble drying). Adopting available sustainable technologies and behaviours could lead to a 20% emission reduction in the US household sector, or a 7.4% reduction of total US emissions (Dietz et al., 2009). Another study estimated the potential emission savings from energy efficient household behaviours at 22% of household emissions in the US, with the highest potential reductions coming from changes in personal transport (Laitner et al., 2009). Additionally, changing dietary choices to a low-meat diet also results in substantial benefits for climate change mitigation (Stehfest et al., 2009).

A sense of urgency with regards to climate change mitigation is also apparent in public opinion polls. In general, people across countries are aware of and concerned about the issue of climate change (Kim and Wolinsky-Nahmias, 2014). A 2012 survey across thirteen countries confirmed that over 80% of people are worried about the possible consequences of

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climate change and see human activity as the main cause of climate change. A recent review showed that despite an observed slight decrease in public concern in recent years, a clear majority of people in many countries still express high awareness and considerable concern about climate change (Capstick et al., 2015). A Swedish study also indicates a shift in opinion about how climate change can be addressed: while participants of a 2005 survey predominantly thought that it will be addressed through the development of new technologies, in 2010 participants believed that behaviour changes would play a major role in climate change mitigation (Von Borgstede et al., 2013).

Despite the high public concern and awareness, we do not currently observe a significant, concerted behavioural change by individuals to contribute to successful climate change mitigation. The changes required to achieve the potential 20-22% reductions in household emissions are not taking place (Dietz et al., 2009, Laitner et al., 2009, Stehfest et al., 2009). The UK remains a car dependent nation, particularly for commuters (Goodman, 2013). International air travel by UK residents has increased by over 1.8 million flights to over 46 million flights a year from 2011 to 2013 (Office for National Statistics UK, 2013). Similarly, UK per capita expenditure on purchasing meat and meat products has seen an 8.6% increase from 2010 to 2013 (DEFRA, 2013). Numerous behavioural studies also lead to the conclusion that concern about environmental issues such as climate change often does not translate into a change in behaviour. For example, Anable and colleagues (2006) published a review on the link between people's attitudes towards climate change and their personal transport behaviour. The review showed that despite public concern about climate change, environmental issues play only a very small part in car-purchasing behaviour, which is predominantly determined by financial and performance criteria (Anable et al., 2006). In a Canadian survey 72.3% of respondents reported a gap between their intention to act in an environmentally friendly manner and their actual behaviour (Kennedy et al., 2009).

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In light of the urgency to promote a change in behaviour it is necessary to understand the barriers to personal actions on climate change. Research especially in the field of environmental psychology suggests a variety of reasons for the observed gap between concern about climate change and environmental issues and personal actions to address these problems. Factors internal to a person (e.g. motivations or values) as well as external to a person (e.g. economic or cultural factors) play an important role in explaining this observed gap (Kollmuss and Agyeman, 2002). Lorenzoni and colleagues identified situational barriers such as a lack of sustainable alternatives or infrastructures that support a change in behaviour (Lorenzoni et al., 2007). They further list other societal factors such as a perceived lack of actions from politicians and businesses. Gifford identifies 29 “psychological barriers to behaviour change” (Gifford, 2011, p.290). These include different characteristics of human cognition (e.g. a tendency to undervalue distant or future risks), ideologies (e.g. a strong belief in a technological solution to climate change), social norms that prevent actions on climate change, and a tendency to deny the problem in order to reduce fear. He also points towards the strong force of habit as a barrier to behaviour change and the personal risks and costs involved in taking actions.

A major barrier to individual behavioural change is that climate change mitigation has the characteristics of a social dilemma. Climate change mitigation has been widely acknowledged as a social dilemma, a collective action problem. The IPCC’s fifth assessment states: “Effective mitigation will not be achieved if individual agents advance their own interests independently. Climate change has the characteristics of a collective action problem at the global scale, because most greenhouse gases (GHGs) accumulate over time and mix globally, and emissions by any agent (e.g., individual, community, company, country) affect other agents.”(IPCC, 2014b, p.5). The social dilemma structure is important for understanding climate change mitigation from an individual perspective. This thesis aims to

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understand how the social dilemma structure of climate change mitigation affects personal actions to address climate change.

2. Social dilemmas

2.1. Definition

Picture a pasture that is used by a group of herdsmen to feed their cattle. The pasture provides a limited amount of grass for the cattle and replenishes every year. The rational herdsman tries to increase the number of cattle he owns in order to increase his profit. But if all herdsmen increase their number of cattle the pasture will soon be overgrazed and cannot replenish. Ultimately, the pasture will no longer provide food for the cattle which results in a loss for every herdsman's livelihood (Hardin, 1968).

The situation pictured above is known as a social dilemma. In a social dilemma individual outcomes are in conflict with collective outcomes (Kollock, 1998). Each individual in a social dilemma can opt for a cooperative or non-cooperative choice. In the herdsmen example the cooperative choice is to keep a smaller number of cattle which the pasture can sustain. The non-cooperative choice is to increase the number of cattle beyond a sustainable number.

Much contemporary literature concerned with social dilemmas adopts Dawes' (1980) definition which sets out the following characteristics of social dilemmas: 1) For the individual, a non-cooperative choice always results in a higher personal payoff than a cooperative choice, regardless of the choice the other actors involved in the dilemma situation make; 2) but all individuals would be better off if everybody involved made a cooperative choice. Therefore a social dilemma has a socially optimum outcome, the best for all, which can be achieved through mutual cooperation.

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Social dilemmas are socially interdependent situations (e.g. Messick and Brewer, 1983). An individual's decision not only results in consequences for themselves, but for all other people involved in the social dilemma. At the same time, the outcome for each individual is not only dependent on their own decision but also on the decisions of all others involved in the social dilemma. The amount of people involved in a social dilemma – the collective - can stretch from two people to larger groups, and even to the entire human race (Horton and Doron, 2011, Kollock, 1998, Van Vugt and Shakespeare, 1998).

Generally an individual's decision in a social dilemma can result in both positive and negative personal payoffs (Dawes, 1980). These personal costs and benefits can be of monetary or material nature, but they can also relate to convenience, social recognition and status, or negative and positive feelings. The sum of negative and positive payoffs resulting from a decision is termed the 'overall payoff' or 'outcome'. Individual rationality favours decisions which lead to the highest possible positive outcome for the individual.

In a social dilemma the non-cooperative choice results in higher positive payoffs for the individual *regardless of what the other individuals involved in the dilemma are choosing* (Dawes, 1980). Therefore non-cooperation is called the dominating strategy (Dawes, 1980). When opting for non-cooperation the individual receives the full personal benefits (e.g. the benefits of increasing the number of cattle), while only bearing a fraction of the resulting collective costs (the additional usage of the pasture) (Hardin, 1968). In addition non-cooperation of a single herdsman is unlikely to threaten overgrazing of the pasture, if other herdsmen cooperate. Therefore the individual perceives a strong temptation to 'free-ride': making a personal non-cooperative choice and profiting from other people's cooperative choices. If the other herdsmen opt for non-cooperation, a cooperative choice of a single

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herdsman will not protect the pasture from overgrazing. Again the individual herdsman is better off not cooperating and receiving the personal benefits from non-cooperation.

Dawes' definition falls short of two features that are found in most real world social dilemmas. Firstly, in his definition the choice between cooperation and non-cooperation is a true binary one. In many real world social dilemmas different degrees of cooperation or non-cooperation exist (Van Lange et al., 2002). Secondly, most real world social dilemmas include a temporal dimension (Hendrickx et al., 2001, Van Lange et al., 2013). Often the conflict presenting itself in a social dilemma is one between immediate self-interest and long-term collective interest.

Social dilemmas are diverse and abundant in real life, including examples like overfishing, choosing what to eat with an equally split restaurant bill, and mitigating climate change. They have been extensively studied by a large number of disciplines, including economics and psychology (Van Lange et al., 2013). Much of our knowledge about behaviour in social dilemmas is based on controlled laboratory experiments or formalised 'games' (Newell et al., 2014). In addition psychologists have assessed people's behaviour and reasoning through interview and questionnaire studies (e.g. Aitken et al., 2011, Horton and Doron, 2011). Field studies exploring real world social dilemmas have further added to our understanding of the effect of specific characteristics of the dilemma situation as well as potential approaches to resolve social dilemmas and avoid a high collective cost (Ostrom and Hess, 2007, Ostrom et al., 1999).

Social dilemmas have to be distinguished from both decision problems and distribution problems. A decision problem is a situation without social interdependence. Thus the consequences of a decision will solely be borne by decision makers themselves and are independent of other people's decisions (Tenbrunsel and Northcraft, 2010). A distribution

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problem does imply social interdependence. But while in a social dilemma a non-cooperative or cooperative choice alters the collective outcome, in a distribution problem the collective outcome stays unaltered (Fennell, 2004). The problem focuses on changes in the distribution of the collective outcome.

Two decision making situations – the chicken dilemma and the assurance dilemma – are sometimes included in the classification of social dilemmas, although they do not possess a dominating strategy and therefore lack one of Dawes' defining characteristics (Kollock, 1998, Van Vugt and Shakespeare, 1998). The name of the chicken dilemma is derived from the situation in which two drivers head towards each other and whoever swerves first loses the game. Both drivers prefer the non-cooperative choice (not to swerve) but non-cooperation does not lead to the highest individual outcome, regardless of what the other driver does. If both drivers chose non-cooperation, there is a high chance that they both die, not a favourable outcome for the drivers compared to cooperating and losing the game. The essence of the assurance dilemma is that an individual is willing to cooperate if assured that the other decision makers will cooperate as well. In the assurance dilemma cooperation actually results in the highest benefits not only for the collective, but also for the individual. Non-cooperation usually occurs for one of two reasons: 1) One decision maker perceives a higher value in beating the other decision makers compared to benefitting both themselves and the collective. 2) One decision maker expects the others will chose non-cooperation (Van Lange et al., 2013).

In this thesis I will focus on social dilemmas with a dominating strategy, as they are the situational structures applicable to climate change mitigation.

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Amongst those situations that are characterised as social dilemmas with a dominating strategy and involve more than two people, two different types can be distinguished: the public good dilemma and the common resource dilemma (Kollock, 1998).

The public good dilemma is also called a social fence (Van Vugt and Shakespeare, 1998). The individual is presented with a situation in which an individual contribution creates a collective benefit - a public good that everyone can access. A pure public good is non-excludable, once it is provided everyone can benefit from it - contributors and non-contributors. The temptation to free-ride is to make use of a public good without contributing to its provision. A pure public good is also non-rival, once it is provided, one person's use of the public good does not reduce its availability for others. The attributes of being non-excludable and non-rival are often only fulfilled to an extent in real life public goods (Kollock, 1998). An example for a public good is a public firework display (Van Lange et al., 2013). People who do not contribute to funding the fireworks can still enjoy watching it. They free-ride on the cooperation of others who contribute towards funding the fireworks. Another key feature of public goods is their 'production function'. This describes the size of contributions needed to provide and maintain the public good over time (Kollock, 1998). Many public goods have a defined threshold included in their production function. This threshold defines the amount of contribution needed to provide the public good in the first place (Kollock, 1998). Experimental research on public good dilemmas uses 'give-some games' as a means to research choice behaviour (Fleishman, 1988). In give-some games participants typically receive money or points to start with. They can then decide how much of this initial endowment they would like to contribute to a public good and how much they would like to keep for themselves. If too little is contributed by all participants and the public good is not provided, contributions are lost. However, if the public good is provided the pot of contributed money is usually doubled and evenly distributed amongst participants

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(regardless of how much they have contributed). A meta-analysis of public good experiments shows that the average contribution rate to the public good across decision rounds is 37.7% of the original endowment participants receive (Zelmer, 2003).

The second type of social dilemma is the common resource dilemma, also known as the tragedy of the commons or a social trap (Hardin, 1968, Kollock, 1998). The herdsman situation is an example of a common resource dilemma in which choosing a personal benefit results in a collective cost (Hardin, 1968). A common resource, in contrast to a public good, is rival, a feature known as the ‘subtractability’ of benefits (Kollock, 1998): the grass eaten by one herdsman’s cow cannot be eaten by other herdsman’s cows. This feature becomes crucial once the replenishment rate of a common resource (also known as the carrying capacity) is exhausted through the sum of individual harvesting choices. The replenishment rate defines the effect of a certain amount of harvesting on the common resource. It also includes thresholds (tipping points) that mark the diminishment of the common resource. If a tipping point is reached the resource fails to replenish and cannot be maintained (Kollock, 1998). A common resource dilemma can take two forms (Hardin, 1968): 1) a valuable resource can be taken out of a common resource pool, such as the grazed grass in the herdsman dilemma; 2) something harmful is put into the system, such as toxic chemicals released into a lake. Choices in common resource dilemmas are prominently studied through ‘take-some games’ (Fleishman, 1988). In laboratory take-some games a common resource exists, for example a common pot of money. In each round of the game participants can decide how much they want to take out of the common resource and keep for themselves. After each round the common resource replenishes, but if the resource decreases beyond a tipping point it can no longer replenish, the game is over and participants can no longer take out money for themselves. Ahn and colleagues (2010), for example, conducted a number of common resource experiments where the socially optimum outcome can be achieved by

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taking out an average of nine tokens from a common resource in each decision round.

Participants in these experiments took an average of 17.1 tokens, thus exceeded the amount at which the resource can replenish

2.2. Theories explaining behaviour in social dilemmas

2.2.1. Rational Choice Theory

According to Rational Choice Theory people weigh up costs and benefits and make choices in order to increase their immediate personal benefits (Boudon, 2009). Humans are understood as “self-interested, short-term maximizers” (Ostrom, 1998, p.2). Rational Choice Theory predicts that people in a social dilemma will always opt for the dominating strategy of non-cooperation and be tempted to free-ride, as it results in the highest personal benefits (Dawes, 1980, Dawes and Thaler, 1988). Social dilemmas are thus viewed as situations which result in collective costs and the inability to achieve socially optimum outcomes (Hardin, 1968, Olson, 2009). Rational Choice Theory has been highly influential in researching human behaviour in social dilemma situations (Ostrom, 2014). Research on experimental social dilemmas shows that the prediction of no individuals choosing to cooperate is not in line with empirical results. For example, 60% of participants in a public good experiment initially cooperated, but this cooperation rate deteriorated to low levels in subsequent rounds (Isaac and Walker, 1988). In another public good experiment ‘dangerous climate change’ was simulated, which could occur with a given probability. Participants had to reach a fixed sum through monetary contributions to avoid ‘dangerous climate change’ which would result in the loss of all their remaining money. When the probability and therefore the risk for ‘dangerous climate change’ was low, groups generally didn’t achieve

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the target sum. In a high risk scenario half of the groups managed to reach the required target sum (Milinski et al., 2008). Real world social dilemmas similarly consist of stories of success as well as failure to provide a public good or sustain a common resource. Resource problems such as overfishing and overgrazing seem to confirm that social dilemmas can end in a high collective cost (Clark, 2006, Doran et al., 1979). Nevertheless other observations from real world social dilemmas demonstrate that people can refrain from choosing the dominating strategy and instead show cooperative behaviour (Ostrom, 2014). Berkes and colleagues (1989) outline a number of case studies where communities managed to sustain a common resource through traditional sustainable hunting, fishing and timbering regimes. These examples challenge Rational Choice Theory as a sole predictor of decisions in social dilemmas. Alternative behavioural theories were needed to explain non-cooperation resulting in a high collective cost, as well as the achievement of the socially optimum outcome through mutual cooperation. Interdependence Theory and the Appropriateness Framework provide two such alternatives to Rational Choice Theory.

2.2.2. Interdependence Theory

Interdependence Theory (Kelley and Thibaut, 1978) provides a framework to understand human interactions in socially interdependent situations in a broader sense - not only restricted to social dilemmas. Interdependence Theory highlights the structure of a situation as being important. This situational structure forms the reality in which people act upon their motives and cognitions and in which interactions take place (Van Lange and Rusbult, 2012). Kelley and colleagues (2003) analysed different possible situational structures and created an atlas of 21 types of interpersonal situations. Social dilemmas involving more than two people form one of these types of interpersonal situations. As outlined before this social dilemma structure is characterised by a socially optimum outcome

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(achieved through mutual cooperation), non-cooperation as a dominating strategy and the social interdependence of the situation. The theory further states that it is not only important what the objective structure of the situation is, but also what people perceive the situation to be. This is captured in the transformation process. The transformation process describes how people can transform a ‘given situation’ into an ‘effective situation’. The ‘given situation’ describes the immediate personal costs and benefits of a decision for the decision maker (ignoring other people’s interests or long term interactions). This ‘given situation’ can be transformed, for example, by taking outcomes for others into account. The resulting ‘effective situation’ determines behaviour (Rusbult and Van Lange, 2003). Figure 2.1 illustrates this transformation process:

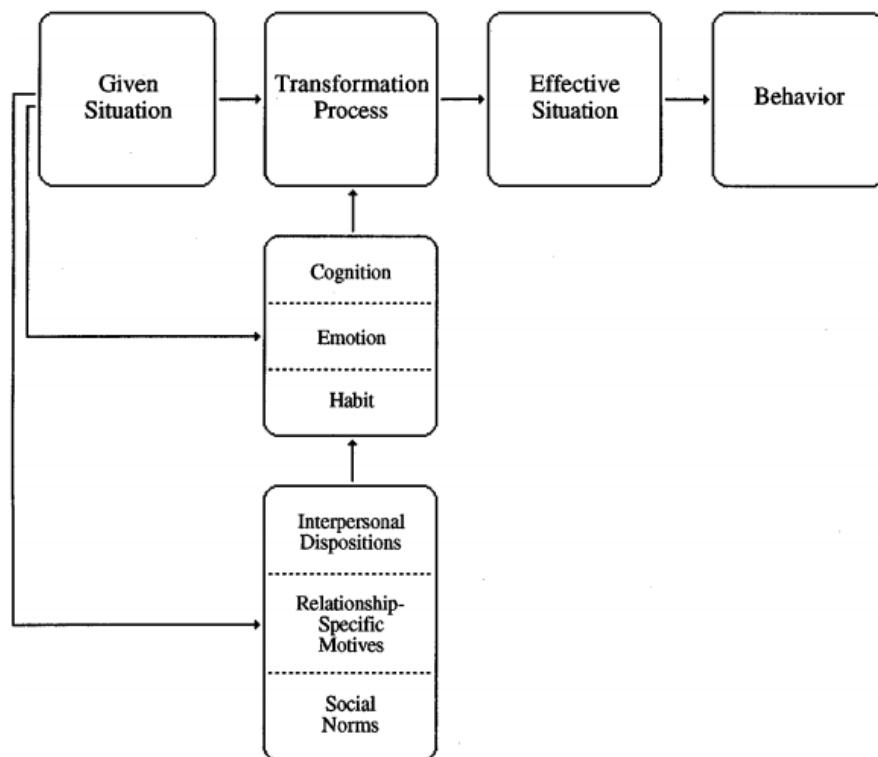


Figure 2.1: The transformation process (Rusbult and Van Lange, 2003).

The transformation process describes how people frequently take into account considerations beyond the immediate effects a choice has for themselves. Thus, in contrast to

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Rational Choice Theory, Interdependence Theory predicts that cooperation in social dilemmas can occur despite the fact that immediate personal benefits are highest when opting for non-cooperation. The transformation process is guided by interpersonal dispositions, relationship specific motives and social norms. These dispositions, motives and norms can be both pro-social (e.g. altruism or equality) or pro-self (e.g. a competitive motive – striving to increase the difference between one's own and other people's outcomes). Research on social dilemmas has especially focused on those dispositions, motives and norms that guide a pro-social transformation and therefore increase cooperation. Interpersonal dispositions have frequently been studied as 'social value orientations'. Social value orientations describe people's preference for how outcomes should be distributed amongst themselves and others. Pro-social value orientations have been found to promote cooperation in social dilemmas (De Cremer and Van Vugt, 1999, Gärling, 1999, Van Lange et al., 1992, Van Lange et al., 1997, Van Vugt et al., 1995, Van Vugt et al., 1996). Relationship specific motives have been studied in relation to reciprocity in social dilemmas. This is discussed further below in the context of strategic approaches to managing social dilemmas. Other research has focused on transformation processes involving temporal considerations in which the 'given situation' is transformed to focus on longer-term consequences. 'Consideration of future consequences' (CFC) is a trait that has received attention in social dilemmas with a temporal dimension. People high in CFC are more likely to opt for cooperation (Khachatrian et al., 2013, Kortenkamp and Moore, 2006). Social norms to cooperate have also been shown to play an important role in explaining cooperation in social dilemmas (Fehr and Fischbacher, 2004). All these factors impact on emotions, cognitions and habits which stimulate and guide the transformation process (Rusbult and Van Lange, 2003). Interdependence Theory thus outlines the importance of considerations and emotional responses to a social dilemma situation which ultimately determine whether a person will cooperate. For example the emotion of guilt as a

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response to a social dilemma has been shown to increase cooperation (Bowles and Gintis, 2002, Ketelaar and Tung Au, 2003), while assessing one's own potential cooperation as insignificant decreases cooperation (Kerr, 1996). The theory also acknowledges that the transformation process does not necessarily result from conscious cognitions and emotions, but can also be habitualised and thus driven by habits as a reaction to repeatedly encountered situational structures (Rusbult and Van Lange, 2003).

2.2.3. Appropriateness Framework

The Appropriateness Framework is characterised by a particular focus on the context in which a decision is being made (March, 1994, March and Olsen, 2004, Messick, 1999, Weber et al., 2004). It describes three different factors that influence behaviour in decision making situations:

- 1) How an individual defines a situation. This determines whether the individual regards it as a cooperative task, a moral situation, or something else. The individual asks the question: "What kind of situation is this?" (March and Olsen, 2004, p.690).
- 2) The individual's identity. For example, the individual may or may not strongly identify with the collective in the social dilemma situation. Here the individual asks: "What kind of person am I?" (March and Olsen, 2004, p.690).
- 3) Which rules or heuristics the individual applies. Rules and heuristics allow a person to decide and react in an effective and quick manner (Mosler and Brucks, 2006) and play a crucial role in explaining behaviour.

Together these three factors influence how the individual answers the question fundamental to the Appropriateness Framework: "What does a person like me do in a

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situation like this?” (Van Lange et al., 2013, p.129). People may choose to cooperate in social dilemmas, as the scope of this question considers factors beyond the question that would be predicted by Rational Choice Theory: “Which option yields the highest immediate personal benefits?”

Separate factors of the Appropriateness Framework have been found to be influential in understanding people’s behaviour in social dilemmas. Framing the social dilemma situations differently to alter the interpretation of the situation has been shown to explain differences in behaviour. Students to whom a social dilemma game was introduced in an economic context (decisions to invest in a joint investment fund) showed lower levels of cooperation compared to students to whom it was introduced in a non-economic context (decisions to contribute to a social event) (Pillutla and Chen, 1999). The situation can also determine which identity is viewed as appropriate: “If the situation is defined as an economic transaction, for example, an individualistic orientation may appear reasonable, whereas a cooperative orientation may be more reasonable when the situation is defined as an ethical dilemma” (Tenbrunsel and Messick, 1999, p.687). Identity has been further demonstrated as important in social dilemma research. As examples, identifying with one’s ingroup (Chen et al., 2007, Kramer and Brewer, 1984) or pro-social social value orientations (Balliet, 2009, Bogaert et al., 2008) help explain cooperation in social dilemmas.

2.3. Cooperation in social dilemmas

Research on experimental and real world social dilemmas shows that people don’t always opt for the dominating strategy and thus non-cooperation, as predicted by Rational Choice Theory. Much research has been dedicated to understand the circumstances and

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factors that result in people opting for cooperation instead. These circumstances and factors form the basis of a number of approaches that help increase levels of cooperation and therefore achieve the socially optimum outcome in social dilemmas. These approaches fall in one of three broad distinctive groups (Kollock, 1998): motivational, strategic and structural.

2.3.1. Motivational approaches

Motivational approaches lead an individual to weigh the collective outcome more strongly without changing the actual payoffs in the dilemma. The assumption behind these approaches is that individuals consider outcomes beyond their own immediate benefits, as described in the transformation process of Interdependence Theory (Rusbult and Van Lange, 2003). If people weigh the collective outcome more strongly, they are motivated to increase collective benefits which increases the likelihood for cooperation (Dawes, 1980, Kollock, 1998, Van Vugt, 1998). The positive effects of the motivational approaches outlined below are consistent with both Interdependence Theory and the Appropriateness Framework.

2.3.1.1. *Pro-social orientations*

Pro-social orientations can be assessed through different measures. Two of the most prominent measures are social value orientations and Schwartz's self-transcendence values. Social value orientations describe "preferences for a particular distribution of outcomes to oneself and others" (Van Lange et al., 1992, p.19). A social value orientation which favours high outcomes for others (pro-social value orientation) increases the likelihood of cooperative choices in social dilemma situations (Bogaert et al., 2008). This was confirmed by a meta-analyses of 82 studies on the relationship between different social value orientations and cooperation in social dilemmas (Balliet, 2009). The analysis further found that the positive effect of a pro-social value orientation is more pronounced in give-some games and if

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participants are not paid for taking part in a study. Schwartz's self-transcendence values describe a person's tendency to value outcomes beyond the self, including outcomes for other people, and have been shown to increase cooperation in social dilemmas (Karp, 1996, Sagiv et al., 2011). However pro-social orientations are relatively stable (Bogaert et al., 2008) and difficult to alter. Although they are positive predictors of cooperative choices in social dilemmas, it is difficult to increase people's pro-social orientation as an approach for achieving socially optimum outcomes.

2.3.1.2. Group identity

Strong group identification with the collective is also associated with higher levels of cooperation (Chen and Li, 2009, Chen et al., 2007, Kramer and Brewer, 1984) as it promotes the valuation of the collective outcome (De Cremer and Van Vugt, 1999). Group identity is fostered through either perceived similarities between oneself and other group members or perceived dissimilarity between one's ingroup and an outgroup (e.g. Hogg and Knippenberg, 2003). Thus group membership plays a vital role in group identity. Goette and colleagues (2006) conducted a real world experiment to test the impact of group membership on cooperation in social dilemmas. Results show that Swiss Army officers were significantly more likely to cooperate with members of their own platoon compared to out-group members, a clear effect of group membership (Goette et al., 2006). Eckel and Grossman (2005) investigated the effect of experimentally induced group identity and differences between weak and strong group identities. Creating a weak group identity by simply assigning different colours to teams did not alter levels of cooperation in a subsequent social dilemma game. But when a strong group identity was created through team building tasks, significant positive effects of group identity on cooperation were observed.

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2.3.1.3. Moralization

Dawes (1980) advocated moralization as a motivational approach to increase cooperation in social dilemmas (see also Hine and Gifford, 1997). Moralization results in a perception of non-cooperative choices as being immoral (because they create negative outcomes for others) and cooperative choices as being moral (Markowitz and Shariff, 2012). A number of studies have shown that free-riding in a social dilemma, or merely opting out of cooperation (without benefiting from the created public good) is moralised by others involved in the dilemma (Cubitt et al., 2011, Delton et al., 2013). These moral judgements and consequential punishments can change free-riding behaviour and thus increase cooperation in a social dilemma (Fehr and Gächter, 2000, Fehr and Gächter, 2002, Kiyonari and Barclay, 2008). Moralization can also be a means to cooperation in itself, without the mechanism of punishment. In an early experiment Dawes and colleagues (1976) were able to demonstrate that emphasizing the moral and ethical implications of different choice behaviours in the instructions of a social dilemma game significantly increased cooperation. Since then a number of studies have confirmed the positive effect of accentuating moral considerations and the perception of ethical decision making in a social dilemma (Batson and Moran, 1999, Biel and Thøgersen, 2007, Tenbrunsel and Messick, 1999). However moralization might not increase cooperation for everyone. Smeesters and colleagues (2003) found that moralization in a social dilemma backfired for people with a consistent pro-self social value orientation (preferring a higher distribution of outcomes to themselves). Morality primes reduced cooperation amongst these individuals.

2.3.1.4. *Communication*

A consistent finding within the social dilemma literature is the positive effect of communication between group members on cooperation (Balliet et al., 2009).

Communication between group members may promote group identity and give the opportunity for moral persuasion, both motivational strategies which elicit positive effects on cooperation (Kollock, 1998).

2.3.2. *Strategic approaches*

In contrast to motivational approaches, strategic approaches for achieving socially optimum outcomes draw on the individual's desire to maximise personal benefits. However, these personal benefits do not reflect the immediate outcomes described in Rational Choice Theory or as the 'given situation' in Interdependence Theory. Rather, they relate to long-term benefits and outcomes expected from long-term interactions and so reflect a transformation to an 'effective situation' (Rusbult and Van Lange, 2003). Like motivational approaches they do not require a change in payoffs (Kollock, 1998).

2.3.2.1. *Reciprocity*

Three conditions are necessary for reciprocity to occur: a) people involved in a social dilemma are faced with multiple interdependent interactions, either through multiple 'decision rounds' in the same dilemma or through the prospect of interaction in future social dilemmas; b) identifiability of the individual decision maker (the possibility of public decisions and the association between decision and decision maker); and c) information about others' past behaviour (Axelrod, 1984). Given those three conditions, individuals can expect others to reciprocate personal cooperation as well as personal non-cooperation in subsequent interactions. Therefore cooperation receives positive reinforcement from others, which

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increases its relative attractiveness (e.g. Milinski et al., 2002b). Conversely, conditions that prevent reciprocity decrease cooperation. Kerr (1999) showed that anonymity of decisions (absence of condition b) decreases cooperation in situations where 1) a social expectation to cooperate exists; 2) others are perceived to be willing and able to sanction (reciprocate) non-cooperation; and 3) decision makers want to avoid this sanction. Scholars distinguish 'direct' from 'indirect' reciprocity. Direct reciprocity is present when the same two individuals encounter each other in more than one decision. Individuals are thus able to directly reciprocate the other person's behaviour in a past encounter. In indirect reciprocity the same two individuals need not encounter each other again. Instead past behaviour is translated into a reputation of being a non-cooperative or cooperative person. A bad reputation leads to others' non-cooperative behaviour, a good reputation to cooperative behaviour (Nowak and Sigmund, 1998, Nowak and Sigmund, 2005). The potential for reciprocity has been shown to increase cooperation in social dilemmas (Carpenter and Matthews, 2004, Komorita et al., 1991, Komorita et al., 1993). Milinski and colleagues (2002a), for example, were able to show that donating to a charity as part of a computerised social dilemma game resulted in indirect reciprocity. Donators received higher income from other players and their status increased.

2.3.2.2. Communication

Communication has already been listed as a motivational approach to increase cooperation through strengthening group identity and moralization. Communication between decision makers can further promote cooperation through sharing a successful solution and stating commitments to cooperate (Bornstein, 1992). Individuals may not be aware of the social interdependence, the threat of collective costs and the potential to achieve the socially optimum outcome through mutual cooperation. Through communication this awareness can

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be increased, which can boost cooperation (Dhont et al., 2012). Communication further gives the opportunity to get a large majority to commit to mutual cooperation in order to achieve the socially optimum outcome (Bornstein, 1992, Kerr and Kaufman-Gilliland, 1994). Thus a social norm to cooperate is created (Fehr and Fischbacher, 2004). But voluntary commitments without any monitoring and sanctioning system and with the attribute of anonymity carry the disadvantage that they are not binding. Individuals may even be more tempted to free-ride because all the others have committed to cooperate (Dawes, 1980). Despite this caveat the positive effect of communication on cooperation in social dilemmas is well documented and a meta-analysis found that face-to-face communication is superior to, for example, written communication and the communication-cooperation relationship is stronger for larger groups (Balliet, 2009).

2.3.3. Structural approaches

Structural approaches rely on a change in the objective payoffs for the individual in a social dilemma, either by increasing the benefits of cooperative choices or decreasing the benefits of non-cooperative choices (Kollock, 1998). Structural approaches are based on the assumptions of Rational Choice Theory that people want to increase their immediate personal benefits.

2.3.3.1. *Incentives and disincentives*

Individual payoffs in a social dilemma can be changed by creating incentives for engaging in cooperative behaviour (Dawes, 1980, Martichuski and Bell, 1991, Stern, 1976, Van Vugt, 1998). Through incentives the personal benefits of cooperative behaviour and thus the probability to opt for the cooperative choice increase (Kollock, 1998). Incentives can be of various forms: monetary, social status and reputation, convenience or positive feelings.

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Whereas incentives aim to increase the attractiveness of cooperative choices, disincentives decrease the attractiveness of non-cooperative choices (Dawes, 1980, Hardin, 1968, Perino et al., 2011, Van Vugt, 1998). In most real life cases they are monetary (e.g. Sterner, 2007). A study on water usage showed that a fixed water tariff, where the costs are paid by the collective, resulted in higher water usage compared to a variable tariff. A variable tariff creates a monetary disincentive to water usage as consumers pay the increased water costs themselves (Van Vugt, 2001). Disincentives can also take the form of social shame and loss of status or increased inconvenience of the non-cooperative behaviour (Ouwerkerk et al., 2005, e.g. Verhoef et al., 1995). Hardin (1968) strongly advocated for the implementation of disincentives such as taxes.

The problem with both incentives and disincentives is their financing. To encourage a majority of people to cooperate through incentives is a very costly undertaking (Dawes, 1980). Disincentives such as taxes require costly monitoring and sanctioning systems (Kaplow, 1990). For that reason the provision of incentives and disincentives have been described as second order dilemmas (Van Vugt and Shakespeare, 1998, Yamagishi, 1992), as financing these measures resembles a social dilemma in itself.

Furthermore, the psychological literature emphasises that the effect of incentives and disincentives may only last for the duration of their presence (Van Vugt, 1998, Kohn, 1999). So while these measures might be feasible in situations where a single cooperative decision is required, they might be less viable for influencing repeated choices. In addition, external incentives and disincentives may risk undermining internal motivations to cooperate (Bowles, 2008, Mulder et al., 2006, Perino et al., 2011). Incentives can also backfire and decrease cooperation if they signal self-interested behaviour as appropriate or suggest distrust or disrespect (Bowles, 2008). Perino and colleagues (2011) showed that this motivational

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crowding out is specifically elicited through monetary disincentives in social dilemma situations. Additionally, disincentives may promote an individual perspective of the problem (e.g. “It is ok to overuse the resource because I am paying an adequate penalty for it”) (e.g. Gneezy and Rustichini, 2000). Disincentives (‘push’ measures) are less popular and considered less acceptable than incentives (‘pull’ measures) by the public as they are seen as more intrusive and coercive (Cherry et al., 2012, De Groot and Schuitema, 2012, Van Vugt, 1998).

The experimental social dilemma literature has found that punishment (disincentives) is generally more effective than rewards (incentives), but a combination of rewards and punishments is even more successful in promoting cooperation (Milinski and Rockenbach, 2012, Sefton et al., 2007, Sigmund, 2007).

2.3.3.2. Privatization

Another approach to common resource dilemmas is the privatization of the resource (Hardin, 1968, Kollock, 1998). Every person involved in the dilemma receives a share of the resource and is then responsible for its maintenance. Privatisation is reflected in individual property rights, where an individual holds all rights to a resource and can exclude others from using this resource (Ostrom et al., 1999). If people deplete their personal share of the resource, they cannot harvest anymore. Property rights prevent them from harvesting other people’s private resources. Privatization of the resource ends social interdependence and thus the social dilemma (Van Vugt, 1998). The privatization approach can also be subject to problems (Kollock, 1998). The assignment of the resource share can cause problems if the resource is not homogenous. The enforcement of private property rights requires a costly monitoring and sanctioning system. Sometimes privatization is not an option because the

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resource cannot be divided amongst individuals, as in the case of fish that move around in the sea (Hardin, 1968).

