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Abstract of the Dissertation

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While the scientific debate over climate change has been settled, the U.S. public is profoundly divided. Some people view climate change as a huge problem that needs to be resolved, whereas others dismiss it as non-issue. It is vital that we understand what is driving attitudes on this issue since climate change is likely to alter our world in multiple, mostly negative, ways. In this dissertation, I rely on experiments, surveys and content analysis to examine the relative merits of two broad perspectives on what is driving public opinion on climate change. One perspective centers on the role of party elite cues. When party leaders take positions on issues, such as on climate change, they simplify complex information so that ordinary Republicans and Democrats only need to follow their party leaders. The other perspective, the value perspective, is based on the central role of values in shaping political attitudes. Climate change is a multifaceted problem and it can be described as a threat towards multiple values. By experimentally infusing messages with different values, I examine if those who adhere to the target values also react the strongest. The key dependent variables in the studies are climate change policies and risk perceptions. Risks perceptions are important since they influence support for policies. The results show strong support for the party cue perspective, yet only cautious support for the value perspective. A content analysis of news articles published by *The New York Times* and *The Associated Press* show that Republican Party leaders are against climate change policies whereas Democratic leaders support them. When party leaders diverge like this, it should lead to a larger gap in the support for climate change policies between the more politically aware Republican and Democratic identifiers compared to the less aware partisans. This is exactly what I find. Moreover, when I experimentally alter party cues, those who identify as Republicans are more persuaded by Republican leaders than by Democratic elites. Democratic leaders, in contrast, are more effective at persuading Democratic identifiers.

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1

Theory and Literature Review

1.1 Introduction

While the scientific debate over climate change[1] has been settled, the discussion continues among policy-makers and ordinary people.[2] Some view climate change as a huge problem, whereas others dismiss it as a non-issue. One of the starkest divisions in the United States is between Democrats and Republicans. Republican leaders accuse Democrats of exaggerating the effects of global warming whereas Democrats say that that Republicans mislead the public by downplaying the issue. The same divide is also visible among ordinary people. Republican identifiers oppose policies to reduce climate change and Democrats support them. On basic issues such as if climate change is real, 70% of Democratic identifiers believe it is happening now whereas only 30% of ordinary Republicans share this view (Malka, Krosnick, and Langer 2009; McCright and Dunlap 2011).

[1] I use the terms *climate change* and *global warming* interchangeably although climate change describes the broad-ranging effects better.

[2] Among the top researchers, those who most frequently publish scientific articles and who are cited the most, 97% agree with the main conclusions of the Intergovernmental Panel on Climate Change .

Zaller (1992) provides a compelling argument as to why the public sometimes disagrees on political issues. According to this perspective, like-minded elites influence ordinary citizens. For example, when politicians discuss whether to go to war or not and inundates the media environment with both antiwar and prowar elite messages, a citizen with a pacifist predisposition becomes more antiwar whereas one with a militaristic predisposition becomes more prowar (Berinsky 2007, 2009; Zaller 1992). The same elite influence model of public opinion can easily be applied to climate change. When party elites send different messages, as they seem to do on climate change, then partisans respond by following their party leaders, which explains the current gap in public opinion on climate change between Republican and Democratic identifiers.

The correspondence in views on climate change between partisan elites and partisan publics might seem to be a clear case of elite influence, but in reality, the direction of the relationship between leaders and the public has not been established. There is continuing uncertainty as to whether or not elites directly cause public opinion to move. Erikson and Tedin (2011) offer four models that provide alternative explanations for a correspondence between elites and the public. According to the *rational-activist model*, citizens are highly informed about politics and act rationally. People know their own policy preferences and select candidates who share these positions. Less demanding on citizens is the *political parties model* because, according to this perspective, people choose parties depending on the most appealing party platforms rather than issue positions. The *delegate model* envisions a political world in which politicians cautiously monitor public opinion and heeds its wishes because they want to stay in office. Politicians are simply following the will of their constituents. Common to these alternative models is that the public is the assumption that influencing policy-makers rather than the opposite. A somewhat different model, but still an alternative explanation to the elite

influence model, is the *sharing model*. This perspective suggests that citizens and leaders reach the same conclusions on issues not because they influence one another but because they come from the same culture. On climate change, this would mean that because Republican leaders and Republican identifiers share the same background, they have independently reached the same conclusion on this topic (Erikson and Tedin 2011).

Yet even if we accept that leaders influence the public on climate change, as they do on many other issues (Jentleson 1992; Zaller 1992), there is still no evidence that elite influence is mediated by party identification. A plausible alternative explanation is that leaders influence people through the content of their words – that is, through the value-based justification they provide. According to this line of thinking, the reason Republican elites persuade Republican identifiers is because they use value-laden arguments that resonate among people who also happen to be Republican.

To solve the complex issue of how elite cues and value-laden arguments affect public opinion, I designed a series of studies to test experimentally the empirical support for the two perspectives. If the elite influence explanation through party cues is accurate, then it should be possible to change attitudes by experimentally changing the party identification of political leaders in an experimentally altered message. Conversely, if the value-based explanation holds, then elite views on climate change should affect attitudes when it is described as a threat to something people hold dear. Naturally, it is also possible that both explanations are true or that the effect of one type of persuasion is dependent on the other. An example of the latter is that Republican leaders might be more effective when they use value-based arguments based on free-market arguments – the type of arguments that have resonance among rank and file Republicans.

I examine the effect of party cues and values on policy attitudes and the perceived risk of climate change. It is important to look at policy attitudes because they can have a direct influence on policymakers. Risk perceptions are central to the study of public opinion on climate change because they are closely linked to policy positions. Once an individual perceives high risks, they tend to support policies to reduce the risks.

While the scientific puzzle is fascinating, another reason to study public opinion on this topic is that few present-day issues are as important to humankind as climate change. Scientists' moderate scenarios point to an increase in a number of negative consequences, such as widespread extinction of plants and animals, because of climate change. People, especially in poorer regions, will suffer from malnutrition, diarrhea and infectious diseases. In addition, more extreme weather in the form of wildfires, droughts and floods threatens to destroy and damage homes, businesses and infrastructure in many countries, including the United States (IPCC 2007). Thus, given the stakes associated with climate change, it is vital that we understand the factors that influence political behavior.

We need to have a better understanding of what is causing people to reach such fundamentally different conclusions, but before turning to the potential explanations, let us first get an overview of what people think about climate change and why it matters.

1.2 Public Opinion

1.2.1 Public Opinion on Climate Change

A sizable part of the American population is willing to take drastic measures to reduce the impact of climate change, but a large number of Americans oppose signing international agreements, making automobile companies build more fuel-efficient cars, educating the public about greenhouse gases, paying more for gas and so on (Nisbet and Myers 2007). It seems as policies that target individuals directly are more likely to provoke opposition. Some are willing to make economic sacrifices themselves yet many oppose such policies. In their review of surveys about climate change, Nisbet and Myers (2007) show that in 2007, a modest 20% of the public favored higher taxes on electricity and 31% favored higher gasoline taxes. The rest of the public opposed these policies. Support for policies that do not influence people directly is higher, yet the public is divided on such issues as well. For example, in 2007, 42% favored laws that require automakers to produce cars that use less gasoline, 44% thought that the industry should be encouraged to do this via tax breaks and 14% argued that the government should stay out of this altogether (Nisbet and Myers 2007).

The public also disagrees starkly on whether global warming is a threat to them or their family, the accuracy of news reports on global warming and the degree of scientific consensus on climate change. For example, in a Gallup poll from 2011, when asked if the threat of global warming is generally exaggerated, generally correct or generally underestimated, 43% said it is exaggerated, 26% answered that it is correct and 29% reported that it is underestimated (Jones 2011).

Moreover, people also differ on the fundamental question of whether climate change is happening. In a poll taken in May 2010, 50% said that it is already happening – that is, they are taking the same position as most scientists. Meanwhile, at the other end of the scale, 19% said that climate change would never happen. The number of people who say that global warming will never happen has been between 9% and 11% in most polls yet recently more people say that it will never happen (Figure 1.1 and Table 1.1).

Table 1.1 about here

Figure 1.1 about here

The strong disagreement over the gravity of climate change is puzzling, especially since the scientific community has concluded that global warming is *unequivocal* and that human activity is behind it (IPCC 2007). If people treated the information similarly, they should reach the same conclusion. Apparently, they do not. It seems as there are powerful factors that filter how people react to information about climate change.

Another pattern that stands out from the polls is the overall stability of opinion over time. Figure 1.1 shows that while there has been a slight decrease in the number of people who believe climate change is already happening and an uptick in the number of people who say it will never happen, the differences in attitudes on climate change policies have remained largely stable in the United States. Gallup's polling on climate change goes back more than 20 years on some questions. Asked whether they personally worry about climate change, Americans worry about it today as much as they did 20 years ago. In 1989, 63 percent said they worried a great deal or a fair amount and a poll taken in 2009 shows that the corresponding number was 60 percent.

Importantly, while it is interesting that there is stability at the aggregate level, it is somewhat misleading because there is remarkable variance in attitudes with some people saying climate change is already occurring and others saying it will never happen. Polls of aggregate level public opinion can give an overview of what people think, but they do not explain why people hold certain attitudes. It is to these micro-level differences that we turn to in the theoretical sections.

1.2.2 Why Study Public Opinion?

It is important to study public opinion on climate change because it can influence policy. Page and Shapiro (1983) find that when public opinion moves, a corresponding policy change usually occurs within a year. Their study relies on aggregate data and includes over 300 cases of opinion change between 1935 and 1979. When opinion and policy both changed, 66 percent of the time they moved in the same direction, which is a much higher number than one would expect just by chance. Public opinion is especially likely to change policies if an issue is salient and if there has been a large change in public opinion. Using similar approach, (Monroe 1979, 1998) reaches the same conclusion as Page and Shapiro. Monroe tracks public opinion from 1960 to 1974 and 1980 to 1993 on a range of issues, examining the congruence between public opinion and national policy. Monroe finds that on issues where the public was satisfied with the status quo, the policy remained unchanged 76 percent of the time. When the public wanted change, the corresponding policy change happened in 59 percent of cases.

Public preferences also influence specific policy areas. Wlezien (1996) studies defense-spending decisions in the United States with time-series analysis of data from 1974 to 1991. He shows that when the public wants more resources going to defense, the policy usually follows.

The same holds for the reverse, that is, when the public wants less spending, policy is adjusted accordingly. Looking specifically at 108 congressional districts and their respective representatives, Bartels (1991) finds that policy positions on defense spending appropriations among the representatives in Congress follow from the aggregate policy preferences of their constituencies.

Similarly, Stimson, MacKuen, and Erikson (1995) find that public opinion influences policy makers in several branches of government. Public opinion is measured by "domestic policy mood", a concept that expresses preferences for more or less federal government across central domestic policy controversies. Politicians use this public mood to adjust their policies in a liberal or conservative direction, primarily because they seek public approval to increase their chances of being reelected. The Presidency, the Congress and even the Supreme Court make decisions that follow public mood. The authors' time-series analysis reveals that change often happens quickly, often within about a year from when the public mood changes (Stimson, MacKuen, and Erikson 1995).

Politicians use polls constantly to find out the policy positions and approaches supported by their constituents. All presidents since Franklin Delano Roosevelt have done this with the exception of Harry Truman. The first president to make polling central was John F. Kennedy who employed Louis Harris as part of his staff. Harris polled extensively for Kennedy during the election campaign of 1960. Kennedy was interested in what issues that were the most important for people and he tracked the perception of his image. Depending on the poll results, Kennedy's campaign adjusted their message (Jacobs and Shapiro 1994). The use of polls expanded substantially with Nixon who conducted more private polls than Kennedy and Johnson did combined (233 compared to 93 and 130, respectively). A new development under Johnson and

especially Nixon was the extensive use of polls during nonelection years. Polls were tailored to test policy proposals and to track public opinion over time. Nixon's polls tested reactions to proposals relating to, for example, Vietnam, busing, inflation and taxes. The goal was to see how policies could be best sold to the public (Jacobs and Shapiro 1995). Nixon used this information strategically in an attempt to influence the public by priming the issues and image aspects that would be advantageous to him (Druckman, Jacobs, and Ostermeier 2004). Nowadays, the use of polls among politicians is not confined to presidents; politicians at all levels view polls as critical to their strategies. It seems truer than ever that all types of politicians "must concern themselves with public opinion." (Key 1961, p. 412)

Finally, public opinion is important because it influences the perceived legitimacy of policies among the public. If people perceive that the majority of the public is behind a certain issue position, then those in the minority tend to think that the majority position is more legitimate than otherwise. When they believe a position is legitimate, they are more likely to accept a policy even though they are in the opposition. The likelihood of people protesting against a policy thus depends on levels of public support or opposition to it (Todorov and Mandisodza 2004).

Someone might argue that global warming is a political issue with no impact, but there are several reasons for thinking that this idea is mistaken. Almost 50% of the American public says that knowing that a candidate is a strong environmentalist influences their vote choice (Langer 2008).

The economy is admittedly often the most important issue for citizens, but also attitudes on environmental issues can have an impact on vote choice and candidate evaluations. Relying

on ANES data from 1996, Davis and Wurth (2003) find that attitudes on how much the government should spend on the environment had a statistically significant effect on political behavior, controlling for party identification, ideology, other issue positions and demographics. Those who wanted environmental spending were more likely to feel positive towards Clinton, negative towards Dole, and to vote for Clinton rather than Dole. In fact, environmental attitudes had an impact on four out of five presidential elections between 1984 and 2000 (Davis, Wurth, and Lazarus 2008). When it comes to global warming, a central environmental concern, it therefore makes sense to examine the dynamics of public opinion closely.

1.3 Two Explanations on the Causes of Climate Change Attitudes: The Party Cue Perspective and the Value Perspective

Although global warming might severely change our world, we know relatively little about what influences public opinion on climate change. We know that people are divided over its existence and in their support for government program designed to combat it. We know less about the origins of these preferences.

Climate change is different from many other political issues because it is a hard topic for people to comprehend fully. It requires at least a basic understanding of the scientific method, probability theory, climatology, the greenhouse effect, emissions and deforestation. Nonetheless, while it is a difficult topic, it is like any other political issue that divides public opinion; people express different opinions on many other complicated issues (e.g., how criminals should be punished, what type of social welfare programs that work best, whether nuclear power is safe, and so on). Since attitudes on climate change share features with attitudes on other topics, the

explanations in those fields can inform us about what might be driving attitudes on climate change.

Based on literatures in political science, psychology and environmental research, I suggest that there are two broad explanations, or perspectives, on what drives public opinion on climate change. One perspective centers on the role of party leaders. Party identification is a stable social identity that tends to condition a range of attitudes, including voting (Green, Palmquist, and Schickler 2002). The positions of party leaders simplify complex information so the only thing regular people need to do is to follow their party leaders (Berinsky 2007; Zaller 1992). With Republican leaders expressing skepticism of climate change and opposing climate change policies, it is understandable that those who identify as Republican hold the same opinion. In contrast, Democratic leaders generally see climate change as a real problem and support policies. Since Democratic identifiers trust and listen to their leaders, they also take the same viewpoint. I refer to this as the party cue perspective.

The other perspective, the value perspective, is based on the central role of values in shaping political attitudes and making sense of information.[3] Schwartz (1994) writes that "values express desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity." Since values are key to understanding the world, it is plausible that they also color how people perceive information about climate change.

To the extent that Americans think climate change is a problem, they primarily perceive it as a threat to people outside the United States, to those who do not have the resources to provide coastal protection, irrigation, firefighters, and air conditioning. It is less of a personal

[3] Values are also known as principles, beliefs, ethea and worldviews. I use these terms synonymously.

problem or an American problem (Leiserowitz 2005; Lorenzoni et al. 2006; Nisbet 2009). Given that climate change has been described as something that affects remote areas of the world, it is probable that those who highly value the well-being of impoverished people living in distant geographical regions see global warming as a serious problem. Nonetheless, it is possible that also other values influence attitudes on climate change, as I describe in the following sections.

Both the party cue and the value explanations are theoretically plausible, but there is a need to test their empirical support. The party cue perspective has gained some attention as the main explanatory model of climate change attitudes (Dunlap and McCright 2008) yet it is far from clear that elites drive public opinion on this particular topic. As stated in the introduction, there are good reasons to question the direction of causality. It is possible that the public is selecting leaders and parties that best suit their attitudes on climate change rather than elites persuading fellow partisans. It is also possible that because of the shared background between ordinary Republicans and their leaders, on the one hand, and Democrats and their leaders, on the other, Democrats and Republicans have reached a different conclusion on climate change without leaders causing it (Erikson and Tedin 2011). Alternatively, it might be as the value perspective suggests, principles rather than party identification influence attitudes on climate change. From this perspective, the effects of party identification that some researchers have found are partially or completely spurious. Party leaders might seem more effective in persuading fellow partisans simply because they use value-laden arguments that work best for people who also happen to share the same party.

Next, I take a more detailed look at the two perspectives. First, I discuss how values might influence attitudes on climate change policies. This section also contains a discussion on

the relationship between values and the perceived risk of climate change. Second, I turn to how party identification and party cues are related to attitudes on climate change.

1.3.1 Values and Risk Perceptions

The value perspective is somewhat more complex than the party cue perspective because values and risk perceptions are intertwined. Before turning to how values affect attitudes on climate change, I first need to discuss risk perceptions. Studies show that the perceived risk of climate change strongly influences support for climate change policies. Quite intuitively, when people believe there are high risks associated with an issue, they support policies that aim to reduce the risk, and when the risks linked to an issue are low, the public is far less supportive of policies that reduce risk (Lubell, Zahran, and Vedlitz 2007; O'Connor, Bord, and Fisher 1999; Zahran et al. 2006).

Since risk perceptions influence support for policies, one way to convince people to support policies to combat climate change is to increase the perceived risk of climate change. This is where values come in. Presumably, if climate change is portrayed as a threat to a specific value, then those who adhere to that value should see higher risks to climate change and consequently support climate change policies. For example, if climate change threatens to increase poverty in developing countries, then those who place a high value on taking care of the weak should increase their support for policies to deal with climate change.

1.3.1.1 Risk Perceptions

Several studies show that risk perceptions influence attitudes on global warming. O'Connor, Bord and Fisher (1999) use the dependent variable *opinions on climate change*

policies (e.g., support for higher taxes on gasoline, taxation of businesses, and laws that require automobile makers to increase fuel efficiency). Risk perceptions about climate change, the main independent variable in their research, is measured by a scale comprised of seven items.[4] Those who think that the consequences will be dire are much more likely to support government initiatives that reduce the effects of global warming. Likewise, when the dependent variable is ecological behavior (for example, how likely respondents are to choose a car that gets good gas mileage and to replace older appliances with more energy efficient new models), risk perceptions have a strong effect on policy support.

In a more recent article that investigates public opinion on global warming, Zahran et al. (2006) also find that the willingness to support government proposals to slow or reverse warming trends depends on risk perceptions. Using a national sample, their multiple regression analysis shows that objective measures of risks, such as if people are living in areas that are more exposed to the effects of climate change, are generally poor predictors of climate change policies. Instead, it is the subjective perceptions of risk that is the strongest predictor of public opinion. Risk perceptions are measured with three items that tap agreement/disagreement to statements about the threat of climate change to personal health, financial, and environmental welfare. The risk scale has a much larger effect than other factors, such as education, on policy support, measured by 11 items on various policies designed to address climate change.

[4] The seven items are introduced with "Suppose annual average temperatures DO increase by 3 degrees Fahrenheit over the next 50 years. Then how likely do you think each of the following would be?" The items include "My standard of living will decrease", "Starvation and food shortages will occur in much of the world", "Rates of serious disease will increase". Even after controlling for factors such as if respondents actually believe in climate change, knowledge of global warming, general environmental beliefs, gender, age and education, risk perceptions have a significant and substantial effect on climate change policies.

In a similar study in terms of measurement, Lubell, Zahran, and Vedlitz (2007) rely on a 6-item measure of risk perceptions. The measure is related to Zahran et al.'s (2006) scale in that it measures the threat posed by climate change to human health, natural resources, and economic development. Three questions focus on the threats posed by climate change to the respondent and three questions ask about the potential risks of global warming to the respondent's state of residence in terms of public health, the environment and the economy. This expanded risk perception scale is used to predict support for climate change policies (e.g., ratifying the Kyoto deal and giving market incentives to encourage industries to reduce emissions), personal environmental political activities (e.g., signing an environmental petition or appeal and donating money to an environmental organization) and environmental behavior (e.g., carpooling and turning off lights and appliances when not in use). The perceived risk associated with climate change is a significant and strong predictor of all three dependent variables, even after controlling for other factors. Importantly, of all the variables in the model, the risk perception variable has the strongest effect on policy preferences and political participation.

In sum, how people perceive environmental risks is one of the strongest predictors of support for policies designed to protect the environment. A high perceived risk of climate change leads to support for policies that aim to reduce the risks whereas a low perceived risks is associated reduced policy support (Lubell, Zahran, and Vedlitz 2007; Stern et al. 1999; Zahran et al. 2006). The same relationship between higher levels of risks and policy support has been found on other issues as well. In a study conducted after the terrorist attacks in 2001, Huddy et al. (2005) find that when the perceived threat of terrorism increased, it substantially increased support for military action in Afghanistan, a more active U.S. role in the world and more surveillance of Arab-Americans.

While it is a key finding in this relatively new research area that risk perceptions strongly influence public opinion on climate change, there are two central problems with this research. First, risk perceptions do not arise in a vacuum. Instead, the perception of risk is a product of several factors. It depends on, for example, individual characteristics, issue positions and knowledge (Sjöberg 2000). In other words, risk perceptions are endogenous. The studies mentioned above all treat risks as exogenous, which is an oversimplification. While values are included as predictors in prior research, they are modeled only as having direct effects on climate change policy preferences, not as factors that influence risk perceptions. Given the central role of values, it appears likely that they also influence how we see risks in the first place. Prior research has overlooked the potential indirect effects values. For example, a value related to the universal well-being of everyone increases support for climate change policies (Stern et al. 1999). When this value is modeled solely as having a direct effect on policy support, the effect it might have in heightening risk perception of climate change is ignored. If it true that risk perceptions are endogenous, and influenced by values, then the effect of risk perceptions has been exaggerated whereas the total effect of values has been underestimated.

The second problem with previous research is that the risks posed by global warming do not come in one neatly packed bundle, and that has consequences for how risks perceptions should be measured. Since climate change is a wide-ranging phenomenon, the risks are diverse and complex. Certain types of risks manifest themselves locally and have a direct economic impact on individuals, other risks threaten some nations more than others, and some risks threaten impoverished regions more than richer regions. Different people see different types of climate change risks. Some people may never see high risks with certain aspects of climate change, but nevertheless think that other risks are posing grave dangers (Milfont, Duckitt, and

Cameron 2006; Schultz 2001; Stern and Dietz 1994). Consequently, to create an additive scale with diverse types of risk perception items (e.g., O'Connor, Bord, and Fisher 1999) is probably simplistic because the types of risks may not go together. For example, it is doubtful that questions that measure risk to the respondent's personal financial situation should be grouped together with questions about the risk of starvation and food shortages in poor countries. Given the multifaceted nature of climate change risks, there is a need to measure different types of risks.

Still, even if there are different types of risks, the effect of the risk variables should be the same; if people feel high risks in any risk domain, they are expected to be more supportive of polices that aim to reduce the emission of greenhouse gases. The differentiation in risks opens up the fascinating possibility that there are separate ways to influence policy support. For example, an individual might think that climate change poses a threat to impoverished people, but not see that climate change might also lead to higher prices of groceries, which affects one's economic well-being. Given the right information, this individual might also see this type of risk. If other types of risk perceptions are heightened, it is possible that this will lead to higher support for climate change policies.

1.3.1.2 Values and Risk Perceptions

A distinct possibility is that values underlie the perception of many politically relevant risks. As Kinder (1998) and others emphasize, values influence attitude positions and they provide structure and help people understand the world (Feldman 2003). Given their importance, it seems likely that they also tell people how to understand the risks associated with climate change.