2.3.3.3. *Rules and regulations*

Another option to govern a common resource are rules and regulations (e.g. Ostrom, 1999), such as prohibiting non-cooperative behaviour as illegal, rationing the resource, or establishing quotas (determining the amount of the resource that everyone is permitted to harvest). A real world example is in Marine Protected Areas, where fishing is not permitted to ensure replenishment of fish stock (Roberts et al., 2001). These coercive measures require a monitoring and sanctioning system to impose the rules. Sanctioning systems are another measure advocated by Hardin (1968) and he promoted it together with taxes as the way to avoid collective costs in common resource dilemmas. While Hardin (1968) saw “mutual coercion, mutually agreed on by the majority of the people affected” (Hardin, 1968) as the only way out of the tragedy of the commons, Dawes (1980) spoke strongly against the introduction of coercive measures because of the cost intensiveness of required sanctioning systems. Additionally he suspected that they may elicit motivations to get around them. Both Hardin and Dawes expressed concern about the power handed over to the authority in charge of monitoring and sanctioning.

Ostrom’s research highlights that no single rule or regulation fits all social dilemmas (Ostrom et al., 1999). She saw every policy, rule or regulation to govern a common resource as an experiment. Based on extensive field research she concluded that the effectiveness of any rule or regulation is increased if it originates from within the collective rather than being superimposed by an authority (Ostrom, 1999). In many real world social dilemmas, people affected by the outcome of the dilemma have created their own community based solutions (communal ownership patterns) to achieve the socially optimum outcome (Ostrom et al.,

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1999). Ostrom thus showed that “private ownership or central governmental control are not the only means for solving [social dilemmas]” (Ostrom, 1985). Experimental evidence confirms that structural approaches may be especially effective when administered by members of the collective, in contrast to an authority (Balliet et al., 2011).

Ostrom and other scholars also broadened the scope of their research to global social dilemmas such as climate change mitigation (Dietz et al., 2003, Ostrom et al., 1999). This research recognises the complexity of dilemmas at a global scale while drawing on lessons learnt from successful governance systems for local and national dilemmas. Ostrom argued that global dilemmas require a ‘polycentric’ approach: structural governance approaches to increase cooperation on multiple levels, from small (local) and medium up to global (Ostrom, 2009).

2.4. The social dilemma of climate change mitigation

The previous sections have provided an overview of social dilemma definitions, behaviour in social dilemmas, and approaches for achieving socially optimum outcomes. This thesis focuses on one specific social dilemma: the social dilemma of climate change mitigation.

Mitigating climate change has been identified as “a social dilemma on an unprecedented scale” (Hasson et al., 2010, p.331). Anthropogenic emissions of greenhouse gases are the major cause of climate change (IPCC, 2013). Climate change is predicted to result in highly negative consequences for a majority of people on earth through an increase in weather extremes, causing flooding and droughts; and a rise in sea-levels, increasing the flood and erosion risk of coastal areas (IPCC, 2014a). To avoid the collective cost of a

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warming planet, mitigation is required by different actors at different levels, including personal actions by individuals (e.g. Hillman, 2004, IPCC, 2014b). From an individual's perspective the mitigation of climate change exhibits all outlined characteristics of a social dilemma (e.g. Milinski et al., 2006). In the mitigation dilemma a non-cooperative choice takes the form of high emission behaviours (not taking action to address climate change), whereas the cooperative choice means engaging in low emission behaviours (taking action to address climate change) (Horton and Doron, 2011, Raihani and Aitken, 2011). Non-cooperative behaviours, such as air travel, car driving, home heating or meat consumption, result in immediate benefits for the individual. For example, they may be more convenient or more subjectively pleasant than the cooperative alternative. Non-cooperation thus represents the individually rational choice. At the same time it contributes to a negative collective outcome in the form of climate change. The outlined social dilemma perspective presents a simplification of choices with emission consequences: as mentioned in chapter one many other factors influence these choices. The presented perspective specifically highlights the social dilemma structure of climate change mitigation.

The climate change mitigation dilemma has been described in different forms in the relevant literature. The main differences lie in definitions of the collective and whether it is outlined as a common resource or a public good dilemma.

Three different definitions of the collective exist: 1) the collective as the world population, therefore a collective of over 7 billion decision makers (Goeschl and Perino, 2012, Horton and Doron, 2011, Milinski et al., 2006, Staats et al., 1996); 2) a collective of companies as decision makers (Tsur and Zemel, 2008); 3) a collective of countries as decision makers (Barrett, 2013, Hasson et al., 2010). In the first two definitions the cooperative choice equates to personal or corporative actions to address climate change. In

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the third definition decisions are made on a political level focusing on environmental policies and international negotiations. Here signing a binding climate change treaty or implementing stricter climate change policies classify as cooperative choices.

Various authors formulate climate change mitigation as a public good dilemma. Here the cost of mitigation is the monetary or legislative contribution that has to be made and climate change mitigation is the public good that needs to be provided (Goeschl and Perino, 2012, Hasson et al., 2010). Contributions could be investments in technologies such as carbon capture or in incentives for mitigation efforts. This public good interpretation is most suitable to describe the political level of climate change mitigation. Others have offered a common resource dilemma interpretation of climate change mitigation (Horton and Doron, 2011, Lozano, 2007, Raihani and Aitken, 2011, Staats et al., 1996, Tsur and Zemel, 2008). In this interpretation the common resource can be defined as the emission budget available to all humans. The emission budget represents the amount of greenhouse gases we can emit when aiming to limit global warming to 2 °C throughout the twenty-first century (Meinshausen et al., 2009). With every behaviour that emits further greenhouse gases into the atmosphere we ‘harvest’ from this common resource. Framing climate change mitigation as a common resource dilemma may have beneficial effects on cooperation, as cooperation is at least initially higher in common resource dilemmas as compared to public good dilemmas (McCusker and Carnevale, 1995, Sell and Son, 1997). The common resource interpretation is better suitable than the public good interpretation to describe an individual’s perspective of climate change mitigation. Not all of the literature on climate change mitigation as a social dilemma clearly distinguishes between a public good or common resource definition (Hasson et al., 2010, Milinski et al., 2006, Newell et al., 2014, Santos and Pacheco, 2011).

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2.4.1. Characteristics of the mitigation dilemma

The climate change mitigation dilemma has a variety of distinctive characteristics that often add to the difficulty of achieving mutual cooperation.

1) Avoiding a loss. In the mitigation dilemma mutual cooperation does not result in an additional gain, but provides the collective with the socially optimum outcome of avoiding a loss (Hasson et al., 2010, Ostrom, 2009). While cooperation in the mitigation dilemma may result in other potential gains for the collective, the central positive outcome of mutual cooperation will be to avoid losses created by dangerous climate change. According to prospect theory people tend to overvalue losses and undervalue comparable gains (Kahneman and Tversky, 1979). The emphasis on loss avoidance may therefore be a factor fostering cooperation in the climate change mitigation dilemma (Raihani and Aitken, 2011).

2) Emissions as a by-product. One distinct characteristic of the mitigation dilemma is that 'harvesting' from the emission budget is not the objective but occurs as a by-product of behaviour that pursues other objectives (Horton and Doron, 2011). When people take a flight, they don't aim to 'harvest' from the emission budget, they simply want to get to a distant place quickly, cheaply and conveniently. People may not even be aware of the effects of their choices on the collective outcome with regards to climate change. Gifford (2011) identifies this lack of awareness - in his terms ignorance - as one of the barriers to actions on climate change. Burke (2001) argues that most people are not well enough informed about the collective cost in the climate change mitigation dilemma to be aware of the social dilemma structure. The situation may be perceived as a pure decision problem without any social interdependence (Burke, 2001). Therefore people may be less likely to transform the 'given situation' of immediate outcomes for themselves into an 'effective situation' (including others and more long-term outcomes) or to identify the situation as being moral.

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3) Size of the collective. The collective in the climate change mitigation dilemma can be countries, companies or individuals. On the individual level the collective encompasses all human beings (Horton and Doron, 2011, Milinski et al., 2006, Staats et al., 1996). The emission budget is accessible for any person on earth to 'harvest' from. A large number of studies have shown the important role of the size of the collective for cooperation in social dilemmas. Although studies find that cooperation decreases with group size, it is often not a straight forward effect of the number of people involved, but depends on the specific characteristics of a social dilemma (Franzen, 1994, Isaac and Walker, 1988, Oliver and Marwell, 1988, Poteete and Ostrom, 2004). The size of the collective may have important implications for group identity, which forms a motivational approach to increase cooperation. An experiment by Ellemers and colleagues (1999) showed that participants identified more strongly with a smaller minority group, compared to a larger majority group (Ellemers et al., 1999). However this finding (like other findings on group size) comes from an experiment comparing very small groups (group size of eight for large groups). The large and diverse collective in the mitigation dilemma underlies several of the characteristics outlined below: it increases anonymity and social uncertainty, personal insignificance, the social trap and social distance.

4) Anonymity of the decision makers. Anonymity of decisions decreases cooperation under certain conditions as it prevents direct or indirect reciprocity (Kerr, 1999). In the mitigation dilemma many decisions are made in private and are thus anonymous. How much meat we eat or how much energy we use in our homes is largely private, a characteristic that is likely to decrease cooperative behaviour.

5) Social uncertainty. Due to social interdependence in social dilemmas, personal outcomes depend on the choices of others. Those choices and therefore the likelihood of

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achieving a socially optimum outcome cannot be predicted with certainty. Thus social dilemmas are subject to high social uncertainty (Aitken, 2009, e.g. Raihani and Aitken, 2011). In the mitigation dilemma social uncertainty is especially high due to the large size and diversity of the collective. Social uncertainty increases the likelihood of opting for the non-cooperative choice (Biel and Gärling, 1995, Staats et al., 1996). Communication between decision makers is an approach to decrease social uncertainty (Kerr and Kaufman-Gilliland, 1994), but is difficult to apply in the mitigation dilemma due to the large collective.

6) Personal insignificance. Choices made by a single individual have a negligible influence on the world's climate. If a single individual decides to cooperate and take actions to address climate change, he or she will not make a significant difference in terms of mitigation outcomes (Aitken et al., 2011). Thus the mitigation dilemma is particularly characterised by personal insignificance. This has been shown to decrease cooperation in social dilemmas (De Cremer and van Dijk, 2002, Kerr, 1996). One social dilemma game found that the smaller a person's possible contribution to a public good, the less likely it became that they cooperated and contributed to the public good (Kerr, 1992).

7) Spatial trap. A further characteristic of the mitigation dilemma is that tangible collective costs are more likely to occur in places spatially distant from the decision makers. This is known as the spatial trap (Osbaldiston and Sheldon, 2002). The highest per capita emissions are from industrialised countries (e.g. Olivier et al., 2012) while the most severe negative consequences of climate change are expected to occur initially in subtropical developing countries (IPCC, 2014a). The spatial trap promotes free-riding and therefore non-cooperation, as decision makers in developed countries bear an even smaller fraction of the collective cost (Lorenzoni et al., 2007). Additionally distant risks are known to be

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undervalued (Gifford, 2011). Thus a potential distant collective cost will be perceived as a lower risk compared to a potential collective cost in close proximity.

8) Temporal trap. Although the consequences of a warming climate can already be observed today, more severe negative consequences are predicted to occur in the future (IPCC, 2014a). The conflict arising in the mitigation dilemma is therefore expanded to one between short term personal outcomes and long-term collective outcomes (Osbaldiston and Sheldon, 2002). The temporal trap also promotes non-cooperative decisions (Horton and Doron, 2011, Kortenkamp and Moore, 2006, Lorenzoni et al., 2007). Temporal discounting means outcomes in the far future are discounted in terms of their personal payoffs (Frederick, 2006, Gifford, 2011). In the climate change mitigation dilemma the temporal trap can even mean that collective outcomes will affect future generations rather than the individuals making cooperative or non-cooperative decisions in the present.

9) Social distance. As a result of the spatial and temporal trap, those bearing a higher fraction of the collective costs are socially distant from the decision makers in industrialised countries creating those costs (Spence et al., 2012). Social distance in turn encourages psychological discounting: less importance is given to the outcomes for the collective and others (Jones and Rachlin, 2006). The resulting lower value assigned to the collective and others' outcomes leads to a decrease in cooperation (e.g. Kollock, 1998).

10) Environmental uncertainty. The collective cost in the mitigation dilemma refers to negative consequences of climate change. Many aspects of this collective cost are subject to a high amount of uncertainty and the exact consequences of a changing climate, regional impacts and time scales are difficult to predict (Lorenzoni et al., 2005, Maslin and Austin, 2012). In addition the avoidance of climate change through mitigation efforts can only be predicted probabilistically (Meinshausen et al., 2009). Environmental uncertainty increases

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the rationale for non-cooperative behaviour (Van Vugt and Shakespeare, 1998). In summary non-cooperation is promoted as a) the collective cost is highly uncertain; b) the collective cost may not be tangible within an individual's lifetime (see also temporal trap); c) it is not clear if mutual cooperation can ensure the socially optimum outcome (Hasson et al., 2010, Horton and Doron, 2011, Staats et al., 1996).

11) Heterogeneity in 'harvest rates' (the amount of CO₂ emitted = the amount 'harvested' from the emission budget). The 'harvested' amount of the emission budget is highly heterogeneous, both between countries (Olivier et al., 2012) and between individuals within countries (Gough et al., 2011). Differences in 'harvest rates' between decision makers can form the basis for reciprocity, moralization and punishment - high emitters can be sanctioned by low emitters. The application of these approaches depends on a reference point perceived by others involved in a social dilemma. Compared to high emitters in industrialised countries individual choices may be perceived as highly cooperative, but compared to per capita emissions in many developing countries, the same choices may be perceived as non-cooperative.

2.4.2. The social dilemma structure of climate change mitigation and actions to address climate change

The social dilemma structure of climate change mitigation has been argued to discourage actions to mitigate climate change as these are inconsistent with self-interested (non-cooperative) responses to the dilemma. Tavoni and colleagues (2011) describe international efforts to contain "the rise in global mean temperature" as a public good and state the "disconnect between individual and collective interest is a prime cause of public goods underprovision." (p.11825). Similarly, Wood (2011) and Raihani and Aitken (2011) identify free-riding incentives as a major difficulty with regards to global cooperation to act

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on climate change. Irwin (2009) describes the pessimistic view that due to the social dilemma structure of climate change mitigation “national governments acting in the interests of rational and self-interested citizens seem unlikely to do much to reduce emissions in their respective countries.” However, he notes that voluntary actions to address climate change by individuals, businesses and countries as well as research on social dilemmas in general show that cooperation in these dilemma situations does occur. Irwin explains cooperation (in the absence of structural approaches) through a combination of direct and indirect reciprocity and cooperative norms. Staats and colleagues (1996) evaluated a 1990 Dutch climate change mass media campaign. The media campaign aimed to increase problem awareness and knowledge of climate change as a means of increasing actions to address climate change and the perceived necessity for climate change policies. The researchers used a pre-post questionnaire design to assess people’s views before and after the campaign was run. The questionnaire contained a number of items derived from a social dilemma perspective of climate change mitigation. These items focused on people’s contributions to climate change mitigation and their perception of others’ contributions. The study found the campaign to be ineffective in increasing actions and policy approval. Staats and colleagues interpret the failing of the mass media campaign from a social dilemma perspective: “If it remains uncertain whether other parties contribute to help preventing the greenhouse effect, people will see their own efforts as wasted. It is unlikely that citizens will be willing to sacrifice some of their personal comfort if not only the collective goals to strive for (i.e. the prevention of ecological disaster) but also the contributions made by other parties are surrounded by so much uncertainty.” (Staats et al., 1996, p.200).

Two studies directly tested this argued negative effect of the social dilemma structure on actions to address climate change. Aitken and colleagues (Aitken et al., 2011) identified the social dilemma structure and related feelings of powerlessness as psychological barriers

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to individual action. They asked members of the public in New Zealand to fill out a paper-based questionnaire assessing knowledge and perceptions of climate change as well as actions to address climate change (“Have you changed your actions partly due to considerations of climate change?”). The questionnaire then asks about the importance of different factors in shaping actions on climate change including personal costs, perceptions of powerlessness (e.g. “The feeling that my contribution is just a drop in the ocean and so is insignificant”), and perceptions related to the commons dilemma (e.g. “Unfairness associated with bearing the cost of change while others do not”). Results revealed that perceptions of powerlessness and the commons dilemma predicted low levels of action on climate change. Franzen (1995) analysed data from survey in Germany that assessed different forms of pro-environmental behaviour as well as perceptions of the social dilemma structure of climate change mitigation. Franzen combined items asking about perceptions of powerlessness and the free-rider problem to a dilemma awareness scale. This dilemma awareness had a small negative effect on pro-environmental behaviour. In contrast to this negative effect of dilemma awareness participants predominantly (83%) agreed with the statement that they would act environmentally friendly, regardless of what other people do.

These questionnaire studies confirm the argument that the social dilemma structure of climate change mitigation discourages actions to address climate change. However, the questionnaire items make the social dilemma structure salient to participants, increasing the awareness of this structure. Qualitative studies that explore people’s perceptions and actions on climate change without making social dilemma characteristics salient suggest a more complex effect of the social dilemma structure.

A number of these qualitative studies suggest that people are not always aware of the social dilemma structure of climate change mitigation, especially in the domain of travel

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behaviour. Through focus groups Hares and colleagues (2010) explored people's awareness of the impacts of travel decisions on climate change, thus the collective cost of individual travel decisions. Findings suggest that collective cost of climate change is rarely considered in holiday planning: "Even though climate change was clearly the main topic of discussion, not one of the participants identified climate change, or even environmental concerns in general, as a factor they consider when making decisions about their holidays." (Hares et al., 2010, p.3-4). Predominant considerations are personal costs and benefits such as cost and travel time. At some point researchers instigated a discussion about the effects of travel behaviour on climate change. Participants only then justified their high emission behaviour with a notion of powerlessness (amongst other justifications), therefore relating to the social dilemma structure of climate change mitigation. Line and colleagues' (2010) focus group study on travel intentions of young people (aged 11 – 18) produced similar findings. Young people's focus is on individual benefits of travel behaviour. The desire to drive and issues around self-image, identity and social recognition dominate behaviour intentions. The link between travel behaviour and the collective cost of climate change was little understood by participants. Higham and colleagues (2014) explored people's awareness of climate change in three different European countries (Norway, United Kingdom and Germany). The researchers were especially interested in the "flyers dilemma", the conflict between personal benefits and collective, climate related, costs of leisure flights. Qualitative interviews with participants revealed that people are aware of the collective climate costs of individual domestic behaviour such as driving and heating, although not all participants perceived a personal responsibility to change these actions in order to address climate change. A common theme was a feeling of insignificance of personal actions for the mitigation of climate change. A general view was that actions to address climate change on a daily basis had to be "convenient and cost effective" (Higham et al., 2014, p.15), highlighting the need for actions

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on climate change to align with personal interests. With regards to the “flyers dilemma”, Higham and colleagues found that especially UK participants were happy to ignore and deny the collective costs of flying given the large personal benefits.

These findings from qualitative studies suggest that people may not necessarily be aware of the collective costs of emission behaviours, when these collective costs are not made salient. Viewing this argument in the light of Interdependence Theory, people may fail to transform the ‘given situation’ into an ‘effective situation’ in which the collective cost is taken into account.

Two qualitative research studies explored the role of the social dilemma structure of climate change mitigation on actions to address climate change. In contrast to the two reported questionnaire studies however, they did not specifically focus on testing the negative effect of the social dilemma structure. Horton and Doron’s (2011) research explored whether people’s sense of fairness increased actions to address climate change. The researchers provided different prompts during focus groups, including information on the link between people’s behaviours, emissions and climate change as well as differences in people’s emissions related behaviour. Some participants were also provided with a social dilemma perspective on climate change mitigation: the emission budget was introduced as a scarce resource. Findings showed that the presentation of this dilemma perspective triggered strong notions of fairness in participants. These notions of fairness can be powerful drivers to change attitudes about consumptions and approval of climate change policies. For example, participants approved of policies as a way to prevent free riding and to achieve a fair distribution of the burden to mitigate.

Capstick (2013) investigated people’s understanding of climate change as a social dilemma, drawing on different qualitative data sets on perceptions of climate change. He

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analysed the occurrence of a social dilemma frame in participants' answers and found evidence of numerous themes relating to the social dilemma structure of climate change mitigation. Among these are references to a self-interested human nature and the self-interested nation, which fails to act for the collective good. Another common theme centres around the insignificance of individual actions and the necessity for others to act. Thus the social dilemma structure of climate change mitigation is often "associated with a sense of resignation, fatalism and lack of agency" (Capstick, 2013, p.3490). However, the research also reveals a number of cooperative considerations as a response to the social dilemma structure. Participants reported acting on climate change because of an obligation to do their bit as part of a collective response. Capstick thus reveals ways in which "both a social dilemma framing and an 'anti'-dilemma counter position [...] support rationales either for action or inaction on climate change at a personal level." (Capstick, 2013, p.3492). Capstick further designed a questionnaire to quantify these two opposing responses to the social dilemma of climate change mitigation. On the one side 30% of respondents agreed or strongly agreed with the statement "The actions of a single person don't make any difference in tackling climate change" and 13% agreed or strongly agreed with the statement "There is no point in me doing anything about climate change because no one else is". On the other side 41% agreed or strongly agreed with the statement "If each of us did our bit to help, we could put an end to the problems of climate change". How the agreement or disagreement with these statements relates to respondents' own actions to address climate change was not assessed.

Overall, research on the effect of the social dilemma structure of climate change mitigation on individual actions to address climate change is limited and inconclusive. The assumption that people are aware of the social dilemma structure of climate change mitigation is contradicted by qualitative research. The argument that the social dilemma

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structure reduces actions on climate change is supported by a number of quantitative and qualitative studies. However, qualitative studies show evidence of a set of cooperative considerations in response to the social dilemma structure, such as fairness notions. They further suggest a potential motivating effect of these cooperative considerations. This suggested effect has not been formally tested.

2.5. Knowledge gaps

There is a considerable amount of knowledge and research on behaviour in social dilemmas and how this can be applied to the social dilemma of climate change mitigation. Based on the literature it is clear that the predictions of Rational Choice Theory do not always reflect reality. A variety of person characteristics and circumstances lead to a higher level of cooperation. Based on this finding, approaches have been developed to further increase cooperation and ensure the achievement of socially optimum outcomes in social dilemmas. Many of the insights on approaches for increasing cooperation are from experimental or lab studies under controlled conditions. It is generally difficult to predict if such approaches can be applied to real world decision making. Further research is needed to identify which approaches to achieve mutual cooperation are best applicable to different real world social dilemmas.

Climate change mitigation is an especially complex social dilemma. Because emissions are only a by-product of a multitude of behaviours relating to cooperation and non-cooperation, it is not clear if the social dilemma structure is obvious to people. The question that arises is whether people perceive a conflict between personal and collective outcomes with regards to behaviours with emission consequences. Interdependence Theory as well as

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the Appropriateness Framework emphasise the importance of the situational structure and how situations are interpreted with regards to behaviour in social dilemmas. The lack of knowledge about whether people are aware of the social dilemma structure of climate change mitigation needs addressing.

It is also unclear whether people engage in a transformation process in the climate change mitigation dilemma to transform the ‘given situation’ based purely on immediate outcomes for themselves. Findings from qualitative research on climate change and emission behaviours suggest that people may not be aware of the collective cost of certain emission behaviours, especially in the area of travel decisions.

The transformation process in social dilemma situations in general and especially with regards to the mitigation dilemma is currently not sufficiently understood. With regards to the climate change mitigation dilemma, some elements of the transformation process have received more research attention. The positive effect of pro-social orientations and a consideration of future consequences on personal actions to address climate change have been studied in more detail. Conversely, considerations and emotional responses to the social dilemma situation are not well understood. These considerations and emotional responses directly guide the transformation to an ‘effective situation’, which then determines behaviour in social dilemma situations. It is important to understand how these antecedents of cooperative and non-cooperative choices affect behaviour in the climate change mitigation dilemma. Two studies have been reported that directly assess the effect of considerations relating to the dilemma structure of climate change mitigation on actions to address climate change (Aitken et al., 2011, Franzen, 1995). However, these studies have limited the assessment to a set of negative, non-cooperative perceptions such as powerlessness and free-riding. Both studies failed to include other, cooperative considerations relating to the

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dilemma structure. Examples of cooperative considerations are fairness or a contribution to a collective effort as described by Horton and Doron (2011) and Capstick (2013). A comprehensive assessment of both non-cooperative and cooperative considerations in response to the social dilemma of climate change mitigation and their influence on personal actions to address climate change is missing.

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Climate change mitigation has been described as probably the greatest social dilemma ever faced (Milinski et al., 2006). The situational structure of such an interdependent situation is an important predictor of behaviour (Van Lange and Rusbult, 2012). As outlined before, the situational structure of a social dilemma is characterised by a socially optimum outcome (achievable through mutual cooperation), non-cooperation as the dominating strategy and the social interdependence of the situation. The aim of this thesis is to understand people's considerations in response to the social dilemma structure of climate change mitigation and how these considerations affect people's actions on climate change.

Much of our knowledge on people's behaviours in social dilemmas is based on games and experiments under controlled conditions. In these experiments the social dilemma structure of the situation is clearly outlined to participants. For example, participants in a common resource dilemma game are informed that all participants will lose their personal benefits if the common resource cannot be sustained (Dorfman et al., 2014). Awareness of the social dilemma structure is a given in these studies, but cannot be assumed in real life situations. Interdependence Theory (Kelley and Thibaut, 1978) also outlines how people may not be fully aware of the social dilemma structure of a situation. They may at first only perceive a 'given situation', which reflects purely immediate personal outcomes, not including collective costs and benefits. This may especially be the case in the complex climate change mitigation dilemma with characteristics such as emissions as a by-product, a spatial and temporal trap or environmental and social uncertainty. For example, research on travel behaviour suggests that people show little consideration of the climate change implications of different travel modes (Higham et al., 2014, Hares et al., 2010, Line et al.,

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2010). A key question is: To what extent are people aware of the conflict between personal and collective benefits when they encounter everyday choices with emission consequences?

- **Objective 1:** To determine people's awareness of the social dilemma structure of climate change mitigation.

It has been argued that the social dilemma structure of climate change mitigation decreases individual actions to address climate change (Aitken et al., 2011). This is because the social dilemma structure may trigger considerations related to the temptation to free-ride, non-cooperation resulting in the highest personal payoffs and characteristics more specific to the climate change mitigation dilemma such as the personal insignificance of individual decision makers. But a social dilemma also includes characteristics that may trigger cooperative considerations. Considerations related to a fair distribution of actions to address climate change or a contribution to a successful collective response are examples (Horton and Doron, 2011, Capstick, 2013). This thesis aims to create a comprehensive set of considerations which can be triggered by the social dilemma structure of climate change mitigation.

- **Objective 2:** To determine people's cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation.

In a subsequent step the thesis aims to establish the link between these cooperative and non-cooperative considerations and people's actions to address climate change. On the one hand, cognitions relating to the powerlessness of the individual or the incentives for free-riding could decrease individual actions to address climate change. As outlined in chapter 2, these non-cooperative considerations are frequently used as an explanation for a lack of actions to address climate change (e.g. Aitken et al., 2011, Staats et al., 1996). On the other

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hand a second set of cooperative considerations relating to the social dilemma structure may increase cooperation. The effects of personal actions on others can lead to a moralisation of the situation (Dawes, 1980). Interdependence Theory (Kelley and Thibaut, 1978) describes how a consideration of the effects on others can transform a ‘given situation’, which is purely focused on immediate personal benefits, to an ‘effective situation’ which may increase cooperation. Similarly the Appropriateness Framework states the importance of whether or not people perceive a situation as a moral situation or not (March and Olsen, 2004). In addition to theories on behaviour in social dilemmas, theories on pro-environmental behaviour also stress the importance of considering others affected by personal decisions. The Norm Activation Model (Schwartz, 1977) and Value Belief Norm Theory (Stern et al., 1999), both of which are frequently applied to explain pro-environmental behaviour, predict that moral norms are activated in individuals who are aware of a threat to others and accept a responsibility to prevent these negative consequences for others. In both the Norm Activation Model and Value Belief Norm Theory, an increased consideration of these negative effects on others is predicted to increase pro-environmental behaviour. The findings of a meta-analysis on factors influencing pro-environmental behaviours confirms that “pro-environmental behaviour is probably best viewed as a mixture of self-interest (e.g., to pursue a strategy that minimises one's own health risk) and of concern for other people, the next generation, other species, or whole eco-systems (e.g., preventing air pollution that may cause risks for others' health and/or the global climate).” (Bamberg and Möser, 2007, p.15). The literature review and knowledge gaps show that the link between cooperative considerations and actions on climate change remains under researched. A combined assessment of both sets of considerations, cooperative and non-cooperative, and their relationship with actions on climate change has not been done before. The resulting knowledge gap is addressed through the novel empirical research set out in this thesis.

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- **Objective 3:** To determine how cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation affect personal actions to address climate change.

If a set of cooperative considerations is associated with an increase in personal actions to address climate change, this could have implications for efforts to promote mitigation on a personal level. These cooperative considerations could potentially be used in communication campaigns to increase actions to address climate change. This thesis explores the potential to encourage actions on climate change through messages based on cooperative considerations.

- **Objective 4:** To determine whether communication based on cooperative considerations can increase personal actions to address climate change.

The thesis is structured as follows:

Chapter four tests awareness of the social dilemma structure and its effect on behaviour through an online study. The first part of the study explores whether people are aware of the social dilemma structure of everyday situations and therefore addresses objective one of the thesis. Participants were presented with a number of different social dilemma situations. Participants' consideration of characteristics that define social dilemmas in their decision making was assessed through two different assessment methods: open-ended questions and a hierarchy ranking task. This determined whether participants included considerations of the conflict between personal and collective benefits in their decision making. Answers to open-ended questions also provide an initial indication of people's considerations in response to social dilemmas, and are therefore relevant to objective two of this thesis.

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In the second part of the study a framing manipulation was administered to test the effects of a salient collective outcome on participants' actions to address climate change. This framing manipulation is a first exploration of the relationship between cooperative considerations relating to the social dilemma structure and action on climate change, and so addresses objective three of this thesis. This social dilemma framing is compared to no information about climate change and purely factual information about climate change.

While chapter four tests people's awareness of social dilemmas, the use of open-ended questions meant that only a limited set of the most salient considerations in response to different social dilemmas was assessed. **Chapter five** develops a comprehensive set of potential considerations to the social dilemma of climate change mitigation. This set is based on findings from chapter four and research literature reviewed in chapter two on social dilemmas in general and on the social dilemma structure of climate change mitigation specifically. The set includes both considerations that are expected to promote cooperation (cooperative considerations) and considerations that are expected to foster non-cooperation (non-cooperative considerations), and so addresses objective two of this thesis. As examples, cooperative considerations include considerations of collective outcomes and outcomes for others, and non-cooperative considerations include a focus on immediate personal benefits or the temptation to free-ride. Chapter five further reports an online questionnaire study which addresses objective three of this thesis. The study tests how both cooperative and non-cooperative considerations are linked to people's actions on climate change and approval of climate change policies. In addition to self-reported data from the questionnaire, the study further uses behavioural assessments, such as a commitment to donate a potential cash prize to an environmental NGO, to test this link.

Chapter six reports the findings from a series of qualitative interviews. These interviews enable a more in depth understanding of people's considerations in response to the

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social dilemma of climate change and their relation to individual actions to address climate change and approval of climate change policies. This chapter therefore provides interpretive depth to the survey data analysed in chapter five, and so complementarily addresses objectives two and three of this thesis. The interviews feature general questions about climate change and climate change mitigation as well as specific card sorting tasks to explore the link between considerations and actions and approval.

Finally, **chapter seven** addresses objective four of this thesis in exploring the following question: Can considerations linked to cooperation be used as a way to promote actions to address climate change? An online pilot study and a field experiment in a shopping mall test whether using cooperative considerations as a basis for messages in climate change communication could increase both people's actions to address climate change and their approval of climate change policies. The studies contain three different experimental conditions which vary the communication message: two of the messages are based on cooperative considerations and one is a control message. The studies test whether these messages influence people's self-reported actions on climate change as well as whether they donate money to a NGO working on climate change and sign a petition for stricter climate change policies.

Empirical chapters four and seven are structured and written in a manuscript form which enables submission for publication. Empirical chapters five and six differ from the original mixed-method manuscript written for publication. They have been separated for this thesis into a chapter describing the quantitative assessment and one describing the qualitative assessment to enable a more detailed description of the methods and analyses involved.

Figure 3.1 illustrates the structure of this thesis in terms of knowledge gaps, objectives and empirical chapters:

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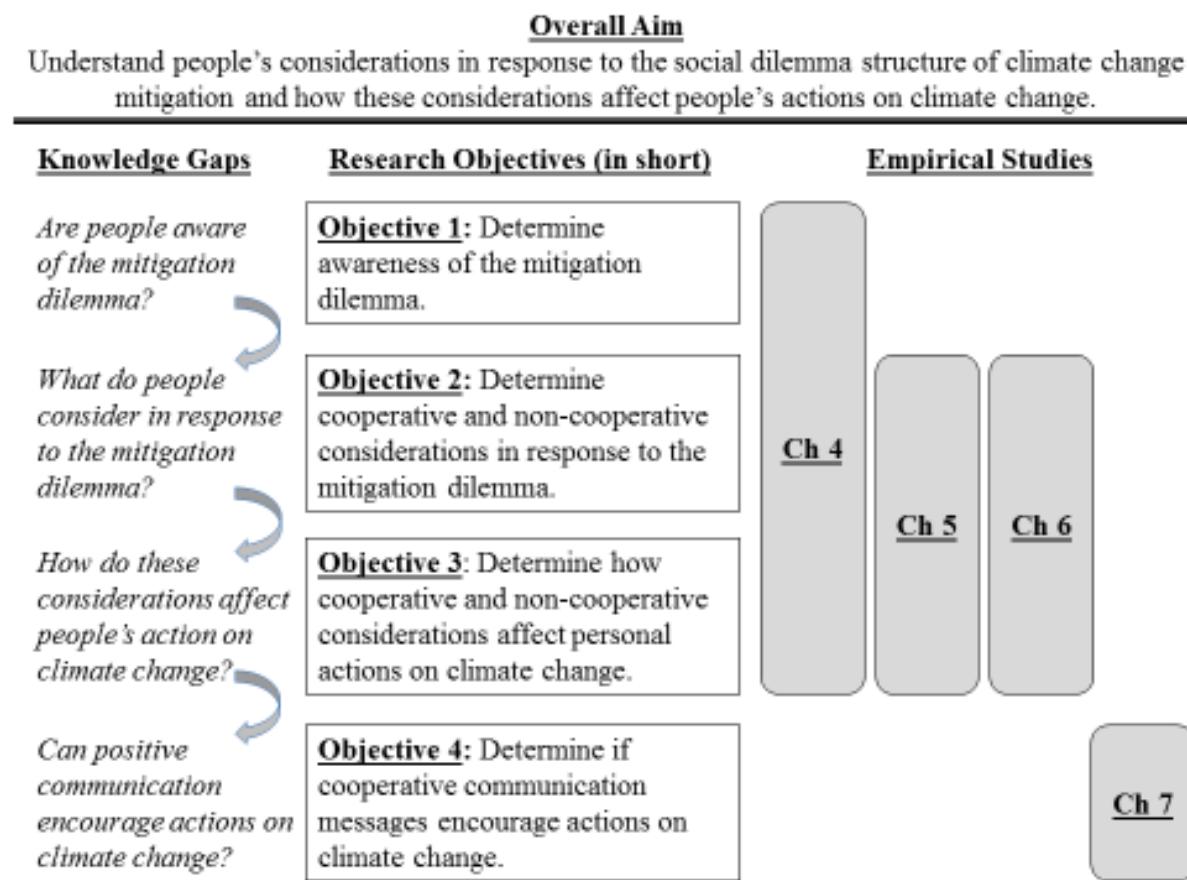


Figure 3.1: Structure of knowledge gaps, objectives and empirical chapters.

Chapter eight synthesises the findings from the empirical chapters four to seven in light of the overall aim of the thesis and the four objectives. It further concludes with an outlook about practical applications and areas for further research.