A prominent explanation for why public opinion is predictable is that people have predispositions that help them understand politics. Kinder (1998) contends that public opinion "can be understood as an expression of three 'primary ingredients': the material interests that citizens see at stake in issues; the sympathies and resentments that citizens feel towards those social groups implicated in public disputes; and *commitment to the political principles that various proposals or candidacies seem to honor or repudiate*." (Kinder 1998, p. 780, italics mine)

Principles, the last factor that Kinder thinks is a critical component in understanding public opinion are also known as values. Regardless of whether we call them values, principles, ethea or worldviews, these predispositions influence a long range of factors. Allport (1961) argues similarly that perhaps the most important role in an individual's life is played by values because of the critical role they have in focusing aspirations.

Schwartz and his collaborators have made important empirical and theoretical contributions to the research on values. According to Schwartz (1994), "values express desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity." Schwartz and Bilsky (1987, 1990) propose a value structure system based on the motivational concern of each value. Schwartz (1992) finds evidence of 10 such motivational values (self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence and universalism). Many of the 10 values that are included in Schwarz's model are important also in other research on values. A key finding from the work of Schwartz and his colleagues is that there is a universal value system structure. Value priorities differ between countries, cultures and individuals, but the structure remains the same. Schwartz's research thus verifies something that is implied in many theories about values.

Research on values has resurged in psychology, and it has the potential to help us to understand key political science questions, such as how people organize their political ideas and make sense of politics (for a discussion, see Feldman 2003). Although important efforts have been made to study values in political science (e.g., Inglehart 1997), values research has yet to make the same impact in political science as it has had in psychology.

The values approach holds a lot of promise for political science because when scholars take them into consideration, they can explain variation in attitudes that party identification and other factors do not account for. All else constant, values systematically influence a range of political and social issue positions (e.g., gay rights, support for political candidates, interpersonal trust) (Schwartz 2007). Moreover, results show that Schwartz's values can account for more variance in voting preferences than other demographic and personality factors (Caprara et al. 2006). Since values influence a many attitudes and perceptions, it plausible that they also influence attitudes on climate change.

Global warming can be described in many ways. However, to many people, it is predominantly perceived as a threat towards remote geographical regions (Leiserowitz 2005; Lorenzoni et al. 2006; Nisbet 2009). Perhaps the reluctance among many Americans to support policies that deal with climate change is that it has not been successfully described as a risk to those who hold more individualistic values. To make climate change relevant to more parts of the public and to increase the support for climate change policies, it is plausible that global warming needs to be portrayed convincingly as a problem that poses a threat to what many Americans value. For example, if climate change is perceived as a threat to the economic well-being of individuals (e.g., because of higher insurance premiums or food prices) or a threat to the

United States (e.g., because of more wildfires or floods), global warming might seems as a bigger problem to more people.

1.3.1.3 The Meaning and Definition of Values

Schwartz's (1994) definition of values is similar to Rokeach's (1973), who explains that "a value is an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence." For both authors values can lead to attitudes and attitudes can be held to express certain attitudes.[5] Basic values have several characteristic that researchers agree upon (e.g., Inglehart 1997; Morris 1956; Rokeach 1973; Schwartz 1992). Schwartz (2007) summarizes this conception:

- Values are beliefs. But they are beliefs tied inextricably to emotion, not objective, cold ideas.
- Values are a motivational construct. They refer to the desirable goals people strive to attain.
- Values transcend specific actions and situations. They are abstract goals. The abstract nature of values distinguishes them from concepts like norms and attitudes, which usually refer to specific actions, objects, or situations.
- Values guide the selection or evaluation of actions, policies, people, and events. That is, values serve as standards or criteria.

[5] Values and traits are sometimes confused. Both concepts refer to stable features of individuals, but there are key differences between values and traits. Values describe what is important to people and what goals they want to attain. Traits depict how people are, instead of explaining what intentions that underlie their behavior and attitudes. Moreover, unlike traits, values are used when people want to give reasons to their behavior. The values people promote are positive and desirable to them whereas traits can be both negative and positive.

- Values are ordered by importance relative to one another. People's values form an ordered system of value priorities that characterize them as individuals. This hierarchical feature of values also distinguishes them from norms and attitudes.

It should be clear from this conception that values provide a way for citizens to constrain more specific attitudes. Unlike ideology, another form of constraint, this psychological type of constraint is not only held by a select few, highly sophisticated individuals (Converse 1964), but by most people. Since values are used in many types of daily circumstances and routines, people become proficient in using their values to understand diverse issues, including politics. Political choices become just another type of domain for the application of values. Given this frequent use of values in daily life, even politically unsophisticated individuals can use them to understand politics (Goren 2004).[6]

There are many values and people vary in how much they adhere to them (e.g., Schwartz 1992). This variance in value adherence is essential because it suggests a way to influence attitudes on political issues, including climate change. When a message about climate change is value-infused so that it emphasizes that impoverished people in distant countries are likely to suffer, then those who highly value the needs of the poor should react the strongest. From the value perspective, key to attitude change is to tailor climate change information so it invokes values. When values are successfully targeted, people should perceive higher levels of risk and express support for climate change policies. Climate change poses many types of risks, and it is

[6] Most of the research on values relies on explicit self-reports. Yet values are associated with attitudes also when they are measured by other approaches. Using response time as a measure of accessibility, Thomsen, Lavine and Kounios (1996) show that values are connected to attitudes in predictable ways. For example, the attitude affirmative action is related to equality, the value. Moreover, this research shows that values have more connections to attitudes than vice versa, which suggests that values are used relatively frequently. Presumably, since values have been thought of, used and rehearsed many times, they come to mind rather quickly and influence a range of attitudes automatically.

therefore possible that a many values can be targeted. Next, I turn to what those values might plausibly be.

1.3.1.4 Values that Influence Attitudes on Climate Change

Researchers have wrestled with the nature of values that influence public opinion on environmental issues and climate change, and a consensus is forming around the idea that environmental concern is positively related to three different values (Eagly and Kulesa 1997; Merchant 1992; Milfont, Duckitt, and Cameron 2006; Stern and Dietz 1994).[7] Adherence to any of these values should lead individuals to be more concerned with the threats of climate change and therefore more likely to support policies to reduce the threats.

One of the values that is related to environmental concern is caring for the well-being of all living things (Stern and Dietz 1994; Stern et al. 1995). The value fits the description of what Schwartz calls *universalism*, as the motivational goal of universalism is to protect the welfare of all people (Schwartz 1992). If people value universalism highly and climate change is portrayed as a threat to impoverished people in other countries, then they should perceive higher levels of climate change risk and support climate change policies. To describe climate change this way should be relatively straightforward since it is expected to have some of the worst effect in already relatively poor countries. With warming weather and droughts, it will be harder to grow crops and some types of cereals that grow in Africa and Asia today might not grow there at all in the future. Moreover, with higher temperatures and more extreme weather, infectious diseases are likely to hit poor people disproportionally (IPCC 2007). Universalists who hear about these

[7] Since environmental concern is so closely related to concern about climate change, it is likely that these factors also influence attitudes on climate change (O'Connor, Bord, and Fisher 1999).

types of threats should be likely to see higher risks with climate change and consequently support policy options to reduce climate change.

Another value that is a source of environmental concern is caring for people in your community (Stern and Dietz 1994; Stern et al. 1995). In Schwartz's terminology, this is called *benevolence*, i.e. the "preservation and enhancement of the welfare of people with whom one is in frequent personal contact." (Schwartz 1992) Benevolence is different from universalism in that the latter is about valuing all living things whereas benevolence is related to valuing people close to you. If people value benevolence highly, they should be more sensitive to climate change risks that expose important groups. In the United States, one of the most important groups is that of being American (Huddy and Khatib 2007). Consequently, if global warming is portrayed as a threat to Americans by, for example, emphasizing the threat of wildfires in California, heat waves in the Midwest or hurricanes along the Gulf Coast, Americans who strongly value benevolence should be more likely to see climate change as posing greater risk and support climate change polices.

A more self-centered value, with focus on social power, wealth, and success, is also related to environmental attitudes. Stern and Dietz (1994) write that "[a]lthough many writers presume that egoistic values lead individuals to oppose considerations of environmental justice and to environmental protection as a public policy goal, egoists who believe environmental changes threaten them personally should be proenvironmental." That is, those who are self-centered in this way tend to react stronger when environmental problems threaten them directly (Rohrschneider 1990)

In Schwartz's value terminology, this value is called *self-enhancement*, a broader value captured by the two more specific values *power* and *achievement*. For achievement, Schwartz writes that "[t]he defining goal of this value type is personal success through demonstrating competence according to social standards." Someone who values power also values "control or dominance over people and resources" (Schwartz 1992, pp. 8-9). To increase risk perceptions and support for climate change policies for those who values self-enhancement, the threats of climate change needs to focus on the risks that directly expose individuals. Someone who values self-enhancement highly tends to be especially susceptible to risks that threaten their own path to success and self-determination. If the risk of global warming is described so that it threatens economic well-being, then those who highly value self-enhancement are expected to react most strongly and support climate change policies.

It should be noted that the values discussed above are not necessarily the only ones that might influence attitudes on climate change. One such potential value is postmaterialism, which a rich literature in comparative politics has identified as a construct that helps to explain societal value differences, as well as differences at the micro level. Postmaterialism is based on the idea that as societies develop economically, people move away from materialistic ideals to care about non-material goals such as freedom of speech (Inglehart 1997). However, while this research has brought important focus to the study of values, it has also been criticized. Specifically, one important critique shows that when one of the material goals, fighting inflation, is substituted for another material goal, reducing unemployment, then the shift from materialism to postmaterialism largely vanishes, which means that the recorded value change over the last decades is a measurement artifact (Clarke et al. 1999). Another key criticism is that materialism-postmaterialism is not based on real and underlying value differences at the individual level, but

that responses are caused mostly by chance. Probably because of this, postmaterialism is a poor predictor of social and political attitudes (Davis and Davenport 1999).

Yet even though postmaterialism seems flawed, it is plausible that other values could explain attitudes on climate change. Nonetheless, the values selected for this project have been chosen with care based on the most recent research in values and attitudes on climate change to increase the likelihood that they are, or can be, associated with climate change. Moreover, the values cover several value directions. For example, self-enhancement is associated with right-leaning attitudes on political issues whereas universalism is more in line with the left-leaning attitudes (Feldman 2003; Schwartz 2007). It is therefore likely that if values influence attitudes on climate change, then one or several of the values selected for this project will register this.

1.3.1.5 Infusing Arguments with Values to Alter Attitudes on Climate Change Policies

The model above focuses on how threats to values influence risk perceptions and ultimately support for climate change policies. In a separate study, to explore further how values might alter attitudes on climate change, persuasion attempts are made by infusing arguments for or against policies with values. The idea that is studied, that people perceive information differently depending on their values, is the same as above. However, instead of exploring how people react when values are threatened, policy positions on climate change are justified in terms of values.

In this separate study, I examine how two different values, humanitarianism and free enterprise, can be used to influence attitudes on climate change policies. Humanitarianism is the principle that people should help others in need. A person who adheres to this value strongly is someone who wants to take care of the less fortunate (Feldman and Steenbergen 2001). As for

free enterprise, it is related to support for the free market system and capitalism. People who strongly espouse this value dislike when the government interferes with business and trade (Feldman 1988). Further details on the methodology of this study are laid out in Chapter 2.

1.3.1.6 Summary of the Value Perspective

The value perspective suggests that values influence how people perceive information and risks about climate change. It explains the current division on climate change as an artifact of value differences in public opinion.

To sum up, three values – universalism, benevolence and self-enhancement – should make individuals especially sensitive to the risks posed by climate change. Those who adhere to the value universalism should be particularly sensitive to the risks that target those who are poor. If such threats are salient, those who value universalism should consequently support climate change policies. People who adhere to benevolence should be especially prone to notice threats towards the nation. When the nation is threatened, they support policies to reduce climate change. Finally, those who value self-enhancement should be prone to notice threats that expose themselves. When this happens, they support climate change policies. These connections are described in Figure 1.2.

In Figure 1.2, the risks posed by climate change are described to be separate (i.e., risks to humankind, the nation and one self) rather than unitary. This empirical question is explored in Chapter 3 along with the other hypotheses related to the value perspective.

Figure 1.2 about here

At the most basic level, the idea advocated by the value perspective is that people react differently to information depending on their values. In Chapter 5, I take a slightly different approach to explore this idea. Here, I examine how people react to persuasion attempts on climate change policies when positions are justified with values.

1.3.2 Party Identification and Party Source Cues

While the value perspective offers a plausible explanation for opinion differences on climate change, the other perspective that this dissertation examines, the party cue perspective, also offers a compelling argument as to why the public is divided on climate change. According to the party cue perspective, party leaders persuade fellow partisans to adopt their position. This avoids the need for costly information processing on a topic that can be difficult for ordinary people to follow. From this perspective, it is effective for citizens to trust leaders who share their political predispositions: Democrats listen to Democratic leaders and Republicans follow Republican elites.

There are few political predispositions as important and stable as party identification. Party identification has a special role because most Americans identify with a party and this identification strongly translates to political opinions and behaviors. Party identification simplifies political decisions because it tells people who they should listen to and trust. In general, individuals who identify as Democrats take their opinions from Democratic leaders whereas Republicans identifiers listen to their party leaders (Campbell et al. 1960; Green, Palmquist, and Schickler 2002).

While some Americans consider themselves independents, the size of this group is often exaggerated, as many of the individuals who say they are independents actually are closet

partisans. When individuals who initially say they are independents are prodded on whether they lean towards either the Republican or the Democratic Party, many concede that they do. In fact, the leaners act politically as other partisans; leaning Republicans are Republicans and leaning Democrats are Democrats. The group of pure independents, that is, those who do not lean towards either party, is only around 10% (ANES 2011; Keith et al. 1992)

In recent decades, the role of party identification has grown even stronger (Bartels 2000). In fact, its effect is so profound that even perceptions of seemingly objective issues, such as the national economy, are colored by the party identification (Bartels 2002). Therefore, when the parties disagree, as occurs on climate change, it should have a profound effect on the mass public.

1.3.2.1 The Stability and Impact of Party Identification

The work carried out by Campbell et al. (1960) on the profound stability and effects of party identification has been challenged numerous times (e.g, Fiorina 1981) yet studies have continued to reaffirm the Michigan school's basic ideas and findings underscoring the power of party identification to shape political attitudes and vote choice (Bartels 2002; Carsey and Layman 2006; Green, Palmquist, and Schickler 2002).

Campbell et al. (1960) define party identification as an "individual's affective orientation to an important group-object in his environment" (Campbell et al. 1960, p. 121). Therefore, party identification is much more than a simple record of previous political behavior. Green, Palmquist, and Schickler (2002) state that party identification is a social identity and compare it with a religious affiliation – another deep-seated belief that rarely changes.

Two aspects together make party identification important. First, it is a stable characteristic and not just a running tally of voting behavior. You will retain your party identification almost regardless of what happens in politics (Goren 2005; Green, Palmquist, and Schickler 2002). Panel data indicates that of all the stable political predispositions, party identification is the variable that changes the least over a four-year period (Goren 2005). In other words, just because you hear of a scandal involving somebody from your favored party does not mean that this will influence your attachment to the party.

The second important aspect of party identification is its unique ability to influence political attitudes and perceptions. Its fundamental impact on vote choice has made it a ubiquitous variable in political behavior (Bartels 2000). The strength of party identification is one of the reasons that political scientists can accurately predict election results before the actual campaign takes place. Forecasters know that people who identify with a party are highly likely to vote for that party, and since an overwhelming majority of citizens identify with a party, predictions can be pretty accurate (Norpoth 2004).[8] Besides voting, party identification also influences a range of other attitudes. Bartels (2002) presents some of the most compelling evidence for its pervasive impact. Relying on panel data, he shows that perceptions of seemingly objective conditions such as the level of unemployment, the inflation rate and the state of the economy are viewed through the partisan lens. For example, during a Republican presidency, Democrats view the state of the economy as worse than Republican identifiers.

[8] Traditionally, forecasters also rely on the state of the national economy and presidential approval to predict outcomes. While campaigns can alter election outcomes, especially in close elections, their effects are generally small.

1.3.2.2 Party Source Cues

Campbell et al. (1960) see "party as a supplier of cues by which the individual may evaluate the elements of politics." (Campbell et al. 1960, p. 128) The party cue does the heavy lifting in politics because it quickly tells people what type of information they should focus on and what they should disregard. Most of the time, most people rely on political shortcuts, and party identification tends to be one of the strongest source cues, if not the strongest (Lau and Redlawsk 2001; Page and Shapiro 1992; Zaller 1992).

The main advocate of the elite model of persuasion is John Zaller who outlines his model in his often-quoted book, *The Nature and Origins of Mass Opinion*. A central component of his model is the flow of elite opinions on public opinion. When elites are united, and they provide a one-sided message on an issue (e.g., for intervention in Vietnam), the public will consequently be persuaded by leaders, yielding a "mainstream pattern" where individuals agree with elites. This effect is especially pronounced among the most politically aware because they are the ones who are most likely to receive and accept elites' message (Zaller 1992).[9]

When elites diverge on policy, and produce a "two-sided information flow" (e.g., prowar versus antiwar), people will also diverge in a predictable pattern. Using the example of the Vietnam War, Zaller shows that individuals with a dovish predisposition grew increasingly critical of the war as the news media started to report antiwar stories. Importantly, it was the most politically aware doves that reacted this way. Equipped with better capabilities to resist the dominant prowar message between 1964 and 1966, they gravitated to the relatively few stories

[9] People really do not have attitudes as they are usually thought of. Rather, people have considerations that they sample every time they give a response. What considerations that are salient at the moment color what response is given. When more permanent attitude change happens, it means that considerations in favor or in opposition of an issue have been altered .

about antiwar leaders. As the antiwar message became stronger in the news media over time, doves with moderate awareness also became critical of the war. As for hawks, and especially the politically aware hawks, they continued to support the war because the prowar message persisted in the news media. In sum, the main point from Zaller's analysis is that public opinion on political issues is a product of the "relative intensity of competing political communications on those issues" and depending on political predispositions and political awareness, that can produce polarization, as it did during the Vietnam War (Zaller 1992, chapter 9).

In a similar vein, Berinsky (2007, 2009) finds that when leaders diverge on foreign policy, and provide cues to fellow partisans, they tend to be influenced by their leaders. Based on data from World War II and the Iraq War, he finds that people pay attention to elite cues rather than to battlefield conditions (e.g., causalities). The elite cue model differs slightly from Zaller's model in that it places less importance on the balance of information but instead focuses on cues. In this model, when a prominent leader such as George W. Bush sends a strong prowar message, this gives information not only to Republicans that they should support the war, but also to Democrats who – given that their Democratic leaders do not follow suit – will oppose the war because they do not trust a Republican president. Democratic leaders would have had to voice support for the war in order for Democrats to support it.

Importantly, Berinsky (2007, 2009) finds that distinct elite messages in time of war influence partisans differently depending on their political awareness. As political awareness increases, and thereby knowledge of elite positions, public opinion polarizes along party lines. There was an enormous difference in support for the war between highly aware strong Democrats and strong Republicans, but a much smaller among the least politically aware. Thus,

by using the same type of variables as Zaller (party identification/political predisposition, political awareness and issue position), he replicates the support for the elite model of influence.

1.3.2.3 The Party Cue Perspective Applied to Climate Change

When the party source cue perspective is applied to climate change, it suggests that the more politically aware partisans should be the most polarized since the parties are sending divergent cues. The partisans who are the most attentive, the ones who follow the news the closest, should be the ones that are the most influenced by their leaders because they are more likely hear their party leaders' message. In fact, there is already some empirical support for the perspective.

Democrats and Republicans who claim to be more knowledgeable about climate change are more polarized on global warming than Democrats and Republicans with less knowledge. Specifically, Republicans who say that they understand climate change a moderate to a great deal are likelier to say that climate change is not happening than less knowledgeable Republicans. In contrast, Democrats who say they know a lot about climate change high are more likely to say that climate change is happening now and that it is mainly caused by human activities than the least aware Democrats (Hamilton 2011). Other studies rely on the same type of self-assessed knowledge question and find the same interaction between party identification and self-reported knowledge of global warming. The interaction influences perceptions of the seriousness of global warming (Malka, Krosnick, and Langer 2009) and whether the effects of climate change have already begun and whether human pollution is the primary cause of climate change (McCright and Dunlap 2011). The problem with these type of studies is that they rely on self-reports of knowledge and not objectively verified political awareness. It is plausible that those

who say that they know a lot about climate change are simply using that question to express already formed and strong attitudes about climate change and not their actual level of awareness. In other words, the direction of causality is questionable.

A better way to look at this issue is by treating education as a proxy for political knowledge. The assumption is that higher educational attainment is related to higher political awareness. In one poll question about whether climate change is caused by humans, the Pew Research Center for People and the Press finds that the attitudinal gap between the most educated Republicans and Democrats is much larger than the gap between Republicans and Democrats that did not graduate from college (56 and 21 percentage points, respectively) (Kohut et al. 2008). While the Pew pollsters do not explain their findings in terms of support for the party cue perspective, this type of finding suggests that the party cue has merit.

Another piece of evidence that gives support to the party cue perspective is the growing partisan divide on climate change. McCright and Dunlap (2011) use Gallup polls conducted over a ten-year period to demonstrate that Republicans and Democrats are more polarized today than ever before. They interpret this finding, together with what they perceive as elite polarization, as evidence for the influence of leaders on fellow partisans.

While the evidence above suggests that party cues are important, it is nevertheless not conclusive. The self-reported knowledge measure that some studies rely on is not very useful as an indicator of party cues. It might just be a reflection of other climate change attitudes rather than actual knowledge and it might not measure exposure to elite arguments. As for education as a proxy of attention, it is just that – an imperfect proxy for attention and not real attention. The growing gap between partisans that McCright and Dunlap (2011) find could be caused by other

factors than party leaders sending diverging messages. Potentially, as climate change becomes a more salient issue, more people seek out information about the topic, and as they do so, individuals sort themselves out along policy positions, without listening to political leaders.

To my knowledge, no studies have applied the Zaller/party cue model to examine public opinion on climate change. The main problem with prior studies is that they do not study real political awareness. To reduce this gap in the literature, I will conduct such a study. I will also test the party cue perspective in an experimental study, to determine the causal relationship between elite partisan cues and public opinion. This is the first experimental study of this kind.

1.3.2.4 The Relative Effects of Party Cues and Values

Undoubtedly, party identification and values are both highly influential long-term predispositions (Kinder 1998) yet there is evidence that suggests that party identification is the more stable and stronger of the two. Goren (2005) finds that rather than values influencing party identification, the latter is influencing the former. Specifically, he finds that when partisans are exposed to a party leader's value-based message, they see this message through a partisan lens and become supportive of the value if they share the same party as the leader, but oppose the value if they do not share the party affiliation. The findings rely on panel data, which allow Goren to make causal claims with greater certainty than if he had relied on cross-sectional data. Goren et al. (2009) provide more supporting evidence for this conclusion with their use of experimental data. In their experiment, they find that when partisan cues are embedded in an experiment, that increases or reduces the support for values depending on party cues and the party identification of the participants.

In addition, in a series of intriguing experiments, Cohen (2003) attests to the guiding role of party identification. He finds that party identification, has a strong effect on social welfare policies. People rely on ideology when there are no party source cues present, but once information about party leaders' positions is available, participants rely on source cues rather than their ideology. Now, ideology is not a value, but rather a mix of considerations, including group attitudes (Conover and Feldman 1981) and it is doubtful that many citizens have an ideology in the traditional sense of the word (Converse 1964) so that party trumps ideology is not entirely surprising. That said, Cohen's (2003) results do indicate that party identification is a powerful predisposition.

The studies above suggest that party identification trumps values, but the evidence is nevertheless not decisive on their relative effects on policy attitudes. To sort out their influence on climate change policies, values and party source cues are experimentally altered in this dissertation to see which predisposition that is most important.

1.3.2.5 Conditional Effects of Party Cues and Values

The discussion above suggests that the best way to influence attitudes on climate change is either to appeal to values or to use party cues, but the reality might be more complex; it is possible that the effects of values and party cues depend on each other, that there are interactive effects. Values may influence attitudes, but persuasion on climate change with values may need to be combined with partisan cues.

One possibility is that elite persuasion that relies on party cues works better when leaders base their appeals on values rather than if they do not. Accordingly, it does not matter what type of value party leaders rely on – what matters is that they use them to persuade. Specifically,

when Republican elites appeals to values, they become more persuasive among supporters of the Republican Party because values strengthen their arguments. Since Republican identifiers trust Republican leaders, they are more likely to process information in a more systematic manner, and therefore be more persuaded. In contrast, when Democratic partisans encounter Republican leaders, they will not be persuaded because they instinctively disregard Republicans information, irrespective of what it is. The same thinking applies to Democratic leaders; they should be more effective at persuading fellow Democrats when they appeal to values rather than if they simply use their standing as party leaders to persuade. Since Republican identifiers tend to ignore what Democratic leaders say, a message infused with values should not resonate more in this group.

A more fine-grained explanation of how elites influence public opinion is that values and party identification must be congruent, and only then can party leaders influence their fellow partisans. As for Republicans, it is possible that when they try to persuade ordinary Republicans, they are more effective when they base their arguments on values that fit its profile as a free-market party compared to if Democratic leaders make such arguments. While the Republican Party has partially been blamed for causing the late-2000s recession,[10] the party is traditionally associated with laissez-faire capitalism and fiscal conservatism (Petrocik 1996). In fact, even though Americans in general tend to identify more with the Democratic Party over the Republican Party (Dienstfrey 2011), the Republican Party has a perceived edge at generating economic growth – 10 percentage points over the Democratic Party (Young and Clark 2011). Moreover, people who identify with the Republican Party and therefore trust Republican leaders

[10] The blame for the recession falls on many people, factors and groups. Factheck.org lists the following as responsible: the Federal Reserve, homebuyers, Congress, real estate agents, the Clinton Administration, mortgage brokers, Alan Greenspan, Wall Street firms, the Bush Administration, the mark-to-market rule, and collective delusion .

are the ones who care more about deregulation and support market capitalism (Erikson and Tedin 2011). In short, given the Republican Party's association with the principle of free enterprise, it is likely that Republican identifiers will be more persuaded by arguments based on this value. Democrats, on the other hand, are less likely to listen to Republican leaders and therefore ignore their arguments altogether.

As for Democratic elites, they may be more effective when they rely on arguments based on the value of humanitarianism since the party is traditionally associated with supporting individuals in need (Erikson and Tedin 2011; Petrocik 1996). When Democratic leaders try to sway the public on climate change, they are expected to be more effective among Democratic identifiers when they appeal to humanitarianism compared to if they do not. People who identify with the Republican Party should in contrast not be influenced by arguments infused with humanitarianism since they do not trust Democratic leaders.

1.3.2.6 Media Analysis of the Parties

If the party cue perspective is true, then we should see leaders diverging on climate change in the media. To reiterate, the perspective states that people tend to take their political opinions from trusted political elites. Those who identify as Republicans listen to Republican leaders while Democrats take their cues from Democratic leaders. Therefore, when elites have different issue positions, this is reflected in the public. Partisans who pay the most attention to elite cues are the most likely to diverge when elites send competing messages on an issue (Berinsky 2007; Zaller 1992). To examine if partisans really are exposed to conflicting partisan messages in the media, I conduct a content analysis of news media coverage of partisan positions on global warming.

There is already evidence suggesting that partisan leaders diverge on climate change. First, there is public opinion evidence. During the last decade, there has been a noteworthy polarization among ordinary people. Not only is there a difference in policy support, but people also differ in their beliefs about whether climate change as real or not. In 2008, 76% of Democrats said that global warming is happening whereas only 42% of Republicans held this opinion. Ten years ago, the gap was a mere four percent (Dunlap and McCright 2008; McCright and Dunlap 2011).

In addition, there is also anecdotal evidence in the press that the Republican leaders tend to oppose legislation that aims to reduce greenhouse gas emissions whereas Democrats support it. A number of high-profile Democrats argue that there is a need to enact legislation to stop greenhouse gas emissions. For example, Barack Obama has come out forcefully in defense of climate change policies. *The New York Times* quoted him saying that "[n]ow is the time to confront this challenge once and for all" and that "[d]elay is no longer an option. Denial is no longer an acceptable response." (Broder 2008). Moreover, the former vice-president and presidential candidate Al Gore who launched a strong campaign for action on climate change with his movie *An Inconvenient Truth* has generated a lot of publicity in favor of climate change policies. Republicans, on the other hand, criticize Democrats for being mistaken about global warming. Al Gore has been a particular lightning rod on this issue. Jim Inhofe, the Republican Senator from Oklahoma, said, "Al Gore has done his movie. Almost everything in his movie, in fact, everything has been refuted. Interestingly enough, the I.P.C.C. -- on sea levels and other scare tactics used in that science fiction movie -- it really has been totally refuted and refuted many times." (Herszenhorn 2008) A common theme among Republican critics of climate change policies is that regulating greenhouse gases will be too costly. For example, the Bush

administration rejected the “fatally flawed” Kyoto deal because it would hurt the U.S. economy (Coleman 2007).

Moreover, a partisan divergence makes intuitive sense because it fits with the ideological differences of the parties. During the Reagan administration the Republican Party became more opposed to environmental regulation in general and climate change regulation in particular. Republicans reasoned that if climate change were to become an important issue, then it would pose a threat to continued economic growth, the free market and sustained governmental deregulation. Moreover, the solutions to climate change threatened national sovereignty because they would require binding international treaties. Republicans opposed such treaties because then the U.S. Constitution would no longer be the supreme law of the country. In the meantime, Democrats began to point out the problems with climate change with Al Gore as one of the earliest among Democrats to make climate change an important issue. The ideological differences on the issue that were established during Reagan remain today (McCright and Dunlap 2003).

Although there is evidence that elites disagree, there are Republican leaders such as John McCain and Lindsey Graham who say that climate change is happening and is mainly caused by humans. They are thus going against what seems to be the traditional party line. McCain has worked with Democrats on a cap and trade policy and his presidential platform included policies to reduce greenhouse gases. Lindsay Graham, the Senator from South Carolina, has written an op-ed article together with John Kerry to call for action to control emissions of heat-trapping gases. Moreover, it is not entirely clear how cohesive the Democrats are because not all Democrats support climate change legislation. For example, Democrats from states that depend

more heavily on fossil fuels such as coal are hesitant about climate change legislation (Broder 2009). Thus, this type of anecdotal evidence goes against the notion that leaders are polarized.

While there are examples of party leaders going against what seems to be the party line, it might nevertheless seem like a forgone conclusion to test a hypothesis about elite polarization in the media, but it is necessary in order to provide a complete picture of the party cue perspective. The parties will have to send conflicting messages on climate change, otherwise the party cue perspective is incomplete as an explanation. Since there are no recent studies on elite opinions on climate change, and because such a study would cast additional light on the party cue explanation, I am conducting a content analysis of how party elites have been discussing climate change in the media over the last years. Moreover, a media analysis can give a more precise view of to what extent leaders diverge.

1.4 Hypotheses

Two broad perspectives on the determinants of climate change attitudes are examined in this dissertation: the value perspective and the party cue perspective. First, I turn to hypotheses related to the value perspective and then I develop hypotheses associated with the party cue perspective. In addition, at the end of the hypothesis section, I put forward hypotheses that are combinations of the party cue and the value perspective.

1.4.1 The Value Perspective

1.4.1.1 Values Influence Attitudes on Climate Change Policies

In simplest form, the value hypothesis suggests that values influence support or opposition to climate change policies. I look at both standing associations between values and policy attitudes (hypothesis 1a) and examine how easily these connections can be altered in an experiment (hypothesis 1b). In the experiment, the nature of the risks is described to target universalism, benevolence and self-enhancement. Specifically, I expect that if universalism is threatened, then people who adhere to universalism increase support for polices, if benevolence is threatened, then people who adhere to benevolence increase support for policies and if self-enhancement is threatened, then people who adhere to self-enhancement increase support for policies. Essentially, the experiment examines how easy it is to change these associations by reframing the nature of the risks posed by climate change.

Hypothesis 1a: The more people adhere to universalism, benevolence or self-enhancement, the more they will support climate change policies.

Hypothesis 1b: If climate change threatens universalism, benevolence or self-enhancement, then people who strongly adhere to a threatened value will increase their support for climate change policies.

In a further test of the value perspective, I examine whether value justifications are effective at altering attitudes on climate change polices. In this experiment, instead of studying whether values condition how people perceive risks and therefore support policies, attempts to change attitudes on climate change policies are based on appeals to the values humanitarianism and free enterprise. Those who adhere to humanitarianism are expected to be more influenced

when persuasive messages are infused with humanitarian arguments and people who value free enterprise should be more affected by persuasive messages that are built on free market arguments.[11]

Hypothesis 1c: If a message that aims to alter attitudes on climate change policies is based on appeals to humanitarianism or free enterprise, then people who strongly adhere to the value will change their attitudes on climate change policies.

1.4.1.2 Texture in How People Perceive Climate Change Risks

I then turn to examine whether the perceived risk of climate change mediates the link between values and policies, and test whether specific types of threats interact with existing values to affect risk perceptions and ultimately policy attitudes.

The section on how risk perceptions influence attitudes on climate change suggests that risk perceptions are more complex than is currently acknowledged. The question is thus whether risk perceptions can be disentangled. Specifically, do people distinguish between the subjective risks of climate change to humankind, the nation and one self? This issue matters because measuring the overall risk posed by climate change may miss some pathways between values and risk estimates that may enhance or dampen support for climate change policies.

Hypothesis 1d: People differentiate between the subjective risks of climate change to humankind, the nation and one self.

[11] More details about this slightly different focus are laid out in Chapter 2 and Chapter 5.

1.4.1.3 Values Influence Risk Perceptions

Since values influence a long range of political attitudes (Feldman 1988, 2003; Kinder 1998), exist in all cultures (Schwartz 1992, 1994), are activated automatically (Thomsen, Lavine, and Kounios 1996) and are inherited (Alford, Funk, and Hibbing 2005) it seems plausible that they also influence how individuals perceive risks. To influence risk perceptions appears essential because once risk is perceived to be high it affects policy preferences.

As discussed above, there may be standing associations between values and risk perceptions (hypothesis 1e). In addition to the analysis of chronic associations, I study whether these associations can be altered experimentally (hypothesis 1f).

If people are sensitive to certain risks depending on their values, then it should be possible to change risk perception on climate change by describing climate change so that it threatens what people value. Specifically, if universalism, benevolence or self-enhancement is threatened, then people who adhere to a threatened value will increase their perception of climate change risk.

Hypothesis 1e: The more people adhere to universalism, benevolence or self-enhancement, the more they will perceive climate change as posing increased risk.

Hypothesis 1f: If climate change threatens universalism, benevolence or self-enhancement, then people who strongly adhere to a threatened value will perceive climate change as posing increased risk.

All hypotheses related to the value perspective are tested in Chapter 3 except hypothesis 1c, which is tested in Chapter 5.

1.4.2 The Party Cue Perspective

1.4.2.1 Party Leaders Diverge on Climate Change

Leadership positions in the news media are central to the party cue perspective because that is how ordinary citizens are persuaded (e.g., Berinsky 2007). If the party cue perspective is accurate, then there should be a divergence between the party leaders in how they approach climate change with Democrats calling for regulation of greenhouse gases and Republicans policy-makers opposing them.

It might seem unnecessary to even set forth and test a hypothesis about leadership positions on climate change because the anecdotal evidence of the party leadership gap is strong. However, the current literature does not give a clear picture of whether the parties disagree and, if so, to what extent. Hypothesis 2a is tested in Chapter 4.

Hypotheses 2a: Democratic leaders are more supportive of climate change legislation than Republican leaders.

1.4.2.2 Party Cues Influence Attitudes on Climate Change Policies

The explanation that party identification influences attitudes on climate change follows from the well-established finding that people rely on cognitive shortcuts to reach decisions in a complex information environment.

Few political predispositions are as important, as stable and have such an effect on political attitudes as party identification (Campbell et al. 1960; Green, Palmquist, and Schickler 2002). While studies have found that support for climate change policies are influenced by party identification (Dunlap and McCright 2008; Malka, Krosnick, and Langer 2009; McCright and

Dunlap 2011) they rely on cross-sectional data and can therefore not speak to the central issue of causality. To solve the issue about what is causing what, I constructed an experiment to test hypothesis 2b. I expect that Democratic elites, compared to Republican elites, will be more effective at persuading policy attitudes of ordinary Democrats and that Republican leaders, relative to Democratic leaders, will be more effective at changing policy attitudes of fellow Republicans. Hypothesis 2b and the hypotheses in the next section are tested in Chapter 5.

Hypothesis 2b: If party leaders take a position on climate change policies, then fellow ordinary partisans will change their position on climate change policies in the same direction.

1.4.3 Combination of Party Cues and Values

In addition, I test whether persuasion based on party cues is more effective if it is made in conjunction with appeals to values. For value appeals to work, they may need to be made by a trusted source, which fellow party leaders are. It is possible that party elites are more effective when their message is value-laden rather than if it is based simply on party source cues alone.

Only when leaders and identifiers share the same party is it likely that value-appeals will make a difference because partisans tend to disregard what leaders from the opposing party say, regardless of what it is. In contrast, partisans listen more attentively to leaders from the same party and what leaders say is therefore more likely to make an impact.

Hypothesis 3a: If party leaders take a position on climate change policies and rely on values to justify it, then fellow ordinary partisans will change their position on climate change policies in the same direction.

It might be more complex than what hypothesis 3a suggests, as persuasion attempts based on values may need to be congruent with partisan expectations. Thus, it is possible that Republicans, because of their tradition with promoting market-based solutions, are more persuasive when they rely on appeals to free enterprise. Likewise, Democrats have a tradition of humanitarianism and may therefore be more persuasive when they make arguments based on humanitarian principles.

Since party leaders who share the same party are trusted elites, fellow partisans tend to listen to what they say. According to the same logic as above, this type of party cue persuasion should be more effective when party leaders encounter fellow partisans because they listen more attentively to their own leaders.

Hypothesis 3b: If Republican leaders take a position on climate change policies and rely on the value of free enterprise to justify it, then Republican partisans are more likely to change their position on climate change policies in the same direction.

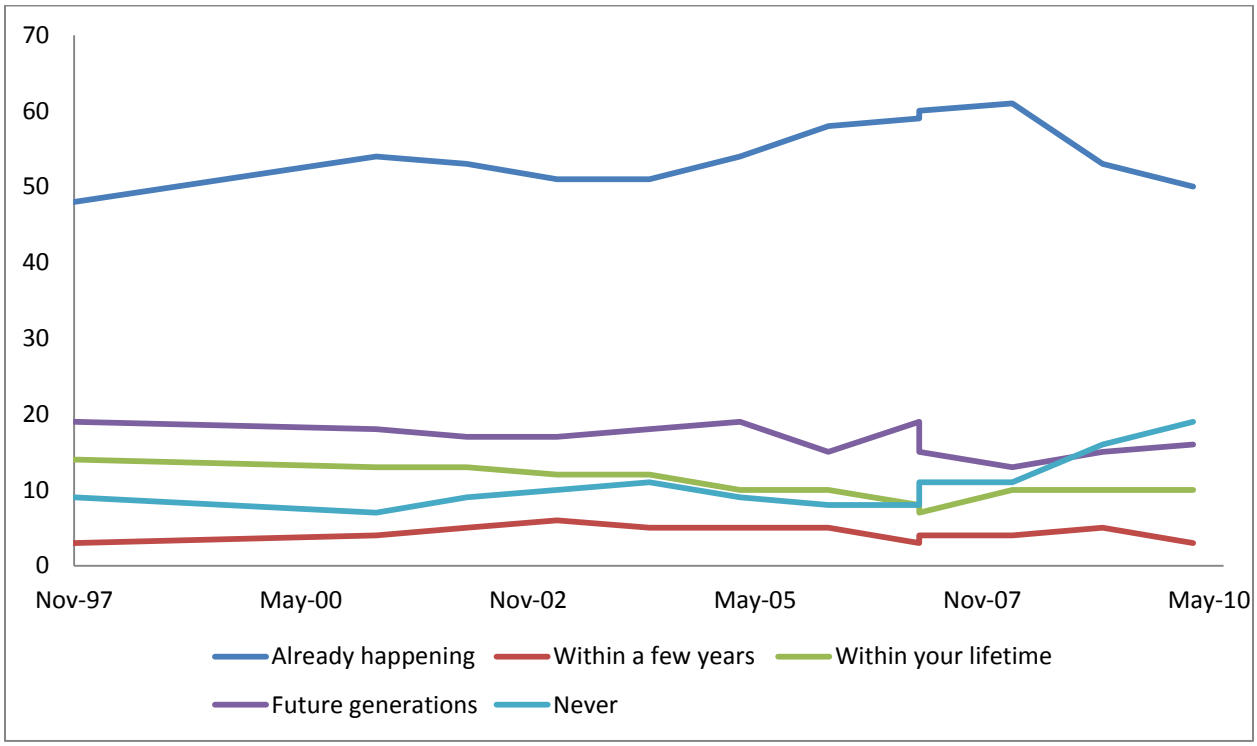
Hypothesis 3c: If Democratic leaders take a position on climate change policies and rely on the value of humanitarianism to justify it, then Democratic partisans are more likely to change their position on climate change policies in the same direction.

Table 1.1 When Climate Change Will Happen

	Nov-1997	Mar-2001	Mar-2002	Mar-2003	Mar-2004	Mar-2005	Mar-2006	Mar-2007	Mar-2007	Mar-2008	Mar-2009	Mar-2010
Already happening	48	54	53	51	51	54	58	59	60	61	53	50
Within a few years	3	4	5	6	5	5	5	3	4	4	5	3
Within your lifetime	14	13	13	12	12	10	10	8	7	10	10	10
Future generations	19	18	17	17	18	19	15	19	15	13	15	16
Never	9	7	9	10	11	9	8	8	11	11	16	19

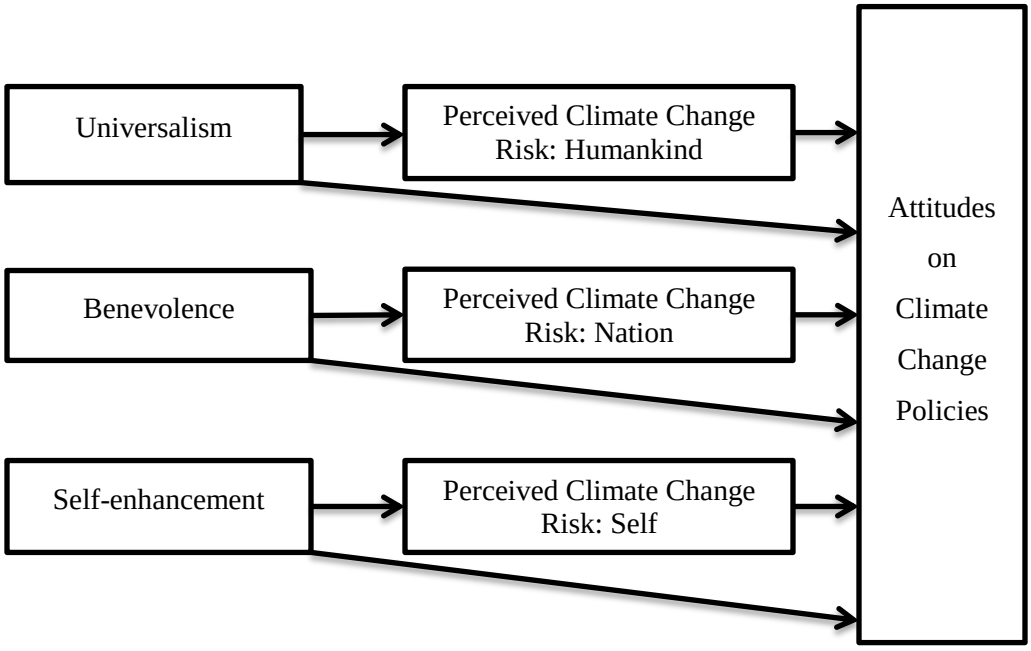
Note: Entries are percentages. Gallup conducted the surveys.

Figure 1.1 When Climate Change Will Happen



Note: Figure depicts data from Table 1.1.

Figure 1.2 The Relationship between Values, Risk Perceptions and Attitudes on Climate Change Policies



Note: The figure describes the expected relationship between values, perceptions of climate change risks and attitudes on climate change policies. In the figure, risk perceptions are separate, but they might also be portrayed as unitary depending on the support for hypothesis 1d.

2

Methodology

To examine how attitudes on climate change are shaped and structured, I conducted four studies: the student values study, the adult values study, the risk perceptions study and the party cues and values study. In addition, I conducted a content analysis and analyzed ANES data. The latter two studies are discussed in chapter 3 and 4, respectively.

The purpose of the student and adult values studies, which were very similar, was to examine how values influence attitudes on climate change policies and the perceived dangers of climate change.

A third study examined the structure of risk perception. The goal of the study was to examine whether respondents differentiate among several types of risks associated with climate change or treat them as unitary. In other words, the study explores whether climate change risks can be differentiated into risks to humankind, the nation and to one self.

The goal of the fourth study was to pit two explanations – the value-based perspective versus the party cue perspective – against each other to see which one most effectively explains climate change attitudes.

2.1 Student Values Study

2.1.1 Sample

The student values study on how values influence climate change perceptions relied on a convenience sample of Stony Brook University students enrolled in political science courses. The students participated in the experiment in exchange for course credit. The study was conducted during the fall of 2008 (November 24-December 11) in a computer lab at the Department of Political Science at Stony Brook University. One hundred and twenty-seven students participated in the experiment.

Table 2.1 demonstrates that the sample was split relatively evenly on gender (53% female and 47% male). Twelve percent were of Hispanic background and 88 percent were Non-Hispanics. The sample included 53% Whites, 5% Blacks, 24% Asians and 19% other. Seventy-four percent were Democrats (including respondents who were leaning Democratic), 6% Independents and 20% Republicans (including Republican leaners). The mean age for the sample was 20.5 years old. All students were in the age group 18 to 34. Twenty-eight percent were freshmen, 9% sophomores, 26% juniors, 33% seniors and 5% had been in college for more than four years.

Table 2.1 about here

2.1.2 Overview of the Questionnaire

The questionnaire contained 94 questions and it was divided into several sections. First, in order to familiarize participants with the computer format of the survey, they were asked questions about the direction the country was heading in. This was followed by the experimental

treatment, in which participants were randomly assigned to read one of three fictional newspaper articles or to a control condition. Subjects in the control group did not read any article. After the experimental treatments, respondents were asked three factual questions about the content of the article (control group subjects did not get these questions) and thereafter they were polled about their views on climate change, including perceptions of risks and opinions on climate change policies. Subsequently, 18 questions measured participants' values. Next, traditional ANES-worded questions measured party identification, ideology, vote choice, trust in the government and political awareness. Moreover, the survey polled participants' background (e.g., race, ethnicity, age, place of birth). These questions were included so that the various samples in this dissertation could be compared. They were also included so that random assignment to conditions could be verified. Lastly, if participants read an article about climate change risks, they were asked how credible, engaging, interesting and compelling they thought it was.

2.1.3 Experimental Treatments

The experimental treatments consisted of fictional newspaper articles designed to mimic online news articles. Participants were randomly assigned to one of three experimental treatments or to a control condition. They will be referred to as the universalism condition, the benevolence condition, the self-enhancement condition and the control condition. In all conditions, except the control condition, participants read an article that highlighted certain risks with climate change. The texts of all articles are included in Appendix A.

Before reading the article, participants were told that "[t]here has been a lot of recent discussion in the news media on the issue of global warming or what some people refer to as climate change. We are interested in what people learn from such news stories. Please read the

story on the next page carefully. You will be asked to answer some questions about the article when you have finished reading it." While it was true that I wanted to see what people took away from the article's content, the primary purpose of the article was to induce heightened risk perceptions. The introduction to the article was designed to increase the chance that participants would read the article attentively and remain unaware of possible alternative conditions.

While the articles differed by condition, as will be illustrated in the next sections, they shared a substantial part of their content.[12] For example, the first three paragraphs of the articles were the same:

> The rise in global carbon dioxide emissions last year outpaced international researchers' most dire projections, according to figures being released today, as human-generated greenhouse gases have continued to build up in the atmosphere.
>
> The new assessment – which took more than 200 experts to complete – paints "a bleak picture," leaders of the project wrote in a paper being published in the journal Science.
>
> In 2007, carbon released from greenhouse gases increased 2.9 percent over that released in 2006, according to scientists that track emissions. This output is at the very high end of scenarios outlined a few years ago by the scientific community and could translate into a global temperature rise of more than 9 degrees Fahrenheit by the end of the century, according to the new estimates.