4. Social dilemma characteristics and cooperation in the climate change mitigation dilemma

4.1. Abstract

Climate change mitigation constitutes a social dilemma, characterised by a conflict between personal and collective outcomes and high social interdependence. Social dilemma characteristics are frequently called upon to explain a lack of personal actions to address climate change. This explanation draws on two assumptions: 1) people consider social dilemma characteristics in everyday decisions with emission consequences; 2) these characteristics discourage personal actions to address climate change. We explored both assumptions in a multi-method online study. The study consisted of three parts. In part one we assessed through open-ended questions whether people consider the conflict between personal and collective outcomes in different everyday decision making situations. Results show that the consideration of social dilemma characteristics differs between situations and can be increased through making the collective more salient. The second part assessed the consideration of social dilemma characteristics through closed-ended questions. When social dilemma characteristics are made salient through closed-ended question participants are more likely to consider them in their decision making. It thus cannot be assumed that people consider social dilemma characteristics in decisions without making these characteristics salient to participants. The third part consisted of a framing manipulation which focused on social dilemma characteristics expected to promote, rather than discourage personal actions to address climate change. The experimental manipulation revealed that framing an everyday decision making situation as a conflict between personal and collective outcomes promotes actions on climate change.

4.2. Introduction

Researchers have argued that people do not act on climate change because climate change mitigation constitutes a social dilemma (e.g. Aitken et al., 2011). The term social dilemma refers to a situation in which the individual outcome is in conflict with the collective outcome (Dawes, 1980, Kollock, 1998). In a social dilemma individuals can select a non-cooperative or a cooperative choice (Osbaldiston and Sheldon, 2002). Cooperative choices promote collective benefits at the expense of personal benefits, while non-cooperative choices increase personal benefits, but result in collective costs (Dawes, 1980, Kollock, 1998). The key to prevent high collective costs in a social dilemma is to increase cooperation (Lozano, 2007, Raihani and Aitken, 2011).

The following three characteristics are central to a social dilemma¹ :

1. The socially optimum outcome is achieved through mutual cooperation. In a social dilemma, non-cooperation results in a socially suboptimal outcome (and mutual non-cooperation in a high collective cost). The socially optimum outcome (which leaves everyone better off) can only be achieved through mutual cooperation.
2. Non-cooperation is the dominating strategy. Non-cooperation results in the highest personal benefits, regardless of other people's choices.
3. Social dilemmas are situations of social interdependence.
 - a. In a social dilemma personal choices change not only personal outcomes, but alter the collective outcome and imply consequences for others.

¹ Note that these characteristics are applicable only to social dilemmas which possess a dominating strategy (as outlined in chapter 2), KOLLOCK, P. 1998. Social dilemmas: The anatomy of cooperation. *Annual Review of Sociology*, 24, 183-214.

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- b. At the same time personal outcomes are not only contingent on personal choices, but on the choices of all others involved in the social dilemma.

The mitigation of climate change is referred to as “a social dilemma on an unprecedented scale” (Hasson et al., 2010, p.331) and has recently received considerable attention amongst social dilemma researchers. As outlined in chapter two, decision makers in the mitigation dilemma can either be conceptualised as countries (e.g. Hasson et al., 2010), companies or individuals (e.g. Raihani and Aitken, 2011). This paper will focus on individuals as decision makers. In the mitigation dilemma a non-cooperative choice takes the form of high emission behaviours (not taking actions to address climate change), whereas the cooperative option means engaging in low emission behaviours (actions to address climate change) (Horton and Doron, 2011, Raihani and Aitken, 2011). High emission behaviours represent the dominating strategy: the individual is better off choosing non-cooperation, regardless of the choices of others involved. If everyone else chooses non-cooperation, a single decision maker’s mitigation efforts will not successfully address climate change. So he loses the immediate personal benefits without preventing the collective cost. On the other hand if everyone else does take actions on climate change, a single decision maker’s non-cooperative behaviour will not trigger severe global warming and he can enjoy the benefits of a non-cooperative choice without the consequences of this severe collective cost.

This also illustrates social interdependence. An individual decision maker cannot avoid the collective outcome of a warming planet themselves, but is dependent on others’ actions to address climate change. At the same time decision makers engaging in non-cooperative behaviours create negative outcomes for a majority of people on earth.

4. Social dilemma characteristics and cooperation

The social dilemma characteristics of climate change mitigation have served as one explanation for the failure to achieve cooperation in the form of personal actions to address climate change (e.g. Raihani and Aitken, 2011). Aitken, Chapman and McClure (2011) asked participants to indicate the importance of different factors for their decision to engage in actions to address climate change. As outlined in chapter two, findings show that awareness of the social dilemma characteristics of mitigation predicts a lack of personal actions (Aitken et al., 2011). Staats, Wit and Midden (1996) explained the failure of a climate change information campaign to significantly change people's behaviour from a social dilemma perspective. They argue that people are aware of the social interdependence of climate change mitigation. As the campaign did not attempt to increase trust in others' cooperative efforts, this awareness discourages behaviour change. Social dilemma characteristics have further been cited as an explanation for the gap between pro-environmental attitudes and green consumerism (Gupta and Ogden, 2009). Two assumptions underlie these explanations:

1) People in social dilemma situations consider social dilemma characteristics in their decision making; 2) A social dilemma situation elicits considerations associated with decreased cooperation. The validity of these assumptions remains understudied to date and is addressed by this paper. The paper is structured as follows: We first explore how and why people may *not* consider social dilemma characteristics in their decision making. We then outline how the consideration of certain social dilemma characteristics may increase cooperation. This is followed by an empirical study designed to investigate two main questions related to objectives one and four outline in chapter three: 1) Are people's decisions in social dilemma situations informed by social dilemma characteristics? 2) What are the effects of considering social dilemma characteristics on cooperation in a social dilemma related to climate change mitigation? Finally we discuss the results and implications of this study.

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4.3. Consideration of social dilemma characteristics

To date, it is still unclear to what extent people consider the three central social dilemma characteristics (the socially optimum outcome achieved through mutual cooperation, non-cooperation as the dominating strategy, and social interdependence) when making decisions in real world social dilemmas. In most economic laboratory experiments these social dilemma characteristics are made explicit, but this may not be the case for real world situations (Gifford, 2008, Ostrom, 1998, Tenbrunsel and Northcraft, 2010). Individuals may for example not perceive the social interdependence of a situation (Dawes, 1980, Fennell, 2004, Kelley and Thibaut, 1978, Tenbrunsel and Northcraft, 2010), preventing the rise of a conflict between personal and collective outcomes (Burke, 2001). Thus the following question arises: Do social dilemma characteristics inform decisions in social dilemma situations, including decisions related to climate change mitigation?

In questionnaire studies, using closed-ended questions, participants report that social dilemma characteristics inform decisions about mitigation behaviours (Aitken et al., 2011, Franzen, 1995). For example, the agreement with statements describing the dependence of personal outcomes on others' choices (as a result of social interdependence) is associated with a stated lack of personal actions to address climate change (Aitken et al., 2011). But the use of closed-ended questions may make social dilemma characteristics salient, which might not actually inform people's choices in real life.

In contrast, open-ended questions are less likely to make social dilemma characteristics salient. When social dilemma characteristics are not made salient, participants are less likely to report social dilemma characteristics amongst the aspects that inform

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decisions about actions on climate change and behaviours with emission consequences (Hares et al., 2010, Horton and Doron, 2011, Line et al., 2010, Platt and Retallack, 2009). For example, focus group research exploring the factors people consider in decisions about overseas holidays found frequent accounts of personal benefits (e.g. weather, costs or travel time), but not of social dilemma characteristics of climate change mitigation, such as the socially optimum outcome or social interdependence (Hares et al., 2010). This indicates that participants viewed these holiday decisions as decision problems (as outlined in chapter two) rather than social dilemmas. Burke (2001) expresses his doubt about the assumption that social dilemma characteristics are considered in decisions about high or low emission behaviour: “most end-product users are too poorly informed about [climate change mitigation] for [social dilemma theory] to be fully applicable” (Burke, 2001).

Qualitative research suggests that the introduction of climate change as a collective cost leads participants to raise and discuss social dilemma characteristics (Horton and Doron, 2011). For example, in the study exploring factors considered in overseas holidays, participants referred to social interdependence only when confronted with the contribution of air travel to climate change (Hares et al., 2010). In-depth explorations of barriers to personal mitigation efforts also led to frequent reports of social interdependence. These include how the fact that successful mitigation requires cooperation from others demotivates personal actions on climate change (Hares et al., 2010, Line et al., 2010, Lorenzoni et al., 2007).

To summarise, the literature suggests that individuals are unlikely to consider social dilemma characteristics in decisions about mitigation behaviour when characteristics are not made salient, but can be led to do so when salience is increased. Salience can be increased through additional contextual information that frames mitigation as a social dilemma (Hares

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et al., 2010, Horton and Doron, 2011) or through closed-ended statements (Aitken et al., 2011).

The psychological literature offers four potential reasons why participants report social dilemma characteristics as important for decisions in closed-ended assessment approaches (where dilemma characteristics are salient), but fail to do so in open-ended assessment approaches (where dilemma characteristics are not salient):

- Anti-introspection bias (Nisbett and Wilson, 1977)
 - People's decisions are informed by social dilemma characteristics, but they fail to report so in open-ended questions due to a limited capacity for introspection. When social dilemma characteristics are presented, their accessibility increases (Chong and Druckman, 2007), and people realise and report their relevance for decisions. This anti-introspection bias is stronger in habitual decisions with little deliberative cognitive involvement.
- Social desirability bias (Crowne and Marlowe, 1960)
 - People's decisions are not informed by social dilemma characteristics. When social dilemma characteristics are presented people realise that considering social interdependence and the socially optimum outcome is a more socially desirable way of making decisions. To be perceived in a better light by others (including the researchers) they report that their decisions were informed by these characteristics.
- Egocentric bias
 - People may excuse inaction on the basis of social dilemma characteristics, when they perceive actions on climate change to be costly (Aitken, 2009, Kerr and Kaufman-Gilliland, 1997, Lorenzoni et al., 2007). Making social dilemma

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characteristics salient might increase such an egocentric bias by making self-serving excuses available.

- Demand bias (Orne, 1969)

From closed-ended questions participants may infer that they are expected to acknowledge or report social dilemma characteristics as informing considerations. Participants may reason, if these characteristics had no relevance for the decision they would not have been included in the closed-ended questions.

This discrepancy between assessment approaches that do and don't increase the salience of social dilemma characteristics has not been studied using the same sample and decision making situations. We address this gap using open-ended questions that do not make dilemma characteristics salient, a situation with explicit social interdependence and assessment through closed-ended questions that increase the salience of social dilemma characteristics.

Based on the stated literature the following hypotheses can be derived:

- H1: Without making them salient, individuals seldom consider social dilemma characteristics when making choices in social dilemma situations.
- H2: When making them salient, individuals show greater consideration of social dilemma characteristics when making choices in social dilemma situations.

In the next section we outline literature relevant to the argument that the consideration of certain social dilemma characteristics may promote, instead of discourage, cooperation.

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4.4. Consideration of social dilemma characteristics and cooperation

Awareness of the social dilemma characteristics of a situation elicits a variety of individual considerations. Some of these considerations are frequently offered to explain the difficulty in promoting cooperation in social dilemmas:

- *Immediate self-interest*: Choices in social dilemmas are influenced by the motive to maximise immediate personal benefits, which results in non-cooperative choices (Dawes, 1980, Hardin, 1968).
- *Temptation to free-ride*: Free-riding is the exploitation of others' cooperation by personally choosing the non-cooperative option (e.g. Horton and Doron, 2011, Kollock, 1998).
- *Fear of being a sucker*: Individuals in a social dilemma may fear that others free-ride on their cooperative choices and exploit their efforts (e.g. Aitken, 2009, Lorenzoni et al., 2007).
- *Personal insignificance and hopelessness*: Many social dilemmas are characterised by a large number of individuals involved, which leads to the relative insignificance of individual choices (Aitken et al., 2011). If others' cooperation cannot be expected, the situation may seem hopeless (e.g. Lorenzoni et al., 2007).

Nevertheless, social dilemma situations may equally elicit considerations that promote cooperation but have received less attention in the social dilemma literature.

Consideration of the socially optimum outcome may motivate cooperation (Batson, 1994, Hine and Gifford, 1997), as the individual realises that everyone (including themselves) will be better off under the condition of mutual cooperation. These notions of *enlightened self-interest* and *collective interest* may in turn motivate the individual to

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cooperate (Burke, 2001, Hine and Gifford, 1997, Horton and Doron, 2011, Lozano, 2007, Tenbrunsel and Northcraft, 2010).

Evidence from the laboratory supports this claim: educating participants about the potential to achieve a socially optimum outcome increased levels of cooperation in a variety of computer-simulated or hypothetical social dilemma situations (Dhont et al., 2012, Isaac, 1985, Pruyn and Riezebos, 2001, Stern, 1976, Van Vugt et al., 1996). Similarly, Kelly and Grzelak (1972) found that co-operators show a higher ability to identify the choice strategy that results in the socially optimum outcome. Hine and Gifford (1997) asked their participants to vocalise goals and strategies they applied in a simulated social dilemma. Participants frequently referred to notions of *enlightened self-interest* and cooperation in order to be ‘better off’ in the end.

Considering that personal non-cooperative choices in a social dilemma result in negative consequences for others (*externalities*) can further elicit moral considerations which can increase cooperation (Dawes, 1980, Dhont et al., 2012, Fennell, 2004, Horton and Doron, 2011, Tenbrunsel and Northcraft, 2010). In Hine and Gifford’s study (1997) one subject directly stated the link between social interdependence, moral considerations and a “cooperative way of maximizing what everybody gets” (Hine and Gifford, 1997, p.185). Horton and Doron (2011) explored the mitigation dilemma in focus groups and concluded: “Evidence suggests that making people aware of the collective context of their behaviour can trigger a deeply held set of fairness instincts in relation to co-operation and free-riding [...]” (Horton and Doron, 2011, p.67). The direct effects of these “fairness instincts” on actual mitigation efforts were not investigated.

On the basis of the cited literature the following hypothesis, related to objective four of this thesis, can be formulated:

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- H3: Consideration of the socially optimum outcome, achieved through mutual cooperation, and consequences created for others are associated with increased cooperation in a social dilemma related to climate change.

To test the three outlined hypotheses, an empirical study was conducted. We explored the consideration of social dilemma characteristics in a variety of social dilemmas, related and unrelated to climate change mitigation. The design and results of this study are described in the following sections.

4.5. Methodology

4.5.1 Participants

An online study was conducted in February 2012 amongst students at the University of East Anglia. Students were recruited through posters, flyers and via emails sent out through the internal email system of a number of schools. The total sample consisted of 187 students, of which 147 completed the questionnaire. Of these 147 students 56 were undergraduate and 91 postgraduate students. The gender ratio was 59% females to 41% males and the mean age was 24.59 ($SD= 5.37$). Different sample sizes were used to analyse the data of unrelated parts of the questionnaire.

4.5.2. Materials and procedure

The online study consisted of three parts. The full questionnaire can be found in Table 4.1 in Appendix A.

Part one was designed to investigate whether people consider social dilemma characteristics in their decision making, when these characteristics are not made salient (H1).

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Participants were presented with five decision making situations (Table 4.2) and asked to list things they weigh up when making a decision in the respective situation. Each situation presents a conflict between personal and collective outcomes, as confirmed by the respective research literature (see references in Table 4.1) and expert assessment. The situations included both, social dilemmas that were linked to environmental issues and those that had no connection to environmental issues. This way we were able to explore whether there are any patterns that emerge solely in dilemma situations linked to environmental issues. The order in which situations were presented was randomised. Open-ended questions were used, which avoid making social dilemma characteristics salient, contrary to closed-ended question formats.

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Situation	Description	Literature	Related to climate change	Deliberative decision making	Social interdependence salient
Restaurant dilemma	Imagine you are at a restaurant with the people from one of your courses. You have agreed that after dinner you will split the bill equally between you. You need to decide what food and drink to have from the menu.	Dawes & Messick (2000)	X	✓	✓
Campaign dilemma	Imagine you are trying to decide whether or not to participate in a climate change campaign by handing out leaflets.	Leighley (1995)	✓	✓	X
Strike dilemma	Imagine you are trying to decide whether or not to actively support public sector strikes by joining a demonstration.	Klandermans (2004)	X	✓	X
Movie dilemma	Imagine you are trying to decide whether or not to watch a movie streamed online for free.	Phau, Teah & Lwin, (2013)	X	X	X
Transport dilemma	Imagine you need to travel to Aberdeen, Scotland (about 500 miles from Norwich) for a couple of days. You need to decide how to get there.	Line, Chatterjee & Lyons (2010)	✓	X	X

Table 4.2: Social dilemma situations presented in the open-ended questions.

The restaurant dilemma is unique in making the collective (the people from one of your courses) explicit. Making social interdependence salient should increase the

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consideration of social dilemma characteristics (H2). The restaurant dilemma acts as a baseline against which dilemmas without an explicit collective can be compared.

Part two of the study, a hierarchy task, was designed to further investigate whether people consider social dilemma characteristics in their decision making when these characteristics are made salient (H2). The movie, campaign and strike dilemmas were presented again alongside different statements of things that people may or may not weigh up when making a decision (Table 4.3). Participants were asked to create a hierarchy that indicates the importance of each of the presented statements for their decision making in the respective situations. Two of these statements referred to social dilemma characteristics and thus increase the salience of social dilemma characteristics. Two statements referred to immediate personal outcomes, thus the 'given situation' in Interdependence Theory (see chapter two). To reduce demand bias and explore the relevance of social dilemma characteristics in the context of other relevant considerations we included statements referring to other factors derived from prominent behaviour theories (Ajzen, 1991, Schwartz, 1977, Stern et al., 1999). Stern's Value-Belief-Norm Theory, for example, is one of the most prominent theories to explain pro-environmental behaviour. Participants were also given the option to exclude from this hierarchy ranking those statements which were not relevant for their decision.

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Statements	Description	Example
Referring to personal outcomes	Time/ effort	“Whether or not it is time consuming”
	Convenience	“Whether or not it is convenient”
Referring to social dilemma characteristics	Costs for others	“Whether or not other people will suffer under climate change”
	Social interdependence	“Whether or not we can make a difference if enough people participate”
Referring to other factors	Attitude towards the activity	“Whether or not supporting strikes is worthwhile”
	Threat	“Whether or not I believe climate change is a threat”
	Personal responsibility	“Whether or not I am responsible for climate change”
	Value	“Whether or not a healthy public sector is important to me.”

Table 4.3: Statements presented alongside the social dilemma situations in the hierarchy task.

Part three of the study was designed to assess the effect of considering the socially optimum outcome achieved through mutual cooperation and the consequences created for others on cooperation (H3). The study targets a cooperative behaviour in the context of climate change mitigation: reduction in meat consumption (Stehfest et al., 2009).

Consideration of these specific social dilemma characteristics was increased through a framing manipulation in the form of a short informative text. Participants were randomly

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assigned to one of four experimental groups (Table 4.4). The respective texts are included in Table 4.5 in Appendix A.

Experimental Group	Framing manipulation
Control Group	No information text
Facts Group	Factual information about the greenhouse gas emissions resulting from meat production
SD Group	Social dilemma framing: information about the conflict between personal and collective outcomes, the socially optimum outcome and the consequences for ‘everyone’ resulting from the decision to consume meat
Facts and SD Group	Factual information and social dilemma framing

Table 4.4: Framing manipulations of the four experimental groups.

This framing manipulation was followed by the assessment of variables associated with cooperation: 1) attitude towards meat consumption, using a Semantic Differential Scale (Cronbach’s Alpha = .887, example item: “Eating meat is unpleasant – pleasant); 2) intention to reduce meat consumption, assessed through two items (Cronbach’s Alpha = .527, example item: “How willing are you to cut down the amount of meat you eat?”); and 3) seeking information on reducing meat consumption through a behavioural measure: At the end of the questionnaire participants could decide whether they would like to be redirected to a website with tips on how to eat less meat. A choice to be directed to this website was interpreted as information seeking behaviour.

4.6. Results

4.6.1. Consideration of social dilemma characteristics without increased salience

Participants' three responses to the open-ended questions were coded with regards to whether or not they contain considerations of social dilemma characteristics. Weighing up solely personal costs and benefits without acknowledging social interdependence and the collective nature of the situation is interpreted as a lack of consideration of social dilemma characteristics. The literature on movie streaming for example lists a number of costs and benefits for the individual consumer of the movie, such as financial aspects (streaming movies for free), convenience or the low quality of streamed movies (Phau et al., 2013). In contrast, references to the socially optimum outcome, non-cooperation as the dominating strategy, or social interdependence, are interpreted as considerations of social dilemma characteristics. In the movie dilemma the lost revenue and the resulting decrease in movie productions is an example of a collective cost and thus a consideration of social dilemma characteristics (Phau et al., 2013). Responses have been coded as personal outcomes, considerations where a social dilemma interpretation is possible, and social dilemma characteristics. Other considerations and ambiguous responses form the last code. Coding examples from the restaurant dilemma provide an illustration of the different codes. "What I feel like eating" is an example of an answer coded as personal outcomes as it focuses purely on personal preferences. Answers that include a very clear deliberation about the collective costs and social interdependence are coded as social dilemma characteristics. The following is an example from this code in the restaurant dilemma: "I tend to avoid the most expensive dish as I believe it would burden others with higher costs; or maybe encourage others to spend more increasing the costs for everyone". In cases where participants refer to others, a potential collective cost or benefit and social interdependence, it is likely that they refer to

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social dilemma characteristics. Where it is likely, but not entirely clear, that a person referred to these as social dilemma characteristics the answer is coded as social dilemma interpretation possible. An example of this category in the restaurant dilemma is referring to the possibility to share a dish. A frequent example of the last category, an ambiguous response, in the restaurant dilemma is “price”. Here it is unclear, whether people refer to the price in relation to the collective cost or simply their personal finances. Figure 4.1 shows a categorisation of considerations cited in response to open-ended questions. The percentage values refer to the proportion of responses which can be allocated to the respective categories.

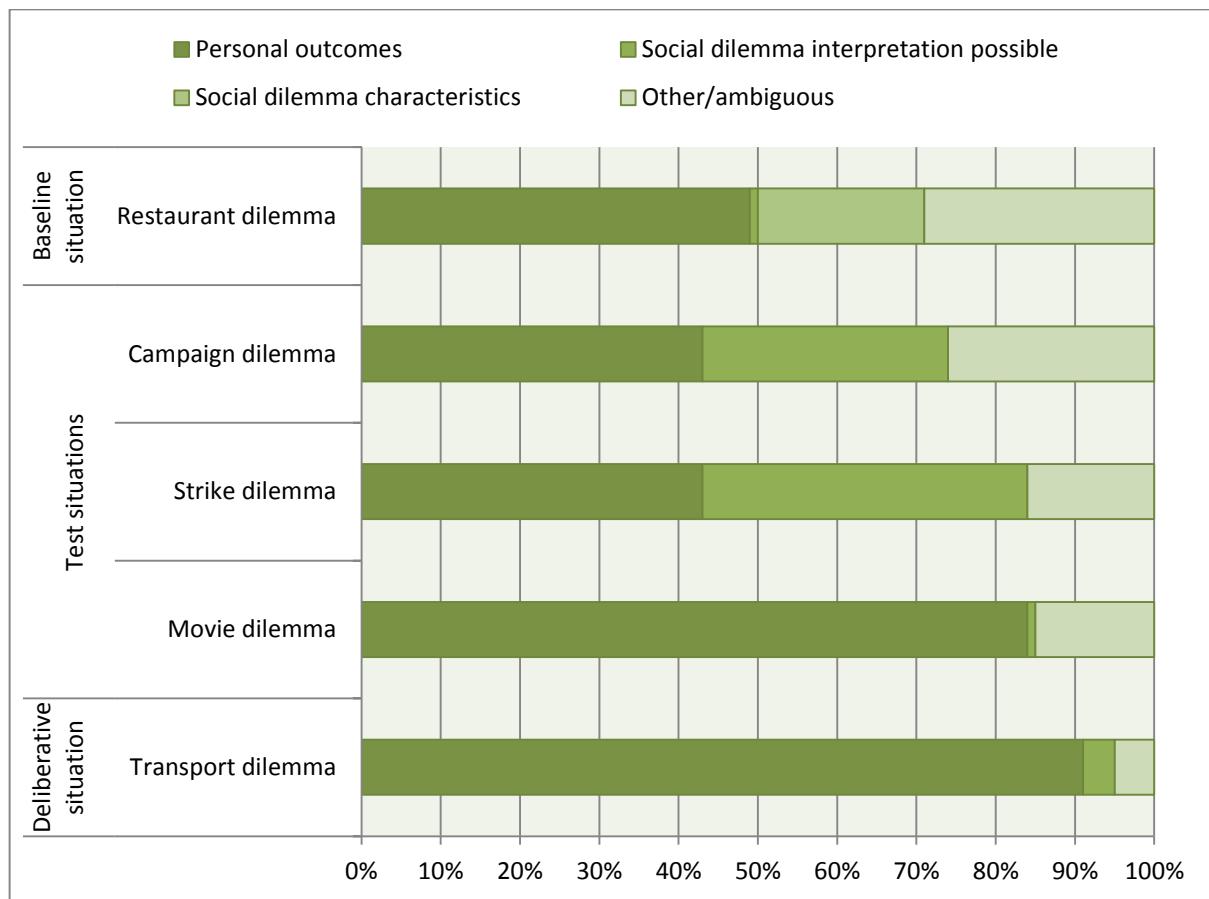


Figure 4.1: Categorisation of responses to open-ended questions.

Results show that personal outcomes represent the most frequently cited considerations. Especially in the movie dilemma, answers focused primarily on personal

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costs and benefits concerned with how enjoyable the experience of watching the movie would be (e.g. quality of the streaming, type of movie).

Social dilemma characteristics were considered to a much lesser extent in the answers across dilemmas. Nevertheless notable differences between situations emerged:

The movie dilemma lacked considerations of social dilemma characteristics almost completely. In contrast, in both the campaign and strike dilemma a theme of concerns about the effectiveness of the activity emerged from the answers. This theme can be interpreted from a social dilemma perspective. In social dilemmas a large enough number of co-operators is needed to achieve the socially optimum outcome. This might be reflected in considerations like “How many other people are demonstrating.” Similarly the theme ‘belief in cause’ that emerged in both dilemmas, can be interpreted from a social dilemma perspective. Participants seemed to question, whether the underlying cause is one of getting closer to a desirable socially optimum outcome. If, for example, people do not perceive a healthy public sector as a desirable outcome with positive implications for everyone, then preserving it will not be perceived as the socially optimum outcome. Several participants raised this consideration in the strike dilemma by questioning whether the strike mattered for them personally, for their future or their family. The presence of this theme emphasises Burke’s argument, that we cannot assume people’s awareness of the collective cost in a social dilemma (Burke, 2001).

One potential explanation for the lack of considerations of social dilemma characteristics in the movie dilemma might be the amount of deliberation involved in the decision making process. Streaming a movie online can be considered as a common behaviour. Compared to a decision about campaigning or supporting a strike it requires little deliberation from the decision maker.

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Similarly, in a climate change related situation which requires less deliberation, the transport dilemma, participants almost uniformly emphasised personal costs and benefits as considerations that informed the choice of travel mode (financial costs, time considerations and convenience or comfort). Statements referring to the environmental impact of different transport modes can be interpreted from a social dilemma perspective, as they refer to the long term socially optimum outcome of preserving the environment. The low number of statements referring to the environment is especially noticeable as a high percentage of the student sample consisted of environmental science students (28%). Although the environment was considered most often by environmental science students, only 32% of these students reported environmental consequences as important for their transport mode decision. The low consideration of social dilemma characteristics in the transport dilemma is in line with qualitative research reported in chapter two. A number of studies have found that awareness of the climate implications of individual decisions is low particularly in the travel domain (Higham et al., 2014, Hares et al., 2010, Line et al., 2010). This finding can be interpreted in two ways: 1) less deliberative decision making situations are less likely to involve considerations of social dilemma characteristics; 2) less deliberative decision making situations are more prone to the anti-introspection bias.

An inferential Chi-square test of independence confirmed a significant association between the type of dilemma and the categories of coded responses, $\chi^2 (12, N = 1077) = 791.849, p < .001$. Table 4.6 in Appendix A shows the standardised residuals for each cell. The largest standardised residuals are for the 'social dilemma interpretation possible' category in both the strike and campaigns dilemma, and for the 'social dilemma characteristics' category in the restaurant dilemma. These make the greatest contribution to the significant chi-square test. The residuals show that the number of answers falling into these categories were greater than expected.

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Overall, personal considerations account for the majority of answers and are especially prominent in less deliberative decision making. This is broadly consistent with H1.

4.6.2. Consideration of social dilemma characteristics when salience is increased

The restaurant dilemma makes explicit social interdependence (others sharing the bill) and thus makes social dilemma characteristics salient. Responses to the restaurant dilemma were consistent with H2: when social dilemma characteristics are made salient, participants frequently took others' choices, thus social interdependence, into consideration.

This was expressed either through a concern about other people's outcomes ("I would tend to avoid the most expensive dish as I believe it would burden others with higher costs [...]"), or a concern about the effect of others' choices on personal outcomes ("What the other person will have as the overall cost will increase"). Several participants tried to balance burdening others and 'being the sucker' ("Because it's split equally I'll decide to not order something really cheap or really expensive"). We also found expressions of a *temptation to free-ride* ("expensive Steak [*sic.*] I would not have bought alone").

Standardised residuals reported in Table 4.6 in Appendix A further confirm the strong relationship between presenting the restaurant dilemma (where the collective is made salient) and open-ended answers in the coding category 'social dilemma characteristics'.

To further explore the role of salient social dilemma characteristics we compared answers to open-ended questions with answers to closed-ended questions for the campaign, strike and movie dilemma. We investigated the importance participants ascribed to the different statements presented alongside the social situations in the hierarchy task (see Table 4.3). The importance was analysed by how frequently each statement was rated amongst the

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top three considerations (most important considerations for their decision). Figure 4.2 shows the frequency of top three ratings for each statement relative to the total amount of top three rankings (separately for each dilemma).

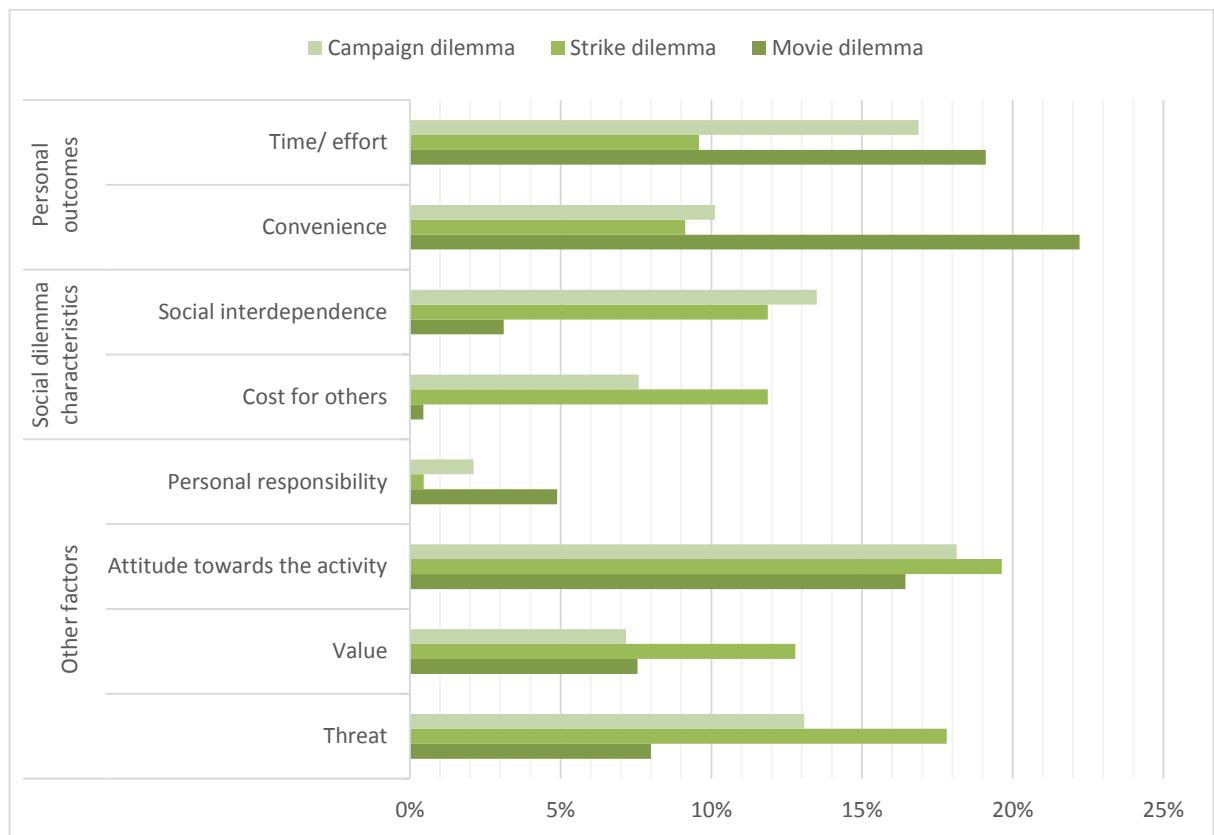


Figure 4.2: Proportion of statements amongst the top three rankings in the hierarchy task.

Inferential chi-square tests on whether a consideration was ranked or not ranked amongst the top three considerations confirm the relationship between different considerations and dilemmas displayed in Figure 4.2. The test found no difference between the three dilemmas with regards to ranking the attitude towards the activity amongst the top three considerations, $\chi^2 (2, N= 448) = .614, p = .736$. For all other considerations, significant differences were found: time/ effort: $\chi^2 (2, N= 448) = 19.394, p < .001$; convenience: $\chi^2 (2, N= 447) = 51.207, p < .001$; social interdependence: $\chi^2 (2, N= 448) = 45.233, p < .001$; cost

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for others: $\chi^2 (2, N= 448) = 43.723, p < .001$; personal responsibility: $\chi^2 (2, N= 448) = 6.78, p < .05$, value: $\chi^2 (2, N= 448) = 6.161, p < .05$; threat: $\chi^2 (2, N= 448) = 29.884, p < .001$.

The results in Figure 4.2 show that the hierarchy ranking reflects the answers to open-ended questions displayed in Figure 4.1. In answers to the open-ended questions the movie dilemma received a high number of considerations of personal outcomes, while references to social dilemma characteristics were negligible. A similar pattern can be found in the results of the hierarchy task for the movie dilemma. Equally, in the campaign dilemma, time was both a frequently named consideration in the open-ended answers and frequently ranked in the top three of the hierarchy task. Furthermore, the importance ascribed to the social dilemma characteristic ‘social interdependence’ (e.g. “Whether or not we can make a difference if enough people participate”) may reflect the ‘effectiveness’ theme that emerged from the open-ended questions.

In spite of these similarities, crucial differences can also be found between the results of the two assessment approaches: open-ended questions where social dilemma characteristics are not made salient and closed-ended questions where salience is increased. One such difference can be observed in the movie dilemma: while personal outcomes were still the aspects most frequently ranked as important in the hierarchy task, they were not as predominant as in the open-ended questions. Considerations of other factors such as threat, value, personal responsibility, social interdependence and the cost for others were not mentioned in the open-ended answers as a reaction to the movie dilemma, but are found in the top three hierarchy ranking. Further, the social dilemma characteristic ‘cost for others’ was not explicitly mentioned in the open-ended answers to the campaign or strike dilemma. On the contrary, in the hierarchy task they appear in the top three hierarchies for both these dilemma situations.

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Thus results are partially consistent with H2, as a discrepancy was found between the two modes of assessment: participants showed a higher consideration of social dilemma characteristics in the hierarchy task where they were made salient. Nevertheless, this discrepancy is small and generally the results from the hierarchy task turned out to be a fairly close reflection of the open-ended answers.