The articles also ended in the same way:

> "The sense of urgency when you put these pieces together is new and striking," said Martin Parry, a climate expert who was co-chairman of the delegation that wrote the report.
>
> "Some of the things we projected to occur in 2050 are likely happening already in the next few decades. What we didn't get is how fast and how big it is, and the degree to which ordinary people would be influenced," Parry said in an interview. "Our mistake was in underestimation."

[12] While it was important that the manipulations were different enough to create a heightened level of concern for each specific value, this had to be balanced with the worry that the manipulations would differ too much, and thus having confounding factors influence the results. Therefore, the manipulations were similar in format and text.

2.1.3.1 The Universalism Condition

In the universalism condition, the article focused on the impact on *people in other countries*, especially those living in the poorer regions of the world. In this article, respondents read that these people experience food shortages as rising temperatures reduced rainfall and diminished or destroyed some types of agriculture. Moreover, the article stated that as the climate changed, diseases would spread to more people in Africa, Asia and South America. A range of effects would hit these regions, as is illustrated by the following paragraph:

> The report estimates that people in Africa are especially vulnerable to the effects of climate change. The fallout from a swiftly warming planet – extreme weather, flooding, rising sea levels, erosion of coastal areas, migration and expanding deserts – will only exacerbate troubles in the world's poorest continent. Countries in Africa are particularly vulnerable because they are lacking in governmental capacity to combat the changing weather.

2.1.3.2 The Benevolence Condition

In the benevolence condition, the article emphasized how *Americans*, a central group to many people living in the United States, would be negatively affected by climate change. Higher temperatures would lead to drier summers, more wildfires, and an increased prevalence of tropical diseases such as dengue fever and the West Nile virus, which were said to affect the elderly and the very young disproportionally. People in the United States would feel the impact of more extreme weather in several ways as indicated by the following paragraph:

> The report estimates that American coastal areas, such as the Gulf Coast, are especially vulnerable to the effects of climate change. Hurricanes and tropical storms have always bedeviled the coasts, but global warming are making matters a lot worse. Sea levels are rising and will continue to rise as oceans warm and glaciers melt, leading to higher storm surges, coastal flooding and storm damage along the United States coasts. In addition, the associated heavy rains can extend hundreds of miles inland, further increasing the risk of flooding. The damages are very likely to lead to injuries, fatalities and high reconstruction costs.

2.1.3.3 The Self-Enhancement Condition

Lastly, in the self-enhancement condition, the article stressed how people would feel the effects *directly themselves*. Subjects assigned to this condition were told that because of changes in the climate, agricultural production would go down and that would lead to higher food prices, which would affect them directly. In this condition, climate change was not something remote that only influenced people in other countries or other Americans. Everybody, meaning the reader as well, were at risk, and the effects of climate change would be felt in their pocketbooks as the next paragraph shows:

> The report estimates that regular people will notice the effects of climate change on their pocketbook in other ways as well. Energy costs will increase as more air conditioning is needed in the summer, and insurance costs will rise because of damage due to extreme weather such as hurricanes, which are expected to increase along the eastern seaboard reaching as far north as Boston.

2.1.4 Risk Perceptions

Questions that tapped factual recall of the article content came immediately after the experimental treatments and then followed questions about risk perceptions.[13] The perceived risks of climate change serves as one of the dependent variables in this experiment. If the experimental treatments were successful, then the risk perceptions questions should register this by increasing the perceived risk of climate change.

[13] The three following questions were used to check knowledge (close-ended response options in parentheses, correct answer in bold): 1. In what journal did the scientists publish their findings? (Nature, Proceedings of the National, Academy of Sciences, **Science**, Journal of Climate, Don't know) 2. If the carbon dioxide emissions continue to increase as they did in 2007, what is the likely global temperature rise at the end of the century according to the new estimates? (6 degrees Fahrenheit, **9 degrees Fahrenheit**, 12 degrees Fahrenheit, 15 degrees Fahrenheit, Don't know) 3. The head of Columbia University's Earth Institute is cited in the news article. What is his name? **Jeffrey Sachs**, William Morgan, Christopher Ferguson, Andrew Schaffer, Don't know)

I divided climate change risks perceptions into to three categories of different types of risk: humankind at risk, nation at risk and self at risk. These parallel the content of the three treatment conditions. Four questions tapped risks to humankind (e.g., How serious a threat will global warming pose to people around the world, living in many different countries, in your lifetime?) These questions focused on the risks to those outside one's immediate environment, such as to people in Africa and Asia. Four questions measured risks to the in-group/Americans (e.g., How serious a threat do you think global warming will pose to Americans or the American way of life in your lifetime?) The questions were about the risks of heat waves and diseases hitting the U.S., and the likelihood of the U.S. economy suffering because of the effects of climate change. Three items tapped climate change risks to self (e.g., How serious a threat will global warming pose to you and your way of life during your lifetime?) The questions asked about risks to the respondents' personal health and economy. All the respondents answered all the questions, regardless of condition. Please see Table 2.2 for the questions.

Table 2.2 about here

In addition, the following question was asked in order to measure climate change risks in general: "How serious of a problem do you think global warming is right now?" This question is used frequently in news organization polls, e.g., ABC News/Washington Post. Moreover, two questions about climate change risks unrelated to any of the experimental treatments were included. One asked about the risks to polar bears and the other about risks to people living in New York State. They were included to see if the effects of the conditions also influenced other domains of climate change risks. In sum, risk perceptions were measured by 14 items in total. Everyone was asked the 14 risk questions, irrespective of experimental condition.

2.1.5 Climate Change Policies

Climate change policies were measured after the risk perception questions by ten items. The items are described in Table 2.3. The policy questions are all related to policy proposals mentioned in the political debate. The set of questions were introduced to participants in the following way:

> U.S. government officials are thinking about ways to reduce the amount of carbon dioxide that is put into the air. We would like your opinion on several possible ways to do this. You might think they are all good ideas. You might think they are all bad ideas. Or you might think some are good and others are bad. For each policy, please indicate how much you support or oppose it.

Participants were asked about, for example, cap and trade, mileage standards of vehicles, international climate change treaties and taxes on gasoline. For each policy item, respondents could select strongly oppose, oppose, support or strongly support.

Table 2.3 about here

2.1.6 Values

Three values are of primary interest for this study: universalism, benevolence and self-enhancement. Those match the risks varied in the treatments. People who value universalism highly are primed to care for those outside their immediate group. Presumably, they should be more likely to respond to risks to people abroad. Those who value benevolence should be more concerned with the well-being of people from the same group. Thus, since Americans is a central group for people who live in the United States, people who score high on benevolence should be sensitive to risks to this group. Self-enhancement is about being able to take care of oneself and not rely on other people. When this is at risk, then people who value self-enhancement should respond stronger.

I rely on Schwartz's Portrait Values Questionnaire (PVQ) to measure values. The PVQ describes fictional people in terms of the goals and wishes that are important to them. The respondents' then rate how close the fictional person is to him or her. For example, one of the items that measure universalism was worded like this: "He thinks it is important that every person in the world be treated equally. He wants justice for everybody, even for people he doesn't know."[14] Participants used the following scale to rate their similarity: Very much like me, Like me, Somewhat like me, A little like me, Not like me, Not like me at all. The three values of interest were measured by 11 items described in Table 2.4.

The PVQ measures the same values as Schwartz's traditional value scale, yet the advantage with using the PVQ is that it makes it easier for respondents to understand the meaning of values. The PVQ has been used in three rounds in the European Social Survey and has been validated in the NES 2006 Pilot study. While it might seem problematic that values are measured indirectly because people are describing themselves through someone else, analysis of the NES 2006 Pilot shows that this question format measures what is supposed to and is as effective as the traditional measure. The PVQ values have the same predictable effects on outcome variables. For example, universalism is positively related to a preference of Bill Clinton to George W. Bush whereas traditionalism leads to a preference of Bush to Clinton (Schwartz 2007).

Table 2.4 about here

[14] The gender of the fictional person was matched to the respondent's gender.

2.2 Adult Values Study

2.2.1 Sample

Eight undergraduate students from Stony Brook University were enlisted as research assistants to recruit respondents for the adult values experiment. All research assistants received education in survey research methods before they began recruiting participants. For example, they were taught about sampling procedures and interviewer effects. Each research assistant was responsible for getting 40 completed surveys. In order to get a diverse sample, I instructed them to conduct quota sampling on gender (20 men, 20 women), age (8 under 30 years old, 20 between 30 and 60, and 12 over 60) and ethnicity (30 white and 10 non-whites). Moreover, to make sure that ordinary adults were selected, the research assistants could not select participants from the Stony Brook University community, family members, or their immediate neighborhood. During the spring of 2009, the research assistants recruited 301 respondents for the survey.[15]

The research assistants also recorded the number of people that refused to participate in the study. One hundred and sixty-four people said no to participation even after mild persuasion attempts by the research assistants. Since 301 respondents completed the survey, it means that the cooperation rate was 65%.[16]

Fifty-two percent of the respondents were female and 48% were men. Thirteen percent were Hispanic and 87% non-Hispanic. In terms of race, there were 77% Whites, 6% Blacks, 7% Asians and 11% other. Around one-third of the sample was between 18 and 34 years old, one-

[15] With eight research assistants assigned to recruit 40 participants each, this should there should be 320 completed surveys. However, one of the research assistants could not complete the assignment.

[16] The cooperation rate is the number of completes divided by the sum of completes and refusals: 301/(301+164)=0.647

third was between 35 and 49 and one-third was 50 years old or over. Twenty-two percent had a graduate degree or professional degree and 22% had a bachelor's degree. The sample was distributed relatively evenly on party identification, with Democrats being 43%, pure Independents 22% and Republicans 35% (see Table 2.1). All respondents were interviewed in the State of New York.

2.2.2 Overview of the Questionnaire

The survey, which included 98 questions, was in many ways similar to the student study, but there were differences as well. It opened by asking respondents about the most important problems facing the United States and the world. Then, 34 questions measured the participants' values. Thus, unlike the student study, value questions came before the treatments. Subsequently, and right before the experimental treatment, a question tapped participants' general perceptions of climate change risk. No question measured pre-treatment risk perceptions in the student study. For the experimental treatment that followed, participants were randomly assigned to read an article that stressed one type of climate change risk – just as in the student study. Those assigned to the control condition did not read an article, but skipped directly to the next section. After the treatment, participants answered two factual questions about the text they had read and then responded to the risk perception questions. Attitudes towards climate change policies were measured afterwards. Subsequently, participants answered questions about their political beliefs and their own background. If they read an article, they answered two questions about how compelling and credible they thought it was. After the survey had been completed and the participant thanked, the research assistants filled out additional information about the interview

(such as time, date and location). The research assistants also noted to what extent the participant seemed suspicious and interested in the survey.

2.2.3 Experimental Treatments

Each research assistant was given four types of surveys (three treatment conditions and one control group) to hand out randomly. The surveys were the same except that they had different fictional news stories. As in the student study, the stories were designed to highlight different types of risks associated with climate change.

The manipulations in the adult study focused on the same type of risks as in the student study, but were modified to be more effective because the results from the student study indicated that the manipulations had had no or weak effects. Compared to the student study, the new articles contained more details on the events that were likely to happen. They also made more references to the group that was at risk and would be affected. For example, the text of the benevolence condition in the student study emphasized the negative effects of climate change on Americans, the United States or America seven times whereas in the adult study risks that affected the nation were mentioned twelve times. Moreover, the title of the article in the adult study clearly indicated who was at risk. In the universalism condition, the title was *Impoverished People Abroad Affected by Climate Changing Faster than Expected*, in the benevolence condition it was *Climate Changing Faster than Expected in the United States, Americans Facing Dramatic Consequences* and in the self-enhancement condition it was *Ordinary People in the Northeast Affected by Climate Changing Faster than Expected*. In contrast, the headings in the student study were the same. Another difference was that unlike in the student study where the first few paragraphs had the same wording, the first paragraph in the adult study described who

was at risk right away. By introducing the risk target early in the text of the story, I hoped to increase the likelihood that people would be affected by the manipulations.

To make sure that respondents took their time to read the material, the stories were introduced as a learning exercise. They were introduced to the participants in the following manner:

> There has been a lot of recent discussion in the news media on the issue of global warming, or what some people refer to as climate change. We are interested in what people learn from such news stories. Please read carefully the story on the following page. It is a typical example of the kind of news stories that have appeared around the nation. You will be asked to answer some questions about it once you have finished reading it.

As stated above, the target of the risk was made clear early in the text, first in the article heading and then in the first paragraph. In the universalism condition, the first paragraph ended with: "Ironically, the people most affected by global warming are living in countries that have done little to create the crisis in the first place." In other words, it targeted people outside the United States, people that participants presumably meet rarely. The benevolence condition stated that "Millions of Americans will face extreme weather, wildfires, and other dire consequences as human-generated greenhouse gases continue to build up in the atmosphere." Lastly, the corresponding sentence in the self-enhancement condition was that "Taxes will increase and insurance premiums will rise because of the damages caused by more extreme weather."

The last paragraph shared the same beginning but ended by highlighting different types of risks. In the universalism condition, the article ended with the following (differences are in bold):

> "Some of the things we projected to occur in 2050 will most likely happen in the next few decades. What we didn't get is how destructive global warming would be, and the degree to which **poor people across the globe** would be influenced," Parry said in an interview. "Our mistake was in underestimation." **The potential impact on poorer countries is huge. They will suffer most because they are least equipped to deal with rapid change.**

In the benevolence condition, it ended with the following paragraph:

> "Some of the things we projected to occur in 2050 will most likely happen in the next few decades. What we didn't get is how destructive global warming would be, and the degree to which **people in the United States** would be influenced," Parry said in an interview. "Our mistake was in underestimation." **Americans are very likely to feel the human and economic costs because of the increasingly intense and more frequently-occurring natural disasters that will make previous ones pale in comparison.**

Lastly, in the self-enhancement condition, the article ended with the following:

> "Some of the things we projected to occur in 2050 will most likely happen in the next few decades. What we didn't get is how destructive global warming would be, and the degree to which **ordinary people** would be affected," Parry said in an interview. "Our mistake was in underestimation." **Ultimately, when the dots are connected, it will be the average taxpayer who bears the burden for global warming. Repairs and reconstruction costs associated with global warming will likely be paid through tax dollars and increasing home insurance costs.**

The complete texts of the experimental treatments are included in Appendix B.

2.2.4 Risk Perceptions

Following the story, participants answered two questions about facts in the text they had read, and then they were asked about the risks with climate change.[17] Two open-ended questions were included to get a more in-depth understanding of what participants were thinking. The first centered on the negative consequences of climate change and the second on who would be most at risk because of climate change:

- What type of negative consequences do you think global warming will have, if any?
- Who do you think is most at risk because of global warming and climate change?

As in the student study, I divided risks into three categories: humankind at risk, nation at risk and self at risk. The types of risk corresponded to the content of the three treatment

[17] 1. In what journal did the scientists publish their findings? Nature, Proceedings of the National Academy of Sciences, **Science**, Journal of Climate, Don't know. 2. The head of Columbia University's Earth Institute is cited in the news article. What is his name? (William Morgan, **Jeffrey Sachs**, Christopher Ferguson, Andrew Schaffer, Don't know)

conditions. Four questions measured risks to humankind (e.g., How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas around the world because of damages caused by extreme weather (e.g., floods, hurricanes) and four tapped risks to the nation (e.g., How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas in the United States because of damages caused by extreme weather (e.g., floods, hurricanes) and four were about risk to the self (e.g., How likely is it that global warming and climate change will worsen your living condition because of damages caused by extreme weather (e.g., floods, hurricanes) The 12 questions are included in Table 2.5.

Table 2.5 about here

In addition, I measured change in general risk perceptions about climate change by asking the question "How serious of a threat do you think global warming is right now?" This question was asked twice – once before respondents read the fictional news story and once after. If the experimental treatment had an effect on participants, this pre and post measure could potentially pick this up.

2.2.5 Climate Change Policies

Attitudes towards climate change policies were assessed after the risk perception questions by eleven items. The questions were the same as in the student study except that one additional item was added. The added item was about whether states should be allowed to set stricter global warming policies than those required by federal law, an issue had surfaced in the debate about regional climate change initiatives. See Table 2.3 for question wordings of the policy items. The introduction to the questions was also the same as in the student study:

> U.S. government officials are thinking about ways to reduce the amount of carbon dioxide that is put into the air. We would like your opinion on several possible ways to do this. You might think they are all good ideas. You might think they are all bad ideas. Or you might think some are good and others are bad. For each policy, please indicate how much you support or oppose it.

The response options to all policy questions were the following: strongly oppose, oppose, support or strongly support.

2.2.6 Quality of Arguments of Experimental Manipulations

At the end of the survey, to measure how good participants thought the arguments in the experimental treatments were, they were asked the following two questions: "Thinking back to the news story you read, how compelling did you find it overall?" and "Thinking back to the news story you read, how credible did you find it overall?" The response options were extremely compelling/credible, very compelling/credible, somewhat compelling/credible, not very compelling/credible and not at all compelling/credible. Combining the answers to these two questions provides an additional mode to examine the effect of the treatments. Note that unlike the other dependent variables, these two questions were only asked of those who read an experimental treatment text, which the participants in the control condition did not do.

2.2.7 Values

Values were measured by Schwartz's values. In total, 25 questions measured Schwartz's values. Five of them measured universalism, four of them benevolence and eight of them self-enhancement. Participants were asked to rate the degree to which each value was a guiding principle in their life. For example, universalism was measured by "Social justice (correcting injustice, care for the weak)" benevolence by "Loyal (faithful to my friends, group)" and self-enhancement by "Ambitious (hard-working, aspiring)". Like the examples above, all the 25

questions had an explanation of the value-item in parenthesis. The values of interest were the same as in the student study. See Table 2.6 for the questions that measured values.

Error! Reference source not found. Table 2.6 about here

There were two changes in how values were measured when compared to the student study. First, the value questions in the adult values study came before the experimental treatment because there was a possibility that the treatments might contaminate value ratings. Second, I relied on the traditional measure of Schwartz's values. While the Schwartz Portrait Values Questionnaire (PVQ) used in the student study may get reliable results, the traditional measure has been tested more frequently and is less time-consuming to distribute. The PVQ-items are lengthy compared to the traditional value items. The PVQ measures, for example, universalism with questions such as this: "He thinks it is important that every person in the world be treated equally. He wants justice for everybody, even for people he doesn't know." Participants rate how similar they are to this person. In contrast, the traditional value measure asks participants to rate the importance of values. As an example, universalism is measured by items like "Equality (equal opportunity for all)". An additional problem with the PVQ is that it is should be matched to the respondent's gender. For instance, if the respondent is male, the person in the value portrait should also be male. To match respondents would have been an additional burden for the research assistants who distributed the surveys, providing a further reason to use the traditional value measure.

2.2.8 Political Awareness

To explore how well the party cue perspective explains attitudes on climate change, political awareness was also measured. Essentially, I am trying to replicate Zaller's prediction

that partisans who most closely follow the news will be most frequently exposed to messages from their partisan elites and thus most influenced by them. For example, someone who follows the news closely will both learn where the party leaders stand on the issues and that John Roberts is the Chief Justice of the Supreme Court. Four questions were asked to measure political awareness:

- What is the name of the current Vice President of the United States? Dick Cheney, **Joe Biden**, Hillary Clinton, Donald Rumsfeld, Don't know
- What is the capital city of Afghanistan? Baghdad, Teheran, Berlin, **Kabul**, Don't know
- What is the name of the current Senate Majority Leader? Tom Daschle, Nancy Pelosi, **Harry Reid**, Michael Bloomberg, Don't know
- What is the name of the Chief Justice of the United States? **John Roberts**, Dick Cheney, Samuel Alito, John Marshall, Don't know

2.3 Risk Perceptions Study

2.3.1 Sample

The participants for this study were recruited on the website Craigslist.com.[18] I posted the link to the survey on local sites in New York State, Connecticut, Rhode Island, Massachusetts, Delaware, Maryland, New Jersey, Washington D.C. and Pennsylvania. The ad, which was posted on the volunteer pages on Craigslist, encouraged readers to participate in a survey about "current affairs". The ad did not mention anything about climate change because I suspected that people already interested in climate change issues would then be the group predominantly taking the

[18] Craigslist is an online community that focuses on classified ads. The site has around 60 million unique visitors each month, with 94% of them coming from the United States (94%). It is the tenth most visited website in the United States according to Alexa (http://www.alexa.com/siteinfo/craigslist.org#)

survey. Naturally, a sample from Craigslist is non-random and it does not represent the general population, yet such a sample is more diverse than a student sample and inexpensive to acquire. Moreover, since questions answered out online, little additional coding was required. The link at Craigslist took them to a survey that had been programmed on Snap Surveys and uploaded with an open-source FTP-client to a Stony Brook University web-server.

Of the 398 participants that completed the survey, 76% were White, 10% Hispanic, 8% Black, 7% Asian and 8% other. The race and ethnicity questions were separate in the student and adult value studies, yet in this study, the questions were combined to save questionnaire space. Participants could select more than one race/ethnicity if they wanted. Fifty-eight percent reported that they were between 18 and 34 years old, 26% were between 35 and 49 years old, and 16% were 50 years old or older. Twenty-one percent of the participants had a graduate degree or professional degree, 34% a bachelor's degree, 34% some college, 9% a high school degree and 2% less than a high school degree. Sixty percent of the respondents were Democratic, 22% were Independent and 18% identified as Republicans. Gender was unfortunately not asked because of a programming mistake. Compared to the adult value study sample, this sample was more Democratic, had a higher educational attainment and was younger.

2.3.2 Overview of the Questionnaire

The survey began by thanking respondents for participating in the research project. Participants were instructed to read questions carefully, to answer all questions and to select only one answering option unless told otherwise. The first question asked respondents about the most serious problem facing the world. Subsequent questions were about global warming and asked, for example, how well participants thought they understood the issue, if global warming had

begun happening and, if so, whether humans or natural variation was causing the changing climate. The core part of the survey followed, as participants were asked about perceived climate change risks. Subsequently, the questionnaire assessed attitudes about climate change policies, values, political attitudes, political awareness, and background. Compared to the other questionnaires, the risk study was relatively short at questions. Of the surveys I designed, this was the only study in my dissertation research that did not contain an experiment.

2.3.3 Risk Perceptions

The purpose of the risk perception study was to examine whether people differentiate among a number of climate change risks or simply group them together as a unitary risk. In order to do this, I measured three types of risk perceptions: risks to humankind, risks to the nation and risks to the self. The three types of risk were also measured in the student study and the adult study.

Five of the items were designed to measure risks to humankind and these focused on risks to people living in many countries, especially those living in the poorer regions of the world (e.g., How likely is it that global warming and climate change will result in food shortages for people in Asia and Africa because of warming air temperatures?) Five questions measured risks to the nation; they focused on the perceived likelihood that different climate patterns would affect Americans and the United States (e.g., How likely is it that global warming and climate change will hurt the national economy of the United States because of damages caused by wildfires, hurricanes, droughts, and weather-related disasters?) Finally, five items measured risks to the self (e.g., How likely is it that global warming and climate change will have a negative impact on your economic and financial situation because more intense and frequent droughts

mean fewer fresh food supplies and higher prices in the supermarket?) Thus, 15 questions were asked about specific climate change risks. The order of the questions was randomized.

As Table 2.7 shows, twelve of the questions were about the likelihood of something negative happening. The answer options (very likely, somewhat likely, not very likely, not at all likely) reflected this question wording. Three questions asked about the seriousness of the risks, and consequently, response options were the following: very serious, somewhat serious, not so serious, and not serious at all.

Table 2.7 about here

In addition to the questions about specific climate change risks, I also asked respondents how serious of a threat global warming was in general. This question was asked primarily so that comparisons could be made between samples. In addition, in order to get a more nuanced and qualitative idea of what respondents thought, I asked an open-ended question about what types of negative consequences global warming would have.

2.4 Party Cues and Values Study

2.4.1 Sample

I conducted a web survey in May and June 2010 to study the effects party cues and values on climate change attitudes. Participants were recruited online, on local Craigslist pages across the country. In addition, ads were posted on Facebook pages affiliated with the Republican Party in order to increase the number of Republicans in the sample. The ads were posted on these pages because, as Table 2.1 shows, the Craigslist sample in the risk perceptions

study was predominantly Democratic. Since a central goal of this study is to see how Republicans react to persuasion attempts, a number of the respondents also had to be Republican.