4.6.3. The effect of a social dilemma framing

Part three of the study introduced a framing manipulation in the form of short, informative texts on the greenhouse gas emissions associated with meat consumption. Differences in variables associated with a reduction in meat consumption were assessed between the four experimental groups. The subsample of vegetarian participants ($n=19$) was excluded from this analysis.

A sumscore of all items assessing the attitude towards meat was created ($M = 44.27$, $SD = 7.40$, maximum possible range 13 - 65). Higher attitude scores represent a more positive attitude towards meat consumption. Attitudes towards meat consumption differed significantly between experimental groups (one-way between subjects ANOVA, $F (3, 95) = 3.70$, $p = .014$, $\eta^2 = .105$). Post hoc comparisons (Tukey HSD test) revealed a significant difference between attitude scores of the ‘control group’ ($M = 48.11$, $SD = 6.81$) and both the ‘SD group’ ($M = 42.85$, $SD = 7.15$) and the ‘facts and SD group’ ($M = 42.20$, $SD = 7.74$). There was no significant difference between the ‘control group’ and the ‘facts group’ ($M = 43.32$, $SD = 6.87$). Thus the presence of the social dilemma framing in the text led to significantly less positive attitudes towards meat consumption, compared to the ‘control group’.

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When investigating the second variable, stated intentions to reduce meat consumption, we calculated a sumscore by adding up the two measurement items ($M = 6.30$, $SD = 1.60$, maximum possible range 2-10). For this second variable, an ANOVA showed no significant differences between groups (one-way between subjects ANOVA, $F (3,105) = 1.45$, $p = .232$, $\eta^2 = .040$). The finding that the framing manipulation affected attitudes towards eating meat, but not self-reported intentions to reduce meat consumption was unexpected. One explanation is a general high reluctance of the UK population to change their diet for environmental reasons (DEFRA, 2008).

Of the 108 non-vegetarian participants who completed the questionnaire up to this final stage, 58 opted to exit to a website with tips on how to eat less meat. A logistic regression was performed to assess the effect of the manipulation on this third variable, information seeking behaviour (Table 4.7). Participants in the ‘SD group’ were found to be significantly more likely to seek further information on reducing meat consumption than participants in the other three groups. The finding that only the ‘SD group’, but not the ‘facts and SD group’ was affected by the manipulation could be due to the order in which information was presented. In the ‘facts and SD group’ factual information was presented first, followed by the social dilemma framing. This may decrease the effectiveness of the social dilemma framing due to a drop in participants’ level of concentration and a lower focus on the social dilemma framing.

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Predictor	B	SE B	Wald	Sig.	Exp(B)
Manipulation 'control' (n= 27)			5.08	.17	
Manipulation 'facts' (n= 27)	.62	.56	1.20	.27	1.85
Manipulation 'facts and SD' (n= 23)	.64	.58	1.23	.27	1.89
Manipulation 'SD' (n= 28)	1.29	.57	5.08	.02	3.64
Constant	-.38	.39	.92	.34	.69

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .051$; $\chi^2 (3, N = 105) = 5.353, p = .148$

Table 4.7: Logistic regression analysis on the effect of the framing manipulation on information seeking behaviour.

In summary, the social dilemma framing led to less positive attitudes towards meat consumption and influenced information seeking behaviour, but did not affect self-reported intentions.

4.7. Discussion

This study explored whether people are aware of the social dilemma structure of a situation and therefore addresses objective one of this thesis (To determine people's awareness of the social dilemma structure of climate change mitigation). Results show that a person's subjective interpretation of a situation can differ from the objective characteristics of the situation (e.g. Ostrom, 1998, Tenbrunsel and Northcraft, 2010). Based on our findings across a range of environmental and social decision situations, it is not justified to assume that without increasing their salience, people's decisions are informed by social dilemma characteristics when confronted with a social dilemma situation. People may still consider social dilemma characteristics when they are not made salient, due to prior knowledge and exposure. Participants' answers to open-ended questions show a number of considerations in

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response to the social dilemma situations (see objective two of this thesis: To determine people's cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation.). A person working on sustainability is likely to see the collective cost of climate change in the transport dilemma, even if it is not made salient. Findings show that students from the School of Environmental Sciences, where climate change is a frequently taught and discussed topic, were more likely to consider the environment in the transport dilemma. Based on our findings we argue that the consideration of social dilemma characteristics cannot be assumed and is more likely when these are made salient. Increasing their salience can be achieved by including explicit wording or adding contextual information. The restaurant dilemma gives an example: it explicitly mentions the affected collective. In the mitigation dilemma the relevance for the collective can be emphasised by stating the benefits of mitigation for everybody, our children or future generations. This introduces the collective as a frame of reference and may thus increase social dilemma considerations. The framing manipulation indicates the positive effects of focusing on the collective outcome and consequences for others. Such a framing effect should be most effective if it takes place at the time of decision making. In the transport dilemma, for example, an indication of the collective costs and benefits of different transport options could be included as additional information when people compare prices on the internet or at travel agencies.

The findings further indicate that social dilemma characteristics are less likely to be considered in situations that require less deliberative decision making such as the transport and movie dilemma. Another explanation for lower considerations of social dilemma characteristics in these two situations could be that they are less likely to be perceived as pro-social. The restaurant, campaign and strike dilemma might, due to their more obvious pro-social aspects, be more likely to lead to considerations of others and the collective. This

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interpretation is supported by Whitmarsh (2009) who found that reasons people express for their choice of travel behaviour are predominantly associated with convenience, while reasons for taking part in a climate change campaign reflect issues of morality.

In addition the movie dilemma has one characteristic which distinguishes it from the other situations. Streaming a movie online often results in an infringement of copyright and therefore in an unlawful act (fact-uk.org, 2012). The fact that an unlawful behaviour has been socially normalised may decrease the consideration of social dilemma characteristics in the situation.

The study was not explicitly designed to disentangle these proposed explanations, but was a first exploratory attempt to assess people's consideration of social dilemma characteristics. Further research is needed to investigate the importance of deliberation in the decision making process and the perceived pro-social nature of a behaviour for the consideration of social dilemma characteristics.

Answers to the open-ended questions were compared with the results from the hierarchy task which made social dilemma characteristics salient. Creating salience in such a way, inherent in the task's nature, is found in most questionnaire based research. We were interested as to whether this methodological artefact would lead to a higher consideration of social dilemma characteristics and therefore explain the cited differences in findings from questionnaire studies and focus groups. Results showed that the outlined differences between open- and closed-ended questions were there, but not as pronounced as expected.

There are four possible explanations for a rise in considering social dilemma characteristics in the hierarchy task compared to the open-ended questions: an anti-introspection bias, a social desirability bias, an egocentric bias and a demand bias. Characteristics of the research design might have reduced the scope for three of these biases.

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This might explain the small nature of the discrepancy between the open-ended questions and the hierarchy task:

Social desirability bias might have been reduced through the anonymity of the online study and further assurance of confidentiality and anonymity of the collected data. Egocentric bias may have been reduced as participants were neither asked about past behaviour nor to state an actual decision. The social dilemma characteristics presented in the hierarchy task were not suitable for justifying inaction, as they were associated with increased action (e.g. “whether or not other people will suffer under climate change”). Demand bias may have been reduced by the option to exclude statements from the hierarchy ranking and the inclusion of statements referring to a variety of other factors that can be considered in the decisions. The small discrepancy between the two assessment approaches may further be due to participants’ aiming for consistency in their answers. Participants might have completed the hierarchy task with their prior answers to open-ended questions in mind.

Anti-introspection bias may on the other hand have contributed to the observed, small discrepancy in considerations of social dilemma characteristics. Participants may have failed to access considerations that actually inform decisions in the respective situations without increased salience. The anti-introspection bias is expected to be stronger in more common decision making. As these decisions require less deliberation, people may be less consciously aware of the things that inform their decisions. The discrepancy between assessments that do and don’t increase the salience of social dilemma characteristics is most pronounced in the movie dilemma, the most common decision making situation.

In conclusion the discrepancy between assessment approaches that differ in the salience of social dilemma characteristics may contribute to explain findings in the literature. Salience effects can lead participants to report social dilemma characteristics as decisive

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factors that are considered to a slightly lesser extent when not made salient. This conclusion has proven to be specifically relevant for the social dilemma characteristic concerned with the consequences for others involved in the dilemma situation.

The study further included a first exploration of the effect of cooperative considerations on mitigation actions, therefore addressing objective three of this thesis (To determine how cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation affect personal actions to address climate change). Findings suggest that a manipulation focusing on the conflict between personal and collective outcomes, the socially optimum outcome and the consequences for others can positively influence variables associated with increased cooperation in a social dilemma related to climate change. The opportunity to instrumentalise certain characteristics of the dilemma situation in order to increase cooperation could be a promising approach for the framing of campaigns that aim for attitude and behaviour change (see chapter seven). These findings are in line with moralization, a motivational approach to increase cooperation in social dilemmas (see chapter two).

A social dilemma framing of climate change mitigation could result in higher cooperation. As Horton & Doron (2011) noted, many governmental intervention programmes shy away from explicitly acknowledging the fact that actions to address climate change often conflict with personal interests. Rather, they try to increase the attractiveness of mitigation efforts through appealing to financial gains or growth possibilities and therefore through focusing on possible personal benefits (see structural approaches in chapter two). But this study suggests that openly acknowledging the personal costs of mitigation may not decrease efforts if it is illustrated that those personal sacrifices go hand in hand with positive effects for the collective and others. The results are especially encouraging as the framing

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manipulation focused on an aspect of life that is especially resistant to behaviour change - meat consumption (DEFRA, 2008). A similar conclusion can be drawn from the salience of social interdependence in the restaurant dilemma. In this situation, where the collective was explicitly mentioned, considerations concerned with reducing the collective cost were much more prominent compared to other decision making situations. Nevertheless, further research is needed to establish whether a social dilemma framing, as administered in this study, would also affect other behaviours related to climate change mitigation and exert an influence on real life actions on climate change (see chapter seven).

This study constitutes a first exploration of the consideration of social dilemma characteristics and its effects especially with regard to the climate change mitigation dilemma. As such it has a number of limitations. Social dilemmas occur in the form of many, very different decision making situations in the real world. We were only able to include a very small number of different situations in our study and thus could only touch on differences between those situations that may affect the consideration of social dilemma characteristics. Further, the decision making situations were hypothetical. Although participants will likely have experienced similar decision making situations, they read them on a computer screen. This compromises the external validity of the findings for real world-decision making. The framing manipulation in part three was administered at the end of the study. By that point participants will have already been exposed to social dilemma characteristics, which may influence the effects of the experimental manipulation. A further limitation is that the qualitative data from open-ended questions was coded only by the author, no independent analysis by a second researcher took place. Involving a team of researchers could increase the confidence in the coding process and make findings more robust and less susceptible to a subjective bias. Finally, the use of a student sample limits the generalizability of the research findings.

5. Effects of cooperative and non-cooperative considerations - a quantitative assessment

5.1. Abstract

Social dilemma characteristics of climate change mitigation are used to explain the lack of widespread individual action on climate change. This chapter examines people's considerations in response to the mitigation dilemma. We first provide a comprehensive set of possible considerations in response to the social dilemma structure of climate change mitigation. Using a quantitative questionnaire study, we then test the significance of considerations linked to both inaction and action. We confirm previous findings that the mitigation dilemma discourages action by eliciting considerations such as *personal insignificance* or *fear of being a sucker*. However, we also find robust evidence for a set of considerations linked positively to action on climate change, including *fairness* and *collective interest*. The quantitative questionnaire further explores how different considerations are linked to people's approval of climate change policies. Findings show that cooperative considerations, which are linked to increased actions, are also linked to higher approval of climate change policies. The hypothesis that a number of considerations which are linked to inaction (e.g. *personal insignificance*) could lead to a higher approval of climate change policies in order to address these cognitions, was not confirmed. Results further show that the *collective interest* consideration is the best predictor for both, actions to address climate change and approval of climate change policies.

5.2. Considerations in response to the social dilemma of climate change mitigation and their relation to actions on climate change

Individual behaviour changes and personal mitigation efforts form one component of decreasing world-wide greenhouse gas emissions and therefore mitigating climate change (IPCC, 2014b). The social dilemma characteristics of climate change mitigation are quoted as one potential explanation for a lack of personal actions to address climate change (e.g. Aitken et al., 2011). From an individual perspective, efforts to mitigate climate change are characterised by a conflict between personal and collective outcomes (Raihani and Aitken, 2011). Individuals can choose to engage in actions to address climate change, the cooperative choice, or to refrain from personal actions to address climate change, the non-cooperative choice (Dawes, 1980, Raihani and Aitken, 2011, Van Lange et al., 2013). Actions to address climate change can be time-consuming, expensive or inconvenient. Thus a non-cooperative choice increases personal benefits, but results in collective costs: a contribution to climate change. The socially optimum outcome, addressing climate change, can be achieved through mutual cooperation, if all or a majority of individuals engage in actions to address climate change (Horton and Doron, 2011, Raihani and Aitken, 2011).

According to Interdependence Theory, this social dilemma structure of climate change mitigation leads to specific considerations (Rusbult and Van Lange, 2003). We use the term consideration here to refer to the cognitions that an individual associates with a specific situation, in our case the climate change mitigation dilemma, which in turn influence the person's behaviour in this situation. In a socially interdependent situation like climate change mitigation (an individual's outcome does not only depend on their own actions, but on the actions of everyone involved) these considerations are influenced by the structure of the situation, interpersonal dispositions, relationship specific motives and social norms (see

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chapter two) (Rusbult and Van Lange, 2003). Based on answers to the open-ended questions reported in chapter four, literature on social dilemmas in general and especially the literature reported in section 2.4.2 on the social dilemma of climate change mitigation several non-cooperative considerations to the climate change mitigation dilemma have been identified:

- *Immediate self-interest.* The climate change mitigation dilemma constitutes a conflict between short-term personal benefits and long-term collective benefits (Van Lange et al., 2013). People may respond to this situation by focusing on the short-term personal benefits, resulting in cognitions of *immediate self-interest*. Qualitative research finds these frequently expressed in references to convenience, forgoings, financial costs or time required for actions to address climate change (Becken, 2007, Capstick, 2013, Horton and Doron, 2011, Kasemir et al., 2000, Lorenzoni et al., 2007, Semenza et al., 2008, Stoll-Kleemann et al., 2001). Based on chapter two, this may occur because people perceive the social dilemma as a pure decision problem, being only aware of the ‘given situation’, the immediate costs and benefits. Alternatively, as predicted by Rational Choice Theory, people may be aware of the collective outcomes, but focus on the maximazation of immediate personal benefits.
- *Temptation to free-ride.* In a social dilemma the highest benefits for an individual result if everyone else behaves cooperatively, while the individual opts for the non-cooperative choice (Dawes, 1980). If everyone else chose to act to address climate change, the inaction of one individual would not harm the climate. This individual would receive all the immediate benefits from inaction, while climate change would still be addressed. In this scenario the individual would free-ride on the cooperative behaviour of everyone else. Cognitions around the *temptation to free-ride* thus mean that the individual is consciously aware of the collective outcome and chooses to exploit the socially interdependent situation. A high temptation to free-ride in social

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dilemma situations is predicted by Rational Choice Theory and has been emphasised by scholars (Albanese and Fleet, 1985, Dawes, 1980, Hughes et al., 2005). References to this consideration can also be found in relation to climate change mitigation (Capstick, 2013, e.g. Horton and Doron, 2011).

- *Fear of being a sucker.* The high temptation to free-ride equally entails the potential to be exploited if one chooses to cooperate. Thus a possible response to a social dilemma situation is the *fear of being a sucker*, a fear that others will free-ride on one's cooperative behaviour (Aitken, 2009). *Fear of being a sucker* has been reported as a theme in connection with people's lack of actions to address climate change (Aitken, 2009, Capstick, 2013, Horton and Doron, 2011, Lorenzoni et al., 2007). The consideration *fear of being a sucker* is closely related to one of the characteristics of the mitigation dilemma (see chapter two): social uncertainty (the uncertainty of whether others involved are going to cooperate).
- *Personal insignificance.* Social dilemmas are characterised by high social interdependence. Personal outcomes are dependent on the choices of everyone (Kollock, 1998). Any individual alone will not be able to mitigate climate change (Aitken et al., 2011). *Personal insignificance* is an important characteristic of the mitigation dilemma (see chapter two) and is reported as a frequent theme associated with perceptions of climate change mitigation (Aitken, 2009, Capstick, 2013, Lorenzoni et al., 2007, O'Neill and Nicholson-Cole, 2009, Semenza et al., 2008, Stoll-Kleemann et al., 2001).
- *Hopelessness.* If, in addition to the realisation of *personal insignificance*, an individual further expects the others involved in the social dilemma to opt for non-cooperation, the situation appears hopeless. If one person alone cannot mitigate climate change and the others cannot be expected to take actions on climate change,

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cognitions around *hopelessness* are a likely response (Capstick, 2013, Lewinsohn-Zamir, 1998, Lorenzoni et al., 2007, Stoll-Kleemann et al., 2001).

As evident from the definitions, these non-cooperative considerations are closely related. They have been used to explain the observed lack of personal actions to address climate change (Aitken et al., 2011, Lorenzoni et al., 2007). But the social dilemma structure of climate change mitigation may also result in a number of closely related cooperative considerations that may promote personal mitigation efforts. The following set of such cooperative considerations is derived from answers to the open-ended questions reported in chapter four and the literature review on social dilemmas, especially literature specific to the social dilemma of climate change mitigation reported in chapter two:

- *Enlightened self-interest.* One characteristic of climate change mitigation is its temporal dimension (see chapter two). Individuals may focus on avoiding personal costs or respectively achieving personal benefits in the future (Batson, 1994, Hine and Gifford, 1997, Milinski et al., 2008). Individuals realise that it would be better for them personally to avoid the future negative consequences of climate change. *Enlightened self-interest* thus represents a transformation of the ‘given situation’ involving temporal considerations (see chapter two) (Van Lange et al., 2013).
- *Collective interest.* Cognitions around *collective interest* focus on the better outcome for everyone, for the collective as a whole (Batson, 1994). With regard to the climate change mitigation dilemma, the collective can be as big as the entire human race. A smaller collective, for example the country or the family, may also lie behind cognitions around *collective interest*. In focus groups conducted by Horton and Doron (2011) participants repeatedly referred to ‘a greater good’ achieved through mitigation.

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- *Externalities.* Cognitions around *externalities* are purely focused around the consequences for others, they do not include the self (contrary to *collective interest*). In social dilemmas personal decisions do result in consequences for others (e.g. Kollock, 1998). An individual's decision not to act to address climate change means further negative impacts on the climate and therefore negative consequences for others as well. The temporal and spatial dimensions of the climate change mitigation dilemma (see chapter two) mean that these negative consequences are expected to be more severe in the future and in subtropical developing countries (IPCC, 2014a). Such externalities created for future generations or people in developing countries arise as concerns in many discussions around climate change mitigation (Horton and Doron, 2011, Lowe et al., 2006).

- *Fairness.* Cognitions around *fairness* are concerned with a fair distribution of the burden or cost of cooperation (actions to address climate change) (e.g. Wilke, 1991). They are thus closely related to differences in emission rates (see chapter two, heterogeneity of 'harvest rates') and perceived differences in responsibilities to act on climate change. The topic of climate change mitigation frequently sparks discussions around *fairness* and a fair distribution of the burden to take actions (e.g. Capstick, 2013, Horton and Doron, 2011). *Collective interest, externalities* and *fairness* considerations represent a pro-social transformation of the 'given situation' as described in Social Interdependence Theory (see chapter two) (Rusbult and Van Lange, 2003).

As Capstick (2013) points out, these cooperative considerations are, to date, understudied. Where climate change mitigation is studied as a social dilemma, the focus is on barriers to personal actions. The promotion of mitigation efforts also tends to be studied "within an individualised and self-interest frame" (Capstick, 2013, p.3496). This chapter

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addresses this research gap by studying both non-cooperative and cooperative considerations to the climate change mitigation dilemma and their relevance for personal actions to address climate change. A better understanding of this relevance can then be used to improve efforts to promote personal actions on climate change (see chapter seven). The association between considerations and personal actions to address climate change can be formulated as follows:

- H1: *Enlightened self-interest, collective interest, externalities and fairness* considerations are associated with an increase in cooperation (taking action to address climate change).
- H2: *Fear of being a sucker, personal insignificance, hopelessness, temptation to free-ride and immediate self-interest* are associated with a decrease in cooperation (not taking action to address climate change).

5.3. Considerations in response to the social dilemma of climate change mitigation and their relation to approval of climate change policies

One potential way to increase cooperation in the social dilemma of climate change mitigation is through climate change policies, thus structural approaches to address the social dilemma. Chapter two introduced a range of structural approaches aimed at increasing cooperation in social dilemma situations. Many of these structural approaches, including incentives or disincentives and regulations, are imposed by governments in the form of policies (Dawes, 1980, Hardin, 1968, Ostrom et al., 1999). ‘Pull’ measures are implemented to increase the attractiveness of cooperation, for example through financial subsidies. ‘Push’ measures aim to decrease the attractiveness of non-cooperation. Prominent examples are taxes or prohibition of a certain behaviour (De Groot and Schuitema, 2012).

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Climate change policies are present in both forms, ‘push’ and ‘pull’ measures. Taxes introduced to reduce energy use by increasing the price for energy are classic ‘push’ measures. Policies like the Green Deal (DECC, 2010), which support investments in home energy efficiency measures, can be categorised as ‘pull’ measures. The difficulty with these two approaches lies in the high costs required to implement and maintain ‘pull’ measures as well as the public objection to ‘push’ measures (Cherry et al., 2012, Dawes, 1980, Van Vugt, 1998). Governments, the institutions authorised to implement such structural approaches, are reluctant to do so because of their low political feasibility (e.g. Gärling and Schuitema, 2007).

Both authors of the classic works on social dilemmas, Dawes (1980) and Hardin (1968), consider coercion as a ‘push’ measure (De Groot and Schuitema, 2012) to resolve social dilemmas. However while Dawes disregards coercive ‘push’ measures as being too costly, Hardin advocates “mutual coercion mutually agreed on” (Hardin, 1968, p. 1247) as the only means to avoid “universal ruin” (Hardin, 1968, p. 1248). He specifically advises for laws and taxation to decrease the attractiveness of the non-cooperative choice. He further emphasises the value of coercive measures which are “mutually agreed upon by the majority of the people affected” (Hardin, 1968, p. 1247), thus would advocate for governmental policies which hold strong public support. This does not mean that people must like these policies. They are accepted to “escape the horror of the commons” (Hardin, 1968, p. 1247). This acceptance occurs when people involved in a social dilemma recognise the necessity for these policies in order to achieve mutual cooperation and thus avoid collective costs.

A number of scholars agree with the assumption that people involved in a social dilemma are willing to give up part of their personal decision-making freedom or invest personal resources in order to achieve the socially optimum outcome (Ostrom, 1998, Yamagishi, 1992). A broad area of research on real world social dilemmas shows that

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communities find ways to manage common resources through self-imposed regulations (Ostrom et al., 1999, Ostrom, 2000, Singh, 1994). Prominent examples of such solutions are fishing quotas to avoid overfishing, or regulated harvesting to limit deforestation (Ostrom, 2000, Singh, 1994). This area of research shows that structural approaches can be a self-chosen strategy for communities to resolve a social dilemma. Nevertheless structural approaches are not always successful in their attempt to create mutual cooperation and stories of failure are just as present in the real world as are stories of success (Ostrom et al., 1999).

The success of any form of structural approach depends on its acceptance amongst the affected individuals (Harrington et al., 2001, Hsu et al., 2008, Kallbekken and Sælen, 2011, Schade and Schlag, 2003). Structural approaches are more likely to be effective if they are self-chosen or based on wide public approval (Schade and Schlag, 2003). This also applies to climate change policies (Cherry et al., 2012, De Groot and Schuitema, 2012).

Increasing the approval of climate change policies is therefore an important strategy to resolve the mitigation dilemma. According to Hardin this can be achieved if people learn about the socially optimum outcome achievable through mutual cooperation (Hardin, 1968). In a study on adolescents' perception of travelling modes, Line and colleagues (2010) guided their young participants to a better understanding of the social dilemma characteristics of travel choices. As a result, several focus group participants emphasised enforced travel behaviour change as a way to achieve mutual cooperation. Horton and Doron (2011) also found their participants recognising the necessity of coercive 'push' measures to ensure mutual cooperation. Even participants that preferred voluntary behaviour change as a first approach wanted this attempt to be backed up by coercion if necessary. Structural approaches are perceived as a viable way to achieve the socially optimum outcome through mutual cooperation in the climate change mitigation dilemma (Horton and Doron, 2011, Line et al.,

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2010). Cooperative considerations (*enlightened self-interest, collective interest, externalities* and *fairness*) represent a focus on this socially optimum outcome and the necessity for mutual cooperation. Thus climate change policies are expected to be more acceptable for people with cooperative considerations as a response to the mitigation dilemma (Horton and Doron, 2011, Line et al., 2010, Markowitz and Shariff, 2012, Schroeder et al., 2003):

- H3: *Enlightened self-interest, collective interest, externalities* and *fairness* considerations are considerations associated with an increase in the approval of climate change policies.

Non-cooperative considerations are expected to be associated with decreased personal actions to address climate change. The non-cooperative considerations *temptation to free-ride* and *immediate self-interest* are similarly expected to decrease the approval of climate change policies. An individual responding to the social dilemma situation with a *temptation to free-ride* (who is aware of the collective outcome but chooses to exploit the interdependent situation) is expected to object to governmental regulations which are designed to prevent free-riding and ensure mutual cooperation. Similarly a consideration of *immediate self-interest* may hinder the acceptance of coercive measures, which limit the opportunity for short term personal benefits.

- H4: *Temptation to free-ride* and *immediate self-interest* are considerations associated with a decrease in the approval of climate change policies.

The non-cooperative considerations *fear of being a sucker, personal insignificance* and *hopelessness* may on the contrary increase the approval of climate change policies. *Personal insignificance* and *hopelessness* include a realisation that others' cooperation is required for a significant mitigation attempt. The expectation that others won't cooperate and

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the socially optimum outcome cannot be achieved, underlies both the *fear of being a sucker* and *hopelessness*. According to Hardin, this should increase the demand for coercive measures (Hardin, 1968). As policy approaches are designed to ensure that everyone contributes to addressing climate change these approaches directly address the *fear of being a sucker*, *hopelessness* and *personal insignificance*. Therefore these considerations should strengthen the approval of climate change policies. Empirical findings on climate change related topics confirm this view (Horton and Doron, 2011, Line et al., 2010, Staats et al., 1996). When focus groups were introduced to the limited emission budget, most participants justified their preference for structural approaches by their desire to inhibit free-riding by others (Horton and Doron, 2011).

- H5: *Fear of being a sucker*, *personal insignificance* and *hopelessness* are considerations associated with an increase in the approval of climate change policies.

5.4. Methodology

5.4.1. Participants

We conducted a quantitative online questionnaire to test the proposed associations between cooperative and non-cooperative considerations and the outcome variables, actions to address climate change and approval of climate change policies. Participants were recruited from a variety of internet forums, social media (Facebook, Twitter) and email lists in the UK. This sampling method was chosen to attract participants from a wide range of different age groups and interests. Targeting different internet forums with a variety of different contents ensured that the sample does not consist predominantly of individuals with a prior specific interest in the issue of climate change mitigation. As an incentive participants

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could choose to be entered into a prize draw for four cash prizes (1x £200, 3x £50) on completion of the online questionnaire.

Two hundred and seventy six participants completed the online questionnaire, 86% of the people who started it (126 men, 148 women, 2 missing, mean age = 34.87 years ($SD = 13.44$)). Of the 276 participants 3.6% reported a doctoral degree as the highest level of education, 20.7% a master's degree, 40.2% a bachelor's degree, 25.4% A-Levels or a college equivalent, 9.4% Secondary School, GCSE or O-Levels and no participant reported less than Secondary School as the highest level of education. Thus the sample shows a larger proportion of highly educated individuals than the UK population (Office for National Statistics, 2013). Answers regarding how people learnt about the study confirmed that participants were recruited from a variety of different online sources (e.g. 34.4% of participants were recruited through 'gumtree', 19.9% through friends or facebook friends and 3.6% through a wedding forum). 15.9% reported to be a member of a group, institution or political party that works (amongst other things or solely) on climate change. This is slightly higher than the UK average, where just under 10% of the population are members of an environmental group (Cracknell et al., 2013). The two most frequently named groups were the Green Party and Greenpeace (Green Party members were explicitly targeted as one source of participants).

5.4.2. Materials and procedure

The online questionnaire first asked participants' consent. Half of the participants then continued to a set of questions assessing people's personal actions to address climate change and the relevance of different considerations for their personal actions. Respondents were asked

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1) Personal actions on climate change (“In your life, do you take any actions to address climate change” based on Aitken et al. (2011)). This item could be answered with yes or no.

In the case of a positive answer to this question participants were asked

1.1) more detailed information about these actions, for example the amount of financial resources, time, effort and inconvenience involved in these actions (four items, Cronbach’s Alpha = .819, example item: “How much time is required for these actions?”, answered on a four item Likert scale ranging from “None” to “A lot”). For the full list of items see Table 5.1 in Appendix B.

2) The importance of 23 statements for whether or not they take actions to address climate change (five point Likert scale ranging from “Unimportant” to “Important”). The 23 statements represent the nine non-cooperative and cooperative considerations (see Table 5.2 in Appendix B). For example, the consideration *fear of being a sucker* was represented by the following three statements: 1) Even if I take actions to address climate change, others will start emitting more. 2) Why should I do my bit, if my next door neighbour doesn’t? 3) It is unfair that I should bear the burden of taking actions whilst others do not.

3) Future actions on climate change: willingness, preparedness and intention to change action due to considerations of climate change (six items, Cronbach’s Alpha = .768, example item: “I intend to take actions to address climate change.”), (DEFRA, 2007, partly based on Lorenzoni et al., 2007). For the full list of items see Table 5.1 in Appendix B.

The other half of participants, after giving their consent, continued to a set of questions assessing people’s approval of climate change policies and the relevance of different considerations for their approval of climate change policies. Respondents were asked

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- 1) Self-reported current approval of climate change policies (four items, Cronbach's Alpha = .946, example item: "I approve of policies which ensure that everyone takes action to address climate change.", answered on a five point Likert scale ranging from "Strongly disagree" to "Strongly agree"). For the full list of items see Table 5.1 in Appendix B.
- 2) The importance of 23 statements for whether or not they approve of climate change policies (five point Likert scale ranging from "Unimportant" to "Important"). The 23 statements represent the nine non-cooperative and cooperative considerations. The presented statements can be found in Table 5.2 in Appendix B.
- 3) Self-reported future approval of climate change policies (four items, Cronbach's Alpha = .916, example item: "I will approve of policies which ensure that everyone takes action to address climate change.", answered on a five point Likert scale ranging from "Strongly disagree" to "Strongly agree"). For the full list of items see Table 5.1 in Appendix B.

All participants ended the online questionnaire with the following assessments

- 4) Demographics, including a question on participants' membership in a group working (solely or amongst other things) on climate change (see Table 5.1 in Appendix B). Such membership can further be interpreted as a measure of personal actions to address climate change.
- 5) A binding choice to donate half of the potential cash prize to an NGO working on climate change. Opting for the donation was interpreted as a form of action to address climate change.
- 6) Exit the online questionnaire to one of four web pages including webpages with an environmental theme (a petition to support policies to address climate change and an environmental blog). A decision to exit to an environmental webpage (the petition or the

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blog) was interpreted as another behavioural measure for actions to address climate change.

A decision to exit to the petition was interpreted as a behavioural measure for the approval of climate change policies.

5.5. Results

5.5.1. Considerations and their association with actions to address climate change

In this section we analyse the data from those 50% of participants who received questions about their personal actions to address climate change. This section therefore addresses the association between considerations and their association with actions to address climate change and tests hypotheses H1 and H2. Data from the 50% of participants who received questions about their approval of climate change policies is analysed in the following section.

82.4% of this subsample reported to take actions to address climate change. A sumscore of more detailed characteristics of these actions (cost, time effort and inconvenience involved) was calculated as a measure of difficulty ($M = 9.42$, $SD = 2.41$, maximum possible range 4-16). Further 15.5% of the sample reported to be a member of a group, institution or political party which works on climate change. 33.1% committed to donating a potential cash prize to an NGO working on climate change and 45.3% exited the survey to an environmental homepage. Participants on average expressed strong intentions to take actions to address climate change ($M = 22.31$, $SD = 4.67$, maximum possible range 6-30).

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Table 5.3 in Appendix B shows the mean importance ratings for the 23 statements which represent the nine cooperative and non-cooperative considerations. We conducted a factor analysis of these 23 importance ratings to explore whether the proposed considerations indeed group into the two expected factors - cooperative and non-cooperative considerations. Due to the highly interrelated nature of the considerations we did not expect each consideration to form a separate factor.

The eigenvalues of an explorative factor analysis were compared with the eigenvalues derived from a Monte Carlo parallel analysis. Based on this comparison a two factor solution could be established and the retrieved two factors were subjected to a Promax rotation (based on the expectations that these two factors were negatively correlated). The emerging factors are represented in Table 5.4. The pattern matrix is reported and small coefficients (.30 and below) are suppressed.

Consideration item	Factor loading	
	Factor 1	Factor 2
Temptation to free-ride1	.352	
Temptation to free-ride2	.541	
Personal insignificance1	.645	
Personal insignificance2	.746	
Personal insignificance3	.664	
Hopelessness1	.614	.357
Hopelessness2	.795	
Fear of being a sucker1	.619	
Fear of being a sucker2	.651	
Fear of being a sucker3	.733	
Immediate self-interest1	.531	
Immediate self-interest2	.550	
Collective interest1	-.383	
Collective interest2		.636
Collective interest3		.830
Enlightened self-interest1		.675
Enlightened self-interest2		.657
Externalities1		.761
Externalities2		.675
Fairness1		.646
Fairness2		.759
Fairness3		.457

Table 5.4: Factor loadings for items exploring the importance of different considerations for actions to address climate change.

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All items reflecting non-cooperative considerations loaded positively on the first factor, almost all items reflecting the cooperative considerations loaded positively on the second factor. The first factor is therefore labelled “non-cooperation factor” and the second factor “cooperation factor”. The sizes of the factor loadings also support this two factor interpretation.

The only item that slightly diverts from this structure is collective interest1 (“Even though it's not in my narrow self-interest, I think about what is best for the greater good, for the human race as a whole”). It does show a high negative loading on the “non-cooperation factor” and a lower positive loading on the “cooperation factor”. This diversion from the otherwise clear-cut factor structure may be explained by the complexity of the specific item or the salience of self-interest in the wording of the item.

Next we explored the associations between the two factors and personal actions to address climate change. Factor scores were calculated by summing up the item scores of all items that could be attributed to the respective factor (simple sum, not weighted by item loadings on the respective factor (DiStefano et al., 2009)). We used regression analysis (linear and logistic regression) to determine which factors predict an increase or a decrease in personal actions (Table 5.5, full regression tables, Tables 5.6 – 5.11, can be found in Appendix B):

Outcome variables – assessments of actions to address climate change					
	<u>Current actions</u>			<u>Future actions</u>	
In your life do you take any actions to address climate change?" (n=133)	Membership in group working on climate change (n= 133)	Donating half of the potential cash prize (n=129)	Exiting to environmental homepage (n=123)	More detailed characteristics of reported actions (n=104)	Willingness and intention to act on climate change in the future (n=132)
Logistic regressions					
Non-cooperation factor	-.078**	-.031	-.047*	-.053*	
Cooperation factor	.099**	-.003	.054	.077**	
Linear regressions					
Non-cooperation factor					-.024
Cooperation factor					.005
					-.220***
					.470***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5.5: Predicting current and future actions to address climate change on the basis of the non-cooperation and cooperation factors (numbers represent non-standardised regression coefficients).