The online advertisement informed potential participants that the survey would take 12-20 minutes to finish and, if they completed it, they would enter a lottery to win a $100 gift certificate. The gift certificate lottery was used as an extra incentive because there was a concern that only those who were especially altruistic would participate and that could be a problem since a central part of the survey was to also recruit people who were on the other end of the spectrum. The recruitment material stated that the survey was about current affairs. It did not mention anything about climate change.

The sample included 63% females and 37% males. Sixty-eight percent were White, 10% Hispanic, 11% Black, 10% Asian and 6% other. The race and ethnicity questions, which had been separated in the student and adult value studies, were combined into one question. Participants could choose more than one race or ethnicity. Fifty-four percent were 18-34 years old, 26% were 35-49, 16% were 50-64 and 3% were 65 or older. As for highest educational attainment, 17% of the participants had a graduate degree or professional degree, 31% had a bachelor's degree, 36% had some college education or associate's degree, 14% had finished high school and 2% had no high school degree. There were 56% Democrats, 18% Independents and 26% Republicans in the sample. The total number of participants was 392.

2.4.2 Overview of the Questionnaire

Two experiments were embedded in the questionnaire. In both experiments, participants read about leading politicians who advocated a position on climate change that went against the participants' own view. The politicians' party identification and value-based justification for the

policies were experimentally altered in both experiments. In the first experiment, the politicians advocated general action/passivity on climate change; in the second experiment, the politicians called for action/passivity on carbon capture and storage, which is a technology that has been proposed to deal with climate change. Carbon capture and storage is an unknown technique that only 17% of Americans have heard of (O'Keefe, Herzog, and Reiner 2010).

To familiarize participants with the question format, the questionnaire began with two general questions about the direction of the country and the role of government. Subsequent questions measured participants' positions on climate change and carbon capture and storage. The answers to these questions determined whether respondents were exposed to information about a politician who took a position for or against climate change policies. Later sections (2.4.3 and 2.4.5) of this chapter describe this in more detail. Party identification and values were measured before the first experimental treatment.

Next, the first experiment followed, which consisted of an article that described party leaders who took a passive or active stance on climate change policies. The article was said to be a common example of how global warming was discussed in the news. Following the treatment, participants' attitudes on climate change policies were measured. Moreover, participants indicated whether they thought the politicians mentioned in the article seemed trustworthy.

After several questions on ideology and trust in government, the respondents were exposed to the second experiment. This experiment manipulated the party and values of senior politicians taking a position on carbon capture and storage. As in the prior experiment, the politicians took a counter-attitudinal position on the issue. After the treatment, one question

measured attitudes on carbon capture and storage. The final questions assessed participants' political awareness and background.

2.4.3 Experimental Treatments: Climate Change Policies

In both experiments, participants were presented with counter-attitudinal information on climate change. In order to do that, the first step was to determine whether they believed that climate change was happening or not. To assess their general attitudes on climate change for the first experiment, the following question was used:

Which of the following statements reflects your view of when the effects of global warming will begin to happen?

A) They have already begun to happen.
B) They will start happening within a few years.
C) They will start happening within your lifetime.
D) They will not happen within your lifetime, but they will affect future generations.
E) They will never happen.

The answer to this question decided what position the politicians in the first experiment would take; either participants encountered politicians who said that we needed to act on climate change now or that action on climate change should not be prioritized. If participants selected the option "They have already begun to happen", the politicians in the news story said that climate change was not an important problem. However, if participants selected "They will start happening within a few years", They will start happening within your lifetime", "They will not happen within your lifetime, but they will affect future generations" or "They will never happen"

then the politicians in the fictional news story made a case for taking action on climate change immediately.[19]

The news story was introduced by telling respondents, "There has been a lot of recent discussion in the news media on the issue of climate change. We are interested in what people learn from such news stories. Please read carefully the story on the following page. It is a recent and common example of how global warming is being discussed in the news." While the stories were fabrications, they followed a format that mimicked how politicians talk about climate change in the press.

The experiment was a 2 (party cue: Democratic leaders or Republican leaders) X 3 (value-based justification: free enterprise, humanitarianism or control/no value) between-subjects factorial design. The humanitarian justification was grounded in concern for the poor whereas the free-enterprise justification was based on concerns about the market economy. In sum, participants randomly encountered one of the following: Republicans, humanitarian Republicans, free enterprise Republicans, Democrats, humanitarian Democrats or free enterprise Democrats. Yet regardless of condition, all persuasion attempts were counter-attitudinal. Table 2.8 describes the design of the experiment.

Table 2.8 about here

Below are the experimental texts, which illustrate differences and similarities between conditions. The experimental treatments separated by condition are included in Appendix D. The text in bold marks a party cue and the text in italics indicates a value-based argument. My notes

[19] Climate change researchers largely agree that the effects of climate change have already begun to happen (Intergovernmental Panel on Climate Change, 4th Assessment Report http://www.ipcc.ch/). For a recent overview, see for example: http://climateprogress.org/2010/02/17/an-illustrated-guide-to-the-latest-climate-science/ Thus, the split is between doubters and non-doubters.

are within brackets. They were not shown to the respondents. Respondents read the following report:

> Leading **Democrats/Republicans** Support Climate Change Policies
>
> The same human economic activity that brought us immense prosperity has also increased the amount of carbon in the atmosphere. While the scope and the long-term consequences are the subject of ongoing scientific research, common sense dictates that the United States should take measured and reasonable steps today to reduce climate change, say leading **Democrats/Republicans**.
>
> Polls also suggest that the public is ready to move forward in this area, with more people than ever calling for investments in new energy, according to the latest national survey by the Pew Research Center for the People and the Press. "I'm just an ordinary American, but I feel that right now is the time to invest in green technology. It seems like a way to get this country back on track," one of the respondents said.
>
> In light of such sentiments, **Democrats/Republicans** emphasize that climate change legislation needs to be passed now. During a week that featured numerous meetings between policy-makers, **Democratic Senate Majority Leader Harry Reid (D-Nev.) and Tim Kaine, chair of the Democratic National Committee/Republican Senate Minority Leader Mitch McConnell (R-KY.) and Michael Steele, chair of the Republican National Committee**, met with Senators and Representatives from their own party to formulate a clear position on climate change.
>
> [Free Enterprise:] *"As part of our climate change strategy, we support solutions that rely on the power of capitalism to reduce emissions. Right now, there is a strong demand for renewable energy. To reduce emissions, the government needs to support free enterprise because the search for profit leads to innovation. We should trust the market to develop alternative energy sources and new technologies,"*/ [Humanitarianism:] *"As part of our climate change strategy, we must take full advantage of renewable energy sources like wind and solar, two of our largest contributors of emissions-free power. Such investments will directly benefit low-income people because they lead to more blue-collar jobs*," **Reid and Kaine/ McConnell and Steele** said.
>
> [Free Enterprise:] *"Besides reducing emissions, investments in green technology will also help grow the economy. By taking the lead in this sector, our businesses will be globally competitive. Higher taxes are not the solution to climate change. Instead, we should encourage companies to innovate and invest in green technology,"* / [Humanitarianism:] *"Moreover, in our effort to reduce emissions, we will make substantial investments in public transit systems so that mass-transit becomes affordable and accessible for everyone. Extreme weather hits the most vulnerable in our society the hardest. The job of the government is to care for them. Our strategy means that big corporations and the very rich will pay higher energy taxes. Yet more importantly, it helps and protects those in need,"* the senior **Democrats/Republicans** told reporters.
>
> "While many of us have had doubts over claims about climate change in the past, the evidence is unambiguous now. We immediately need to reduce greenhouse gases," said the **Democratic/Republican** leaders.

In contrast, Democrats or Republicans elites who made the case for passivity on climate change said the following:

Leading **Democrats/Republicans** Put Climate Change on the Backburner

Climate change is a reality, but now is not the time to pass climate change legislation. The current proposals involve raising the price of energy, which would be costly for ordinary Americans. Americans are not supportive of such changes and we should respect the voice of the people on this matter, say leading **Democrats/Republicans**.

The priority placed on climate change has fallen off among the public, according to the latest national survey by the Pew Research Center for the People and the Press. Meanwhile, strengthening the economy is a higher priority today than it has been at any point over the past decade. "I'm just an ordinary American, but I feel that we should deal with climate change later, and not now when we should put all our efforts to get this country back on track," one of the respondents said.

In light of such sentiments, **Democrats/Republicans** emphasize that climate change legislation needs to wait. During a week that featured numerous meetings between policy-makers, **Democratic Senate Majority Leader Harry Reid (D-Nev.) and Tim Kaine, chair of the Democratic National Committee/Republican Senate Minority Leader Mitch McConnell (R-KY.) and Michael Steele, chair of the Republican National Committee**, met with Senators and Representatives from their own party to formulate a clear position on climate change.

[Free Enterprise:] *"In the middle of an economic downturn, when businesses across the country are struggling, it is not the time to add an extra burden on them,"*/ [Humanitarianism:] *"In the middle of an economic downturn, when we have a widening economic gap between the rich and the poor, it is not the time to add an extra burden on low-income people,"* **Reid and Kaine/McConnell and Steele** said.

[Free Enterprise:] *"A climate change bill would lead to higher energy prices, and that puts American corporations at a disadvantage compared to foreign companies. It also leads to more regulation and bigger government. Our focus should be on making capitalism work, not expanding government reach and cutting economic growth. Therefore, efforts to reduce climate change will have to wait,"/* [Humanitarianism:] *A climate change bill would lead to higher energy prices, and they hit the weakest in society the hardest. There are already too many impoverished people in our country. Our focus should be on social justice and reducing inequalities, not sticking the needy with excessive utility bills. Therefore, efforts to reduce climate change will have to wait,"* the senior **Democrats/Republicans** told reporters.

"Good policy is going to be left behind by the insistence that the climate change has to be addressed first. Other domestic worries are simply too important and they force us to think very carefully about our priorities," said the **Democratic/Republicans** leaders.

To make sure that the value justifications also were perceived as value-based, they had been pretested in another small survey. In that survey, statements were rated based what type of values they evoked. The results of this pre-test are shown in Chapter 5 and they demonstrate that participants saw significant differences between the humanitarian messages and the free enterprise messages.

2.4.4 Climate Change Policies

The main dependent variable for the first experiment was a five-item scale of attitudes on climate change. The policies are all common proposals in the current political debate. Participants rated the climate change policies on how strongly they supported or opposed them. The options in the four-point scale were strongly support, support, oppose and strongly oppose. More specifically, I used the following items:

- Give states the right to set stricter global warming policies than those required by federal law.
- Introduce an economy-wide market-based cap-and-trade program that would set a limit on greenhouse gas emissions and allow industries to buy and sell their rights to emit. Companies are given a fixed number of permits and can sell their extra permits if they reduce their emissions.
- Introduce a higher federal mileage standard on vehicles to increase fuel efficiency.
- Increase the price of fossil fuels (like gasoline) through taxation to encourage people to save energy.
- The U.S. government should actively engage and lead international negotiations on climate change.

2.4.5 Experimental Treatments: Carbon Capture and Storage

A second experiment was embedded in the questionnaire; it dealt with public opinion on carbon capture and storage (CCS) and tested whether opinion was affected by party cues and values. The experimental design was the same as the study above – the only aspects that were different with this experiment was that it came after the first experiment, the experimental treatments were shorter and the issue unfamiliar.

CCS is a technology that promises to reduce the amount of greenhouse gases that are produced when we burn fossil fuels in power plants. With this technology, the greenhouse gases are captured before they enter the atmosphere and then stored underground permanently.

Just as in the previous experiment on climate change policies, this experiment focused on counter-attitudinal persuasion. Participants' attitudes on CCS were measured early in the questionnaire by the following question:

Carbon capture and storage is a technology proposed to address global warming. Carbon dioxide from power plant exhaust is captured and then stored in underground reservoirs. Do you think the federal government should or should not rely on carbon capture and storage?"

A) Should

B) Should not

Only two options were available to respondents and they had to pick one of them. If participants said, "Should", then the politicians in the experiment advocated that we should not use CCS. In contrast, if they answered, "Should not", the politicians said that the technology was worthwhile and something we should invest in.

The treatment was introduced by telling participants that "[w]e have one last question about climate change." Then all participants read the following sentence: "Carbon capture and storage aims to reduce the climate impact of burning fossil fuels by capturing carbon dioxide from power station smokestacks and disposing of it underground." The paragraph that followed this statement was the experimental treatment. Participants were randomly assigned to read a counter-attitudinal position, just as in the first experiment. The texts, separated by condition, are included in Appendix D. When Democrats or Republicans made a call for action, participants read the following (party cue in bold, value-laden justification in italics, my notes within brackets):

> Senior **Democratic/Republican** policy makers strongly endorse the development and usage of this technology. "Fossil fuels will remain an important part of domestic energy consumption in the

> 21st century. With carbon capture technologies, these fuels would provide clean and affordable energy. [Free Enterprise:] *It is critical to keep energy costs low because higher costs would hit American businesses hard and curb economic growth,"*/ [Humanitarianism:] *It is critical to keep energy costs low because higher costs would hit impoverished people hard and cause additional suffering for the weakest in society,"* **Democratic/Republican** leaders say.

Yet if they were assigned to party elites that were against carbon capture and storage, they instead read the following:

> However, senior **Democratic/Republican** policy makers are highly skeptical of carbon capture and storage. "Carbon capture technologies are not cost-effective. Adding these technologies to the electricity generation process would increase the cost of electricity by up to 100 percent. [Free Enterprise:] *These additional costs would hit American businesses hard and curb economic growth,"*/ [Humanitarianism:] *These additional costs would hit impoverished people hard and cause additional suffering for the weakest in society,"* **Democratic/Republican** leaders say.

2.4.6 Carbon Capture and Storage

The dependent variable for the CCS experiment was attitudes on a policy proposal about CSS. The proposal is similar to a project the Department of Energy is working on. Attitudes to the proposal were assessed immediately after the experimental treatment by the following question: "The US Government has recently announced it will spend $3.4 billion to demonstrate the carbon and capture and storage technology at coal-fired power stations and other industrial facilities. What is your view of this proposal?" The answering options were strongly support, support, neither support nor oppose, oppose and strongly oppose.

2.4.7 Party Identification

Party identification is an "individual's affective orientation to an important group-object in his environment" (Campbell et al. 1960, 121). It is a deep-seated social identity that provides meaning to politics for citizens (Green, Palmquist, and Schickler 2002). In other words, people rely on party identification to make sense of politics, which they do by listening to leaders of the same party and disregarding information from party leaders of other parties.

This study measured party identification in the same way as the American National Election Studies (ANES). The ANES has measured this concept since the 1950s using branched questions. Respondents are first asked, "Generally speaking, do you usually think of yourself as a Republican, Democrat, independent, or what?" If the respondent says Democrat, the next question is, "Would you call yourself a strong Democrat or a not very strong Democrat?" If the respondent chooses Republican, they are asked: "Would you call yourself a strong Republican or a not very strong Republican?" If the respondent chooses Independent, other party or no preference, then the following question is, "Do you think of yourself as closer to the Republican Party or to the Democratic party?" When the responses to the questions are combined, it forms a 7-point scale that ranges from strong Democrat to strong Republican.

2.4.8 Values

Two values are of specific focus in this study: humanitarianism and free enterprise. Humanitarianism is the principle that people should help others. Someone who scores high on this value thinks it is critical to take care of those in need (Feldman and Steenbergen 2001). It is measured by the level of agreement or disagreement to statements such as: "A person should always be concerned about the well-being of others."

Humanitarianism is somewhat different from egalitarianism because the latter is associated with support for bigger government since this can reduce inequalities in society. An egalitarian is therefore likely to support policies that control market forces. As for humanitarians, they are not necessarily opposed to market forces, but the focus is rather to reduce suffering. Government intervention can be a useful tool to accomplish this goal, but not the only one; what matters is that suffering is alleviated (Feldman and Steenbergen 2001). Theoretically, this

principle is similar to the value universalism. There are differences, though. Looking at how they are measured (there is more on measurements of concepts in the subsequent methodology chapter), it appears as universalism puts more emphasis on social justice than what humanitarianism does, with the latter being more related to empathy. Another difference is that humanitarianism is more rooted in political science research whereas universalism comes from psychology research.

People who value free enterprise favor a free market system and capitalism. Those who value free enterprise support the idea of a small government that stays out of individuals' lives. The government should not interfere with business and trade, according to this perspective. For example, one might expect that someone who scores high on free enterprise would disapprove of government bailouts and stimulus packages. It is measured by asking how much people agree or disagree to statements such as "The less government gets involved with business and the economy, the better off this country will be." The items that measure the two values are included in Table 2.9.

Table 2.9 about here

Most Americans think that capitalism is the best system, yet there are many who are skeptical. On a question concerning whether or not the free enterprise system is the best economic system, 37 percent agreed strongly, 22 agreed somewhat, 20 percent disagreed somewhat, and 9 percent disagreed strongly (Miller 2011). Clearly, there is variation on this value and that is important in the subsequent analysis.

As in the other studies about values, the expectation is that when an argument evokes a value, then those who strongly adhere to that value will be most persuaded. For example, when

the politicians in the experiments make a case for enacting climate change policies based on concerns for taking care of the less fortunate, then participants who score high on humanitarianism should react stronger than those who score low on this value.

Table 2.1 Sample Characteristics

		Student Values Study	Adult Values Study	Risk Study	Party Cues and Values Study
Sample		Stony Brook undergraduates	New York State residents	Craigslist	Craigslist and Facebook
Mode		Computer lab	Pen and paper	Web	Web
Gender	Female	53	52	-	63
	Male	47	48	-	37
Hispanic[a]	Non-Hispanic	88	87	90	90
	Hispanic	12	13	10	10
Race	White	53	77	76	68
	Black	5	6	8	11
	Asian	24	7	7	10
	Other	19	11	8	6
Age	18-34	100	31	58	54
	35-49	0	31	26	26
	50-64	0	21	14	16
	65 and over	0	16	2	3
Education	No HS degree	-	2	2	2
	High school degree	-	19	9	14
	Some college/assoc.	-	32	34	36
	Bachelor's degree	-	25	34	31
	Graduate/Prof. degree	-	22	21	17
Party ID	Democratic[b]	74	43	60	56
	Independent	6	22	22	18
	Republican[c]	20	35	18	26
N		127	301	398	392

Note: Entries are in percent. Due to rounding, percentages do not always add up to 100%.

[a] The studies in the first two columns separated questions about Hispanic background and racial background in to two questions – "Are you of Hispanic origin or descent, or not?" and "Do you consider yourself White, Black, Asian, Native American or something else?" The web surveys (the last two columns) combined the two questions by allowing respondents to select multiple racial and ethnic groups, including Hispanic/Latino – "What racial or ethnic group(s) best describe(s) you? (Select all boxes that apply.)"

[b] Includes Democratic leaners

[c] Includes Republican leaners

Table 2.2 Risk Perception Questions in the Student Value Study

Risks to Humankind (Universalism)	Risks to Nation (Benevolence)	Risks to Self (Self-enhancement)
How serious a threat will global warming pose to people around the world, living in many different countries, in your lifetime? *Very serious, Somewhat serious, Not so serious, Not serious at all*	How serious a threat do you think global warming will pose to Americans or the American way of life in your lifetime? *Very serious, Somewhat serious, Not so serious, Not serious at all*	How serious a threat will global warming pose to you and your way of life during your lifetime? *Strongly agree, Agree, Disagree, Strongly disagree*
How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas around the world? *Very likely, Somewhat likely, Not very likely, Not at all likely*	Scientists say that global warming and climate change will pose a health risk to people because it increases the intensity and length of extreme heat waves, causing death and suffering due to dehydration, hyperthermia and heat stroke. How likely is it that Americans will be at danger from such consequences? *Very likely, Somewhat likely, Not very likely, Not at all likely*	Scientists say that global warming and climate change will pose a health risk to people because it increases the intensity and length of extreme heat waves, causing death and suffering due to dehydration, hyperthermia and heat stroke. How likely is it that you will be at danger from such consequences? *Very likely, Somewhat likely, Not very likely, Not at all likely*
How likely is it that global warming and climate change will result in food shortages for people in Asia and Africa because of warming air temperatures? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will affect public health and the cost of health care in the U.S. because of an increase in tropical diseases? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How strongly do you agree or disagree with the following statement: Global warming and climate change will have a noticeably negative impact on my economic and financial situation in the next 25 years because of higher food prices. *Strongly agree, Agree, Disagree, Strongly disagree*
How likely is it that global warming and climate change will have its worst effects on the world's poorest people? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will slow down economic development in the U.S. because of damages caused by extreme weather? *Very likely, Somewhat likely, Not very likely, Not at all likely*	

Note: Question order of the items was randomized.

Table 2.3 Climate Change Policy Questions in the Student and Adult Values Studies

Introduce a higher federal mileage standard on vehicles to increase fuel efficiency.
Establish a climate change education program that through national information campaigns and school education aims to broaden the understanding of climate change, possible long and short-term consequences, and potential solutions.
Increase the price of fossil fuels (like gasoline) through taxation to encourage people to save energy.
Introduce a market-based cap-and-trade mechanism that would set a limit on greenhouse gas emissions and allow industries to buy and sell their rights to emit such gases. Companies are given a fixed number of permits and can sell their extra permits for cash to other companies if they invent, improve, or acquire a way to reduce their emissions.
The U.S. government should actively engage and lead international negotiations on global warming and climate change.
Give states the right to set stricter global warming policies than those required by federal law.*
Set the goal of putting 1 million Plug-In Hybrid cars - cars that can get up to 150 miles per gallon - on the road by 2015 by offering federal aid to automakers and tax credits to buyers of these cars.
Establish a national target of producing at least 25 percent of the U.S. electricity from renewable sources (like hydro power, solar power, and windmills) by 2025 by providing homeowners tax breaks and other incentives to install solar panels and other sources of renewable energy in their homes.
Give tax credits to farmers and others who plant trees, restore grasslands, or undertake farming practices that capture carbon dioxide from the atmosphere.
Double federal science and research funding for clean energy projects.
Develop technologies to capture carbon dioxide emissions at coal and natural gas-burning power plants for permanent burial underground.

Note: Response options to all questions were the following: strongly oppose, oppose, support or strongly support.
*Not asked in the student study.

Table 2.4 Values Question in the Student Value Study

Universalism	Benevolence	Self-enhancement
(He/She) thinks it is important that every person in the world be treated equally. (He/She) wants justice for everybody, even for people (he/she) doesn't know.	It is very important to (him/her) to help the people around (him/her). (He/She) wants to care for other people.	Being very successful is important to (him/her). (He/She) likes to impress other people.
It is important to (him/her) to listen to people who are different from (him/her). Even when (he/she) disagrees with them, (he/she) still wants to understand them.	It is important to (him/her) to be loyal to (his/her) friends. (He/She) wants to devote himself to people close to (him/her).	(He/She) thinks it is important to be ambitious. (He/She) wants to show how capable (he/she) is.
(He/She) strongly believes that people should care for nature. Looking after the environment is important to (him/her).	It is important to (him/her) to respond to the needs of others. (He/She) tries to support those he knows.	It is important to (him/her) to be in charge and tell others what to do. (He/She) wants people to do what (he/she) says.
It is important to (him/her) to adapt to nature and to fit into it. (He/She) believes that people should not change nature.		(He/She) always wants to be the one who makes the decisions. (He/She) likes to be the leader.