The regression results are in line with prior expectations (H1 and H2). Non-cooperative considerations are associated with not taking action to address climate change, whereas cooperative considerations are associated with actions on climate change. The underlying structure of the considerations (two factor solution) contributes to predict self-reported current and future actions to address climate change. The two factor solution significantly predicts whether or not people take any actions to address climate change in their life ($\chi^2 (2, N = 133) = 22.004, p < .001$, see Table 5.6 in Appendix B). It further explains a significant amount of variance in participant's self-reported willingness and intention to act on climate change in the future ($F (2, 130) = 75.695, p < .001$, see Table 5.11 in Appendix B). The two factor solution also significantly predicts two behavioural measures for future actions to address climate change: exiting to an environmental homepage ($\chi^2 (2, N = 123) =$

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19.060, $p < .001$, see Table 5.9 in Appendix B) and donating half of a potential cash price ($\chi^2 (2, N = 129) = 12.312, p = .002$, see Table 5.8 in Appendix B). Nevertheless the factors fail to explain a significant amount of variance in more detailed characteristics of current actions to address climate change ($F (2, 102) = .334, p = .717$, see Table 5.10 in Appendix B). One potential explanation for this finding lies in the subjective interpretation of the items assessing these characteristics. Participants were, for example, asked how much time they invest into actions to address climate change. It is possible that a person high in cooperative considerations perceives an action like taking the bus, as less time consuming than a person with high non-cooperative considerations. The factors did not significantly predict the strong commitment of group membership ($\chi^2 (2, N = 133) = 1.693, p = .429$, see Table 5.7 in Appendix B). The pattern that associations between the factors and outcome variables are strongest for self-reported data, lower for behavioural outcome measures and lowest for lifestyle commitments (group membership) is to be expected.

The above analysis established the importance of the two factors for actions to address climate change. We also explored the influence of each consideration individually. We calculated a composite score for each of the nine considerations by summing up the item scores of their respective measurement items. For example, the composite score for the consideration *fear of being a sucker* is calculated by summing up the scores of the items: 1) Even if I take actions to address climate change, others will start emitting more. 2) Why should I do my bit, if my next door neighbour doesn't? 3) It is unfair that I should bear the burden of taking actions whilst others do not. We then conducted a further set of regression analyses with the same outcome variables as above, but the composite scores of each consideration as independent variables. The results are shown in Table 5.12 (full regression tables, Tables 5.13 – 5.18, can be found in Appendix B):

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	Outcome variables – assessments of actions to address climate change				
	Current actions		Future actions		
In your life do you take any actions to address climate change?" (n=133)	Membership in group working on climate change (n= 133)	Donating half of the potential cash prize (n=129)	Exiting to environmental homepage (n=123)	More detailed characteristics of reported actions (n=104)	Willingness and intention to act on climate change in the future (n=132)
Logistic regressions					
Externalities	.114	.080	.113	.232	
Collective interest	.243	.305	.289	.093	
Enlightened self-interest	-.080	-.198	-.226	-.144	
Fairness	-.005	-.103	.048	.087	
Immediate self-interest	-.205	-.274*	-.049	-.063	
Fear of being a sucker	-.012	.120	-.300*	-.124	
Personal insignificance	-.215	.388**	-.049	-.172	
Hopelessness	.146	-.444*	.119	.107	
Temptation to free-ride	-.007	-.105	.393*	.156	
Linear regressions					
Externalities			.335	.228	
Collective interest			-.094	.447*	
Enlightened self-interest			.031	.299	
Fairness			-.113	.117	
Immediate self-interest			.052	-.717***	
Fear of being a sucker			.057	.081	
Personal insignificance			-.020	-.271	
Hopelessness			-.334*	-.068	
Temptation to free-ride			.096	.296	

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5.12: Predicting current and future actions to address climate change on the basis of the nine cooperative and non-cooperative considerations (numbers represent non-standardised regression coefficients).

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Overall, the regression model including each of the nine considerations significantly explains whether or not participants take any actions to address climate change ($\chi^2 (9, N = 133) = 25.887, p = .002$, see Table 5.13 in Appendix B), membership in a group working on climate change ($\chi^2 (9, N = 133) = 31.991, p < .001$, see Table 5.14 in Appendix B), donations of half of a potential cash prize ($\chi^2 (9, N = 129) = 19.946, p = .018$, see Table 5.15 in Appendix B), participants exiting to an environmental homepage ($\chi^2 (9, N = 123) = 26.150, p = .002$, see Table 5.16 in Appendix B) and participants' willingness and intention to address climate change in the future ($F (9, 123) = 18.902, p < .001$, see Table 5.18 in Appendix B).

Results show that only one of the cooperative considerations significantly predicts actions to address climate change once the other considerations are controlled for: *collective interest* is a significant positive predictor of people's reported willingness and intention to act on climate change in the future. This finding is in line with H1. However, contrary to expectations, the remaining cooperative considerations did not predict actions on climate change. With regards to the non-cooperative considerations, *immediate self-interest* and *hopelessness* are strong predictors of people's lack of action to address climate change. While this finding is in line with H2, the remaining non-cooperative considerations did not negatively predict actions on climate change. Two further results are noteworthy. Firstly, contrary to expectations, *personal insignificance* positively predicts people's membership in a group working on climate change. This suggests that people who do feel their own actions will not make a meaningful difference look to become part of a collective, a group that works on climate change. Therefore membership of a group maybe a way to overcome *personal insignificance*. Secondly, the *temptation to free-ride* positively predicts the donation of half of the potential cash prize to an environmental NGO. The two items assessing the *temptation to free-ride* are "Others could take actions and address climate change without my help" and "I would rather have others take care of climate change so I don't have to take actions".

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People may through donating a potential cash prize ‘pay’ others to take actions. Thus the items might have been interpreted by a number of people as others are more capable or better placed to take actions, rather than in the sense of free-riding in a social dilemma.

5.5.2. Considerations and their association with approval of climate change policies

In this section we analyse the data of the 50% of participants who received questions about their approval of climate change policies. We thus assess the association between considerations and people’s approval of climate change policies.

50.7% of this subsample exited to a petition for stricter climate change policies. Participants on average expressed high current approval of climate change policies ($M = 15.39$, $SD = 4.02$, maximum possible range 4-20) and future approval of climate change policies ($M = 15.27$, $SD = 4.13$, maximum possible range 4-20).

Table 5.3 in Appendix B shows the mean importance ratings for the 23 statements which represent the nine cooperative and non-cooperative considerations. We performed a factor analysis on the 23 importance ratings to explore whether the expected structure of the considerations is reflected in the findings. We expected one factor to contain cooperative considerations expected to be associated with an increase in the approval of climate change policies as well as an increase in actions to address climate change: *enlightened self-interest*, *collective interest*, *externalities*, and *fairness*. We expected the second factor to contain non-cooperative considerations that are expected to be associated with an increase in policy approval but a decrease in actions to address climate change: *fear of being a sucker*, *hopelessness* and *personal insignificance*. Finally a third factor we expected to contain the

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non-cooperative considerations expected to be associated with a decrease in policy approval and a decrease in actions to address climate change: *temptation to free-ride* and *immediate self-interest*. Again, due to the highly interrelated nature of the considerations we did not expect each consideration to form a separate factor.

A Monte Carlo parallel analysis indicated a three factor solution. The detected factor structure, based on an explorative factor analysis within Promax rotation, is shown in Table 5.19. The pattern matrix is reported and small coefficients (.30 and below) are suppressed.

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Item (cooperative considerations)	Factor loadings			Item (non-cooperative considerations)	Factor loadings		
	<u>Factor1</u>	<u>Factor2</u>	<u>Factor3</u>		<u>Factor1</u>	<u>Factor2</u>	<u>Factor3</u>
Collective interest1	.495			Hopelessness1	.432		
Collective interest2	.833			Hopelessness2		.709	
Collective interest3	.884			Fear of being a sucker1		.722	
Fairness1	.546	.303		Fear of being a sucker2		.695	
Fairness2	.856			Fear of being a sucker3		.644	
Fairness3	.647			Personal insignificance1		.649	
Externalities1	.748			Personal insignificance2		.300	.387
Externalities2	.725	.324		Personal insignificance3		.362	.436
Enlightened self-interest1	.796			Temptation to freeride1	.336		.636
Enlightened self-interest2	.621	.324		Temptation to free-ride2			.557
				Immediate self-interest1			.604
				Immediate self-interest2	-.334		.462
				Immediate self-interest3			.617

Table 5.19: Factor loadings for items exploring the importance of different considerations for participants' approval of climate change policies.

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Factor1 shows high positive loadings for all cooperative considerations (*collective interest, fairness, enlightened self-interest* and *externalities*). As expected, this factor includes all cooperative considerations which are expected to be associated with both an increase in policy approval and an increase in actions to address climate change. Additionally hopelessness1 has its highest positive loading on this factor. This is not surprising though, as the item content is highly suggestive of a policy approach (“Voluntarily most people won’t take actions and we won’t be able to tackle climate change”). Due to its content the first factor is called “policy cooperation factor”. Factor2 shows high loadings for the fear of being a sucker items, hopelessness2 and personal insignificance1. Most of these items focus on the theme that others won’t act and therefore personal actions are unjustified. We call this factor “why me”. This factor reflects well the expected second factor, containing considerations expected to be associated with an increase in policy approval, but a decrease in actions to address climate change. The third factor shows high positive loadings on the temptation to free-ride items, the immediate self-interest items and personal insignificance2 and 3. These items share a high focus on self-evaluation and centre on the themes of personal costs and personal insignificance. We call this factor “personal costs/ insignificance factor”. We did not expect this third factor to contain items relating to personal insignificance. Thus the detected factor structure is largely in line with our expectations but does not reflect the expected factor structure fully. Next we tested the associations of the detected factors with policy approval. We expected the “policy cooperation factor” as well as the “why me factor” to be associated with an increase in policy approval and the “personal costs/ insignificance factor” with a decrease in policy approval.

We calculated factor scores by summing up item scores of those items that load highly on a factor. We then used regression analysis (linear and logistic regression) to determine which factors predict an increase or a decrease in the approval of climate change

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policies. Table 5.20 shows a summary of the results of these regression analyses (full regression tables can be found in Appendix B, Tables 5.21 – 5.23):

Outcome variables – assessments of approval of climate change policies			
	Exiting to petition for stricter climate change policies (n=127)	Current approval of climate change policies (n=133)	Future approval of climate change policies (n=137)
Logistic regression			
Policy cooperation factor		.107**	
Why me factor		-.039	
Personal costs/ insignificance factor		-.123*	
Linear regressions			
Policy cooperation factor		.325***	.345***
Why me factor		-.002	.025
Personal costs/ insignificance factor		-.105*	-.099*

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5.20: Predicting current and future approval of climate change policies on the basis of the factors ‘policy cooperation factor’, ‘why me factor’ and ‘personal costs/ insignificance factor’ (numbers represent non-standardised regression coefficients).

Overall, the regression model including the three factor solution significantly explains participants exiting to a petition for stricter climate change policies ($\chi^2 (3, N = 127) = 38.900$, $p < .001$, see Table 5.21 in Appendix B), current approval of climate change policies ($F (3$,

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$134) = 85.869, p <.001$, see Table 5.22 in Appendix B), and future approval of climate change policies ($F (3, 130) = 95.342, p < .001$, see Table 5.23 in Appendix B).

The link between considerations and the approval of climate change policies can be summarised as follows: The “policy cooperation factor” as well as the “personal costs/ insignificance factor” are associated with participants’ approval of climate change policies across a variety of measures. On the contrary, the “why me factor” does not significantly contribute to the approval of climate change policies. The results are in line with H1: the “policy cooperation factor” is associated with an increased policy approval. H2 also finds support in the results: the third factor “personal costs/ insignificance factor”, which contains the items representing *temptation to free-ride* and *immediate self-interest* is negatively linked to policy approval. H3 is not supported by the results: The “why me factor”, comprising items referring to the *fear of being a sucker*, *hopelessness* and *personal insignificance*, did not significantly predict levels of policy approval. Additionally, items relating to *personal insignificance*, contrary to the hypothesised direction are linked to a decrease in policy approval. The results are summarised in Figure 5.1:

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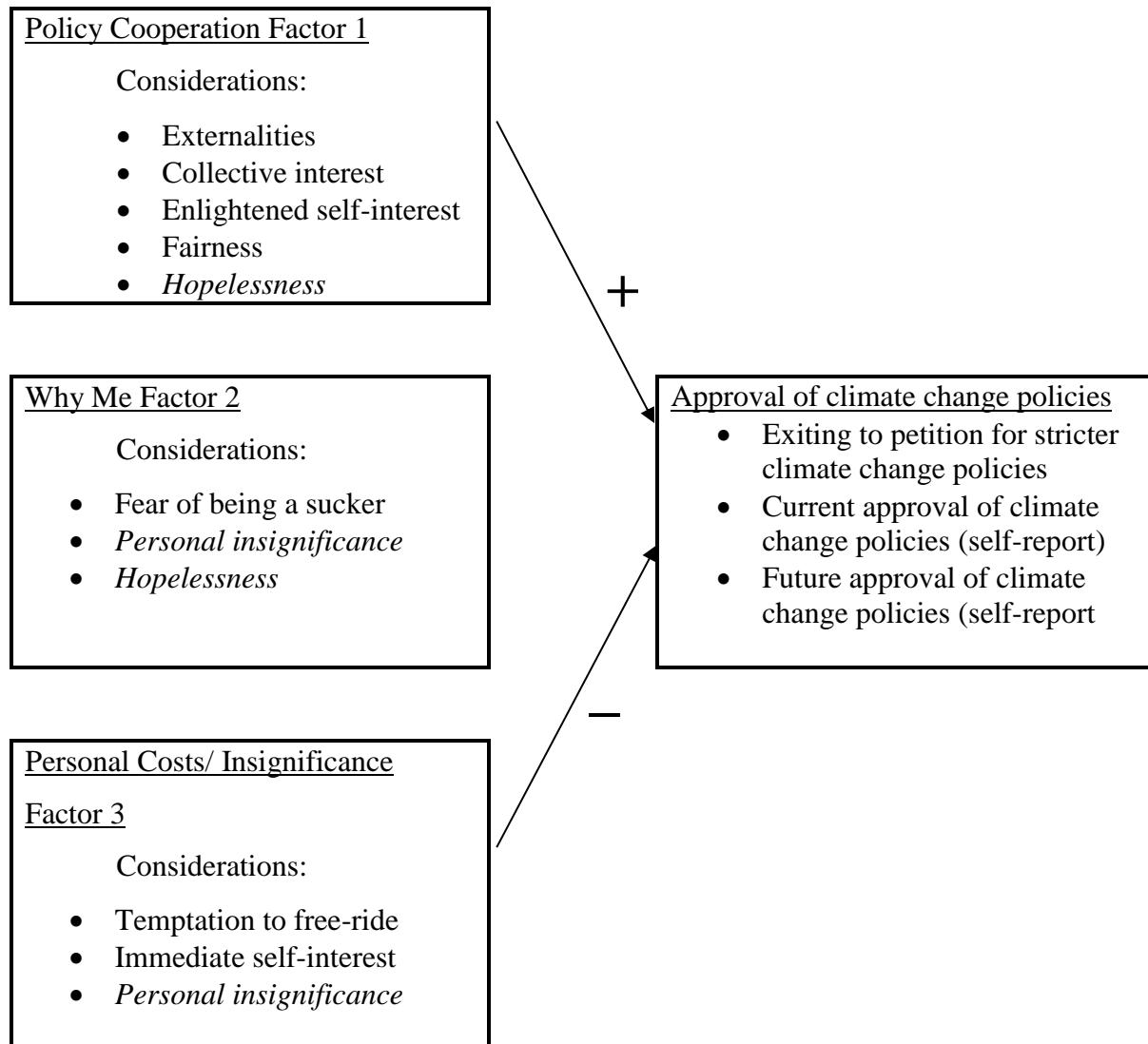


Figure 5.1: Associations between factors and approval of climate change policies.

Overall the results were partially in line with expectations.

In addition to the association between the outlined factors and approval of climate change policies we were further interested in the influence of each consideration individually. We created a composite score for each of the nine considerations by summing up the item scores of their respective measurement items. We then conducted a series of regressions, with the different measures for policy approval as outcome variables and the sumscores for the

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nine considerations as independent variables. Results of these regressions can be found in Table 5.24 (full regression tables, Tables 5.25 – 5.27, can be found in Appendix B):

Outcome variables – assessments of approval of climate change policies			
	Exiting to petition for stricter climate change policies (n=127)	Current approval of climate change policies (n=137)	Future approval of climate change policies (n=133)
Logistic regression			
Externalities	-.361		
Collective interest	.375*		
Enlightened self-interest	.139		
Fairness	.267*		
Immediate self-interest	-.144		
Fear of being a sucker	.003		
Personal insignificance	.019		
Hopelessness	-.161		
Temptation to free-ride	-.292		
Linear regressions			
Externalities		.255	.073
Collective interest		.401**	.636***
Enlightened self-interest		.192	.219
Fairness		.376**	.351**
Immediate self-interest		-.149	-.071
Fear of being a sucker		.089	.048
Personal insignificance		-.244*	-.227*
Hopelessness		.006	.212
Temptation to free-ride		.229	.122

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5.24: Predicting current and future approval of climate change policies on the basis of the nine cooperative and non-cooperative considerations (numbers represent non-standardised regression coefficients).

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Overall the regression model including each of the nine considerations significantly explains participants exiting to a petition for stricter climate change policies ($\chi^2 (9, N = 127) = 47.436, p < .001$, see Table 5.25 in Appendix B), current approval of climate change policies ($F (9, 128) = 28.617, p < .001$, see Table 5.26 in Appendix B) and future approval of climate change policies ($F (9, 124) = 31.689, p < .001$, see Table 5.27 in Appendix B).

Results show that the two cooperative considerations *collective interest* and *fairness* consistently predict people's approval of climate change policies across the three different measures. This result is in line with H3. However, contrary to expectations, the remaining cooperative considerations do not predict policy approval. With regards to the non-cooperative considerations, *personal insignificance* is the only consistent negative predictor of policy approval. Thus, while people may see membership in a group that works on climate change as a way to address a feeling of *personal insignificance*, climate change policies do not seem to be supported as a way to address personal insignificance. These findings, do not support hypotheses H4 and H5, as *personal insignificance* is the only negative predictor of policy approval, whereas this consideration was expected to increase approval.

5.6. Discussion

This chapter developed a comprehensive set of considerations in response to the social dilemma structure of climate change mitigation and therefore addresses objective two of this thesis (To determine people's cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation). We further explored the role of cooperative and non-cooperative in people's actions on climate change, addressing objective three of this thesis (To determine how cooperative and non-cooperative

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considerations in response to the social dilemma structure of climate change mitigation affect personal actions to address climate change). We were interested in how they may facilitate or hinder personal actions to address climate change and the approval of climate change policies.

Non-cooperative considerations, as outlined in the literature (e.g. Aitken, 2009, Aitken et al., 2011, Capstick, 2013, Horton and Doron, 2011, Lorenzoni et al., 2007), are indeed present in people's thinking about climate change mitigation. Their discouraging effect can be seen in the findings from this quantitative assessments. But results also show that cooperative considerations play an important role in people's reasoning and are linked to increases in personal actions to address climate change. It is an important finding that the social dilemma structure of climate change mitigation can both, discourage and encourage actions to address climate change, through eliciting different considerations. This is the first study that assesses the importance of both cooperative and non-cooperative considerations simultaneously. Similarly, we could show that cooperative considerations are not only associated with an increase in actions to address climate change, but also with an increase in the approval of climate change policies. Thus strengthening these cooperative considerations could have a beneficial effect not only on personal actions to address climate change, but also help to increase public approval of climate change policies. In both cases, *collective interest* is the consideration most strongly associated with increases in action and approval. Further, *fairness* is a significant positive predictor of people's approval of climate change policies. We were specifically interested to see whether people show higher approval of climate change policies in association with three of the non-cooperative considerations: *fear of being a sucker*, *personal insignificance* and *hopelessness*. We hypothesised that these three considerations are linked to an increase in policy approval. Findings from the quantitative data did not support this hypothesis. The two factors containing items representing the

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relevant non-cooperative considerations did not show a positive association with the approval of climate change policies. Further, regression analyses using composite scores for every considerations as independent variables show that *hopelessness* and *fear of being a sucker* do not significantly predict policy approval, while *personal insignificance* is a negative predictor. Thus our data does not support the strategy to use *personal insignificance* as a way to achieve public approval of or demand for policies. This strategy can be found applied in campaigns seeking public pressure on politicians (Kang, 2014). *Personal insignificance* is, however, a positive predictor for membership in a group working on climate change. Thus, people may use the collective power of a group to overcome their feelings of personal insignificance. This study has a number of limitations. The self-reported nature of the data may give rise to a social desirability or self-serving bias. Nevertheless we took several steps to reduce these biases and thus increase our confidence in the presented findings and interpretations. The online study was anonymous and it is likely that most participants completed it in the absence of others. Further we included several behavioural measures in addition to self-reported measures. It is unlikely that participants chose to donate half of a big potential cash prize on the basis of social desirability. However, with regards to the behavioural measure of policy approval, exiting the site to a petition asking for stricter climate change policies, we have no means of knowing whether participants signed the petition or not. We only know that they chose to be directed to the petition site.

Despite these steps taken, participants' answers reflect their personal interpretations. As the study design is not experimental, these interpretations may represent participants' post hoc rationalisations and may differ from people's reasons and motivations underlying actions to address climate change. Further experimental research is needed to establish a definite causal relation between the two sets of considerations and personal actions on climate change

6. Effects of cooperative and non-cooperative considerations – a qualitative assessment

6.1. Abstract

This chapter uses semi-structured interviews to explore in depth people's cooperative and non-cooperative considerations and how these relate to action on climate change and approval of climate change policies. Twenty interview participants were asked general questions about climate change, people's actions to address climate change and policy approval. They were then given a specific sorting task to explore which considerations have a discouraging effect and which have an encouraging effect. The qualitative data enabled us to explore subthemes and reasonings behind considerations. The interview data supports and extends the findings of the quantitative study in chapter five. Divergences from the findings of the quantitative data are also highlighted and discussed. These areas of divergence include the effect of considerations of others and *immediate self-interest*. A crucial finding of this qualitative study is that people apply a number of reasoning strategies to overcome considerations linked to inaction.

6.2. Introduction

The previous chapter reported quantitative empirical research exploring the link between cooperative and non-cooperative considerations and people's actions to address climate change and approval of climate change policies. It showed how both sets of considerations are linked to personal actions to address climate change and policy approval. This chapter investigates these links using qualitative data gathered through semi-structured interviews. Such qualitative data gives the opportunity to explore in more depth the link between considerations and the two outcome variables, people's reasoning behind and explanation for these associations as well as a more in depth exploration of divergences found between hypotheses and findings from the quantitative data. The more in depth data provides, for example, the chance to explore potential explanations for the finding of a non-significant association between the "why me factor" and policy approval.

6.3. Methodology

6.3.1. Participants

Participants were recruited through flyers and posters, displayed at different cafes and public places around Norwich. People interested in participating in the interview study were asked to fill out a short online questionnaire to assess their demographics as well as their actions to address climate change and their levels of policy approval. Forty five people expressed an interest of which twenty participants were selected to represent a variety of age groups, educational and socio economic statuses as well as levels of personal actions on climate change and policy approval. Selected participants were invited to take part in an interview that lasted approximately 45 minutes and receive a reimbursement of £20. Of these

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twenty participants, ten were male and ten were female. Two participants reported to be members of an organisation that works on climate change. The twenty participants were aged between 20 and 78, with a mean age of 38.75 ($SD= 14.87$). The sample shows a larger proportion of highly educated individuals than the UK population (Office for National Statistics, 2013): of the twenty interview participants one person reported their highest level of education as less than secondary school, two people reported Secondary School, GCSE or O-Levels as their highest level of education, three people A-levels or college equivalent, eight people a Bachelor's Degree, five people a Master's Degree and one person a Doctoral Degree.

6.3.2. Materials and procedure

Interviews took place either in people's homes or in a public place. An interview guide outlining the structure of the interviews can be found in Table 6.1 in Appendix C. However the nature of semi-structured interviews means that there is some variability between interviews to ensure a natural conversational flow to the questions and answers which also explored areas of interest more deeply.

The interviews started with open questions asking participants' opinion on the issue of climate change and why they think some people do and some don't act on climate change. The interviewer noted any reasons participants offered for action or inaction on paper cards.

The second part of the interview was a sorting task. The interviewer presented a number of paper cards with short statements on them. Nine of these cards contained statements representing the nine cooperative and non-cooperative considerations. The nine statements can be found in Table 6.2 in Appendix C. The rest of the cards contained summary statements of the reasons participants named for people's actions and inactions to address

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climate change during the first part of the interview. Participants were asked to sort the cards into three different categories: those representing considerations that encourage them to act on climate change; those representing considerations that discourage them to act on climate change; and those that represent considerations not relevant to acting on climate change.

Participants were asked to elaborate their thoughts and give examples throughout this sorting task and explore hierarchies and communalities amongst encouraging and discouraging considerations.

In the third part of the interview participants were asked to discuss reasons why people do or don't approve of climate change policies.

In the final part of the interview participants were again presented with three paper cards containing statements representing the three non-cooperative considerations *fear of being a sucker, personal insignificance* and *hopelessness*. They were asked to elaborate whether these considerations encourage or discourage them to approve of climate change policies and what effect they believe these considerations have on other people.

The interview data was transcribed and analysed for themes relating to the nine cooperative and non-cooperative considerations. The analyses focused on a deeper understanding of the nine considerations, including their importance for people's actions to address climate change and approval of climate change policies. Additionally subthemes of the nine considerations were explored as well as themes relating to approaches to reduce discouraging considerations. A priori themes based on expected considerations were supplemented by emergent themes of participants' reactions to the presentation of the nine statements representing considerations.

6.4. Results

The following sections explore the nine considerations and their importance for people's actions to address climate change and approval of climate change policy in greater depth and detail through the analysis of the qualitative interview data. They further outline where the interview data confirmed the role of considerations established in the quantitative assessment in chapter five and explore divergences between the two data sets. Table 6.3 gives examples of interview statements related to the different considerations and provides a summary of relevant subthemes identified in the following sections.

Consideration	Subthemes	Example
Collective interest		<i>Well, I've been thinking about the [climate change]. [...] The feeling I had... I've had really strong feelings in recent years.</i> <i>Because I felt, that... there is a better way to life, really. Which would be better for everybody.</i> → participant 5, male 78
Enlightened self-interest		<i>[...] The average office worker isn't going to appreciate being sat at seventy degrees in an office. And so by doing something about the climate, you'll actually help out in the long run, with that. You won't be sat in an office at seventy degrees, it'll be forty degrees and you might not be melting all over the place, or something like that.</i> → participant 3, male, 24
Externalities	Future generations abstract	<i>[...] We're ok, although already the weather is starting to go downhill. And</i>

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		<i>that seems to be, because of climate change. But I am worried about the future generations. → participant 7, female, 27</i>
	Offspring	<i>Well, I've got grandchildren. So, you can't sort of really help but sort of to project forward a bit, can you. Just to imagine what it would be like for them. [...] → participant 6, female, 65</i>
	Vulnerable current others (less prominent theme)	<i>Interviewer: So, one is 'Climate change is a serious threat.' Yeah?</i> <i>Yes, if not to me individually than to the world at large, or to certain vulnerable populations. → participant 9, male, 50s</i>
Fairness	Everybody has to do his/ her bit	<i>[...] You know, maybe I don't do enough but at least I do something. You know, like compared to other people who are completely oblivious you know, at least I can say: well, I'm doing something. → participant 2, female, 35</i>
	We are fortunate/ less vulnerable, thus we can and should take action	<i>[...] Particularly in the developing world, they have less choices and ability to influence their local environments or life. That does upset me and I think to a certain extent it does encourage my actions, even though I am sceptical about climate change, cause I believe in social justice.</i> <i>→ participant 13, male, 39</i>
	We (humans or the West) are responsible	<i>I guess anyone who believes that it's a consequence of our activities,</i>

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	for the problem and thus should address it	<i>philosophically you therefore should change your activity ... to try and alleviate your impact. → participant 9, male, 50s</i>
Temptation to free- ride	Government or businesses should take action	<i>Interviewer: So, you said, some people might think somebody else has to take care of it, who do you think, or what they think of?</i> <i>Politicians, governments. Leave it to somebody else, they make the policies, they should be the ones that deal with it, perhaps. That's perhaps how they think. → participant 15, female, 40</i>
Personal insignificance	I cannot do anything about the situation	<i>[...] What, if. Everything you feel is as though you do is a drop in the ocean. You feel as though whatever you do won't have any effect. → participant 17, female, 46</i>
	Businesses hold the power to change	<i>Yeah, I think it's like we are completely draining the world's resources massively. Unfortunately it's the big corporations who control the world, who have all the power, they are so governed by immediate profits so don't really care about future generations. They just wanna make money for themselves. → participant 16, male, 35</i>
	Difficulty to achieve collective action	<i>I can't see how everybody ... I don't believe everybody would be agreeable to sort of altering their way of life, if it was necessary. That's all. → participant 6, female, 65</i>
Hopelessness		<i>Well, it's just life really and I just think like, you can't really change it, because</i>

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there are so many people that, you know that do all this stuff in the world and it's gonna get worse and worse and worse.

[...] → participant 19, female, 20s

Fear of being a sucker Not right if others don't act *Interviewer: And does that discourage you personally as well, or ...? Do you think that?*

Well, it does a bit. Yeah, it does a bit.

Because you can feel yourself, if you are not careful, you are doing a whole lot of stuff and other people aren't? And other people are resisting, what you are suggesting. → participant 6, female, 65

Others cancel out one's effect *I think it taps back to... You know if you think about making, yielding a patch of land. If you do the weeding, get rid of the weed so that the plants can grow up and then someone comes along and just walks all over it, compresses the soil, then your work's been ruined. In a way it feels a little bit like that. [...] You know if somebody is driving round in an electric car and somebody else like me is pumping out fumes with my car then you know, I'm the bad guy, so... → participant 8, female, 44*

Immediate self-interest

Ok, my gut feeling, the most common one is ... ease of life, availability of, availability of savings. I don't even know if that makes sense. How easy is that to do something compared to having to do something. For example, how easy would

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it be to use public transport every day for your 25 year career? That's gonna be a lot of, you know, saving compared to using the car every day over your 25 year career. But, but how easy is that? → participant 1, male, 36

Table 6.3: Examples of interview quotes referring to the nine cooperative and non-cooperative considerations and important subthemes.

The interview data confirm the expected predominately encouraging effect of *collective interest* and *externalities* (consequences for others) on personal actions to address climate change. When we probed further to understand why *collective interest* is a consideration related to people's increased actions two main reasonings emerged: 1) We can only approach the problem successfully as a collective. 2) Other people and the consequences it will have on them. This indicates that *collective interest* and *externalities* are strongly related. In connection to the cooperative consideration *externalities*, participants mentioned several groups of others: 1) future generations in general, 2) offspring, more specifically and 3) less frequently, vulnerable current others. Answers reflected both the spatial and temporal dimensions of the climate change mitigation dilemma. Overall, others were frequently referred to as the most encouraging reason to take actions to address climate change, and future generations were especially important. Here the interview data diverges from the quantitative data reported in chapter five. While considerations around *externalities* were reported as strongly encouraging actions on climate change by interview participants, the consideration did not emerge as a significant predictor for any of the measures assessing actions on climate change in the quantitative assessment. However, the quantitative data

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shows a positive trend towards *externalities* encouraging actions on climate change and the items assessing the consideration *externalities* do not specifically mention future generations.

Interview participants who did not feel encouraged to take actions due to consequences for others, reported that they 1) were not sure about those consequences, 2) did not feel responsible for those consequences or 3) focused on the minor consequences that they expected for people in the UK. The uncertainty of consequences for humans reflects one of the distinct characteristics of the climate change mitigation dilemma (see chapter two): environmental uncertainty.

Participant 8 (female, age 44): It [the externalities prompt] doesn't make me feel like: alright I really need to do something about this. [...] I think the main thing that I'm thinking when we are talking is: I really don't know what impact it will have for humans. So...

With regards to the cooperative consideration *fairness* three important subthemes emerged: 1) everybody has to do his or her bit, 2) we are fortunate or less vulnerable, thus we can and should take action 3) we (humans or the West) are responsible for the problem and thus should address it. *Fairness* was mostly categorised as a relevant consideration that encourages personal actions to address climate change. Different reasoning for this encouraging effect of *fairness* considerations can be detected: 1) collective action will be more effective, 2) leading by example or as a role model, displaying the fair behaviour and thus encouraging others, 3) others would have to compensate for personal inaction.

But some participants voiced objection to the notion of *fairness*. One basis of objection was that people should do something because they want to and not out of an obligation based on *fairness*:

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Participant 6 (female, age 65): [...] I don't think you can insist that people do certain things. I mean it's more a matter of persuasion. But, I would sort of regard it as looking at my contribution. You see. As part of the fairness. Yeah. But, you know, I don't think you can really nag other people. You can educate them. I don't think you can nag.

Another objection was based on a differentiation between *fairness* as equality and *fairness* as differentiated responsibilities:

Participant 12 (female, age 24): 'Fairness' I put under 'less likely' [to encourage actions]. Because I do think that some, for example, governments have more responsibility than kind of the entire population. Because it's their responsibility to actually promote the reasons and to put the... You need somebody to actually implement the policies or the ... encourage people to change. Yeah. So yeah, they have a greater burden to a certain extent.

These objections to considerations around *fairness* could explain the fact that *fairness* did not emerge as a significant predictor of actions to address climate change in the quantitative assessment.

In line with the quantitative data reported in chapter five, *enlightened self-interest* did not emerge as a dominant consideration. This is due to the belief that the current generation will not be confronted with severe negative consequences of climate change. Participants predicted that it would increase as a motivation when the effects of climate change worsen and become geographically closer and more personal.

To summarise, the interview supported the positive link between the cooperative considerations *collective interest* and *externalities* and personal mitigation efforts. It further

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offered insight into why the other two cooperative cognitions *fairness* and *enlightened self-interest* were not found to encourage personal actions to address climate change.

While the quantitative data indicates a negative link between non-cooperative considerations on a factor level and personal mitigation efforts, the qualitative data suggests more complex links. In many cases interview participants did report discouraging effects of non-cooperative considerations. Nevertheless, participants also revealed different strategies to protect themselves from these discouraging effects. In some cases participants even report a defiant reaction which results in an encouraging effect. These counter reasonings could not be detected on the basis of the questionnaire data due to the fixed, pre-formulated items. Table 6.4 identifies the key counter reasonings, that emerged from the interviews and gives illustrative examples.

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Counter reasoning	Example (interview quotes)
Desire to be one of the 'good ones', who is not discouraged, but takes actions on climate change.	Participant 17 (female, age 46): 'Temptation to free ride' [...] that would encourage me to act. Because knowing that other people. I wouldn't want to be one of the people that benefited from somebody else's actions. I would want to be one of the ones that contribute to benefit from those actions. So that would make me want to do it, rather than somebody to turn around and say 'Well actually, we did everything and you just benefited.'
Acting as a role model, encouraging larger changes and inspiring more people.	Participant 14 (male, age 30): Even if the efforts that I make, make next to no difference, they are at least making a small difference and hopefully by other people seeing that I'm doing it, they might go: well he is doing it maybe I do it as well.
If everyone adopted these non-cooperative considerations, nothing would ever get done	Participant 16 (male, age 35): I know a lot of people would say this thing, well I'm just one person, how much change can I make, but it's if everyone thinks like that, no one makes a change.
Being part of the collective action	Participant 19 (female, age 20): 'Personal insignificance. I'm just one in billions, my actions will not make a difference.' ... yeah, I do think that in some ways, but then I think obviously every little does really help [...]. So, no I think that people do make a difference, even if it's just a little thing. I guess it's one less little bit that's going into the ozone I guess.