Note: Respondents were instructed to describe how similar the person in the statement was to himself or herself. They used the following scale: Very much like me, Like me, Somewhat like me, A little like me, Not like me, Not like me at all

Table 2.5 Risk Perception Questions in the Adult Values Study

Risks to Humankind (Universalism)	Risks to Nation (Benevolence)	Risks to Self (Self-enhancement)
How serious a threat will global warming pose to people around the world, living in many different countries, in your lifetime? *Very serious, Somewhat serious, Not so serious, Not serious at all*	How serious a threat do you think global warming will pose to Americans or the American way of life in your lifetime? *Very serious, Somewhat serious, Not so serious, Not serious at all*	How serious a threat will global warming pose to you and your way of life during your lifetime? *Very serious, Somewhat serious, Not so serious, Not serious at all*
How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas around the world because of damages caused by extreme weather (e.g., floods, hurricanes)? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas in the United States because of damages caused by extreme weather (e.g., floods, hurricanes)? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will worsen your living condition because of damages caused by extreme weather (e.g., floods, hurricanes)? *Very likely, Somewhat likely, Not very likely, Not at all likely*
How likely is it that global warming and climate change will affect public health in the world's poorest countries because of an increase in tropical diseases? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will affect public health in America because of an increase in tropical diseases? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will affect your health because of an increase in tropical diseases? *Very likely, Somewhat likely, Not very likely, Not at all likely*
How likely is it that global warming and climate change will result in food shortages for people in Asia and Africa because of warming air temperatures? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will hurt the national economy of the United States because of damages caused by wildfires? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How strongly do you agree or disagree with the following statement: "Global warming and climate change will have a noticeably negative impact on my economic and financial situation in the next 25 years because of higher food prices." *Strongly agree, Agree, Disagree, Strongly disagree*

Table 2.6 Value Questions in the Adult Values Study

Universalism	Benevolence	Self-enhancement (Power)	Self-enhancement (Achievement)
Equality (equal opportunity for all)	Loyal (faithful to my friends, group)	Social power (control over others, dominance)	Ambitious (hard-working, aspiring)
Social justice (correcting injustice, care for the weak)	Honest (genuine, sincere)	Wealth (material possessions, money)	Influential (having an impact on people and events)
Broadminded (tolerant of different ideas and beliefs)	Helpful (working for the welfare of others)	Authority (the right to lead or command)	Capable (competent, effective, efficient)
A world at peace (free of war and conflict)	Forgiving (willing to pardon others)	Observing social norms (to maintain face)	Successful (achieving goals)
Unity with nature (fitting into nature)			

Note: Respondents indicated how important each value was to them as a guiding principle in their life. They rated values on the following scale: Opposed to my values, Not important, Important, Very important, Of supreme importance.

Table 2.7 Risk Perception Questions in the Risk Perceptions Study

Risks to Humankind	Risks to Nation	Risks to Self
How likely is it that global warming and climate change will increase deaths and illness in the world's poorest countries because of an increase in tropical diseases? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas in the United States because of damages caused by hurricanes and tropical storms? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will worsen your living conditions because of damages caused by extreme weather such as floods and storms? *Very likely, Somewhat likely, Not very likely, Not at all likely*
How likely is it that global warming and climate change will result in food shortages for people in Asia and Africa because of warming air temperatures? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will hurt the national economy of the United States because of damages caused by wildfires, hurricanes, droughts, and weather-related disasters? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will affect your health because of an increase in tropical diseases? *Very likely, Somewhat likely, Not very likely, Not at all likely*
How likely is it that global warming and climate change will unleash giant "sand seas" in Africa - giant fields of sand dunes with no vegetation - because a shortage of rainfall and increasing winds? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will pose a health risk to people in the United States because lengthier and more intense heat waves cause dehydration, hyperthermia and heat strokes? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will have a negative impact on your economic and financial situation because more intense and frequent droughts mean fewer fresh food supplies and higher prices in the supermarket? *Very likely, Somewhat likely, Not very likely, Not at all likely*
How likely is it that global warming and climate change will have its worst effects on the world's poorest people because they are the least prepared? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will have a negative impact on the national economy of the United States because more intense and frequent droughts mean fewer fresh food supplies and higher prices in the supermarket? *Very likely, Somewhat likely, Not very likely, Not at all likely*	How likely is it that global warming and climate change will pose a health risk to you because more intense and lengthier heat waves cause dehydration, hyperthermia and heat stroke? *Very likely, Somewhat likely, Not very likely, Not at all likely*
Overall, how serious a threat will global warming pose to poor people around the world, living in many different countries, during your lifetime? *Very serious, Somewhat serious, Not so serious, Not serious at all*	Overall, how serious a threat do you think global warming will pose to Americans or the American way of life during your lifetime? *Very serious, Somewhat serious, Not so serious, Not serious at all*	Overall, how serious a threat will global warming pose to you and your way of life during your lifetime? *Very serious, Somewhat serious, Not so serious, Not serious at all*

Note: Question order of the items was randomized.

Table 2.8 Experimental Design of the Party Cue and Values Study

	Participant: "Climate change **is** happening now" and therefore politicians in experiment **against** climate change policies		Participant: "Climate change **is not** happening now" and therefore politicians in experiment **for** climate change policies	
	Democratic Source Cue	*Republican Source Cue*	*Democratic Source Cue*	*Republican Source Cue*
No Value	**Democratic Against**	**Republican Against**	**Democratic For**	**Republican For**
Humanitarianism	**Humanitarian Democratic Against**	**Humanitarian Republican Against**	**Humanitarian Democratic For**	**Humanitarian Republican For**
Free Enterprise	**Free Enterprise Democratic Against**	**Free Enterprise Republican Against**	**Free Enterprise Democratic For**	**Free Enterprise Republican For**

Note: The table describes the experimental design of the party cue and values experiment. The experiment was a 2 (party cue: Democratic leaders or Republican leaders) X 3 (value-based justification: free-enterprise, humanitarianism or control/no value) between-subjects factorial design.

Table 2.9 Humanitarianism and Free enterprise Questions

Humanitarianism	Free enterprise
One should always find ways to help others less fortunate than oneself.	Putting government regulations on business does not endanger personal freedom. (Reverse)
It is best not to get involved taking care of other people's needs. (Reverse)	The less government gets involved with business and the economy, the better off this country will be.
A person should always be concerned about the well-being of others.	Government intervention leads to too much red tape and too many problems.
People tend to pay more attention to the well-being of others than they should. (Reverse)	There should be no government interference with business and trade.

Note: Participants rated to what extent they agreed or disagreed to each statement. The response options were: strongly agree, somewhat agree, somewhat disagree, strongly disagree

3

Values, Risk Perceptions and Climate Change Policies

The purpose of this chapter is to examine five hypotheses related to the value perspective. The chapter is divided into two sections. In the first part of the chapter, I examine the direct effects of values on support for climate change policies (hypothesis 1a) and whether these connections can be experimentally altered (hypothesis 1b). If the theory is correct that values increase risk perceptions, which in turn lead to support for policies to reduce the threat, then the effect of values should be observed on policy support.

In the second part of the chapter, I examine if perceptions of climate change risks mediate the connection between values and policies, and test whether specific types of threats interact with existing values to influence risk perceptions. The section begins with a study on the structure of risk perceptions. The goal is to determine whether people perceive different types of climate change risks (hypothesis 1d), or if people simply treat all risks as the same. I then turn to hypothesis 1e, which suggests that there are standing associations between values and risk

perceptions. Hypothesis 1f is tested by experimentally exposing participants to information about climate change risks that target values.

This chapter tests predictions on the effects of values on risk perceptions and attitudes on climate change with data from the adult and student studies. The studies had the same design (as noted in Chapter 2) and the results from the two studies are essentially equivalent. Therefore, since the adult study relies on a larger and more diverse sample than the student study, the results of the adult study are presented in this chapter. Results from the student study are laid out in the appendix. As for the prediction about the structure of risk perceptions (hypothesis 1d), I rely on data from the risk study.

3.1 The Direct Political Effects of Values

3.1.1 How Values Influence Attitudes on Climate Change Policies

To examine whether values and experimental treatments affect attitudes on climate change policies, a scale of policy attitudes was created. Factor analysis indicates that there is only one factor of climate change policies as there is only one factor with an eigenvalue over one. The rest are well below one. The eigenvalue for first factor is 3.89, the second factor 0.62, the third factor 0.28, and the fourth factor 0.16, and so on with gradually lower values. Absent any expectation but a one-dimensional structure, this decision should be uncontroversial. All items load highly on the scale and I therefore keep all the items in the scale.

Cronbach's alpha for the policy scale is 0.84, which indicates that the scale is very reliable. The scale was created to range from 0 to 1, with higher values meaning more support.

The question wordings of the items that comprise the dependent variable climate change policies are described in detail in the methodology chapter. The 11 policy items were asked after the experimental treatments and the risk items.

3.1.1.1 Standing Associations between Values and Climate Change Policies

This first section focuses on the direct effect of values on support for climate change policies, such as cap and trade and taxes on gasoline. If the threats of climate change have been salient in the political debate, then there should be standing linear effects from values to attitudes on climate change polices.

I first examine support for hypothesis 1a, that is, there is a positive relationship between the values universalism, benevolence and self-enhancement, and support for climate change policies. This is tested by regressing attitudes on climate change policies onto the values while controlling for other factors. Keep in mind that the experimental treatments are not included in this model; it only examines standing associations between values and policy attitudes.

Table 3.1 shows that the value universalism has a statistically significant effect on support for climate change policies ($t = 3.72$, $p < 0.001$). One unit change in universalism (i.e. going from the lowest to the highest adherence since the value is coded 0-1) increases support for polices by 0.288, all else equal. The coefficient for self-enhancement, 0.124, is also statistically significant ($t = 2.06$, $p = 0.04$). However, further analysis reveals that this effect is driven by outliers, to which ordinary least squares regression is very sensitive. Robust regression reduces the effect of the variable to 0.12 (S.E. = 0.74) which leads to it no longer being statistically significant by conventional standards. No other variables are affected by influential outliers and

their effects stay the same. As for the third value in the model, benevolence, it does not have a statistically significant effect on climate change policies (t = -0.38, p = 0.71). In other words, there is mixed support for the hypothesis.

Most of the control variables in the model are non-significant. However, ideology has a significant effect. Going from the most conservative to the most liberal (one unit change) increases support for policies by 0.183. Still, this effect is of lesser importance since the focus of the analysis is on values.

Table 3.1 about here

In sum, the significant coefficient for universalism gives support for hypothesis 1a while self-enhancement and benevolence do not. Hypothesis 1a is thus partially supported. Moreover, the fact that universalism has an effect on climate change policies establishes a basis for further meditational analysis with risk perceptions as the mediating variable. I return to this issue in the section on the indirect effects of values (3.2.2.1). Next, I turn to the effects of the experiment.

3.1.1.2 Main Effects of Experimental Manipulations on Climate Change Policies

Before testing hypothesis 1b, the simple main effects of the conditions are examined. The presence or absence of main effects does not tell us anything about the interactive effects that would give support to hypothesis 1b. However, it is a good place to start the analysis because it is useful to see if the three treatment conditions increased support for climate change policies relative to the control condition. Participants in the three treatment conditions read a fictional news story that stressed either of three risks posed by climate change: risks to poor people in remote regions, risks to the United States and risks to one self. In contrast, participants assigned

to the control condition did not read anything about climate change risks. Main effects may give an indication of the effectiveness of the different experimental conditions.

The results show that neither of the experimental treatments did increase support for climate change policies relative to the control condition (Table 3.2). All groups share the same superscript, which indicates non-significant differences between the groups. The highest level of support came from the universalism condition ($M = 0.70$) and the lowest from the benevolence condition ($M = 0.65$). While close to being statistically significant, this difference is non-significant by conventional standards ($t_{141} = 1.69$, $p = 0.09$).

Table 3.2 about here

Still, these non-significant main effects do not necessarily mean that hypothesis 1b lacks support since the hypothesis is assessed by how interactions between values and experimental conditions influence attitudes on climate change policies.

3.1.1.3 Interactions between Experimental Condition and Values on Climate Change Policies

If people filter climate change information thought their own values, they should respond stronger when risks threaten what they value and thereby support policies to reduce the threat. Hypothesis 1b is supported if the interactions between values and their respective experimental conditions (i.e. universalism X universalism condition, benevolence X benevolence condition, and self-enhancement X self-enhancement condition) are significant and positive.

When climate change policies are regressed onto the experimental conditions, values and their respective interactions, the interactions that would give support to hypothesis 1b are non-

significant, as the left column in Table 3.3 shows. The coefficient for the universalism interaction is -0.057 and far from being significant (t = -0.47, p = 0.64). The benevolence interaction, 0.145, is non-significant as well (t = 1.14, p = 0.27), although it is in the right direction. Finally, the coefficient for the self-enhancement interaction is 0.158 and non-significant (t = 1.01, p = 0.32). Thus, there is no support for the idea that when climate change risks target specific values, then those who adhere to these specific values support policies to reduce climate change risks.

As in the analysis above on the standing effects of values, the value universalism increases support for policies in this model too. The coefficient is 0.426 and statistically significant (t = 5.24, p < 0.001). Since both the dependent variable and the independent variable are coded 0-1, it is clear that universalism has a substantial effect on policy preferences.

Table 3.3 about here

I will come back to this issue in the section on risk perceptions (3.2.2.2), but for now, it is sufficient to know that random assignment did not make all groups equal in terms of risk perceptions. Specifically, the control group scored lower on risk perceptions before the experimental treatment. To make sure that these differences in risk perceptions that existed pre-treatment did not affect the results, I included pre-treatment risk perceptions as a covariate in the model. The coefficient for the pre-treatment risk perceptions, 0.248, is statistically significant (t = 8.36, p < 0.001) yet the focus is on the interactions between values and treatment conditions, and they remain non-significant even with this control variable included (Table 3.3, right column).

3.1.1.4 Summary

The experimental treatments did not increase support for climate change policies compared to the control condition. Importantly, the universalism condition, the benevolence condition and the self-enhancement condition did not have a stronger effect on participants who adhere to the target values universalism, benevolence and self-enhancement, respectively, as were indicated by the non-significant interactions. This means that hypothesis 1b was not supported by the experiment.

Nonetheless, the value universalism was found to be associated with support for policies, which gives some support for hypothesis 1a. While this finding is not providing any final evidence on the role values in shaping attitudes on climate change, it suggests that some values matter. In addition, the finding provides a basis for further study of the mediating role of risk perceptions.

3.2 The Indirect Political Effects of Values via Risk

3.2.1 Differentiation of Climate Change Risks: Three Dimensions or One?

This first part of the second section tests hypothesis 1d, whether people differentiate between different types of risks associated with climate change. The prediction proposes that there is texture in the way people see climate change risks. Given the wide-ranging possible effects of climate change, people may disentangle these risks. Specifically, I suggest that there are three types of climate change risks: risks to humankind, risks to the community and direct risks. Risks to humankind involve negative events that threaten people in other countries, that is,

risks that expose those outside one's immediate environment. Risks to the nation threaten fellow Americans. Direct risks are related to the well-being of individuals directly, e.g., pocketbook effects. Chapter 1 contains a more exhaustive discussion of the structure of risk perceptions.

In contrast to a tripartite division of risks, the assumption in prior research is that climate change risks, irrespective of whether they target impoverished people in Africa, increase the frequency of wildfires in California or drive up insurance premiums, are essentially the same. They are all about the risks of climate change and it does not matter whom they target or what type of consequences they entail.

It is important to study the structure of risk perceptions before turning to the effect of values on risk perceptions (i.e., the test of hypothesis 1e and hypothesis 1f) because the results of the risk study determine the dependent variables of later studies. If hypothesis 1d is supported, which means that the subjective risks of climate change to humankind, the nation and one self can be distinguished empirically, then subsequent models will need to consider this. Thus, the effect of values on risk perceptions should be assessed in how values affect these more detailed types of risk perceptions rather than how they affect general climate change risk perceptions.

Another reason to study risk is that if there is structure in risks, and risk perceptions influence policy attitudes, it opens up different ways to influence policy attitudes. Those who want to influence attitudes on climate change may do so by providing specific information about different risks (e.g., how global warming is likely to change the United States *and* impoverished regions) rather than just assuming that general climate change risk is all that matters.

3.2.1.1 Factor Analysis of Climate Change Risks

While the theoretical prediction tested in this section is straightforward – there are three factors of climate change risk – there is a strong alternative possibility that all climate change risks are the same, and form one dimension.

I follow the recommendation of Fabrigar et al. (1999) and first analyze the data with exploratory factor analysis (EFA), and then turn to confirmatory factor analysis (CFA) to assess the empirical structure of the risks posed by climate change. Exploratory factor analysis (EFA) is data-driven; it is essentially up to the data to tell us what patterns there are in the data. The disadvantage with this method is that there are endless possible rotations if more than one factor is extracted and it can be hard to decide which solution is the most accurate. An excellent answer to this potential problem is to rely on CFA because this flexible method allows the researcher to model relationships and impose restrictions that are deemed theoretically suitable.[20] In the subsequent CFA, the pattern that is modeled, and compared to the one factor solution, is the tripartite division of climate change risks. These models are compared in terms of how well they fit the data.

[20] Factor analysis assumes that there are factors or latent traits/internal attributes that can be measured by surface attributes, e.g., questions in a survey. A general definition of factor analysis is that it "involves a set of techniques designed to identify order and structure in […] data by providing a parsimonious and meaningful explanation for the observed variation and covariation in surface attributes." . Factor analysis can be a fantastic tool if used correctly, yet it is critical that the researcher thinks carefully about the predicted pattern of results before using factor analysis because otherwise the method can give results that are practically useless; theory driven analysis is a must

3.2.1.2 Exploratory Factor Analysis of Climate Change Risks in Risk Study

The items analyzed in the factor analysis are described in Table 3.4. There were 12 items in the analysis, with four items measuring each type of hypothesized risk.[21] Also described in Table 3.4 are the frequency distributions for the questions. In general, participants saw higher risks to people outside their immediate environment. People in for example Africa were perceived to be at a higher risk than people living in the United States were. Risks to oneself were deemed relatively low. For example, increases in tropical diseases because of climate change were perceived to affect the world's poorest countries – not oneself.

Table 3.4 about here

A key step in exploratory factor analysis is to determine the correct number of factors.[22] Zwick and Velicer write that (1986) "[o]ne of the most important decisions the applied researcher faces is selecting how many factors or components to retain." If too few factors are selected (underfactoring), then those items that belong to excluded factors will load on the included factors and make the result hard to interpret. If too many factors (overfactoring) are extracted, then the results might lead us to develop theories with no real meaning (Fabrigar et al. 1999).

A traditional method of factor extraction is to look at the eigenvalues of the factors. If a factor has a higher value than one, this indicates that it should be retained (Kaiser 1960). The

[21] Three items were excluded from the analysis because they were worded differently and reduced the fit of all models. Instead of asking about the likelihood of some climate change event happening, these three items were asking about the seriousness of certain threats. The items about seriousness were included in the questionnaire because prior research has partially relied on these questions in their risk measures.

[22] Kaiser-Meyer-Olkin measure (KMO) of overall sampling adequacy is an indicator of whether factor analysis can be performed. The KMO for the 12 risk items is 0.96, which is marvelous, and thus indicates that factor analysis is justified.

first factor in the exploratory factor analysis of the risk items has an eigenvalue of 8.26. The eigenvalues of subsequent factors, 0.90, 0.77 and 0.49, are below one. The factor values are plotted in Figure 3.1. Thus, when Kaiser's criterion is applied to the risk study data, only one factor should be retained. This finding casts some doubt on the veracity of hypothesis 1d.

Another way to extract factors is by looking at the scree plot. In this method, one visually examines the plot of eigenvalues and searches for the elbow in the graph. The factors above the elbow should be retained. The scree plot from the factor analysis shows that the elbow is at the second factor, and therefore it yields the same conclusion as Kaiser's criterion. EFA sometimes results in an indistinct elbow or two elbows, and that can make it hard to decide how many factors to retain, but in this case, it appears that only one factor should be retained.

Figure 3.1 about here

However, the methods of factor extraction mentioned above are only guidelines. Importantly, when factor analysis is guided by theory, as it is in this case, theory should always be taken into account. The prediction is that the items measure three factors of risk. Therefore, the emphasis should be to examine how well the results match this prediction. If it is valid, then the items that measure risks to humankind will comprise one factor, items about risks to the nation a second factor, and items that focus on risks to self a third factor.

When three factors are retained in the exploratory factor analysis (see Table 3.5), the risk items load on the factors they should according to hypothesis 1d. For example, items supposed to tap risks to humankind largely fall on the same factor and not on the risks to self or risks to nation factors. The same holds for risks to nation-items; they tap the same factor. One of these items, about the national economy being hurt by weather related-disasters, has a rather weak

loading on the risks to nation factor (0.23), although it is generally a weak item and does not load strongly on either of the other two risk factors. The items that measure risks to self all load on the same factor, with loadings between 0.50 and 0.65. While there are some cross-loadings, i.e., items that load on two or more factors simultaneously, the overall pattern indicates that the hypothesis is accurate. Importantly, the fit index RMSEA is 0.045 for the three-factor model, which suggests that it fits the data well.[23] According to conventions of the meaning of fit statistics, anything below or around 0.05 indicates that a model is good at explaining the data. Fit statistics are described further in the subsequent section on confirmatory factor analysis.

The simpler one-factor model, which Kaiser's criterion, the scree plot and prior researchers suggested were the best, seems to adequately describe the data, too. The results in the rightmost column in Table 3.5 show the loadings of the one-factor model. Most of the items have strong loadings, with many around or above 0.90. It is important to note, however, that the one-factor model does not have as good of a fit as the three-factor model. While the RMSEA is an acceptable 0.087, it is not as good as the model that separates climate change risks.

In sum, based on the results from the exploratory factor analysis of the risk items, there is reason to believe that the three-factor model is superior to the one-factor model. However, it is difficult to be completely conclusive based on EFA results. The pattern of loadings and the better RMSEA suggest that there is support for it. Still, Kaiser's criterion and the scree plot indicate that there should only be one factor. Moreover, the fit of the one factor model is acceptable.

Table 3.5 about here

[23] Since the three potential factors are all about climate change, it would be unrealistic to assume that the factors are unrelated. Thus, rather than relying on orthogonal rotation, I let the factors be correlated by using promax oblique rotation.

The beginning of this chapter mentioned that there are drawbacks with only relying on exploratory factor analysis. Specifically, EFA gives the researcher very limited opportunity to specify models and to compare them. To alleviate such problems, and to examine the hypothesis further, I next turn to confirmatory factor analysis.

3.2.1.3 Confirmatory Factor Analysis of Climate Change Risks

An advantage with CFA is that it gives the researcher flexibility in comparing models. In such comparisons, model fit is one of the most important concerns. The subsequent analysis relies on three types of fit measures, RMSEA, TLI and CFI, since there no consensus on which one is the best. Fan, Wang, and Thompson (1999) note that the RMSEA is sensitive to model misspecification, does not depend so much on estimation method and is not strongly influenced by sample size. Thus, unlike other methods that are sensitive to such factors, RMSEA tends to produce stable results. A RMSEA value of less or equal to 0.05 is good fit, between 0.05 and 0.08 fair fit, and 0.08 to 0.10 can be described as mediocre fit. Anything above is a poor fit. The Tucker-Lewis index (TLI) (or, by another name, the non-normed fit index) and the comparative fit index (CFI) are two other popular measures of fit that are relatively unaffected by sample size. TLI and CFI are comparative fit measures, i.e., they are compared to a baseline model of no relationships. In contrast to RMSEA, TLI and CFI values that are higher are better. A value above 0.95 on TLI and CFI is considered good fit (Kaplan 2008).

The two models that are compared are the tripartite division of climate change risks (i.e. hypothesis 1d) and the standard one-dimensional model. In the first model, each of the three risk factors (risks to humankind, risks to nation and risks to self) are measured by four items each. The three factors are also modeled on one overarching climate change risk dimension because

they are assumed to all fall on a general climate change risk dimension. To model the three factors on one overarching factor makes it more realistic yet it does not influence the fit of the model (see Figure 3.2). In the one-dimensional model, all risk items load on one factor (see Figure 3.3).

Figure 3.2 about here

Figure 3.3 about here

The results from the confirmatory factor analysis, shown in Table 3.6, suggest that the three-factor model is superior to the model that does not distinguish between different climate change risks. The RMSEA is 0.041 for the three-factor model, which indicates a very good fit. In contrast, the fit for the model that treats risks about climate change as a unitary construct is 0.087. This latter model has an acceptable fit, yet it is worse than the three-factor model. The two other fit indices, TLI and CFA, are very good for both although they are slightly higher for the three-factor model. Thus, both models are OK, while the tripartite models is somewhat superior.[24]

Overall, the items in the three-factor model load highly on the factors except for two of the items that measure threats to Americans. The question on whether the national economy of the U.S. will be hurt because of extreme weather and fires, and the question about health risks to Americans seem to load poorly on the national risk factor than do other items (0.40 and 0.55, respectively). The loadings on the higher order single risk factor are all very high. For example, the loading of the risks to humankind factor on climate change risk perceptions is 0.97.

[24] The risk models were estimated with weighted least squares with mean and variance adjustment (WLSMV) estimation to account for the possibility of non-normality. Maximum likelihood is inappropriate because of the potential non-normality . The response categories are similar to a Likert scale, so maximum likelihood would perhaps work, yet there is censoring on some of the items so WLSMV is probably better.

The items in the one-dimensional model also demonstrate strong loadings on climate change risk perceptions (see the rightmost column in Table 3.6). Generally, the items load slightly less than in the three-factor model, but almost all items are good. The exceptions are again two of the items that focused on risks to Americans, and they are the same items that had the lowest loadings in the three-factor model.

Table 3.6 about here

While climate change risks are different, that does not mean that they are completely unrelated. In fact, the correlations between the three risk factors are high, as Table 3.7 shows. The lowest correlation, 0.77, is between risks to humankind and risks to self, and the highest correlation, 0.87, is between risks to humankind and risks to nation. Thus, the while there are differences, they are not striking.

Table 3.7 about here

3.2.1.4 Summary

The exploratory factor analysis yielded contradictory findings. One the one hand, two traditional methods of factor extraction, Kaiser's criterion and the scree plot, suggested that only one factor should be retained.

Yet, on the other hand, there was persuasive evidence that supports the three-factor model. When three factors were retained and rotated in exploratory factor analysis, the right items loaded on the hypothesized factors. Moreover, the results from the confirmatory factor analysis supported the three-factor model because the fit of the tripartite model was superior to the one-factor model. The RMSEA was 0.041 for the tripartite model whereas it was 0.087 for

the one-dimensional model. The fit of both models were acceptable, meaning that researchers that have grouped together items regardless what type of risk they measure are not entirely wrong. It is important to note, however, that the tripartite model had a better fit and therefore describes the structure of risk perceptions more accurately.

In conclusion, both models are accurate, yet the tri-partite model is more so. Therefore, all three risk factors will serve as dependent variables in the subsequent analysis. Nonetheless, given that the fit of the one-factor model was acceptable and that the model is more parsimonious, this specification of the dependent variable will also be examined. Thus, there is support for hypothesis 1d, yet the one-dimensional model is not soundly rejected.

3.2.2 How Values Influence Climate Change Risk Perceptions

After the examination of the structure of risk perceptions, I next investigate how values influence risk perceptions. I begin with hypothesis 1e, which suggests that there is a linear relationship between the values universalism, benevolence and self-enhancement, and risk perceptions. I also conduct a meditational analysis. Subsequently, I test if specific types of threats interact with existing values to influence risk perceptions (hypothesis 1f).

3.2.2.1 Stable Associations between Values and Risk Perceptions, and Meditational Analysis

Hypothesis 1e is tested by regressing risk perceptions onto universalism, benevolence and self-enhancement. The hypothesis is supported if values increase risk perceptions. These standing associations between values and risk perceptions are investigated while controlling for

party identification, ideology and background factors. The effects of the experimental treatments are not examined in this model.

Given the support for hypothesis 1d, I separate the dependent variables into three types of risks, and regress each type onto values. In addition, since the one-dimensional model of risk perceptions has an acceptable fit and is more parsimonious, it is also included as one of the dependent variables. The reliabilities for all scales are high (risks to humankind, $\alpha = 0.89$; risks to the nation, $\alpha = 0.85$; risks to one self, $\alpha = 0.84$; general climate change risks, $\alpha = 0.94$). All dependent variables are coded 0-1, with higher values meaning higher risk.

The value universalism has a strong and significant effect on all the four risk scales (Table 3.8). The effect on risks to humankind is 0.348 ($t = 3.05$, $p = 0.003$). That universalism increases perceptions also of risks to the nation and to one self is unsurprising given that the three types of risk scales are closely related. General perception of climate change risks is increased by 0.267 with one unit change in universalism, all else constant ($t = 2.49$, $p = 0.01$). As before, the variable is coded 0-1. Clearly, the effect of universalism is substantial and hypothesis 1e is therefore at least partially supported.

However, the other two values do not have significant effects on their respective dependent variables. As for benevolence, 0.128, it does not increase perceptions of risks to nation ($t = 1.13$, $p = 0.26$). The effect of self-enhancement on risks to one self, 0.125, is non-significant ($t = 1.03$, $p = 0.30$). Moreover, the effects of the two values on general perception of risk are non-significant. While the coefficients for both variables are in the right direction, they are not statistically significant, and therefore, they do not lend support for hypothesis 1e.

Table 3.8 about here

The theoretical expectation is that the effect of values on climate change policies is mediated by risk perceptions. Here, I examine this issue empirically. For mediation to take place, three steps must be met (Baron and Kenny 1986). In the beginning of this chapter, universalism (i.e. the initial variable in Baron and Kenny's terminology) was found to influence attitudes on climate change policies (see 3.1.1.1). Thus, the first step in meditational analysis is met. (The model is also included in Table 3.8, the second column from the right, to make it easier to examine effects.) In this section, it has been shown that universalism influences risk perceptions, i.e., the mediator. Therefore, the second step of meditation is also met.

The third step is to investigate if the mediator affects climate change policies, the outcome variable. In the rightmost column of Table 3.8, I show a model that predicts attitudes on climate change policies. The model includes the mediator, general risk perceptions, and universalism, the initial variable. The effect of risk perceptions on climate change is statistically significant ($t = 7.35$, $p < 0.001$); a unit change in risk perceptions, increases support for policies by 0.326, all else equal. Therefore, the third step of mediation is met as well (Baron and Kenny 1986).

The extent of the mediation is the reduction of the effect of the initial variable when the mediator is included in the model. Note that the effect of universalism in Table 3.8 is still statistically significant, but not as strong. The effect of the coefficient is reduced from 0.288 to 0.206. There are various tests of whether a mediator significantly conveys the effect of the initial variable to the outcome variable. One popular test in meditational analysis is the Sobel test, which is a conservative test of mediation (Sobel 1982). The test statistic of the Sobel test is 1.89,

which translates to a *p-value* of 0.059, two-tailed test. While the p-value is not particularly low, I conclude that there is partial mediation by risk perceptions.[25]

The conclusion about mediation would be strengthened if universalism, or the other two values, conditions how people perceive risks with climate change when values are threatened experimentally. Thus, I turn next to the effects of the experimental treatments on risk perceptions.

3.2.2.2 Main Effects of Experimental Manipulations on Risk Perceptions

The adult study contained three experimental conditions and one control condition. The main effects of the experimental treatments indicate that at least two of the treatments were successful in affecting risk perceptions (Table 3.9). Participants assigned to the universalism condition saw higher risks to humankind (Universalism condition, $M = 0.84$; Control condition, $M = 0.71$, $t_{148} = 3.50$, $p = 0.001$). Those assigned to the benevolence condition perceived higher risks to the nation compared to the control (Benevolence condition, $M = 0.72$; Control condition, $M = 0.62$, $t_{151} = 2.60$, $p = 0.01$). However, subjects in the self-enhancement condition did not see significantly higher risks to themselves compared to the control (Self-enhancement condition, $M = 0.56$; Control condition, $M = 0.53$, $t_{146} = 0.85$, $p = 0.40$).

Given that the three risk scales are highly related, it is unsurprising that participants in the universalism condition also saw higher risks to the nation and that the benevolence condition was associated with higher risks to humankind, as is demonstrated by the non-shared superscripts in Table 3.9. Overall, the conditions did little to increase risks to self.

[25] If the meditational analysis instead focuses on risk perceptions to humankind (4-item scale) rather than general risk perceptions as the mediator, the p-value for the Sobel test is 0.005 and clearly significant.

Looking at the effect of the experimental conditions on general climate change risk perceptions (all climate change risk items in one scale), we see that participants in the universalism condition ($M = 0.70$) and benevolence condition ($M = 0.70$) perceived higher risks with climate change compared to the control condition ($M = 0.62$). T-tests reveal that these differences are significant ($t_{145} = 2.49$, $p = 0.01$ and $t_{150} = 2.25$, $p = 0.026$, respectively). The self-enhancement condition increased risk perceptions, but the difference is non-significant by conventional standards ($t_{146} = 1.33$, $p = 0.19$). Thus, according to these results it seems like the experimental treatments were largely successful (see Table 3.9).

However, the results are apparently driven by differences between the groups that existed before the experimental treatments. A fundamental assumption in experimental research is that all other variables except the treatment variable are held constant because of random assignment. This assumption is sometimes violated, especially when the sample size is small. Yet the groups were large in this experiment (all groups had more than 70 participants), and random assignment did not work as the great equalizer. It is possible to know this because one variable measured the perception of risk before the experimental treatment. Pre-treatment risk was measured with the following question: "How serious of a threat do you think global warming is right now?" As the second column in Table 3.9 shows, those in the universalism condition saw higher risks with climate change *before* they were exposed to the experimental material. The difference between the control condition and the universalism condition is significant. It is therefore unsurprising that when the pre-risk variable is included as a covariate in an ANOVA with the risk scale as a dependent variable and the conditions as explanatory variables, there are no significant differences between the conditions and differences across conditions are fully explained by pre-existing risk estimates.

Table 3.9 about here

3.2.2.3 Interactions between Experimental Condition and Values on Climate Change Risk Perceptions

The veracity of hypothesis 1f is tested by interacting experimental conditions with values. If people perceive climate change risks through their values, they should respond most strongly when climate change is described as a threat to what they value. The more one adheres to a value, the stronger this reaction should be. Specifically, when climate change is depicted as threatening to people in other countries, as it is in the universalism condition, then individuals who value universalism should react to the threat the strongest and see heightened risk with climate change. Similarly, when the fictional news story in the experiment highlights risks to the United States – which it does in the benevolence condition – then people who value benevolence should be the most effected. Correspondingly, when climate change is said to have pocketbook effects (as it is in the self-enhancement condition) then those who value self-enhancement should perceive greater risks. To test this prediction, the conditions and their corresponding values were multiplied to create interaction terms (e.g., universalism X universalism condition). If these interaction terms are significant and positive in the multiple regression models, then there is support for hypothesis 1f.

The interaction terms are non-significant in the model and there is thus no support for the hypothesis. Neither the universalism interaction, nor the benevolence interaction, nor the self-enhancement interaction are significant in any of the models. As Table 3.10 demonstrates, the effect of the interactions do not depend on how the dependent variable is specified; if risk perceptions are separated into three types of risks, as the section above on risk perceptions

indicates that they should, using these three factors as dependent variables do not alter the results of the interactions – they remain non-significant. The interactions are non-significant also in the student study, which is outlined in the appendix.

The only significant coefficient in Table 3.10 is the degree to which respondents endorse the value of universalism as a predisposition. Going from the lowest value to the highest, that is, one unit change in universalism, there is an increase in general climate change risk perceptions by 0.516, all else equal. Universalism has a similar influence on the other scales. In essence, those who value social justice, unity with nature, and equality (aspects of universalism) are most inclined to perceive the risks of global warming. This suggests that values do shape risks, but that this does not depend on exposure to a message concerning the risks of climate change to specific values.

Table 3.10 about here

3.2.2.4 Examining the Value Interactions with Alternative Specifications and Exclusions

To further probe the effects of values on risk perceptions and make sure that the effects of the interactions were not dependent on respondent characteristics or model specification, a number of alternative specifications were examined and some participants excluded from the analysis. However, and as I describe in this section, these modifications and adjustments do not alter the conclusion above.

First, the experimental groups differed in risk perceptions before treatments, as already noted in reference to Table 3.9. Nevertheless, even if pre-treatment risk is included as a control variable to adjust for this, the non-significant interactions remain (see Table 3.11). The pre-

treatment risk variable is obviously highly significant given its strong relationship to the dependent variables, yet that is less interesting since it is only included to reduce differences between the conditions. When pre-treatment risk is included, the effect of universalism largely disappears. This indicates that pre-treatment risk is influenced by universalism as well, which gives some support to the value perspective.

Table 3.11 about here

Second, a visual examination of the general risk perception scale indicates that there is right-censoring on the variable, meaning that we could not observe a few observations that would have scored very highly on climate change risks (see Figure 3.4). While not particularly apparent, the visual inspection suggests that there may also be some left-censoring. Censoring on the dependent variable can lead to inconsistent estimates of the parameters. Thus, OLS regression will not yield accurate parameter estimates regardless of how large the sample size is (Long 1997). To adjust for the possible censoring, the models with the interactions were estimated with Tobit models that allowed for both left- and right-censoring. While there was noticeable right-censoring on a few of the dependent variables (risks to humankind: 76 observations; risks to nation: 33 observations; risks to self: 17 observations; general climate change risks: 11 observations), the Tobit models did not fundamentally alter the results as the interactions remain non-significant (see Table 3.12).

Table 3.12 also shows that the effect of universalism remains substantial and significant in the Tobit models. A one unit change in universalism leads to an increase in perceived risks to humankind by 0.741, to nation by 0.537, to one self by 0.499 and to general risk by 0.538.

Figure 3.4 about here

Table 3.12 about here

Third, there is a possibility that some people were habitually disposed to agree more or less to value items. Therefore, I subtracted the mean of all values from the individual values of interest (i.e., universalism, benevolence and self-enhancement) and created new interaction terms. Still, this adjustment had no impact on the results. Universalism remains significant and positive while the other variables remain non-significant.[26]

Table 3.13 about here

Fourth, while an effort was made to make the fictional newspaper articles easy to read for everyone, it is possible that some individuals were better at understanding the texts. There are several ways to look at this. One is to include only participants who were politically aware. Yet, as the second column in Table 3.13 shows, the interactions are not significant among the politically aware either. In this model, participants who got more than 50 percent correct of the political knowledge questions were included. It should be noted that the particular point of the cut-off does not matter, as the interactions are non-significant even if the threshold for inclusion is higher. Along the same line of thinking, perhaps only those with a higher level of educational attainment were able to understand the texts of the treatments. However, the results, shown in the third column of Table 3.13, demonstrate that interactions are non-significant also among those with some college education or higher. Similarly, right after the experimental treatments, participants were asked two factual questions about the text. Yet a model that only includes those who accurately recalled the article content does not alter the results (see the fourth column of

[26] Rather than running three separate models for each risk factor (risks to humankind, risks to nation and risks to self), these subsequent models rely on the one-factor climate change risk dependent variable because it is unwieldy to present that many models. Importantly, this decision does not alter any results.

Table 3.13). Potentially, one had to spend time on the questionnaire to be fully influenced by the treatments. However, the interactions are non-significant irrespectively of how much time participants spent filling out the questionnaire (the fifth column of Table 3.13 shows those who took more than 15 minutes).

Another possibility that led to the non-significant results above is that other values or predispositions could have influenced the effects of the experimental treatments. Possibly, I looked at the wrong predispositions. However, interactions with party identification, ideology or any other of Schwartz's values are also non-significant.

3.2.2.5 Summary

The three experimental conditions (the universalism condition, the benevolence condition and the self-enhancement condition) raised risk perceptions compared to the control condition, but this effect was driven by differences in risk perceptions between the conditions that existed before the treatment.

The prediction by hypothesis 1f, that people respond to risks differently depending on their values, was not supported by the experiment. The treatments that targeted specific values did not cause higher risk perceptions among those who adhered these specific values. Specifically, the hypothesis was tested by creating product terms with experimental conditions and corresponding values (e.g., universalism X the universalism condition). The lack of significant interactions means that it did not find support. Different model specifications and exclusion of certain participants did not alter this conclusion.

However, the value universalism was found to be strongly related to risk perceptions and this gives partial support for hypothesis 1e. In other words, someone who adheres to universalism is much more likely to perceive higher climate change risks. Importantly, the meditational analysis shows that universalism affects climate change policies through risk perceptions. Since this finding is only based on cross-sectional data, it is not conclusive evidence of a causal link, but it suggests that risks mediate the effect of values on policies.

3.3 Summary of Chapter 3

The chapter has examined predictions related to the value perspective. First, I studied if there was a standing relationship between three values, universalism, benevolence and self-enhancement, and attitudes on climate change policies. Prior research on environmental issues has found that any of these values have the potential to increase concern for the environment. Given the salience of climate change in the debate, it was deemed possible that people who adhere to these values have already reached the conclusion that climate change poses a grave threat and that therefore increased their support for climate change policies to reduce the risks.

As predicted by hypothesis 1a, I found that people who strongly adhere to the value universalism are more likely to support climate change policies. However, benevolence and self-enhancement are not associated with more support. Thus, there is mixed support for hypothesis 1a.

Embedded in the survey was an experiment with four conditions. Participants in three of the conditions read a fictional news story that highlighted certain types of threats posed by

climate change. Those assigned to the control condition simply skipped the story section and continued with the questionnaire. In the universalism condition, risks to poor people, especially in distant regions were emphasized. The benevolence condition emphasized threats to people in the United States. Lastly, the self-enhancement condition stressed risks posed to one self, e.g., pocketbook effects.

The goal of the experiment was to examine whether experimental treatments could activate the links that may exist between values and policy support. If people who, for example, value universalism are informed that climate change threatens impoverished people, as in the universalism condition, then they should consequently support policies to reduce the threat. The data did not give support for this idea, however, and hypothesis 1b is consequently not supported.

Before I turned to examine how values influence risk perceptions, I studied the structure of climate change risks. I found support for hypothesis 1d, which is the idea that people perceive different climate change risks. By relying on exploratory and confirmatory factor analysis, I found that people separate the risks to humankind, the nation and one self. However, the alternative explanation, that people perceive climate change risks as unitary, was not soundly rejected. In fact, both models had acceptable fit. An advantage with the one-dimensional model is that it is more parsimonious, and this compensates for the somewhat inferior fit of this model compared to the tripartite model of risk perceptions.

If values indeed condition how people perceive the risks with global warming, then there might be a connection between the three values and risk perceptions already, which is predicted by hypothesis 1e. After all, most people have heard about climate change so values have had the

chance to color perceptions of risks. I found that there exists a link between universalism and risk perceptions, yet no association was found between the other two values and risk perceptions. The support for hypothesis 1e is therefore mixed.

The theoretical model predicts that values influence attitudes on climate change, yet importantly, this link is mediated by risk perceptions. That is, some values make people particularly sensitive to climate change risks, which in turn make people more supportive of policies to reduce the threats. Baron and Kenny (1986) have outlined a few steps that must be met for mediation to take place. In the case of universalism, I found that the effect of this value on support for climate change policies is partially mediated by risk perceptions. It is important to note that this conclusion is not based on experimental findings, but on the standing effects of values. Thus, it is not definite evidence of cause and effect.

In an attempt to establish such causality, values were interacted with experimental conditions that targeted the values. According to hypothesis 1f, this should activate the link between values and risk perceptions because values make people more or less prone to perceive risks. However, I found no support for hypothesis 1f.

Given that climate change has largely been described in media as a threat to impoverished people (Leiserowitz 2005; Lorenzoni et al. 2006; Nisbet 2009), it is not surprising that those who value universalism seem to have reacted to this information, and increased their risk perceptions, which is what I found. However, so far, only one value is related to higher risk perceptions and support for policies.

It is extraordinarily difficult to influence risk perceptions and attitudes on climate change policies with experimental treatments. In the first study I conducted, the student study, I was

unable increase risk perceptions and support for climate change policies. Moreover, I could not activate links between values and attitudes on climate change (see Appendix for results). Even after designing more intense treatments, as in the adult study, the effects were non-significant. Moreover, the potential link between values and risk perceptions was unchanged by the treatments. Even the association that exists already between universalism and attitudes on climate change was unaffected by the experimental treatments. In other words, it seems to require a tremendous amount of powerful information to change attitudes with values.

The texts that participants read were explicitly devoid of party source cues. Considering the polarizing political debate over climate change, it is perhaps unsurprising that people seem to disregard information when it does not come from a political source. Climate change a difficult topic to understand and the safe position may be to discount all new information unless it comes from a trusted source. Even pure independents may suspect that the material they read comes from a political source and therefore take a very skeptical approach to the info. In the next two chapters, I investigate if the underlying differences in public opinion on climate change are caused by a disagreement between Republican and Democratic elites.

Table 3.1 Effects of Values on Climate Change Policies

	Climate Change Policies
Universalism	**0.288 (0.077)**
Benevolence	-0.029 (0.078)
Self-enhancement	**0.124 (0.078)**
Party Identification (Democrat)	0.008 (0.043)
Ideology (Liberal)	**0.183 (0.054)**
Age	0.001 (0.001)
White	0.047 (0.025)
Female	0.022 (0.019)
U.S. Born	0.011 (0.030)
Household Income	-0.030 (0.042)
Education	0.070 (0.042)
Constant	**0.166 (0.076)**
Adj R-Squared	0.22
N	230

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of $p < 0.05$, two-tailed test. The dependent variable climate change policies is an 11-item scale, coded 0-1, with higher values meaning more support. Universalism is measured by five items, benevolence by four items and self-enhancement by eight items. Values range from 0 to 1 with 1 meaning strongest adherence. Party identification ranges from strong Republican (0) to strong Democrat (1). Ideology goes from extremely conservative (0) to extremely liberal (1). Age ranges between 18 and 89. White is a dummy for white ethnicity, minority ethnicity is the baseline. Female is a dummy for female, with male as the excluded category. U.S. born is a dummy meaning born in the United States, coded zero for otherwise. Household income is coded in 22 categories with less than $4,999 as the lowest category and more than $200,000 as the highest. Education is measured by a 7-point scale with higher values indicating higher education. Both household income and education range from 0 to 1.

Table 3.2 Main Effects of Experimental Conditions on Climate Change Policies

	Climate Change Policies (11 items)
Control Condition (no story)	0.66[a]
Universalism Condition	0.70[a]
Benevolence Condition	0.65[a]
Self-enhancement Condition	0.68[a]
N	289

Note: Means that share a superscript are not significantly different at p<.05, two-tailed test. Climate change policies are measured by an 11-item scale, coded 0-1, with higher values meaning more support.

Table 3.3 Climate Change Policies Regressed on Conditions and Values in Adult Study

	Climate Change Policies	**Climate Change Policies**
Universalism	**0.426 (0.081)**	**0.243 (0.076)**
Benevolence	-0.073 (0.079)	-0.030 (0.070)
Self-enhancement	0.090 (0.081)	0.112 (0.072)
Universalism Condition	0.067 (0.090)	-0.034 (0.080)
Benevolence Condition	-0.132 (0.099)	-0.148 (0.089)
Self-enhancement Condition	-0.082 (0.095)	-0.030 (0.085)
Universalism * Universalism Condition	-0.057 (0.122)	-0.044 (0.110)
Benevolence * Benevolence Condition	0.145 (0.128)	0.148 (0.114)
Self-enhancement * Self-enhancement Condition	0.158 (0.157)	0.054 (0.140)
Pre-treatment Climate Change Risk Perception	-	**0.248 (0.030)**
Constant	**0.368 (0.071**)	**0.290 (0.064)**
Adj R-Squared	0.17	0.34
N	280	280

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05, two-tailed test. The dependent variable is climate change policies, an 11-item scale, which ranges from 0 to 1, with higher values meaning higher policy support. Of the experimental conditions, the control is the baseline category. Values range from 0 to 1 with higher values meaning strongest adherence. Pre-treatment climate change risk perceptions was measured with one question before the experimental treatments. The variable is scored 0 to 1 with higher values meaning higher perceived risk.