Table 6.4: Key counter reasonings to overcome the discouraging effect of non-cooperative considerations.

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The qualitative data also revealed other notable divergences from the findings of the quantitative data.

Immediate self-interest was acknowledged as an important discouraging consideration for participants' own as well other people's actions on climate change. But participants also reported that *immediate self-interest* can encourage actions to address climate change, if these actions serve immediate personal, for example economic, benefits. Strategic approaches (see chapter two), such as incentives build on this encouraging effect based on self-interest.

Participant 13 (male, age 39): My quality of life is improved, in terms of, my time isn't wasted on commuting. I am able to enjoy all the city centre, you know, on my doorstep. Less of my income is wasted on financing a car. I'm healthier because of walking and cycling. So all the positive reasons for a low carbon life style I'm now enjoying and experiencing and valuing. But the only reason I did it was for economic.

Actions to address climate change were also seen as an investment in the future, which would eventually pay off. This is an indication of *enlightened self-interest*.

Participant 5 (male, age 78): 'Immediate self-interest. Addressing climate change is expensive and inconvenient right now'. Well ... I would ... Yeah. ... I think, it would be more expensive not do anything right now. Actually. I think, it'll become more expensive, if we don't do anything. So, I would be encouraged to take action, to ... counter this sort of thing.

With regards to the discouraging effect of *personal insignificance*, participants voiced three different (but potentially related) subthemes: 1) The individual is not capable of doing anything about the situation. 2) Businesses hold the power to change. 3) Achieving collective action is difficult. Some participants very strongly disagreed with the notion of *personal*

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insignificance. Either they felt that their efforts do matter and that even small changes make a difference, or they would not let it count as an easy way to opt out of responsibility.

The data also revealed two different sources for the non-cooperative consideration *fear of being a sucker*: Participants voiced this feeling either because 1) It is not right that others don't act (closer to *fairness* considerations) or because 2) Others would cancel out the effect an individual can have (closer to *personal insignificance*).

Further the qualitative data indicate that *hopelessness* was very much overlapping with a feeling of *personal insignificance*, a finding that is in line with the closely related definition of the two concepts. When probed with *personal insignificance* some participants literally referred to hope or *hopelessness*.

Participants did mention *temptation to free-ride*, but no one stressed that people actually aimed to profit from other people's cooperative behaviour. Participants acknowledged an attitude of 'let someone else do it'. In the majority of cases this attitude was observed in other people, but not as an important consideration for participants' own actions to address climate change. In fact reactions to prompts showed that cognitions around the *temptation to free-ride* were alien to a number of participants. Participants saw the *temptation to free-ride* mainly as a profit- driven motive for businesses. Thus the interview data shows that participants assign less importance to the *temptation to free-ride*, compared to its role in social dilemma research and literature.

Especially when they talked about other people's inactions, participants saw *personal insignificance*, *hopelessness* and the *fear of being a sucker* as an excuse people made, when their real motivation not to act was laziness, convenience or selfishness.

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Interviewer: So, if you think about those people 'Who aren't good' in your terms.

[...] Why do you think they are not doing their bit?

Participant 7 (male, age 27): Sheer laziness, I think. Part of it is.... They... The excuses they make are, that it's 'their little thing isn't going to make any difference'.

In conclusion, the qualitative data largely confirmed the negative link between non-cooperative considerations and personal actions to address climate change. But it also revealed different strategies that people use to minimise or avoid such a discouraging effect of non-cooperative considerations.

With regards to the approval of climate change policies, the qualitative interviews showed that participants did offer policies as a possible approach to achieve mutual cooperation and frequently acknowledged it as a way to ensure that everyone participates in actions to address climate change.

Participant 7 (female, age 27): I am aware that we cause it [climate change] quite a lot as, as human beings. I, I would like to, I would like there to be some kind of policy where everyone has to make difference with it. In, even in small ways. Cause, I know people that are lazy. And they pollute, and they... and I know all of that contributes.

This is in line with previous research that showed how people perceive policies as a strategy to resolve the climate change mitigation dilemma (Horton and Doron, 2011, Line et al., 2010).

Further the qualitative data, in line with the quantitative data, suggests that climate change policies may be rather regarded in the light of *collective interest* and *fairness* than in the light of *fear of being a sucker*, *personal insignificance* and *hopelessness*:

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Interviewer: [...] What is their reasoning for... supporting policies?

Participant 9 (male, age 50s): They would have to feel that it was the best thing for their society in general.

Thus both the quantitative and qualitative assessments suggest that approval of climate change policies is better supported through cooperative considerations, with regards to structural approaches directed at all citizens. Equally both data sets highlight the cooperative considerations *collective interest* and *fairness* as considerations that particularly encourage policy approval.

Some participants perceive policies as an approach to enforce change on companies and businesses rather than fellow citizens. *Fear of being a sucker, personal insignificance* and *hopelessness* are more frequently mentioned in reference to businesses that would be forced to act through policies:

Interviewer: [...] Why do you think some people [...] would ask for policies to approach climate change or to address climate change?

Participant 16 (male, age 35): [...] To me people causing the most damage to climate change is down to the big corporations that have all the power in the world [...]. Individuals can make all the change they want, but big corporations who are mining the world of its oil, cutting down the trees doing these unethical things and whatever they are the ones with rules to be in place, maybe laws to restrain them in sort of to make a sacrifice.

Because of the unclear role *hopelessness, personal insignificance* and *fear of being a sucker* play from a theoretical perspective in relation to the approval of climate change policies, we asked some participants directly how they perceive the relationship between

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these three considerations and approval of climate change policies. Answers were very mixed. Consistent with H5 (outlined in chapter five), some participants thought these considerations make it more likely that people approve of policies, because policies will ensure that others act.

Interviewer: And why do you think some people would strongly approve of policies?

Participant 7 (female, age 27): [...] And maybe they would feel a bit less ... annoyed, when other people don't do their bit and they do. As well.

Interviewer: [...] Would a feeling of hopelessness make you more or less likely to say we need a policy?

Participant 8 (female, age 44): I think policy could give you hope. Because someone is showing, somebody, that there is a general belief that things can be different, I think that's what a policy shows sometimes.

Others thought *fear of being a sucker*, *personal insignificance* and *hopelessness* are related to decreased approval of climate change policies, because these considerations reflect a general negative outlook.

Participant 11 (male, age 30): I think if you have that [hopelessness], then like I say, you not gonna think that legislation will make a difference. [...] What would happen is that people who have that negative outlook, their general view will be: this won't make a difference, so why would I vote for it, this won't make a difference, so should I go along with it, why should I deal with it?

Thus the qualitative data suggest a possible explanation for the quantitative result that the “why me factor” does not show any significant link to the approval of climate change

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policies: interview participants did report opposing associations between the considerations *hopelessness, personal insignificance* and *fear of being a sucker* and policy approval.

6.5. Discussion

The interview data enabled us to explore the considerations and their association with personal actions to address climate change and approval of climate change policies in more detail. The interview study therefore addresses objective two of this thesis (To determine people's cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation) and objective three (To determine how cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation affect personal actions to address climate change). In line with the quantitative data, the qualitative data confirmed considerations around collective interest as a key consideration that encourages both, actions to address climate change and the approval of climate change policies. Key reasonings for this encouraging effect were that collective action is more effective (the awareness of a socially optimum outcome) and potential consequences for others (*externalities*). These themes may be important gateways to strengthening cooperative considerations and their encouraging effect. Further research is needed to investigate if and how these cooperative considerations can be strengthened and used to promote personal actions to address climate change (see chapter seven). Further confirming findings from the quantitative assessment, *fairness* considerations are reported as important encouragement for the approval of climate change policies. This suggests that policies are likely to be perceived as a way to achieve a fair distribution of the burden to mitigate. Further research is required to investigate whether eliciting especially *fairness* and *collective interest* considerations can be a gateway to introduce climate change policies in a

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way that reduces public objection (see chapter seven). *Temptation to free-ride*, a non-cooperative consideration that receives considerable attention in the social dilemma literature (e.g. Albanese and Fleet, 1985, Axelrod, 1984, Hughes et al., 2005), was not perceived as a key barrier to personal actions to address climate change in interviews. The finding that *temptation to free-ride* is more likely to be attributed to businesses may reflect research findings about distrust in businesses with regards to climate change mitigation (Horton and Doron, 2011, Lorenzoni and Pidgeon, 2006, Lorenzoni et al., 2007). Further, *immediate self-interest* can increase personal actions to address climate change, if these actions produce immediate personal benefits. This aspect of *immediate self-interest* is frequently used in social marketing approaches to climate change mitigation (e.g. Lucas et al., 2008), although appealing to self-interest can undermine intrinsic motivation to change (Corner and Randall, 2011, Evans et al., 2013).

Participants frequently reported that certain non-cooperative considerations may ‘cross their minds’, or are familiar from other people’s reasoning, but do not decrease personal actions. Participants voiced different strategies they apply to reduce the discouraging effect of non-cooperative considerations. Some participants even reported to turn the non-cooperative considerations into an encouraging force, by wanting to counter them. This finding is in line with and extends research that reports people’s ability to find resolutions for the social dilemma of climate change mitigation (Capstick, 2013). Amongst the identified strategies, two are especially noteworthy: The role-model reasoning (acting as a role model, encouraging larger changes and inspiring more people) and ‘what would happen if no one acted’ have not been identified as strategies to deal with the mitigation dilemma in previous research. The findings indicate strategies to counter potentially discouraging non-cooperative considerations (Lorenzoni et al., 2007).

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Participants frequently suggested that the other non-cooperative considerations are voiced as excuses when *immediate self-interest* is the real underlying motivation for inaction. This causal pathway was most frequently discussed in the context of other people's behaviour. This is consistent with an egocentric bias or social desirability bias (see chapter four). To protect their own self-esteem or to appear in a better light in the eyes of others (including the researchers) participants may not have voiced *immediate self-interest* as their own motive for inaction (Crowne and Marlowe, 1960).

When we asked participants to elaborate on the link between the non-cooperative considerations *fear of being a sucker*, *hopelessness* and *personal insignificance* and policy approval, the answers fell in two groups. One group confirmed the positive connection stated in the literature. They believed that people who do respond with *fear of being a sucker*, *personal insignificance* or *hopelessness* would perceive policies as a way to achieve mutual cooperation and therefore approve of them. This explanation would create a positive link between the three non-cooperative considerations and policy approval. The other group argued that people who respond with these non-cooperative considerations have a general negative outlook and thus would not see climate change policies as a potential solution. On the contrary, their negative outlook would generalise to climate change policies. This is the reason why they would disapprove of these policies, creating a negative link between the non-cooperative considerations and policy approval. Further research is needed to determine whether the public is indeed split into these two different tendencies and what determines which category one falls in.

Attention has to be drawn to a number of important limitations of this qualitative assessment. Firstly, the qualitative interview data exploring the role of considerations to the climate change mitigation dilemma for the approval of climate change policies was collected

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in the second part of the interview. The first interview part explored the link between considerations and people's actions on climate change. Thus interviewees had already been exposed to the different considerations and related them to personal actions. This prior exposure may have influenced results from the second part of the interview. Secondly, the interview data was only analysed by the author and no independent data analysis by a second researcher was conducted. Analysis through a second, independent researcher would be able to address potential selective perceptions and subjective bias. Thirdly, the sample is likely to have a self-selection bias. Although a number of measures were taken to ensure the recruitment of a sample varying in a number of demographic variables, it is likely that people who expressed interest in the study did so for one of two reasons, their personal interest in the issue of climate change or to receive the financial incentive of £20.

7. The effect of collective interest and fairness messages on actions on climate change

7.1. Abstract

From an individual's perspective climate change mitigation is a social dilemma, a conflict between personal benefits and collective benefits. Social dilemmas elicit non-cooperative considerations including free-riding, but also cooperative considerations including *fairness* and an interest for the collective. In this study we use an online pilot study and a field experiment to address the following question: Can framing messages around *collective interest* and *fairness* promote actions to address climate change and approval of climate change policies? In a pilot study we found that students who were exposed to a *collective interest* message (Act on climate change for the good of everybody) or a *fairness* message (Act on climate change – everybody has to do their bit) showed a tendency to express higher willingness and intention to act on climate change. In the real world setting of a shopping mall, we found contradicting results. People exposed to the control message (Act on climate change) on posters and questionnaires expressed higher willingness and intention to act on climate change, higher approval of climate change policies and were more likely to donate to a charity working on climate change, compared to people exposed to a *collective interest* or *fairness* message. We discuss potential reasons for these unexpected findings, including an adverse effect of moralising messages and the importance of the message context. We further found that values and identities related to a focus on collective outcomes may moderate the effect of different framing messages.

7.2. Introduction

Climate change mitigation is a pressing issue that requires action on multiple levels, including personal actions to address climate change (IPCC, 2014b). However, from an individual's point of view climate change mitigation is a social dilemma (Raihani and Aitken, 2011). A social dilemma constitutes a conflict between immediate personal benefits and longer term collective benefits (Dawes, 1980, Kollock, 1998).

Previous research suggests that this social dilemma structure elicits non-cooperative considerations that explain an observed failure to act to address climate change (Aitken et al., 2011). For example, people may think it is unfair if they make the effort to act on climate change when others don't, as everyone will benefit from successful climate change mitigation. Recent research as well as chapters four, five and six of this thesis have further considered the possibility of a second set of cooperative considerations elicited by social dilemma structures (Batson, 1994, Capstick, 2013, Horton and Doron, 2011). These cooperative considerations could potentially increase, not decrease personal actions to address climate change, and offer potential ways to promote climate change mitigation and the approval of climate change policies.

In an online study and field experiment we tested whether message frames based on cooperative considerations related to the climate change mitigation dilemma have a positive effect on action and policy approval as outcome variables. This study therefore addresses objective four. We also tested personality characteristics as moderators on this effect. The tested personality characteristics relate to a person's focus on the collective benefit in a social dilemma rather than on personal benefits.

7.3. Promoting mitigation through cooperative considerations

The social dilemma structure of climate change mitigation can elicit different cooperative and non-cooperative considerations. As outlined in chapter five, considerations describe the cognitions a person associates with a specific situation, here with the climate change mitigation dilemma. According to Interdependence Theory these considerations form one important determinant of a person's subsequent actions in a social dilemma (Rusbult and Van Lange, 2003). As outlined in chapter five, four cooperative considerations can be identified:

- *Enlightened self-interest.* Individuals may focus on these long term benefits for themselves, realizing that it is better for them to avoid the negative consequences of climate change in the future (Batson, 1994, Hine and Gifford, 1997, Milinski et al., 2008).
- *Collective interest.* Individuals may focus on the positive results of mitigating climate change for everyone and thus on 'a greater good' (Batson, 1994, Horton and Doron, 2011). In the case of climate change mitigation the collective can be perceived on different scales: it may be as large as the entire human race or a nation, or it may only comprise a community.
- *Externalities.* Individuals may solely focus on the consequences for others, not including the self (Horton and Doron, 2011, Lowe et al., 2006).
- *Fairness.* Mitigating climate change results in immediate personal costs, thus in a burden for those who act. Individuals may be concerned with the fair distribution of this burden (Capstick, 2013, Horton and Doron, 2011, e.g. Wilke, 1991).

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Chapters five and six show that these four cooperative considerations form a consistent underlying factor linked to both action on climate change and the approval of climate change policies. Cooperative considerations are based on the desire to achieve the collective benefit, the best outcome for the individual in the long run, the collective and others. In a social dilemma this collective benefit can only be achieved if a large enough number of people cooperate. Climate change policies are designed to achieve this mutual cooperation. People responding with cooperative considerations are thus also more likely to approve of climate change policies (Horton and Doron, 2011, Line et al., 2010, Markowitz and Shariff, 2012, Schroeder et al., 2003).

These prior findings suggest that eliciting cooperative considerations can achieve two important aims: increasing personal actions to address climate change and increasing the approval of climate change policies.

This study tests whether communication messages framed around cooperative considerations can increase cooperation in the climate change mitigation dilemma. Framing is “to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation and/or treatment recommendation” (Entman, 1993). In order for a framing effect to occur, the desired interpretation of the issue must be accessible and salient. Models of communication stress different components of communication including the sender (who is a message from?), the channel (how is it communicated?), the message (what is communicated?) and the receiver (who is the communication directed to?) (Berlo, 1960). Based on the definition of framing, the message is the obvious target of any framing exercise in order to achieve the desired interpretation of an issue. But the sender and the

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channel can be further components that may help making certain aspects of a message more salient.

Framing messages in different ways is a widely used technique to elicit desired emotions or considerations, including in the area of environmental behaviour. A number of studies show that using different frames to communicate information about environmental behaviour can increase pro-environmental attitudes and promote pro-environmental behaviour (Bain et al., 2012, Moser, 2010, Nisbet, 2009, Pelletier and Sharp, 2008, Spence et al., 2010). Chapter two further alludes to experiments in social dilemma research, where framing the situation differently (for example as a non-economic compared to an economic context, or as a moral situation) was shown to increase cooperation (Dawes et al., 1976, Pillutla and Chen, 1999).

In this study we test framing effects related to climate change mitigation by exposing participants to interpretations of climate change mitigation based on two cooperative considerations, *fairness* and *collective interest*. In our experiments, we manipulate one component of the communication, the message, to study the effect of different framings. Specifically, we test the following:

- H1: Exposure to messages based on cooperative considerations to the climate change mitigation dilemma leads to an increase in actions to address climate change and the approval of climate change policies.

To identify those cooperative considerations with the strongest association with actions to address climate change and approval of climate change policies we used the results from the quantitative and qualitative assessment reported in chapters five and six. The results from the quantitative assessment in chapter five show that *collective interest* is the only significant positive predictor of actions to address climate change, across a variety of

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measures. Both *fairness* and *collective interest* are significant predictors of approval of climate change policies. We selected these two cooperative considerations, *collective interest* and *fairness*, as the basis for our framing manipulation in this study.

In addition to these findings from the quantitative data, the interview data in chapter six also highlights the pronounced importance of *collective interest* for people's actions on climate change and *collective interest* and *fairness* for people's approval of climate change policies.

Our hypotheses, based on the literature review and previous research, predict a positive relationship between cooperative considerations and both outcome variables. The only predicted positive relationship we could not confirm in chapters five and six is the positive link between *fairness* and people's actions to address climate change. However, a variety of research from different fields further supports the hypotheses that both these frames, *fairness* and *collective interest*, may exercise a positive effect on people's cooperation in social dilemmas and so increase pro-environmental behaviour. In the case of *collective interest* frames, experimental research on social dilemmas indicates that knowledge about the social optimum and consequences of personal actions for the collective can increase cooperation (Dhont et al., 2012, Kelley and Grzelak, 1972, Schroeder et al., 1983). Further, increasing the weight assigned to the collective outcome underlies the motivational approaches to increase cooperation in social dilemmas (see chapter two). Lozano (2007) argues that creating "a new breed of humans, *Homo Socio-collaboratibus*" (p.371), who has collective interest at heart, would ensure sustainable development and overcome the current environmental crisis. A study of young people's travel behaviour showed that when participants were made aware of the collective context of travel choices, policies were suggested as a way to achieve mutual cooperation (Line et al., 2010). Fairness, justice and

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collective action frames have also been used by the environmental movement as a tool to mobilise participation (Taylor, 2000). A fair distribution of the economic burden to address environmental issues is also a prominent discourse in political debate, especially in relation to international climate change negotiations (Johansson-Stenman and Konow, 2009, Oberthür, 2006, Ringius et al., 2002) . Horton and Doron (2011) published a report based on a series of focus groups which explored whether the public perceives climate change from a fairness perspective and how far this fairness frame can motivate actions on climate change. The authors conclude “Fairness and citizenship can drive support for sustainable consumption [...] if people understand the social context of behaviour” (Horton and Doron, 2011). Support for climate change policies to ensure mutual cooperation and avoid free-riding was frequently justified as a means of ensuring a fair distribution of the mitigation burden.

7.4. Personality characteristics

The effect of different messages will also depend on the receiver, the characteristics of the person receiving the message. Psychological predispositions, such as values, worldviews and experiences, will influence how a person engages with issues like climate change mitigation (Newell et al., 2014). Previous research on framing has shown that certain frames are only effective if they are in line with people’s pre-existing interpretations (Nisbet, 2009, Smeesters et al., 2003). Are frames relating to *collective interest* and *fairness* effective only in people with predispositions consistent with collective outcomes? Three personality characteristics pre-dispose people towards collective outcomes (in contrast to personal outcomes): self-transcendence values, collective identity and communitarianism.

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- Self-transcendence values include a consideration of other people and interpersonal relations and are important predictors of how people act in a social dilemma (Van Vugt et al., 1995). Several studies show the importance of self-transcendence values for cooperation, either using Schwartz's value scale (Karp, 1996) or by assessing social value orientations (Balliet et al., 2009). A self-transcendent person focuses outside their own interest.
- Identification with the collective influences behaviour in social dilemmas (De Cremer and Van Vugt, 1998, De Cremer and Van Vugt, 1999). In-group identity is positively related to cooperation in social dilemmas, including those related to environmental issues (Gupta and Ogden, 2009). Who the collective is, and how much a person identifies with the collective, is especially important in the climate change mitigation dilemma. People may view their community as the collective, their country or everyone (the entire human race). Recent research on place attachment, for example, showed that stronger global attachment, in contrast to national attachment, is related to a number of beliefs around climate change, including opposition to myths that legitimise inaction (Devine-Wright et al., 2015).
- Communitarianism is a worldview based on a conceptualization of cultural theory (Thompson et al., 1990). Cultural theory formulates a typology of cultural biases (based on social or cultural framing of a topic) that shape an individual's perception and attitude. Cultural cognition is one conceptualization of cultural theory that measures cultural worldviews using attitudinal scales including the individualism – communitarianism scale. This scale assesses individuals' tendencies towards a more competitive way of life or a way of life based more on solidarity (Kahan et al., 2012).

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We expected that people with stronger predispositions towards collective outcomes will be more affected by messages based on cooperative considerations to the climate change mitigation dilemma (moderator effect). We also expect a direct relationship between predisposing personality characteristics and both cooperative considerations, actions to address climate change and the approval of climate change policies (main effect). A predisposition towards collective outcomes underlies a number of the motivational approaches to increase cooperation in a social dilemma (see chapter two). Our study therefore tested the following:

- H2 (Main effects): Predispositions towards collective outcomes are associated with an increase in actions to address climate change and approval of climate change policies.
- H3 (Moderator effects): Predispositions towards collective outcomes reinforce the effect of *collective interest* and *fairness* framing on actions to address climate change and approval of climate change policies.

Predispositions towards collective outcomes are measured by self-transcendence values, collective identity, and communitarianism.

7.5. Pilot Study

We piloted the effect of the different messages on both outcome variables (actions to address climate change and approval of policies) on a student sample.

The pilot study was designed to test H1 in a controlled environment in which participants read the framing messages and answer questions.

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7.5.1. Methodology

7.5.1.1. Participants

Students from a course on quantitative research methods in development studies were asked to fill out an online questionnaire and pass the link on to friends and family. Thirty four people filled out the questionnaire (22 women). Their age ranged from 18 to 58, with a mean age of 24.61 ($SD = 11.67$). This low mean age was to be expected, as the questionnaire was filled out by students and their families.

7.5.1.2. Materials and procedure

The online questionnaire consisted of the following assessments of personal actions to address climate change and the approval of climate change policies (item wording can be found in Table 7.1 in Appendix D):

- Actions to address climate change (three items assessing current intention and willingness to take actions to address climate change, Cronbach's Alpha = .906, example item: "I am prepared to take actions on climate change in the future.", answered on a five point Likert scale ranging from "Strongly disagree" to "Strongly agree")
- Approval of climate change policies (two items, Cronbach's Alpha = .909, example item: "I will approve of policies which ensure that everyone takes actions to address climate change.", answered on a five point Likert scale ranging from "Strongly disagree" to "Strongly agree")

An experimental manipulation was introduced both as a heading and in the specific wording of questions. Based on the results of the quantitative and qualitative assessments

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reported in chapter five and six we designed a different message for each of three conditions: a control condition where none of the cooperative considerations are elicited through framing and two conditions which elicit the cooperative considerations, *fairness* and *collective interest*. The messages had to be similar in format and short enough to be able to use them as framing manipulations in later field experiments.

- [Control condition]: Act on climate change
- [Collective interest condition]: Act on climate change for the good of everybody
- [Fairness condition]: Act on climate change – everybody has to do their bit

7.5.2. Results and discussion

To assess the influence of the three different framing messages we calculated sumscores for actions to address climate change ($M = 11.47$, $SD = 2.35$, maximum possible range 3-15) and approval of climate change policies ($M = 7.83$, $SD = 1.42$, maximum possible range 2-10). We then conducted ANOVAs, with the different messages as independent variables and the sumscores for actions on climate change and policy approval as dependent variables.

ANOVA results revealed that there is no significant difference between the three different framing messages with regards to actions to address climate change (one-way between subjects ANOVA, $F (2, 31) = 2.02$, $p = .150$, $\eta^2 = .115$). However the results show a tendency in the expected direction. As illustrated in Figure 7.1, participants who read the *collective interest* or *fairness* message displayed higher reported willingness and intention to

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address climate change. The insignificant ANOVA result is likely to be due to the small sample size.

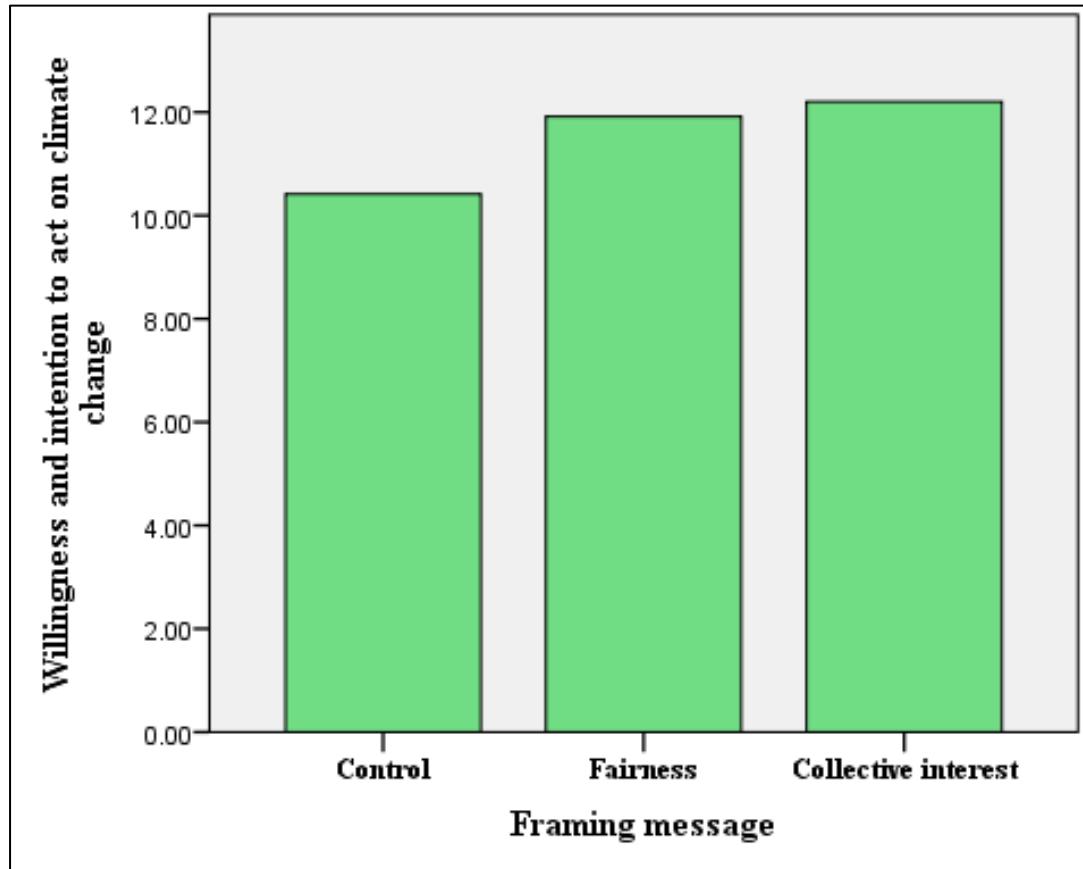


Figure 7.1: Average willingness and intention to take actions to address climate change in the three experimental conditions.

With regards to approval of climate change policies, the ANOVA showed no significant difference between the three experimental groups (one-way between subjects ANOVA, $F(2, 32) = .149, p = .862, \eta^2 = .009$). Descriptive statistics further reveal, that people in the *collective interest* condition reported higher average levels of policy approval

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($M = 8.00$, $SD = 1.34$) compared to the control ($M = 7.83$, $SD = 1.40$) and *fairness* condition ($M = 7.67$, $SD = 1.61$), but the difference was very small.

The pilot study showed a tendency in line with H1: a framing message based on *collective interest* and *fairness* leads to higher actions on climate change. This finding increased our confidence in the framing manipulation and confirmed the manipulation for use in a field setting. With regards to the approval of climate change policies the pilot study did not produce a significant effect or clear tendency. The small sample size means that this study is limited in power. The student sample further limits its generalisability. Therefore the results may not be robust and may not apply to populations across a wider range of ages, educational backgrounds or cultures.

7.6. Field Study

After piloting the framing manipulation on a student sample, we tested its effects in a field study. For the field study we collaborated with a Cambridge based NGO working on climate change mitigation, called Cambridge Carbon Footprint. This NGO was specifically selected because their work solely concentrates on climate change mitigation and because their relatively new and unknown status reduced the risk of participants having strong preconceptions towards this NGO. The messenger is an important factor in any climate change communication (Berlo, 1960, Moser, 2010). We wanted to test real world climate change communication, therefore it was important to select a messenger that was not a university researcher, would be likely to communicate on climate change and is consistent with the message given (Moser and Dilling, 2011). Cambridge Carbon Footprint is a community based charity, working with volunteers and trying to assist individual change

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within the local community. This charity is highly suitable as a messenger for both messages around *fairness* and *collective interest*.

The field study took place at the Grafton shopping mall in Cambridge on several Sunday afternoons throughout the winter and spring of 2014.

The purpose of this field study was to test the outlined hypotheses in a study that offers a high degree of external validity, uses actual behavioural measures and a larger sample size as well as a diverse sample from the general public.

7.6.1. Methodology

7.6.1.1. Participants

One hundred and twenty nine people took part in this field study. Each participant received a small financial incentive of £2 to take part. All participants were passers-by at the Grafton shopping mall in Cambridge. Their ages ranged from 11 to 74 with a mean age of 31.43 ($SD = 14.95$). Several participants came in groups of two or more to fill out the questionnaire, thus there are several participants who are connected to each other for example through friendships or family relationships. Of the participants 60.6% were female and 39.4% were male.

7.6.1.2. Materials and procedure

In this field study we administered a questionnaire and additionally set up a behavioural measure that assessed people's actions to address climate change and approval of climate change policies in a real world setting.

The questionnaire consisted of the following assessments (a full list of items used in the questionnaire can be found in Table 7.1 in Appendix C):

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- Communitarianism (four items based on Kahan and colleagues (2012), Cronbach's Alpha = .501, example item: "Government should put limits on the choices individuals can make so they don't get in the way of what's good for society.", answered on a five point Likert scale ranging from "Strongly disagree" to "Strongly agree")
- Schwartz transcendence values (three items based on Schwartz and colleagues (2001), Cronbach's Alpha = .754, example item: "It is important that every person in the world should be treated equally and have equal opportunity in life.", answered on a five point Likert scale ranging from "Strongly disagree" to "Strongly agree")
- Collective identity (three items - community, Britain, humans in general (McFarland et al., 2012), example item: "I identify with (feel a part of, feel love toward, have concern for) people in my community.", answered on a five point Likert scale ranging from "Not at all" to "Very much"). These items were not combined to a scale, but used separately.
- Actions to address climate change (three items assessing intention and willingness to take actions to address climate change, Cronbach's Alpha = .854), example item: "I am prepared to take actions on climate change in the future.", answered on a five point Likert scale ranging from "Strongly disagree" to "Strongly agree")
- Approval of climate change policies (two items, Cronbach's Alpha = .827, example item: "I will approve of policies which ensure that everyone takes actions to address climate change.", answered on a five point Likert scale ranging from "Strongly disagree" to "Strongly agree")
- Two items assessing gender and age of participants.

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We booked a table reserved for charities on three Sundays to collect data at the Grafton shopping mall. Above this table a poster advertised that people could earn £2 for completing a short questionnaire. We also asked people walking by if they were willing to complete the questionnaire. Once participants filled out the questionnaire, they were asked to return to the table to collect the £2 reward and provide a signature to confirm that they received the money. After receiving the money in the form of four 50p coins, participants were asked to fold their completed questionnaire and drop it in a box on the other end of the table. Next to this box a donation tin was placed with the respective experimental message on the donation tin. In front of the tin another poster displayed the experimental message and a request to donate generously. A petition was displayed on the table asking people to sign to support stricter climate change policies. Again in front of the petition a poster with the experimental message and a request to sign the petition was displayed.

Thus the experimental manipulation was achieved through presenting the respective message for each condition five times: 1) as a heading for questionnaire items relating to climate change, 2) in the wording of one of the questions asking about people's actions to address climate change, 3) on the donation tin, 4) on a poster in front of the donation tin, 5) on a poster in front of the petition.

Each experimental message (control, fairness, collective interest) was presented for the time span of an hour. After an hour the questionnaire and the messages on the tin and posters were changed to a different message. Throughout the three different days of data collection each of the messages were further presented at similar times of the day. We were thus able to assess the effect of the experimental message on participants' self-reported intention and willingness to act to address climate change, their self-reported approval of climate change policies, their donation behaviour (which serves as a behavioural measure for

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actions to address climate change) and the signing of the petition (which serves as a behavioural measure for the approval of climate change policies).

7.6.2. Results

We ran a series of stepwise multiple regressions to determine the role of the different personality characteristics predisposing a focus on collective outcomes as well as the effect of the framing manipulation.

Descriptive statistics for the different personality characteristics were as follows: collective identity community ($M = 3.32$, $SD = .96$, maximum possible range 1-5), collective identity Britain ($M = 3.17$, $SD = 1.07$, maximum possible range 1-5), collective identity all humans ($M = 3.27$, $SD = 1.19$, maximum possible range 1-5), communitarianism ($M = 11.66$, $SD = 2.91$, maximum possible range 4-20), and self-transcendence values ($M = 13.25$, $SD = 1.97$, maximum possible range 3-15).

On average participants reported a high willingness and intention to act on climate change ($M = 11.55$, $SD = 2.04$, maximum possible range 3-15). We started by assessing the unique contribution of the personality characteristics to explaining people's self-reported willingness and intention to act on climate change. We included the personality characteristics as predictors in a linear regression model with self-reported willingness and intention to act on climate change as the dependent variable (the full regression table can be found in Table 7.2 in Appendix D). Self-transcendence values ($t = 2.254$, $p = 0.26$) and a collective identity with all humans ($t = 2.909$, $p = .004$) were significant positive predictors of participants' reported intention and willingness to act on climate change. This is consistent with H2.

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We then added the experimental framing conditions into the model. We added two dummy variables, representing the contrast between the control condition and the respective experimental condition (collective interest and fairness). R^2 change for this model was .020 (F change = 1.533, p = .220). The full regression table can be found in Table 7.3 in Appendix D.

After establishing a marginally significant negative effect of the *collective interest* manipulation (t = -1.743, p = .084) we also tested interaction terms between the contrast variable for the *collective interest* manipulation and the personality characteristics. The interaction between the *collective interest* manipulation and a collective identity with one's community was a predictor for people's self-reported willingness and intention to address climate change. Further the interaction term between the *collective interest* manipulation and self-transcendence values reached marginal significance and was kept in the model. R^2 change for this model was .070 (F change = 5.887, p = .004). The final model, including these interaction terms, explains a significant amount of variance in people's willingness to take actions. The model is presented in Table 7.4:

Predictors	B	SE B	β	t	Sig.
Constant	8.374	1.579		5.304	.000
Self-transcendence values	.096	.101	.091	.944	.347
Collective identity community	-.296	.245	-.137	-1.205	.231
Collective identity Britain	.156	.248	.081	.628	.531
Collective identity humans	.568	.202	.325	2.811	.006
Communitarianism	.089	.059	.125	1.522	.131
Collective interest manipulation	-8.390	2.528	-1.907	-3.319	.001
Fairness manipulation	-.493	.406	-.115	-1.214	.227
Collective interest manipulation x self-transcendence values	.346	.186	1.024	1.862	.065
Collective interest manipulation x collective identity community	.939	.386	.720	2.431	.017

Note: All variables were entered simultaneously; n = 120; R² = .340; F (9, 111) = 6.36, p < .001

Table 7.4: Linear regression analysis predicting participants' self-reported willingness and intention to take actions to address climate change (personality characteristics, manipulation and interaction terms as predictors).

Results from the multiple regressions show that the collective interest manipulation exerts a negative effect on people's reported intention and willingness to act on climate change, compared to the control message. People who received the message relating to *collective interest* (Act on climate change for the good of everybody) reported a lower willingness or intention to address climate change compared to those who received the control message (Act on climate change).

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This finding that the control message led to a higher willingness and intention to act on climate change was contrary to expectations (H1). One explanation could be that the more neutral control message allows a wider interpretation and thus gives people the chance to read their personal motivations into the message. The control message may not antagonise people who do not agree with the interpretations offered in the other two experimental messages. Another potential explanation is an adverse reaction to the *collective interest* message. The message could have consciously or subconsciously been perceived as morally laden and too prescriptive or moralizing, which in turn might evoke an adverse reaction.

This negative effect of the *collective interest* manipulation is reduced for people with high self-transcendence values and for people that strongly identify with their community. These findings are illustrated in Figures 7.2 and 7.3, presenting simple slopes (based on uncentred data):

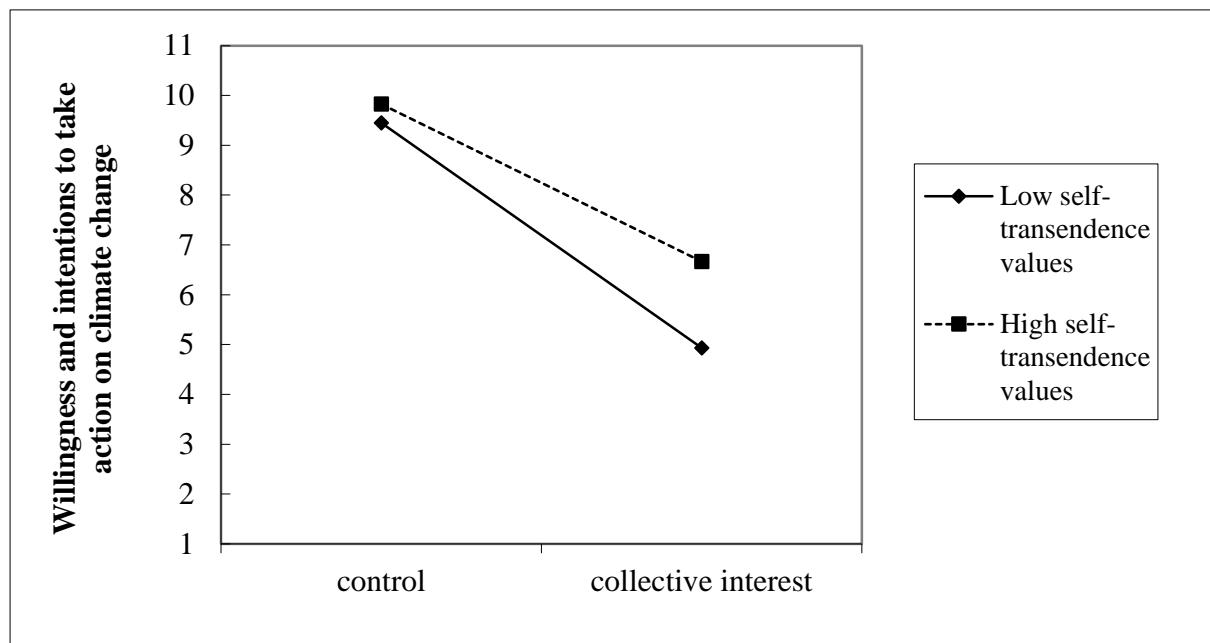


Figure 7.2: Simple slopes for the pattern of interaction between the collective interest manipulation and self-transcendence values.

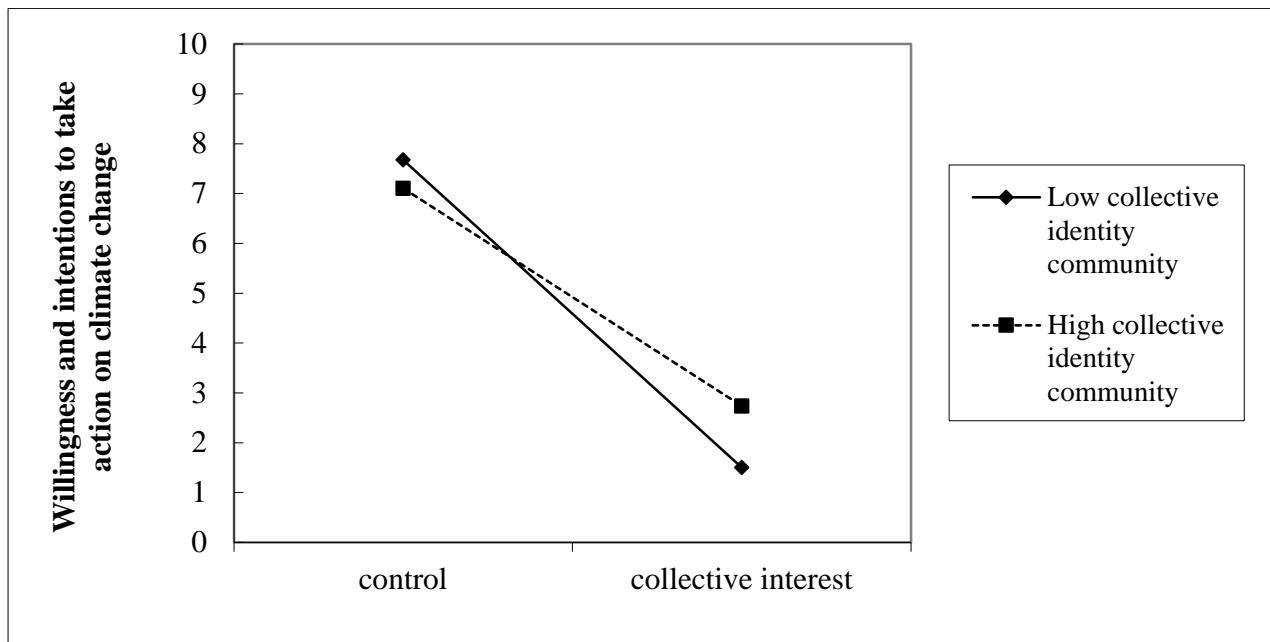


Figure 7.3: Simple slopes for the pattern of interaction between the collective interest

manipulation and collective identity community.

The fact that the negative effect of the *collective interest* message is less for people high in self-transcendence values supports the interpretation of an adverse reaction to the message in the rest of the sample. People high in self-transcendence values are less likely to experience this adverse reaction, as a *collective interest* message is more in line with their stronger focus on others. Further we can observe that self-transcendence values are no longer a significant predictor of the willingness and intention to act on climate change when we include the interaction term ‘*collective interest manipulation x self-transcendence*’. This result is expected as self-transcendence values were entered a second time as part of the interaction term.

Next we analysed the behavioural variable assessing actions to address climate change: people’s donations to Cambridge Carbon Footprint. Of the 129 participants 18

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donated all or part of their participation money to Cambridge Carbon Footprint. We performed a logistic regression to assess the effect of the different messages on whether participants donated any of the money they received for the experiment or not. The outcome variable here is a binary variable which assessed whether people donated or not. Results are similar to the ones reported below when a continuous variable of the amount donated is used.

Again, in a first step we assessed the importance of the personality characteristics for whether or not participants donated to Cambridge Carbon Footprint. A logistic regression revealed that identifying with humans in general ($\text{Wald} = 3.827, p = .050$) as well as communitarianism ($\text{Wald} = 4.942, p = .026$) were both positive predictors of whether or not people donated to Cambridge Carbon Footprint (the full regression can be found in Table 7.5 in Appendix D). The Chi-square for this block of variables is $\chi^2 (5, N = 122) = 11.301, p = .046$.

A second step added the framing manipulation as a predictor in the regression model. The results are displayed in Table 7.6. The Chi-square for this second block of variables is $\chi^2 (2, N = 122) = 3.395, p = .183$, which illustrates that this did not improve the model beyond the predictor variables from the first step. Overall this final model significantly explains participants donating money to Cambridge Carbon Footprint.

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Predictors	B	S.E.	Wald	Sig.	$Exp(B)$
Self-transcendence values	.111	.178	.390	.532	1.118
Collective identity community	.265	.382	.482	.487	1.304
Collective identity Britain	-.647	.478	1.833	.176	.524
Collective identity humans	.843	.420	4.019	.045	2.323
Communitarianism	.226	.106	4.527	.033	1.253
Control manipulation			3.323	.190	
Collective manipulation	-1.228	.764	2.584	.108	.293
Fairness manipulation	-.947	.697	1.845	.174	.388
Constant	-7.257	3.034	5.721	.017	.001

Note: All variables are entered simultaneously; Cox & Snell $R^2 = .113$; $\chi^2 (7, N = 122) = 14.696, p = .040$

Table 7.6: Logistic regression analysis predicting whether or not participants donate to Cambridge Carbon Footprint (personality characteristics and manipulation as predictors).

Similar to the self-reported actions to address climate change, the data on actual donations shows the control message to be the most successful message. This trend did not reach significance but indicates that the control message may be more successful in promoting actual donation behaviour. Again, potential explanations for this finding are the higher openness to interpretation of the control message or adverse reactions to the other framing messages. In addition Table 7.6 also shows identifying with humans in general and communitarianism as significant positive predictors of donations.

Further analyses including interaction terms between the manipulation and personality traits did not reveal any significant interaction effects.

After looking at the effect of the manipulation and the role of personality characteristics with regards to actions to address climate change, we repeated the linear

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regression analyses for the approval of climate change policies. On average people reported high approval of climate change policies ($M = 7.50$, $SD = 1.65$, maximum possible range 2-10). Again in a first linear regression model we included the personality characteristics as predictors and people's self-reported approval of climate change policies as dependent variable (the full regression table can be found in Table 7.7 in Appendix D). The regression analysis revealed self-transcendence values as a significant positive predictor for the approval of climate change policies ($t = 2.860$, $p = .005$). Further identifying with humans in general was found to be a marginally significant positive predictor for self-reported approval ($t = 1.847$, $p = .067$).

Next we included the manipulation in the form of a dummy contrast variable in the linear regression model. R^2 change for this model was .037 (F change = 2.957, $p = .056$). After establishing a significant negative effect of both the *collective interest* ($t = -2.213$, $p = .029$) and *fairness* manipulation ($t = -2.031$, $p = .045$) (see Table 7.8 in Appendix D) we further explored potential interaction effects between the personality characteristics and the two experimental manipulations. We found only one significant interaction effect, and thus included the respective interaction term 'fairness framing manipulation x communitarianism' in the final model, which is displayed in Table 7.9. R^2 change for this model was .025 (F change = 4.022, $p = .047$). Overall this final model explains a significant amount of variance in participants' self-reported approval of climate change policies.

Predictors	B	SE B	β	t	Sig.
Constant	2.609	1.287		2.027	.045
Self-transcendence values	.208	.071	.245	2.927	.004
Collective identity community	-.067	.181	-.038	-.371	.711
Collective identity Britain	.295	.204	.188	1.445	.151
Collective identity humans	.289	.167	.204	1.735	.085
Communitarianism	.088	.057	.152	1.538	.127
Collective interest manipulation	-.788	.339	-.221	-2.322	.022
Fairness manipulation	1.586	1.180	.455	1.344	.182
Fairness manipulation x communitarianism	-.201	.100	-.665	-2.006	.047

Note: All variables were entered simultaneously; n = 121; R² = .303; F (8, 121) = 6.130, p < .001

Table 7.9: Linear regression analysis predicting participants' self-reported approval of climate change policies (personality characteristics, manipulation and interaction terms as predictors).

Results show that people reading the control message were significantly more likely to approve of climate change policies compared to people who read the *collective interest* message. As was the case for actions to address climate change, the effectiveness of the control message was surprising. Similarly the two explanations for these results are an adverse reaction to the framing manipulation texts and the higher openness for interpretation of the control message.

Results show a significant interaction term (*fairness manipulation x communitarianism*). Including this interaction term results in the *fairness manipulation* no

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longer exerting a significant main effect on approval of policies. The negative effect of the *fairness* message is larger for people who are high in communitarianism. This finding is illustrated in Figure 7.4 through simple slopes (based on uncentred data).

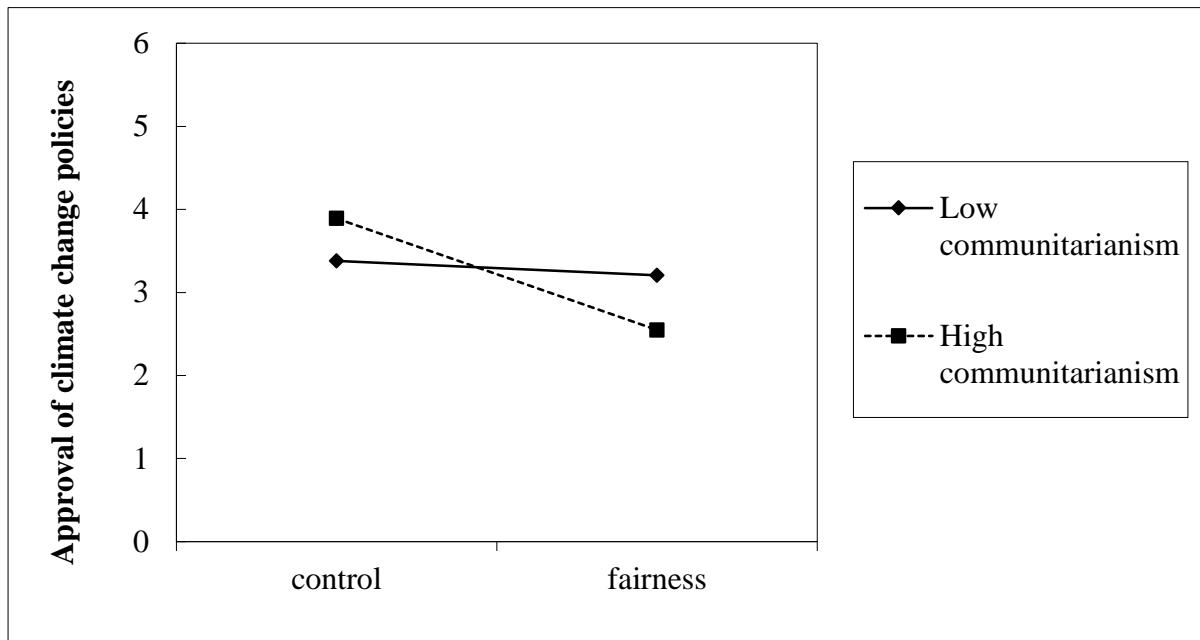


Figure 7.4: Simple slopes for the pattern of interaction between the fairness manipulation and communitarianism.

People high in communitarianism already advocate solidarity and policy solutions. These people might be negatively affected by a message that ‘preaches’ something they already do. But this finding and explanation contradicts the remaining interaction findings, where people with personality characteristics in line with the message framing did not experience the adverse effect of the *collective interest* and framing message.

Unfortunately we were not able to assess if a similar manipulation effect could be detected for the behavioural measure of signing a petition which asks for stricter climate change policies. Only three participants signed the petition, a sample size too small to draw any conclusions.

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To summarise, with regards to the manipulation effects, the field study suggests the control message is more effective than the *collective interest* and *fairness* message for promoting actions to address climate change and approval of climate change policies. Interaction effects reveal that the reduced effectiveness or negative effect of the *collective interest* message on actions to address climate change is less pronounced in people with high self-transcendence values and those who strongly identify with their community. These findings are in line with findings from a social dilemma study reported in chapter two. Researchers found that moralization in a social dilemma backfired when participants showed a high pro-self orientation. Primes that induced morality reduced cooperation amongst these participants (Smeesters et al., 2003). The reduced effectiveness or negative effect of the *fairness* message on the approval of climate change policies is reinforced by communitarianism.

With regards to the direct effects of personality characteristics, results show that strongly identifying with all humans everywhere is a consistent predictor for actions to address climate change, not only self-reported actions, but also the behavioural measure (donating to Cambridge Carbon Footprint). Findings further show that this collective identity with all humans was also marginally predictive of approval of climate change policies. Thus a collective identity that is as widely placed as humans everywhere, in contrast to identifying with people in the own country or people in the community, shows a consistent positive effect in our field study.

Further the field study replicated results from the pilot study in terms of the positive effect of self-transcendence values on people's self-reported actions to address climate change and approval of climate change policies. But while self-transcendence values did predict self-reported measures, they were not a positive predictor for the stronger behavioural

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measure, donating to Cambridge Carbon Footprint. However, communitarianism, the measure of a more solidary way of life, was a positive predictor only for this behavioural measure.

7.7. Discussion

The pilot and field study aimed to test the effects of a message based on cooperative considerations and therefore address objective four of this thesis (To determine whether communication based on cooperative considerations can increase personal actions to address climate change). Results were not in line with the expected positive effect of such messaging on actions to address climate change and approval of climate change policies. Only the pilot study showed trends in the expected direction: they suggest a positive effect of messages based on the two cooperative considerations *collective interest* and *fairness* on people's actions to address climate change. In contrast, results from the field study indicate that the control message was most effective in increasing action and approval. This discrepancy between findings from the two studies has various possible explanations.

First, the pilot study was a computer based questionnaire, while participants in the field study filled in their questionnaire while shopping in a busy environment. It is possible that if people have time and concentrate on the messages, which is more likely the case in a computer based assessment, the *collective interest* and *fairness* framing may indeed elicit cooperative considerations and lead to an increase in action. In a busy and distracting environment, like a shopping centre, people may be less concentrated and thus simpler messages, not eluding to concepts like fairness, may be more effective.

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Second, in the field study the experimental messages were repeated several times, including on colour posters which also displayed the logo of Cambridge Carbon Footprint. The more frequent repetitions of the messages in the field study and the link to a charity working on climate change mitigation may in combination with the *collective interest* and *fairness* message have led to participants feeling guilty or lectured. This in turn might have created an adverse reaction to these framing messages. Contrarily, in the pilot study the message was only displayed twice and without any connection to a charitable organisation. The reported interaction effects can be interpreted to support this explanation. The negative effect of the *collective interest* message, compared to the control message is reduced for people high in self-transcendence values and those that highly identify with their community. Due to their belief and values these people may not experience the adverse effect of being lectured by a repeated *collective interest* message.

Third, the pilot study was conducted on a sample of students, whereas the field study sample consisted of a sample of passers-by in a Cambridge shopping mall. The same messages may exhibit different effects dependent on the audience. Students in development studies have been exposed to a variety of topics relating to *fairness* and the *collective interest* as part of their course. They may thus be more receptive to these messages and perceive them as less moralising, compared to the sample from the field study.

Further research is needed to determine the conditions under which messages based on cooperative considerations can be successful in promoting actions to address climate change and the approval of climate change policies.

Values and identities strongly related to collective outcomes, especially if the collective is seen as broad as the entire human race, are related to people's actions and approval of climate change policies. Especially if we take together the two most consistent

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predictors, self-transcendence values and an identification with all humans everywhere, we can find support for the claim that we need to foster global citizenship to successfully mitigate climate change (Dower and Williams, 2002, Schattle, 2008, Szerszynski and Toogood, 2000). Further research is needed to identify ways to increase this broad collective identity.

The results from the pilot and field study and especially the detected interaction effects further suggest that there is no one-size-fits-all solution for messaging in campaigns. The results clearly show that personality influences how people respond to messages. Careful pre-testing of campaigning communication in the environment they are intended to be used in and on the audience they are exposed to is strongly recommended.

Several shortcomings of these studies should be recognised. As stated above, the pilot study functioned as a first test of our hypotheses and therefore was subject to a small and biased sample. This was not the case in the field study, for which we had a larger, diverse sample. The problems arising here were of different nature: as noted, several participants came in groups, as families or friends, to take part in the study. Participants were then asked to answer the questionnaires independently and it was ensured, where possible, that the participants received their reward separately and dropped their own questionnaire in the box separately. Additionally some of the participants were very young (the youngest was eleven). This happened especially if parents assured that their children were able to grasp the subject and wanted to complete the questionnaire as well. To ensure that these young participants did not skew results, we reran the analyses excluding participants below the age of 16. This change in the sample did not change the reported findings. A further complication might have been, that some participants already had earmarked the £2 for something else before they went through the process of filling in the questionnaire and being exposed to the experimental

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manipulation message. We issued the £2 in four pieces of 50p, so participants did not have to make an all-or-nothing decision with regards to their donation.

8. Discussion

This thesis aims to understand people's considerations in response to the social dilemma structure of climate change mitigation and how these considerations affect people's actions on climate change. Findings show that the social dilemma structure can have both, an encouraging and a discouraging effect. The effect depends on which characteristics of the dilemma are focused on and whether cooperative or non-cooperative considerations are elicited. Although the literature documents the negative effects in some detail, the potential for positive effects promoting cooperation has been inadequately addressed. This thesis helps to fill this knowledge gap. In this concluding chapter I will discuss key findings in more detail, draw out strategies to increase cooperation in the climate change mitigation dilemma, and identify areas for further research.

8.1. Awareness of social dilemma characteristics

The first objective of this thesis is to determine to what extent people are aware of the social dilemma characteristics of a situation. As outlined in chapters three and four, Interdependence Theory, the Appropriateness Framework and researchers in the field of social dilemmas suggest that people may not be aware of the collective outcome, outcomes for others and long-term consequences in social dilemma situations. When making a decision the individual's focus may remain on short-term consequences for themselves (Rusbult and Van Lange, 2003). This does not necessarily mean that decision makers are purely driven by the motive to maximise personal benefits, as suggested by Rational Choice Theory. They may simply not be aware of consequences beyond these short term benefits. This unawareness in turn prevents the rise of a conflict between personal and collective outcomes,

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a defining characteristic of social dilemmas (Burke, 2001). Findings from the empirical study reported in chapter four show that the awareness of a conflict between personal and collective outcomes varies between different specific decision making situations. Certain situational characteristics were linked to an increased consideration of collective outcomes. A more salient pro-social nature of the situation is one of these characteristics. This finding is in line with the Appropriateness Framework and Interdependence Theory, which both emphasise people's understanding of the situation and thus the effect of framing situations differently. Additionally the more common a situation, the less likely that consequences beyond immediate personal benefits are considered. Results further showed that people are more likely to consider the conflict between personal and collective outcomes when the social dilemma structure is made salient. Especially when the collective is made salient, as the restaurant dilemma shows, considerations of the collective and others involved in the social dilemma are much more likely. In this case certain factors described by Interdependence Theory – such as relationship specific motives (“how well I know and get on with the course mates”), social norms (“choose food and drink that is in the total amount similar to that from everyone else”) and interpersonal dispositions (“not too expensive so as to burden others”) – were triggered, which led to a transformation of the ‘given situation’. Putting social dilemma situations into a social context and making the affected collective salient, can increase considerations of collective outcomes. However, the overall conclusion is that it cannot be assumed that people perceive social dilemma decision making situations as such in every day decision contexts.

This conclusion also applies to decision making situations with emission consequences (the transport and campaign dilemma in chapter four): the collective outcome of decisions is not necessarily obvious to people in specific decision making situations related to climate change mitigation. This is reinforced by decisions related to climate change

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mitigation being often talked about in terms of personal costs and benefits. This applies to public perceptions, advertising and communication to increase pro-environmental behaviour, which often advertises behavioural change from this personal costs and benefits perspective (Corner and Randall, 2011). Home heating and water usage is often seen through the lens of costs and bills, travel advertisements refer to price, comfort and experience, and dietary decisions are made based on taste, cost and personal health.

The awareness of a conflict between personal and collective outcomes differs depending on whether people reason about specific decisions or more generally about actions to address climate change. Findings from the qualitative data reported in chapter six show that if people talk about climate change and climate change mitigation in general, the collective outcome is more likely to be considered, compared to when presented with specific decision making situations (chapter four). During open discussions about climate change at the beginning of interviews, participants demonstrated an awareness of collective outcomes and outcomes for others. Participants mentioned consequences for future generations and the danger of an uninhabitable climate. This awareness may be linked to the amount of information and education on climate change the public has been exposed to in recent years. Research has also shown that climate change is perceived as a moral issue (Poortinga and Pidgeon, 2003) and so the pro-social nature of related decisions maybe more salient. Linking specific personal decisions directly to climate change may have the potential to increase people's awareness of the conflict between personal and collective outcomes and transform the perceived decision problem into a social dilemma.

8.2. Consideration of the collective outcome

The conditions under which awareness of a conflict between personal and collective outcomes increases are important because chapters four, five, six and seven clearly show that a salient collective outcome (as opposed to a focus solely on the personal outcome) is linked to increased actions to address climate change. In chapters five and six I found that people who respond with cooperative considerations which relate to the long term collective outcome show higher levels of action on climate change and approval of climate change policies. In line with these findings chapter seven found that personality characteristics reflecting a predisposition to focus on the collective outcome in a social dilemma are associated with increased cooperation. Chapters four and seven also show that making the collective outcome salient in online framing experiments increased actions to address climate change. These findings are in line with theories on behaviour in social dilemmas as well as pro-environmental behaviour. As outlined in chapter three, a focus on the collective outcome and consequences for others is linked to increased cooperation and pro-environmental behaviour in these theories and forms the basis for motivational approaches to increase cooperation. Nevertheless I did find a divergent result in a field study conducted in a shopping mall (chapter seven). Here the *collective interest* and *fairness* framing messages had a negative effect on actions to address climate change and approval of climate change policies (compared to a control message). Possible explanations for this finding, which is contrary to the overall conclusion that can be drawn from literature review and the remaining empirical chapters of this thesis, are outlined in chapter seven.

The overall conclusion is as follows: there is strong indication that a focus on the collective outcome has a positive effect on actions on climate change. However, this positive effect cannot be achieved unconditionally by climate change communication. Although

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messages relating to the collective outcome have caused an increase in actions in some of the studies, this was not the case for the field study experiment. Communication messages have to be viewed in their context: although a focus on the collective outcome can generally increase actions on climate change, the audience and situation in which the message is communicated plays an important role.

8.3. Considerations of personal costs and benefits

Apart from the positive link between cooperative considerations and a focus on the collective outcome and actions on climate change, I also looked at a potentially discouraging effect of the social dilemma structure. One of the obvious reasons for a lack of cooperation in the mitigation dilemma is a focus on personal costs and benefits, as predicted by Rational Choice Theory. This focus is reflected in two of the non-cooperative considerations: *immediate self-interest* and *temptation to free-ride*. These are indeed empirically linked to a decrease in action on climate change as demonstrated in chapter five. Additionally a desire to increase personal benefits was named as a strong driver of decision making in answers to the open ended questions in chapter four. This is especially true for decision making situations that are not of an obvious pro-social nature. If a pro-social nature was more salient, personal benefits were less frequently named as drivers for decisions. Results in chapter four and five further show that in discussions about climate change mitigation, *immediate self-interest* and the *temptation to free-ride* were more frequently mentioned in relation to other people's behaviour or corporations than in relation to one's own behaviour. This could be an indication of a social desirability bias. People may feel reluctant to admit to these drivers, when they could be judged on that basis. In the qualitative interviews people refer to an egocentric or social desirability bias when talking about other people's reasoning: the three

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non-cooperative considerations *fear of being a sucker, hopelessness and personal insignificance* are frequently referred to as excuses others make when the true motivation is to increase personal benefits.

8.4. Strategies to increase cooperation in the climate change mitigation dilemma

Based on the findings discussed above, a potential strategy to increase cooperation in the climate change mitigation dilemma is to increase individuals' consideration of collective outcomes. This means clearly linking specific decisions, such as meat consumption or transport decisions, to their collective costs with regards to climate change. Generally, increasing people's awareness that these decisions have emission consequences might already have a positive effect. But findings from chapter four suggest that this awareness has to go further to increase cooperation; the emission consequences have to be clearly linked to outcomes for the collective and others. This finding underlines the viability of moralization, a motivational approach for ensuring socially optimum outcomes introduced in chapter two. In line with this strategy Horton and Doron have advocated making people more aware of the social context of climate change mitigation and related personal decisions (Horton and Doron, 2011).

As outlined in chapter two, another way of increasing the consideration of collective outcomes is to strengthen group identity. In the case of climate change mitigation that means strengthening of global citizenship. Global citizenship is understood as "a concept which signifies the way in which one's identity and ethical responsibility is not limited to their "local" community (i.e. family, nation)" (Jefferess, 2008, p.27). Chapter seven confirms that

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this could be a viable approach, as identifying with the human race as a whole was linked to increased action to address climate change in the empirical studies.

All non-cooperative considerations showed a clear link to reduced actions to address climate change. This is a very clear result from both quantitative and qualitative data. Thus while strengthening a focus on the collective outcome and cooperative considerations is a viable strategy to increase cooperation, weakening the effect of non-cooperative considerations might be another important approach. In chapter five interviewees reported a number of reasonings to counteract this discouraging effect of non-cooperative considerations, for example the desire to act as a role model. These countering strategies can be interpreted as people's own motivational approaches which make it more likely for them personally to cooperate. As outlined in chapter two, motivational approaches increase the valuation of the collective outcome. The countering strategies of wanting to be one of the 'good ones' and acting as a role model can also be interpreted as a strategic approach. People may hope that their cooperation is reciprocated by others, either for interpersonal long-term benefit or to achieve the aim of mutual cooperation and thus achieve to tackle climate change. Such strategies might be more broadly applied to address people's fears and worries about climate change in a direct way.

Chapter two introduced a number of structural approaches, such as incentives or disincentives and rules and regulations, to increase cooperation in social dilemmas. These approaches are often applied by governments in the form of policies, but are difficult to implement if they lack public support. Thus in order to increase the effectiveness and viability of these approaches, ways to increase public approval need to be found. Findings from the empirical chapters suggest that the same strategies to increase cooperation can be used to increase public approval of climate change policies. Conversely results suggest that

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eliciting the non-cooperative considerations *fear of being a sucker, personal insignificance* and *hopelessness* are not a viable strategies to increase demand for policy solutions.

8.5. Methodological contributions

In addition to the empirical insights, this thesis makes an important methodological contributions: the finding that the assessment method (and thus the framing contained in questions) can lead to differences in findings. Chapter four highlights that making social dilemma characteristics salient in the questions (through closed ended response options) leads to slightly more frequent reports of these characteristics being considered in decision making. This sort of increased salience is a common characteristic of questionnaire based research. Empirical findings should be interpreted in the light of the fact that assessment methods do influence research outcomes.

8.6. Field study material not included in this thesis

Findings from one part of my research related to the framing manipulation in chapter seven, are not reported in the empirical part of this thesis due to a very small sample size. In order to further increase the external validity of the framing manipulation reported in chapter seven I implemented an experiment based on flyers. 10,000 flyers were printed, containing the different experimental messages. The flyers showed the logo of Cambridge Carbon Footprint, the respective experimental message, and an invitation to a talk about motivating oneself to act on climate change. The talk was co-organised by Cambridge Carbon Footprint and the topic of the talk was chosen to entail a clear intention from attendees to change behaviour. The flyer asked people to book a place at the event via email. Every experimental

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message was assigned a different email address for booking. Thus I was able to assess the effect of the different messages on the number of people booking a place at the event. The flyers were distributed through two different means: 8,000 flyers were distributed via the Cambridge Crier, a free newspaper, and a further 2,000 flyers were delivered by hand. While the event was very well attended and considered a success, only ten people from the 10,000 households who received flyers booked via email. Thus the sample size was too small to draw any conclusion on the effectiveness of different messages. One of the problems was discovered by a sampled door-knock after the distribution date of the Cambridge Crier. People reported very frequently that either the whole newspaper or at least the flyer inlays were not read, but thrown straight into the bin. A lot of time and energy went into organizing this field experiment. The fact that the data could not be used underlines the difficulties that can be encountered when moving from a controlled laboratory experiment to a field experiment. Nevertheless, learning about the time scales required and the many potential difficulties encountered in a field experiment of this scale, as well as the positive experience of the co-designed event, made the flyer experiment an important part of my personal and professional development.

8.7. Outlook and further research

Further research is needed to address the question of how cooperative considerations, related to the desirability of collective outcomes, can be strengthened and how a global citizenship identity can be promoted. Further research is also needed into effective ways of making salient the reasonings that people use to counteract non-cooperative considerations. Communication campaigns are one way of increasing cooperative considerations, global citizenship, and counter reasonings to non-cooperative considerations. The findings from this

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thesis indicate that communication messages may present a way to elicit cooperative considerations, but careful attention has to be paid to the context and the audience. To test the effect of different contexts and audiences, similar experiments to the one reported in chapter seven could be run in different places and with different target audiences. The channel through which the message is communicated might further play an important role. The experiment in chapter seven used posters and questionnaire items to deliver the respective communication messages. Another possibility would be to use the researcher in contact with participants to deliver different messages orally when inviting participants to the research study. This method could potentially strengthen the manipulations. A second option has been demonstrated in other studies (e.g. Horton and Doron, 2011): engaging people in the social context of climate change mitigation through group discussions may form an important component to achieve the strengthening of cooperative considerations. In Horton and Doron's study prompts described the emission budget as a scarce resource and therefore framed emission behaviour as a social dilemma. The effects of discussions following this prompt versus discussions not using this and other social dilemma prompts could be tested through questionnaires which can be administered at the end of a group discussion or the use of a behavioural measure, such as the option to donate money or sign up to a group working on climate change. If found to be successful in achieving a change in emission behaviour, such group discussions could, for example, be included in adult and child education programs. Public and political debate could also help increase the salience of collective outcomes and global citizenship as opposed to a focus on personal outcomes and national or local identity. Environmental groups and politicians could include the collective cost explicitly in their narratives and arguments around climate change.

Findings from chapter six show that future generations are the most important conceptualization of others affected by climate change. The temporal dimension of climate

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change mitigation means that the collective stretches beyond the lifetime of the decision maker. As outlined in chapter two this can lead to social and temporal discounting and thus decrease cooperation. This research however suggests that a concern for future generations can be a strong driver for action. Thinking about potential consequences for future generations was reported as a strong motivation to take actions on climate change in the interview study reported in chapter six. One explanation for this positive effect is the existence of a legacy motive. Legacy can be defined as “an enduring meaning attached to one’s identity and manifested in the impact that one has on others beyond the temporal constraints of the lifespan”(Fox et al., 2010, p.153). Research is needed to further determine the effect of considerations of future generations. Do these considerations encourage social and temporal discounting? Or do they encourage a legacy or other motive which fosters actions on climate change? Initial findings suggest that a positive legacy could be a strong motivator for pro-environmental actions (Zaval et al., 2015). The research by Zaval and colleagues suggests that people who report a higher legacy motive are more likely to display pro-environmental behaviour and that priming a legacy motive can have a positive effect on donations to an environmental NGO and self-reported intentions to act in a pro-environmental way. Expanding this research through a field study similar to the one reported in chapter seven, but using a legacy framing, could increase confidence in these initial findings. Such a legacy framing could, for example, be a text explicitly raising the question of how we will be remembered by future generations. Future research could test the effect of a legacy priming in a classic social dilemma game to explore its potential to encourage cooperation. Using different social dilemma games, both related and unrelated to environmental issues, could shed light on whether the legacy motive increases cooperation only in situation related to environmental issues or has a broader effect on different social dilemma situations. Further exploration of the origin of the legacy motive is needed as well.

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Gathering a number of demographic data and data on other beliefs would enable future research to determine associations between the legacy and other motives. It would further shed light on who displays a strong legacy motive and whether it is more pronounced in people with children and of older age.

8.8. Conclusion

The aim of this thesis is to understand people's considerations in response to the social dilemma structure of climate change mitigation and how these considerations affect people's actions on climate change. The dominant argument in the literature is that the social dilemma structure elicits non-cooperative considerations which explain a lack of personal actions on climate change. The findings of this thesis challenge two key elements of this argument.

Firstly, this argument assumes that people are aware of the social dilemma structure of a situation when making decisions with emission consequences. Objective one of this thesis addresses this assumption. Objective one is: To determine people's awareness of the social dilemma structure of climate change mitigation. Findings reported in chapter four show that we cannot assume people's awareness of social dilemma characteristics in decision making situations. Education, the salience of the collective or the prosocial nature of the situation and the amount of deliberation involved are factors that influence people's awareness of these social dilemma characteristics.

Secondly, the dominant argument in the literature assumes that the social dilemma structure of climate change mitigation elicits only non-cooperative considerations associated with decreased actions on climate change. Objectives two and three of this thesis address this

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assumption. Objective two is: To determine people's cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation. Objective three is: To determine how cooperative and non-cooperative considerations in response to the social dilemma structure of climate change mitigation affect personal actions to address climate change. Findings reported in chapter four, five and six of this thesis support the evidence of non-cooperative considerations and their association with decreased actions. However there was also evidence of a second set of cooperative considerations which are associated with an increase in action. Especially the consideration of *collective interest* (mitigation of climate change as the socially optimum outcome) shows a clear link to people's personal actions on climate change and approval of climate change policies. Additionally, people demonstrate reasoning strategies to overcome the discouraging effect of the social dilemma structure.

Evidence of this second set of cooperative considerations and their association with increased actions on climate change opens up the potential to use these considerations as a way to promote personal mitigation efforts. This possibility is reflected in objective four of this thesis. Objective four is: To determine whether communication based on cooperative considerations can increase personal actions to address climate change. Findings reported in chapter four and seven indicate that while there is potential for a positive effect of communications based on cooperative considerations, such approaches need to carefully consider the context and audience of the communication and require thorough piloting to avoid adverse effects.

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Appendix A

Part 1 – open-ended questions:

The following questions present a number of decision making situations. Please imagine you are the one making these decisions. We are interested in the things you weigh up when making a decision. There are no right or wrong answers; this is simply about how you personally make decisions.

1. Imagine you are at a restaurant with the people from one of your courses. You have agreed that after dinner you will split the bill equally between you. Please list up to three things you weigh up when deciding what food and drink to have from the menu.
2. Imagine you need to travel to Aberdeen, Scotland (about 500 miles from Norwich) for a couple of days. You need to decide how to get there. Please list up to three things you weigh up when deciding on a mode of transport.
3. Imagine you are trying to decide whether or not to participate in a climate change campaign by handing out leaflets. What things might you weigh up in your mind when making this decision? Please list up to three things you weigh up.
4. Imagine you are trying to decide whether or not to actively support public sector strikes by joining a demonstration. What things might you weigh up in your mind when making this decision? Please list up to three things you weigh up.
5. Imagine you are trying to decide whether or not to watch a movie streamed online for free. What things might you weigh up in your mind when making this decision? Please list up to three things you weigh up.

Part 2 – closed-ended questions (hierarchy task)

The following questions are about a similar set of decisions. This time we have provided a selection of things other people might weigh up when making these decisions. These are listed in a box marked 'Items'. Please rank these things IN ORDER OF IMPORTANCE TO YOUR DECISION by dragging them into the box marked 'Ranking in order of importance'.

If any of these things have no relevance at all to how you make the decision, please leave them in the "Items" box.

1. Decision: whether or not to participate in a climate change campaign by handing out leaflets Please rank the following things in order of importance to your decision:

Whether or not it is convenient

Whether or not I believe climate change is a threat

Whether or not a stable climate is important to me

Whether or not we can make a difference if enough people participate

Whether or not it is time consuming

Whether or not participating in climate change campaigns is worthwhile

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Whether or not other people will suffer under climate change

Whether or not I am responsible for climate change

2. Decision: whether or not to actively support public sector strikes by joining a demonstration Please rank the following things in order of importance to your decision:

Whether or not supporting strikes is worthwhile

Whether or not other people will suffer as a result of cuts in the public sector

Whether or not we can make a difference if enough people support the strikes

Whether or not I believe the public sector needs improving

Whether or not a healthy public sector is important to me

Whether or not it is convenient

Whether or not it is time consuming

Whether or not I am responsible for cuts in the public sector

3. Decision: whether or not to watch a movie streamed online for free Please rank the following things in order of importance to your decision:

Whether or not cinema-goers will have to pay more as a result

Whether or not I am responsible for negative impacts on the film industry

Whether or not we can make a difference if enough people pay for movies

Whether or not a good cultural event is important to me

Whether or not it involves a lot of effort

Whether or not it is convenient

Whether or not I believe it has a negative impact on the film industry

Whether or not watching movies online for free is worthwhile

Part 3 – manipulation

Participants are presented either with no text or one of the three experimental manipulation texts outlined in Table 4.5. The manipulation texts had the following introduction:

Below you will find some information about the environmental consequences of meat consumption. (In this context, meat does not include fish). Please read the text carefully before you move on to the next section. It is really important for our research that you read through the text and don't skip it.

Outcome variables associated with cooperation

The last section of the study aims to find out about your opinion on issues around meat consumption. (In this context, meat does not include fish).

1. The following questions ask you to rate what you think about eating meat on a number of scales. Each scale has two opposite poles. For each scale, indicate what you think about eating meat by choosing the appropriate tick box on the scale between these opposite poles. (Remember that, in this context, meat does not include fish). If you're unsure of where to tick on any particular scale, you may leave it blank.

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bad - good
 unpleasant – pleasant
 environmentally unfriendly - environmentally friendly
 tasteless – tasty
 unhealthy – healthy
 immoral – moral
 unsafe – safe
 detrimental – beneficial
 inconvenient – convenient
 unfavourable – favourable
 insipid – appetizing
 negative- positive

2. Do you intend to change the amount of meat you eat in the next month?

Intend to eat much more meat
 Intend to eat more meat
 Intend to eat the same amount of meat
 Intend to eat less meat
 Intend to eat much less meat
 Don't know

How willing are you to cut down the amount of meat you eat?

Very willing
 Fairly willing
 Neither willing nor unwilling
 Not very willing
 Not at all willing
 Don't know

3. Please now exit the survey by clicking on one of the two buttons below.

[EXIT to website with tips on how to eat less meat](#)
[EXIT to google homepage](#)

Note: Further demographic variables such as age, gender and education were also assessed.

Table 4.1: Items used in the online questionnaire of chapter four.

Framing manipulation text 'facts group':**Meat production responsible for 18% of annual global greenhouse gas emissions**

Greenhouse gases cause the vast majority of global warming. Raising animals for food is one of the largest sources of greenhouse gas emissions. Producing one calorie from animal protein requires on average 11 times as much fossil fuel input as producing one calorie from plant protein - and so releases 11 times as much of the greenhouse gas carbon dioxide. Farmed animals also produce large amounts of methane, and the meat industry is responsible for the majority of nitrous oxide emissions. Both methane and nitrous oxide are highly potent global warming gases.

Framing manipulation text 'SD group':**The collective costs of eating meat**

When we choose to eat meat, we do not only have the enjoyment of eating meat ourselves, we also create negative consequences for everyone by contributing to global warming.

Often when we make a choice about what to eat, we only think about things like price, taste, appetite and so on. We seldom take into account that the global consumption of meat imposes high costs on us all in the form of a changing climate, both today and in the future. We can reduce these collective costs by personally deciding to eat less meat.

Framing manipulation text 'facts and SD group':**Meat production responsible for 18% of annual global greenhouse gas emissions**

Greenhouse gases cause the vast majority of global warming. Raising animals for food is one of the largest sources of greenhouse gas emissions. Producing one calorie from animal

protein requires on average 11 times as much fossil fuel input as producing one calorie from plant protein - and so releases 11 times as much of the greenhouse gas carbon dioxide. Farmed animals also produce large amounts of methane, and the meat industry is responsible for the majority of nitrous oxide emissions. Both methane and nitrous oxide are highly potent global warming gases.

The collective costs of eating meat

When we choose to eat meat, we do not only have the enjoyment of eating meat ourselves, we also create negative consequences for everyone by contributing to global warming. Often when we make a choice about what to eat, we only think about things like price, taste, appetite and so on. We seldom take into account that the global consumption of meat imposes high costs on us all in the form of a changing climate, both today and in the future. We can reduce these collective costs by personally deciding to eat less meat.

Table 4.5: Texts presented in the different experimental conditions.

Categorisation of coded open-ended answers				
Dilemma situation	Personal outcomes	Social dilemma interpretation possible	Social dilemma characteristics	Other/ambiguous
Restaurant	-4.3	-6.0	10.9	5.8
Transport	7.3	-7.1	-3.0	-6.8
Campaign	-4.1	10.1	-4.0	2.9
Strike	-4.0	14.2	-3.9	-.5
Movie	3.4	-4.2	-4.0	-.8

Table 4.6: Standardised residuals for cells displaying the relation between dilemma situation and categories of coded open-ended answers.

Appendix B

Items assessing more detailed characteristics of personal actions to address climate change:

How much financial cost is involved in these actions?

How much time is required for these actions?

How much effort is required for these actions?

How much inconvenience is involved in these actions?

Items assessing future actions on climate change:

I will find it hard to take actions to address climate change.

I will be prepared to take actions that involve some financial costs to address climate change.

I will be prepared to take actions that require some amount of time to address climate change.

I will be prepared to take actions that require some amount of effort to address climate change.

I will be prepared to take actions that involve some amount of inconvenience to address climate change.

I intend to take actions to address climate change.

Items assessing current approval of climate change policies:

I approve of policies which ensure that everyone takes action to address climate change.

I approve of strict enforcement of policies that help address climate change.

Policies that help address climate change might be unpleasant, but they are necessary.

I approve of groups and institutions that try to implement policies to address climate change.

Items assessing future approval of climate change policies:

I will approve of policies which ensure that everyone takes actions to address climate change.

I will approve of strict enforcement of policies that help address climate change.

Policies that help address climate change might be unpleasant, but they are necessary.

I will approve of groups and institutions that try to implement policies to address climate change.

Items assessing demographics:

How did you hear about the survey?

Drop-down items assessing age, gender, highest level of education and yearly personal income

Are you a member of any group/ institution/ political party working (amongst other things or solely) on climate change?

Please name the group/ institution/ political party.

Table 5.1: Items used in the online questionnaire of chapter five.

Item name	Wording
Collective interest1	Even though it's not in my narrow self-interest, I think about what is best for the greater good, for the human race as a whole.
Collective interest2	We would all be better off with a stable climate.
Collective interest3	We need to do something, otherwise we will all be negatively affected by climate change.
Enlightened self-interest1	It would be better for me, if we addressed climate change.
Enlightened self-interest2	Ultimately, I would be negatively affected by climate change.
Externalities1	Everyone who does not take actions is increasing the likelihood of dangerous climate change and therefore the likelihood that others are negatively affected by climate change.

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Externalities2	By taking actions, I can reduce the negative consequences (resulting from climate change) for others.
Fairness1	Not taking actions would be unfair to those that do take actions to address climate change.
Fairness2	Everyone has to change his or her lifestyle to some degree in order to address climate change.
Fairness3	We in the West are responsible for the highest emissions, we should be the ones taking actions.
Temptation to free-ride1	Others could take actions and address climate change without my help.
Temptation to free-ride2	I would rather have others take care of climate change so I don't have to take actions.
Personal insignificance1	I am just one in billions, my actions will not make a significant difference.
Personal insignificance2	It doesn't matter if I don't take actions, the outcome will be the same anyway.
Personal insignificance3	My efforts won't affect the outcome of climate change.
Hopelessness1	Voluntarily most people won't take actions and we won't be able to tackle climate change.
Hopelessness2	It's not worth me taking actions to address climate change if others don't do the same.
Fear of being a sucker1	Even if I take actions to address climate change, others will start emitting more.
Fear of being a sucker2	Why should I do my bit, if my next door neighbour doesn't.
Fear of being a sucker3	It is unfair that I should bear the burden of taking actions whilst others do not.
Immediate self-interest1	I don't want considerations of climate change to affect my life.
Immediate self-interest2	Taking actions to address climate change would restrict my personal freedom.
Immediate self-interest3	I am more concerned about the immediate consequences of my actions for my own life, than about the consequences of my actions for climate change.

Note: The statements are derived from existing scales for non-cooperative cognitive responses, focus group and interview research on climate change mitigation and social

dilemma literature (Horton and Doron, 2011, Lorenzoni et al., 2007), existing questionnaires (Aitken et al., 2011, DEFRA, 2009) and prior conducted research.

Table 5.2: Item names and wordings of the 23 statements representing cooperative and non-cooperative cognitive responses to the climate change mitigation dilemma.

Appendix

Item name	Importance ratings in relation to personal actions to address climate change		Importance ratings in relation to approval of climate change policies	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Collective interest1	4.04	.918	4.10	1.065
Collective interest2	4.17	1.000	4.23	1.029
Collective interest3	4.07	1.029	4.12	1.140
Enlightened self-interest1	3.63	1.179	3.69	1.265
Enlightened self-interest2	3.56	1.200	3.54	1.240
Externalities1	3.75	1.162	3.74	1.173
Externalities2	3.70	1.016	3.83	1.108
Fairness1	3.63	1.134	3.68	1.254
Fairness2	3.94	1.067	4.12	1.073
Fairness3	3.55	1.286	3.63	1.301
Temptation to free-ride1	3.06	1.249	2.80	1.227
Temptation to free-ride2	1.99	1.058	2.01	1.099
Personal insignificance1	2.46	1.281	2.52	1.341
Personal insignificance2	2.46	1.153	2.39	1.191
Personal insignificance3	2.66	1.248	2.46	1.213
Hopelessness1	3.13	1.241	3.59	1.221
Hopelessness2	2.42	1.326	2.65	1.379
Fear of being a sucker1	2.97	1.317	3.00	1.375
Fear of being a sucker2	2.19	1.179	2.27	1.298
Fear of being a sucker3	2.47	1.242	2.59	1.283
Immediate self-interest1	2.54	1.182	2.49	1.213
Immediate self-interest2	2.39	1.130	2.82	1.275
Immediate self-interest3	2.68	1.193	2.72	1.239

Table 5.3: Average importance ratings of the 23 statements representing cooperative and non-cooperative considerations in relation to personal actions to address climate change and approval of climate change policies.

Appendix

Predictor	B	SE B	Wald	Sig.	Exp(B)
Non-cooperation factor	-.078	.028	8.000	.005	.925
Cooperation factor	.099	.033	8.761	.003	1.104
Constant	.847	1.592	.283	.595	2.332

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .152$; $\chi^2 (2, N = 133) = 22.004, p < .001$

Table 5.6: Summary of logistic regression analysis for factors predicting whether or not participants take any actions to address climate change.

Predictor	B	SE B	Wald	Sig.	Exp(B)
Non-cooperation factor	-.031	.025	1.589	.208	.969
Cooperation factor	-.003	.032	.006	.937	.997
Constant	-.506	1.643	.095	.758	.603

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .013$; $\chi^2 (2, N = 133) = 1.693, p = .429$

Table 5.7: Summary of logistic regression analysis for factors predicting participants' membership in a group working on climate change.

Appendix

Predictor	B	SE B	Wald	Sig.	Exp(B)
Non-cooperation factor	-.047	.021	5.071	.024	.954
Cooperation factor	.054	.029	3.442	.064	1.056
Constant	-1.198	1.462	.672	.413	.302

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .091$; $\chi^2 (2, N = 129) = 12.312, p = .002$

Table 5.8: Summary of logistic regression analysis for factors predicting participants donating half of the potential cash prize.

Predictor	B	SE B	Wald	Sig.	Exp(B)
Non-cooperation factor	-.053	.021	6.485	.011	.948
Cooperation factor	.077	.029	6.869	.009	1.080
Constant	-1.142	1.424	.644	.422	.319

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .091$; $\chi^2 (2, N = 123) = 19.060, p < .001$

Table 5.9: Summary of logistic regression analysis for factors predicting participants exiting to an environmental homepage.

Appendix

Predictor	B	SE B	β	t	Sig.
Constant	13.350	2.204		6.056	.000
Non-cooperation factor	-.024	.031	-.078	-.777	.439
Cooperation factor	.005	.045	.011	.106	.916

Note: All variables were entered simultaneously; n=104; $R^2 = .007$; $F (2, 102) = .334$, $p = .717$

Table 5.10: Summary of linear regression analysis for factors predicting more detailed characteristics of reported actions.

Predictor	B	SE B	β	t	Sig.
Constant	17.863	2.663		6.707	.000
Non-cooperation factor	-.220	.038	-.356	-.356	.000
Cooperation factor	.470	.052	.555	8.985	.000

Note: All variables were entered simultaneously; n=132; $R^2 = .538$; $F (2, 130) = 75.695$, $p < .001$

Table 5.11: Summary of linear regression analysis for factors predicting willingness and intention to act on climate change in the future.

Appendix

Predictor	B	SE B	Wald	Sig.	Exp(B)
Externalities	.114	.245	.218	.641	1.121
Collective interest	.243	.212	1.312	.252	1.275
Enlightened self-interest	-.080	.192	.175	.676	.923
Fairness	-.005	.163	.001	.973	.995
Immediate self-interest	-.205	.145	1.994	.158	.814
Fear of being a sucker	-.012	.148	.007	.934	.988
Personal insignificance	-.215	.153	1.975	.160	.807
Hopelessness	.146	.201	.530	.466	1.157
Temptation to free-ride	-.007	.190	.001	.971	.993
Constant	1.425	2.222	.411	.521	4.159

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .177$; $\chi^2 (9, N = 133) = 25.887, p = .002$

Table 5.13: Summary of logistic regression analysis for considerations predicting whether or not participants take any actions to address climate change.

Predictor	B	SE B	Wald	Sig.	Exp(B)
Externalities	.113	.182	.385	.535	1.119
Collective interest	.289	.170	2.906	.088	1.335
Enlightened self-interest	-.226	.138	2.663	.103	.798
Fairness	.048	.118	.165	.684	1.049
Immediate self-interest	-.049	.114	.185	.667	.952
Fear of being a sucker	-.300	.118	6.426	.011	.741
Personal insignificance	-.049	.113	.189	.664	.952
Hopelessness	.119	.145	.677	.410	1.126
Temptation to free-ride	.393	.155	6.435	.011	1.481
Constant	-3.712	2.113	3.086	.079	.024

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .139$; $\chi^2 (9, N = 133) = 31.991, p < .001$

Table 5.14: Summary of logistic regression analysis for considerations predicting membership in a group working on climate change.

Appendix

Predictor	B	SE B	Wald	Sig.	Exp(B)
Externalities	.080	.218	.134	.714	1.083
Collective interest	.305	.220	1.917	.166	1.357
Enlightened self-interest	-.198	.147	1.801	.180	.821
Fairness	-.103	.140	.549	.459	.902
Immediate self-interest	-.274	.136	4.037	.045	.760
Fear of being a sucker	.120	.136	.782	.377	1.128
Personal insignificance	.388	.140	7.706	.006	1.474
Hopelessness	-.444	.189	5.538	.019	.642
Temptation to free-ride	-.105	.176	.357	.550	.900
Constant	-2.592	2.234	1.345	.246	.075

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .220$; $\chi^2 (9, N = 129) = 19.946, p = .018$

Table 5.15: Summary of logistic regression analysis for considerations predicting donating half of the potential cash prize.

Predictor	B	SE B	Wald	Sig.	Exp(B)
Externalities	.232	.173	1.792	.181	1.261
Collective interest	.093	.159	.340	.560	1.097
Enlightened self-interest	-.144	.142	1.030	.310	.866
Fairness	.087	.114	.581	.446	1.090
Immediate self-interest	-.063	.110	.331	.565	.939
Fear of being a sucker	-.124	.106	1.375	.241	.883
Personal insignificance	-.172	.110	2.422	.120	.842
Hopelessness	.107	.141	.574	.448	1.113
Temptation to free-ride	.156	.140	1.241	.265	1.169
Constant	-1.439	1.847	.607	.436	.237

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .192$; $\chi^2 (9, N = 123) = 26.150, p = .002$

Table 5.16: Summary of logistic regression analysis for considerations predicting participants exiting to an environmental homepage.

Appendix

Predictor	B	SE B	β	t	Sig.
Constant	9.632	1.999		4.819	.000
Externalities	.355	.181	.273	1.967	.052
Collective interest	-.094	.176	-.086	-.536	.593
Enlightened self-interest	.031	.128	.027	.239	.811
Fairness	-.113	.119	-.128	-.947	.346
Immediate self-interest	.052	.111	.061	.465	.643
Fear of being a sucker	.057	.121	.071	.472	.638
Personal insignificance	-.020	.113	-.026	-.180	.858
Hopelessness	-.334	.145	-.326	-2.299	.024
Temptation to free-ride	.096	.146	.074	.657	.513

Note: All variables were entered simultaneously; n=109; R² = .094; F (9, 100) = 1.155, p = .333

Table 5.17: Summary of linear regression analysis for considerations predicting more detailed characteristics of reported actions.

Predictor	B	SE B	β	t	Sig.
Constant	17.351	2.474		7.013	.000
Externalities	.228	.234	.090	.974	.332
Collective interest	.447	.220	.211	2.028	.045
Enlightened self-interest	.299	.166	.134	1.803	.074
Fairness	.117	.155	.067	.754	.452
Immediate self-interest	-.717	.142	-.424	-5.040	.000
Fear of being a sucker	.081	.148	.051	.546	.586
Personal insignificance	-.271	.147	-.173	-1.848	.067
Hopelessness	-.068	.189	-.032	-.357	.722
Temptation to free-ride	.296	.188	.112	1.574	.118

Note: All variables were entered simultaneously; n=132; R² = .580; F (9, 123) = 18.902, p < .001

Table 5.18: Summary of linear regression analysis for considerations predicting willingness and intention to act on climate change in the future.

Predictor	B	SE B	Wald	Sig.	Exp(B)
Policy cooperation factor	.107	.036	8.891	.003	1.113
Why me factor	-.039	.050	.619	.431	.961
Personal costs/ insignificance factor	-.123	.052	5.671	.017	.884
Constant	-2.221	1.921	1.338	.247	.108

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .264$; $\chi^2 (3, N = 127) = 38.900, p < .001$

Table 5.21: Summary of logistic regression analysis for factors predicting whether or not participants exit to a petition for stricter climate change policies.

Predictor	B	SE B	β	t	Sig.
Constant	3.491	1.471		2.373	.019
Policy cooperation factor	.325	.025	.736	13.141	.000
Why me factor	-.002	.047	-.003	-.051	.960
Personal costs/ insignificance factor	-.105	.046	-.150	-2.278	.024

Note: All variables were entered simultaneously; n=137; $R^2 = .658$; $F (3, 134) = 85.869, p < .001$

Table 5.22: Summary of linear regression analysis for factors predicting current approval of climate change policies.

Appendix

Predictor	B	SE B	β	t	Sig.
Constant	2.090	1.457		1.435	.154
Policy cooperation factor	.345	.024	.769	14.158	.000
Why me factor	.025	.047	.032	.537	.592
Personal costs/ insignificance factor	-.099	.046	-.138	-2.139	.034

Note: All variables were entered simultaneously; n=133; $R^2 = .688$; $F (3, 130) = 95.342$, $p < .001$

Table 5.23: Summary of linear regression analysis for factors predicting future approval of climate change policies.

Appendix

Predictor	B	SE B	Wald	Sig.	Exp(B)
Externalities	-.361	.216	2.802	.094	.697
Collective interest	.375	.175	4.598	.032	1.455
Enlightened self-interest	.139	.142	.970	.325	1.150
Fairness	.267	.135	3.912	.048	1.307
Immediate self-interest	-.144	.103	1.956	.162	.866
Fear of being a sucker	.003	.098	.001	.976	1.003
Personal insignificance	.019	.105	.031	.860	1.019
Hopelessness	-.161	.133	1.458	.227	.851
Temptation to free-ride	-.292	.157	3.467	.063	.747
Constant	-3.047	2.333	1.706	.192	.047

Note: All variables were entered simultaneously; Cox & Snell $R^2 = .312$; $\chi^2 (9, N = 127) = 47.436, p < .001$

Table 5.25: Summary of logistic regression analysis for cognitive responses predicting participants exiting to a petition for stricter climate change policies.

Predictor	B	SE B	β	t	Sig.
Constant	3.911	1.659		2.358	.020
Externalities	.255	.190	.131	1.339	.183
Collective interest	.401	.131	.274	3.055	.003
Enlightened self-interest	.192	.139	.103	1.385	.168
Fairness	.376	.121	.273	3.099	.002
Immediate self-interest	-.149	.098	-.112	-1.528	.129
Fear of being a sucker	.089	.089	.073	1.000	.319
Personal insignificance	-.244	.102	-.188	-2.404	.018
Hopelessness	.006	.125	.003	.051	.959
Temptation to free-ride	.229	.142	.106	.1613	.109

Note: All variables were entered simultaneously; n=137; $R^2 = .668$; $F (9, 128) = 28.617, p < .001$

Table 5.26: Summary of linear regression analysis for cognitive responses predicting current approval of climate change policies.

Predictor	B	SE B	β	t	Sig.
Constant	1.173	1.648		.712	.478
Externalities	.073	.189	.037	.386	.700
Collective interest	.636	.130	.425	4.897	.000
Enlightened self-interest	.219	.138	.115	1.590	.114
Fairness	.351	.119	.251	2.946	.004
Immediate self-interest	-.071	.097	-.052	-.738	.462
Fear of being a sucker	.048	.089	.038	.534	.594
Personal insignificance	-.227	.100	-.172	-2.266	.025
Hopelessness	.212	.124	.100	1.704	.091
Temptation to free-ride	.122	.141	.054	.860	.391

Note: All variables were entered simultaneously; n=133; R² = .697; F (9, 124) = 31.689, p < .001

Table 5.27: Summary of linear regression analysis for cognitive responses predicting future approval of climate change policies.

Appendix C

Main questions	Probes/ Alerts
<u>Start</u>	
<p><i>Thank you.</i> <i>Your opinions and comments will be extremely valuable. I am solely interested in your opinion, in what you think.</i> <i>There is no right or wrong</i></p>	<p>Do not frame climate change as a problem Emphasis on no expectation</p>
Go through consent form	Emphasise ethics and confidentiality
Sign form	
Ask again the permission to audiotape	
<i>Any further questions before we start?</i>	
Start recorder.	
<u>Open questions</u>	
<i>Can you please briefly summarise your views on climate change for me?</i>	
<i>When you think about climate change, how does it make you feel?</i>	<i>Why does it make you feel....?</i>
<i>In general, what do you think are reasons why people do take actions to address climate change?</i>	<i>Why would that lead people to take actions?</i>
<i>In general, what do you think are reasons why people do NOT take actions to address climate change?</i>	<i>Why would that discourage people to take actions?</i>

	Stress that they are understandable reasons and valid.
<u>Cognitive responses exploration</u>	
<p><i>We have talked a bit about the reasons why or why not people might act on climate change. I have noted down some of the things you said on these cards.</i></p> <p><i>Here I have some additional cards with different things people might consider. Some of the things might encourage people to take actions, others might discourage people to take actions.</i></p>	<p><i>Have I missed any important things from our prior discussion?</i></p>
<p><i>I would now like to talk about some of the things you personally consider or think about when it comes to your actions on climate change.</i></p> <p><i>Can you please sort all these cards for me in three groups:</i></p> <ul style="list-style-type: none"> • <i>This group is for all the things that you don't consider, that have no influence on whether or not you take action on climate change. Things that are unimportant.</i> • <i>This group is for things that do cross your mind and that rather encourage you to take actions.</i> • <i>And this group is for things that do cross your mind and that rather discourage you to take actions.</i> 	<p>Cards with group headings.</p> <p>Further probe the why, if necessary</p>
<p><i>Ok, let's have a closer look at the things that rather encourage actions.</i></p> <ul style="list-style-type: none"> • <i>Can you sort them according to their importance? Which is the most encouraging thing? Why do you think this is the most encouraging thing?</i> <p><i>Are there any things that you would group together under a common heading? What heading would this be?</i></p>	<p>Possibly keep addressing back to climate change.</p>
<p><i>Now I would like to ask you to do the same exercise for the things that rather discourage actions to address climate change.</i></p> <ul style="list-style-type: none"> • <i>Can you sort them according to their importance? Which is the most encouraging thing? Why do you think this is the most encouraging thing?</i> 	

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<ul style="list-style-type: none"> Are there any things that you would group together under a common heading? What heading would this be? 	
<u>Approval of policies</u>	
<i>One possible approach to address climate change is through policies. These policies require approval from citizens like yourself.</i>	Possibly give examples of policies: taxes, subsidies, restrictions, regulations.
<i>In general, what do you think are reasons why people do approve of policies that help address climate change?</i>	<i>Why would that lead to approval?</i>
<i>In general, what do you think are reasons why people do NOT approve of policies that help address climate change?</i>	<i>Why would that lead to disapproval?</i>
<i>Ok, let's have another look at this group (show personal insignificance, fear of being a sucker and hopelessness). Can you please have a look through them again and tell me which ones would rather increase and which ones would rather decrease your approval of policies that help address climate change.</i>	<i>Why do you think this decreases/increases approval?</i> <i>Personal insignificance → does it translate to insignificance in political actions?</i>
<u>End</u>	
<i>We are now at the end of the interview. Thank you.</i>	
<i>Is there anything you would like to add to what we have discussed?</i>	
<i>We have discussed a lot of topics today and you have offered very interesting and important thoughts and insights. In case I have any questions regarding the topics we discussed or any need for clarification, could I contact you via email?</i>	
<i>Likewise, if you have any further questions, comments or would like to request information on a topic we discussed, please feel free to contact me any time.</i>	Possibly give info material.

Pay and get form signed.	
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Table 6.1: Interview guide for semi-structured interviews of chapter six.

Cognitive response	Interview prompt
Collective interest	Collective interest – We would all be better off with a stable climate.
Enlightened self-interest	Enlightened self-interest – Ultimately it would be better for me if climate change was addressed.
Externalities	Consequences for others – Climate change will result in negative consequences for others.
Fairness	Fairness – A fair distribution of the burden to act on climate change.
Temptation to free-ride	Temptation to free-ride – Others can address climate change and I can profit from their efforts.
Personal insignificance	Personal insignificance – I am just one in billions, my actions will not make a difference.
Hopelessness	Hopelessness – Others just won't take actions, the situation is hopeless.
Fear of being a sucker	Fear of being a sucker – Why should I be the sucker and address climate change, when others don't?
Immediate self-interest	Immediate self-interest - Addressing climate change is expensive/ inconvenient etc. right now.

Table 6.2: Prompts used during the qualitative interviews to introduce the nine cooperative and non-cooperative considerations.

Appendix D

Items assessing communitarianism:

The government should do more to advance society's goals, even if that means limiting the freedom and choices of individuals.

Government should put limits on the choices individuals can make so they don't get in the way of what's good for society.

The government interferes far too much in our everyday lives.

The government should stop telling people how to live their lives.

Items assessing Schwartz transcendence values:

It is important that every person in the world should be treated equally and have equal opportunity in life.

It is important to listen to people who are different from me. Even when I disagree with them, I still want to understand them.

People should care for nature. Looking after the environment is important to me.

Items assessing collective identity:

I identify with (feel a part of, feel love toward, have concern for) people in my community.

I identify with (feel a part of, feel love toward, have concern for) people in Britain.

I identify with (feel a part of, feel love toward, have concern for) all humans everywhere.

Items assessing actions to address climate change (wording of control group):

I intend to take actions on climate change.

I am prepared to take actions on climate change in the future.

I am willing to help address climate change.

Items assessing approval of climate change policies:

I will approve of policies which ensure that everyone takes actions to address climate change.

Policies that help address climate change might be unpleasant, but they are necessary.

Table 7.1: Items used in questionnaires of chapter seven.

Predictors	B	SE B	β	t	Sig.
Constant	5.786	1.420		4.075	.000
Self-transcendence values	.201	.089	.192	2.254	.026
Collective identity community	-.016	.228	-.007	-.069	.945
Collective identity Britain	.157	.259	.081	.606	.546
Collective identity humans	.611	.210	.349	2.909	.004
Communitarianism	.058	.060	.082	.980	.329

Note: All variables were entered simultaneously; n = 120; R² = .250; F (5, 115) = 7.683, p < .001

Table 7.2: Linear regression analysis predicting participants' self-reported willingness and intention to take actions to address climate change (personality characteristics as predictors).

Predictors	B	SE B	β	t	Sig.
Constant	6.364	1.506		4.226	.000
Self-transcendence values	.192	.089	.183	2.158	.033
Collective identity community	-.045	.230	-.021	-.197	.844
Collective identity Britain	.147	.258	.076	.572	.568
Collective identity humans	.587	.210	.336	2.802	.006
Communitarianism	.068	.060	.095	1.122	.264
Collective interest manipulation	-.749	.430	-.170	-1.743	.084
Fairness manipulation	-.332	.420	-.077	-.790	.431

Note: All variables were entered simultaneously; n = 120; R² = .270; F (7, 113) = 5.977, p < .001

Table 7.3: Linear regression analysis predicting participants' self-reported willingness and intention to take actions to address climate change (personality characteristics and manipulation as predictors).

Predictors	B	S.E.	Wald	Sig.	Exp(B)
Self-transcendence values	.133	.183	.523	.469	1.142
Collective identity community	.353	.375	.885	.347	1.423
Collective identity Britain	-.536	.462	1.489	.222	.569
Collective identity humans	.790	.404	3.827	.050	2.202
Communitarianism	.243	.109	4.942	.026	1.275
Constant	-8.775	3.017	8.457	.004	.000

Note: All variables are entered simultaneously, Cox & Snell $R^2 = .088$; $\chi^2 (5, N = 122) = 11.301, p = .046$

Table 7.5: Logistic regression analysis predicting whether or not participants donate to Cambridge Carbon Footprint (personality characteristics as predictors).

Predictors	B	SE B	β	t	Sig.
Constant	2.591	1.145		2.262	.026
Self-transcendence values	.207	.072	.243	2.860	.005
Collective identity community	.023	.183	.013	.125	.901
Collective identity Britain	.250	.209	.160	1.197	.234
Collective identity humans	.316	.171	.223	1.847	.067
Communitarianism	.027	.048	.047	.570	.570

Note: All variables were entered simultaneously; n = 121; $R^2 = .240$; $F (5, 116) = 7.340, p < .001$

Table 7.7: Linear regression analysis predicting participants' self-reported approval of climate change policies (personality characteristics as predictors).

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Predictors	B	SE B	β	t	Sig.
Constant	3.586	1.207		2.971	.004
Self-transcendence values	.191	.071	.225	2.675	.009
Collective identity community	-.047	.183	-.027	-.258	.797
Collective identity Britain	.253	.206	.161	1.228	.222
Collective identity humans	.306	.169	.216	1.816	.072
Communitarianism	.024	.048	.042	.508	.612
Collective interest manipulation	-.760	.344	-.213	-2.213	.029
Fairness manipulation	-.685	.337	-.196	-2.031	.045

Note: All variables were entered simultaneously; n = 121; R² = .278; F (7, 114) = 6.265, p < .001

Table 7.8: Linear regression analysis predicting participants' self-reported approval of climate change policies (personality characteristics and manipulation as predictors).