Table 3.4 Percent of Respondents Perceiving Different Types of Climate Change Risks in Risk Study

Risks to Humankind	Very likely	Some-what likely	Not very likely	Not at all likely
How likely is it that global warming and climate change will increase deaths and illness in the world's poorest countries because of an increase in tropical diseases?	52.6	31.3	11.2	5.0
How likely is it that global warming and climate change will result in food shortages for people in Asia and Africa because of warming air temperatures?	49.0	34.1	10.8	6.2
How likely is it that global warming and climate change will unleash giant "sand seas" in Africa - giant fields of sand dunes with no vegetation - because a shortage of rainfall and increasing winds?	29.7	46.3	17.1	6.9
How likely is it that global warming and climate change will have its worst effects on the world's poorest people because they are the least prepared?	64.6	20.9	8.3	6.2
Risks to Nation				
How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas in the United States because of damages caused by hurricanes and tropical storms?	50.9	33.6	9.6	5.9
How likely is it that global warming and climate change will hurt the national economy of the United States because of damages caused by wildfires, hurricanes, droughts, and weather-related disasters?	45.3	35.6	12.8	6.4
How likely is it that global warming and climate change will pose a health risk to people in the United States because lengthier and more intense heat waves cause dehydration, hyperthermia and heat strokes?	33.3	41.0	19.2	6.5
How likely is it that global warming and climate change will have a negative impact on the national economy of the United States because more intense and frequent droughts mean fewer fresh food supplies and higher prices in the supermarket?	42.0	38.7	12.6	6.7
Risks to Self				
How likely is it that global warming and climate change will worsen your living conditions because of damages caused by extreme weather such as floods and storms?	25.5	40.0	25.3	9.3
How likely is it that global warming and climate change will affect your health because of an increase in tropical diseases?	17.5	37.3	31.9	13.4
How likely is it that global warming and climate change will have a negative impact on your economic and financial situation because more intense and frequent droughts mean fewer fresh food supplies and higher prices in the supermarket?	38.0	36.2	16.7	9.2
How likely is it that global warming and climate change will pose a health risk to you because more intense and lengthier heat waves cause dehydration, hyperthermia and heat stroke?	23.0	36.4	28.2	12.4

Note: Entries are percentages of respondents giving a specific response. *Answer options are *Very serious, Somewhat serious, Not very serious, Not at all serious*.

Table 3.5 Exploratory Factor Analysis of Climate Change Risk Items in Risk Study

	Three Factor Model			One Factor Model
Risks to Humankind				
How likely is it that global warming and climate change will increase deaths and illness in the world's poorest countries because of an increase in tropical diseases?	**0.59**	0.25	0.16	**0.90**
How likely is it that global warming and climate change will result in food shortages for people in Asia and Africa because of warming air temperatures?	**0.65**	**0.30**	0.07	**0.92**
How likely is it that global warming and climate change will unleash giant "sand seas" in Africa - giant fields of sand dunes with no vegetation - because a shortage of rainfall and increasing winds?	**0.58**	0.14	0.25	**0.88**
How likely is it that global warming and climate change will have its worst effects on the world's poorest people because they are the least prepared?	**0.75**	0.07	0.17	**0.91**
Risks to Nation				
How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas in the United States because of damages caused by hurricanes and tropical storms?	0.12	**0.69**	0.07	**0.78**
How likely is it that global warming and climate change will hurt the national economy of the United States because of damages caused by wildfires, hurricanes, droughts, and weather-related disasters?	0.09	0.23	0.10	**0.37**
How likely is it that global warming and climate change will pose a health risk to people in the United States because lengthier and more intense heat waves cause dehydration, hyperthermia and heat strokes?	-0.06	**0.56**	0.07	**0.50**
How likely is it that global warming and climate change will have a negative impact on the national economy of the United States because more intense and frequent droughts mean fewer fresh food supplies and higher prices in the supermarket?	0.12	**0.88**	0.00	**0.86**
Risks to Self				
How likely is it that global warming and climate change will worsen your living conditions because of damages caused by extreme weather such as floods and storms?	0.21	0.18	**0.62**	**0.90**
How likely is it that global warming and climate change will affect your health because of an increase in tropical diseases?	**0.34**	0.02	**0.65**	**0.92**
How likely is it that global warming and climate change will have a negative impact on your economic and financial situation because more intense and frequent droughts mean fewer fresh food supplies and higher prices in the supermarket?	0.20	0.20	**0.50**	**0.81**
How likely is it that global warming and climate change will pose a health risk to you because more intense and lengthier heat waves cause dehydration, hyperthermia and heat stroke?	0.15	0.26	**0.57**	**0.88**
RMSEA	0.045			0.087
N	346			346

Note: Factor analysis of 12 items. Rotation relies on promax, an oblique rotation. Models are estimated in Mplus using WLSMV. Entries in bold indicate a loading of more than 0.3.

Table 3.6 Confirmatory Factor Analysis of Climate Change Risk Items in Risk Study

	Three Factor Risk Model (Humankind, Nation, Self)			One Factor Risk Model
H1: How likely is it that global warming and climate change will increase deaths and illness in the world's poorest countries because of an increase in tropical diseases?	0.91			0.90
H2: How likely is it that global warming and climate change will result in food shortages for people in Asia and Africa because of warming air temperatures?	0.93			0.92
H3: How likely is it that global warming and climate change will unleash giant "sand seas" in Africa - giant fields of sand dunes with no vegetation - because a shortage of rainfall and increasing winds?	0.89			0.88
H4: How likely is it that global warming and climate change will have its worst effects on the world's poorest people because they are the least prepared?	0.92			0.91
N1: How likely is it that global warming and climate change will worsen the living conditions of people in coastal areas in the United States because of damages caused by hurricanes and tropical storms?		0.84		0.78
N2: How likely is it that global warming and climate change will hurt the national economy of the United States because of damages caused by wildfires, hurricanes, droughts, and weather-related disasters?		0.40		0.37
N3: How likely is it that global warming and climate change will pose a health risk to people in the United States because lengthier and more intense heat waves cause dehydration, hyperthermia and heat strokes?		0.55		0.50
N4: How likely is it that global warming and climate change will have a negative impact on the national economy of the United States because more intense and frequent droughts mean fewer fresh food supplies and higher prices in the supermarket?		0.95		0.86
S1: How likely is it that global warming and climate change will worsen your living conditions because of damages caused by extreme weather such as floods and storms?			0.92	0.90
S2: How likely is it that global warming and climate change will affect your health because of an increase in tropical diseases?			0.94	0.92
S3: How likely is it that global warming and climate change will have a negative impact on your economic and financial situation because more intense and frequent droughts mean fewer fresh food supplies and higher prices in the supermarket?			0.83	0.81
S4: How likely is it that global warming and climate change will pose a health risk to you because more intense and lengthier heat waves cause dehydration, hyperthermia and heat stroke?			0.89	0.88
[Scale loading:] Risks to Humankind	0.97			-
[Scale loading:] Risks to Americans	0.90			-
[Scale loading:] Risks to Self	0.98			-
CFI	0.996			0.983
TLI	0.999			0.995
RMSEA	0.041			0.087
N	346			346

Note: The entries are standardized factor loadings. They are all significant at the p<.001 level. Models are estimated in Mplus using WLSMV.

Table 3.7 Correlations of Risk Factors

	Risks to Humankind	**Risks to Nation**	**Risks to Self**
Risks to Humankind	1		
Risks to Nation	0.87	1	
Risks to Self	0.77	0.82	1

Note: Entries are correlations between the three proposed risk scales. Four items measure each scale (see Table 3.3 for items) N=346

Table 3.8 Effects of Values on Risk Perceptions and Climate Change Policies

	CC Risks to Human-kind (4-item scale)	CC Risks to Nation (4-item scale)	CC Risks to Self (4-item scale)	Climate Change Risk Perceptions (12-item scale)	Climate Change Policies	Climate Change Policies
Universalism	**0.348 (0.114)**	**0.240 (0.115)**	0.231 (0.120)	**0.267 (0.107)**	**0.288 (0.077)**	**0.206 (0.071)**
Benevolence	0.005 (0.113)	0.128 (0.114)	0.129 (0.119)	0.082 (0.105)	-0.029 (0.078)	-0.053 (0.070)
Self-enhancement	0.083 (0.115)	0.171 (0.115)	0.125 (0.121)	0.124 (0.107)	**0.161 (0.078)**	0.115 (0.071)
Party Identification (Democrat)	**0.172 (0.063)**	0.073 (0.063)	0.126 (0.066)	**0.128 (0.058)**	0.008 (0.043)	-0.029 (0.039)
Ideology (Liberal)	0.025 (0.079)	0.069 (0.079)	-0.008 (0.083)	0.031 (0.074)	**0.183 (0.054)**	**0.165 (0.049)**
Age	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)
White	-0.032 (0.038)	-0.012 (0.038)	-0.035 (0.039)	-0.018 (0.035)	0.047 (0.025)	**0.049 (0.023)**
Female	0.015 (0.028)	0.019 (0.028)	0.045 (0.030)	0.027 (0.026)	0.022 (0.019)	0.015 (0.018)
U.S. Born	-0.029 (0.044)	-0.053 (0.044)	-0.057 (0.046)	-0.052 (0.041)	0.011 (0.030)	0.032 (0.027)
Household Income	-0.082 (0.060)	**-0.154 (0.061)**	-0.110 (0.064)	**-0.116 (0.056)**	-0.030 (0.042)	0.010 (0.038)
Education	0.037 (0.062)	0.070 (0.062)	0.096 (0.065)	0.066 (0.057)	0.070 (0.042)	0.048 (0.038)
Climate Change Risk Perceptions (12-item scale)					-	**0.326 (0.044)**
Constant	**0.424 (0.111)**	**0.287 (0.112)**	**0.227 (0.117)**	**0.320 (0.103)**	**0.166 (0.076)**	0.060 (0.070)
Adj R-Squared	0.15	0.14	0.12	0.15	0.22	0.38
N	234	234	235	233	230	228

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of $p < 0.05$, two-tailed test. The dependent variables for risk perceptions are three types of risk perceptions about climate change and general risk perceptions about climate change. Risk perceptions range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk. The dependent variable climate change policies is an 11-item scale. Universalism is measured by five items, benevolence by four items and self-enhancement by eight items. Values range from 0 to 1 with 1 meaning strongest adherence. Party identification ranges from strong Republican (0) to strong Democrat (1). Ideology goes from extremely conservative (0) to extremely liberal (1). Age ranges between 18-89. White is a dummy for white ethnicity, minority ethnicity is the baseline. Female is a dummy for female, with male as the excluded category. U.S. born is a dummy meaning born in the United States, coded zero for otherwise. Household income is coded in 22 categories with less than $4,999 as the lowest category and more than $200,000 as the highest. Education is measured by a 7-point scale with higher values indicating higher education. Both household income and education range from 0 to 1.

Table 3.9 Main Effects of Experimental Conditions on Risk Scales

	Risks to Humankind (4 items)	Risks to Nation (4 items)	Risks to Self (4 items)	General Risk Scale (12 items)	Pre-Risk (before treatment)
Control Condition (no story)	0.71^{a}	0.62^{a}	0.53^{a}	0.62^{a}	0.67^{a}
Universalism Condition	0.84^{b}	0.70^{b}	0.59^{ab}	0.70^{b}	0.78^{b}
Benevolence Condition	0.78^{b}	0.72^{b}	0.61^{b}	0.70^{b}	0.75^{ab}
Self-enhancement Condition	0.77^{ab}	0.67^{ab}	0.56^{ab}	0.67^{ab}	0.71^{ab}
N	298	298	301	295	301

Note: Means that share a superscript are not significantly different at $p<.05$, two-tailed test. The dependent variables are three types of risk perceptions about climate change, general risk perceptions about climate change and pre-treatment risk perceptions. The dependent variables range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk.

Table 3.10 Climate Change Risk Perceptions Regressed on Conditions and Values in Adult Study

	CC Risks to Human-kind (4-item scale)	**CC Risks to Nation (4-item scale)**	**CC Risks to Self (4-item scale)**	**Climate Change Risk Perceptions (12-item scale)**
Universalism	**0.586 (0.113)**	**0.497 (0.114)**	**0.473 (0.120)**	**0.516 (0.107)**
Benevolence	-0.152 (0.110)	-0.025 (0.111)	0.046 (0.117)	-0.046 (0.105)
Self-enhancement	0.117 (0.119)	0.119 (0.121)	0.151 (0.128)	0.139 (0.114)
Universalism Condition	0.194 (0.132)	0.237 (0.131)	0.237 (0.138)	0.241 (0.125)
Benevolence Condition	0.104 (0.144)	0.136 (0.144)	0.288 (0.153)	0.176 (0.136)
Self-enhancement Condition	-0.017 (0.138)	-0.122 (0.139)	0.024 (0.147)	-0.033 (0.131)
Universalism * Universalism Condition	-0.120 (0.178)	-0.249 (0.177)	-0.264 (0.186)	-0.240 (0.170)
Benevolence * Benevolence Condition	-0.069 (0.185)	-0.069 (0.186)	-0.302 (0.197)	-0.146 (0.175)
Self-enhancement * Self-enhancement Condition	0.119 (0.230)	0.276 (0.231)	-0.003 (0.244)	0.122 (0.217)
Constant	**0.347 (0.102)**	**0.226 (0.103)**	**0.079 (0.109)**	**0.214 (0.097)**
Adj R-Squared	0.13	0.11	0.08	0.12
N	286	286	286	283

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05, two-tailed test. The dependent variables are three types of risk perceptions about climate change and general risk perceptions about climate change. The dependent variables range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk. Of the conditions, the control is the baseline category. Values go from 0 to 1 with 1 meaning strongest adherence.

Table 3.11 Climate Change Risk Perceptions Regressed on Conditions, Values and Pre-treatment Risk Perceptions in Adult Study

	CC Risks to Humankind (4-item scale)	**CC Risks to Nation (4-item scale)**	**CC Risks to Self (4-item scale)**	**Climate Change Risk Perceptions (12-item scale)**
Universalism	**0.184 (0.091**)	0.080 (0.089)	0.082 (0.102)	0.113 (0.082)
Benevolence	-0.046 (0.084)	0.078 (0.083)	0.146 (0.095)	0.057 (0.076)
Self-enhancement	0.173 (0.091)	0.192 (0.090)	0.214 (0.103)	**0.202 (0.083)**
Universalism Condition	0.112 (0.101)	0.154 (0.098)	0.161 (0.112)	0.154 (0.090)
Benevolence Condition	0.069 (0.110)	0.098 (0.108)	0.252 (0.123)	0.139 (0.098)
Self-enhancement Condition	0.106 (0.106)	0.014 (0.104)	0.147 (0.119)	0.094 (0.095)
Universalism * Universalism Condition	-0.070 (0.137)	-0.201 (0.132)	-0.225 (0.150)	-0.185 (0.123)
Benevolence * Benevolence Condition	-0.061 (0.142)	-0.057 (0.139)	-0.293 (0.159)	-0.136 (0.127)
Self-enhancement * Self-enhancement Condition	-0.119 (0.176)	0.019 (0.173)	-0.242 (0.198)	-0.122 (0.158)
Pre-treatment Climate Change Risk Perception	**0.520 (0.037)**	**0.539 (0.036)**	**0.508 (0.042)**	**0.524 (0.033)**
Constant	**0.168 (0.079)**	0.037 (0.078)	-0.098 (0.089)	0.033 (0.071)
Adj R-Squared	0.49	0.51	0.40	0.54
N	286	286	286	283

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05, two-tailed test. The dependent variables are three types of risk perceptions about climate change and general risk perceptions about climate change. The dependent variables range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk. Of the conditions, the control is the baseline category. Values range from 0 to 1 with 1 meaning strongest adherence. Pre-treatment climate change risk perceptions was measured with one question before the experimental treatments. The variable is scored 0 to 1 with higher values meaning higher perceived risk.

Table 3.12 Tobit Models of Risk Perceptions Regressed on Conditions and Values in Adult Study

	CC Risks to Humankind (4-item scale)	**CC Risks to Nation (4-item scale)**	**CC Risks to Self (4-item scale)**	**Climate Change Risk Perceptions (12-item scale)**
Universalism	**0.741 (0.146)**	**0.537 (0.125)**	**0.499 (0.125)**	**0.538 (0.109)**
Benevolence	-0.121 (0.141)	-0.023 (0.121)	0.042 (0.121)	-0.051 (0.106)
Self-enhancement	0.030 (0.154)	0.145 (0.134)	0.171 (0.133)	0.156 (0.117)
Universalism Condition	0.143 (0.171)	0.244 (0.143)	0.237 (0.144)	0.246 (0.127)
Benevolence Condition	0.163 (0.185)	0.140 (0.159)	0.308 (0.159)	0.192 (0.138)
Self-enhancement Condition	-0.033 (0.180)	-0.138 (0.154)	0.041 (0.153)	-0.019 (0.133)
Universalism * Universalism Condition	0.013 (0.237)	-0.259 (0.195)	-0.267 (0.194)	-0.249 (0.173)
Benevolence * Benevolence Condition	-0.127 (0.239)	-0.057 (0.206)	-0.324 (0.205)	-0.164 (0.179)
Self-enhancement * Self-enhancement Condition	0.184 (0.299)	0.303 (0.256)	-0.040 (0.253)	0.094 (0.221)
Constant	**0.292 (0.132)**	0.192 (0.113)	0.059 (0.113)	**0.196 (0.098)**
Left-censored observations	7	7	10	6
Uncensored observations	203	246	259	266
Right-censored observations	76	33	17	11
N	286	286	286	283

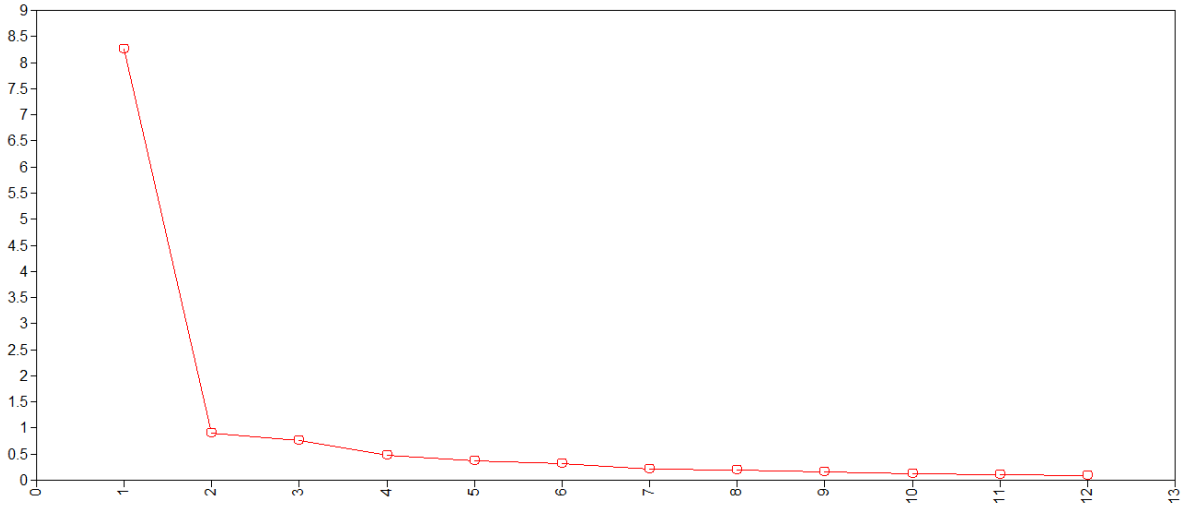
Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05, two-tailed test. The dependent variables are three types of risk perceptions about climate change or general risk perceptions about climate change. The dependent variables range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk. Of the conditions, the control is the baseline category. Values go from 0 to 1 with 1 meaning strongest adherence.

Table 3.13 Climate Change Risk Perceptions Regressed on Conditions and Values in Adult Study with Exclusions and Adjustments

	Mean Adjusted Value Model	**High Political Awareness**	**Some College or Higher**	**Accurate Recall of the Story**	**> 15 Min Filling out Survey**
Universalism	**0.643 (0.193**	**0.512 (0.145)**	**0.535 0.117**	**0.483 0.119**	**0.463 0.110**
Benevolence	0.067 (0.151	-0.065 (0.131)	-0.070 0.112	-0.006 0.116	-0.038 0.111
Self-enhancement	0.274 (0.249	0.078 (0.139)	0.113 0.122	0.118 0.123	0.089 0.123
Universalism Condition	0.070 (0.038	0.211 (0.169)	0.232 0.139	0.225 0.154	0.181 0.142
Benevolence Condition	0.075 (0.042	0.230 (0.162)	0.083 0.151	0.137 0.155	0.049 0.146
Self-enhancement Condition	0.038 (0.049	-0.092 (0.160)	0.005 0.164	-0.061 0.140	-0.108 0.134
Universalism * Universalism Condition	-0.156 (0.288	-0.228 (0.228)	-0.190 0.188	-0.226 0.206	-0.194 0.194
Benevolence * Benevolence Condition	-0.154 (0.261	-0.220 (0.214)	0.046 0.196	-0.049 0.204	-0.006 0.187
Self-enhancement * Self-enhancement Condition	-0.002 (0.350	0.183 (0.272)	0.044 0.279	0.172 0.233	0.203 0.222
Constant	**0.624 (0.030**	**0.263 (0.124)**	**0.219 0.105**	**0.220 0.100**	**0.296 0.103**
Adj R-Squared	0.04	0.07	0.17	0.13	0.09
N	275	204	224	227	256

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05, two-tailed test. The dependent variable is general risk perceptions about climate change, a 12-item scale. The dependent variables range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk. Of the conditions, the control is the baseline category. Values go from 0 to 1 with 1 meaning strongest adherence.

Figure 3.1 Scree Plot of Climate Change Risks Items in Risk Study



Note: The graph plots the eigenvalues of the risk items after exploratory factor analysis. Results estimated in Mplus using WLSMV.

Figure 3.2 Tripartite Climate Change Risk Model

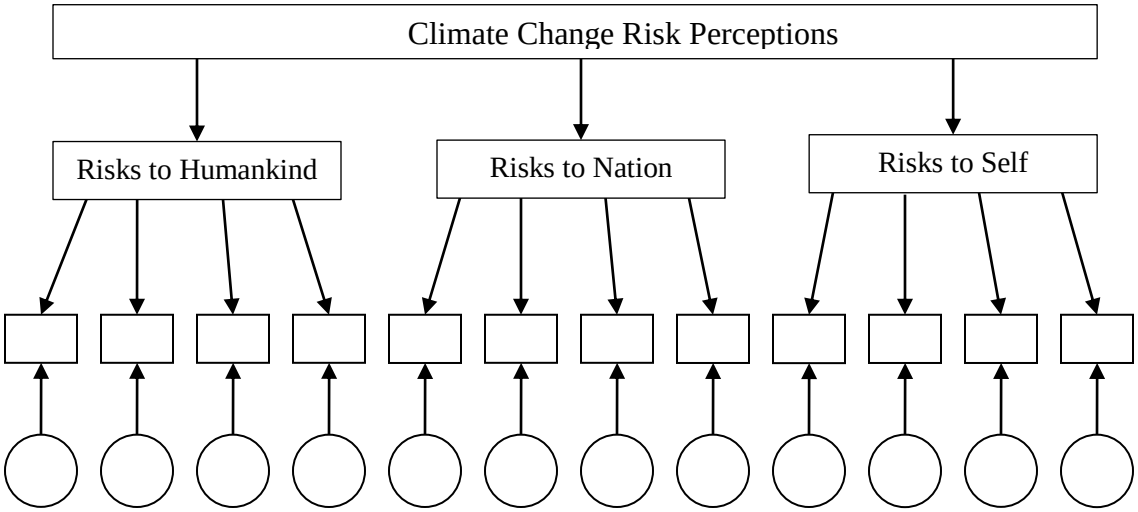


Figure 3.3 One-factor Climate Change Risk Model

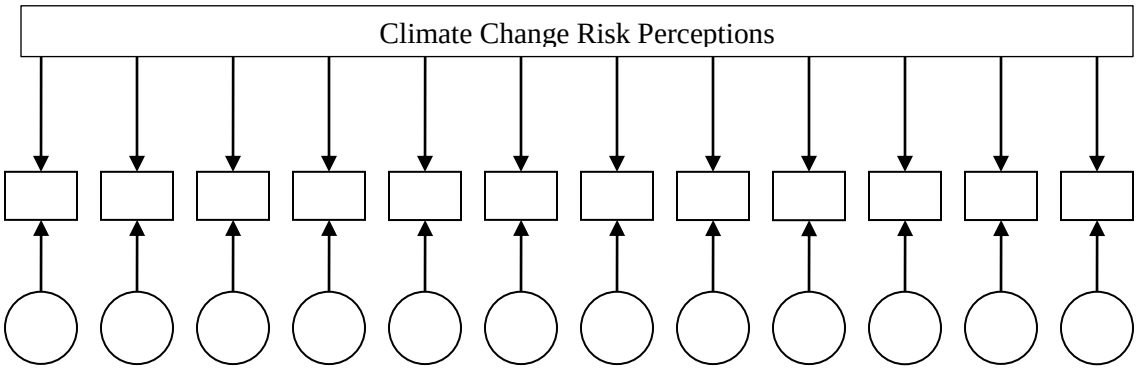
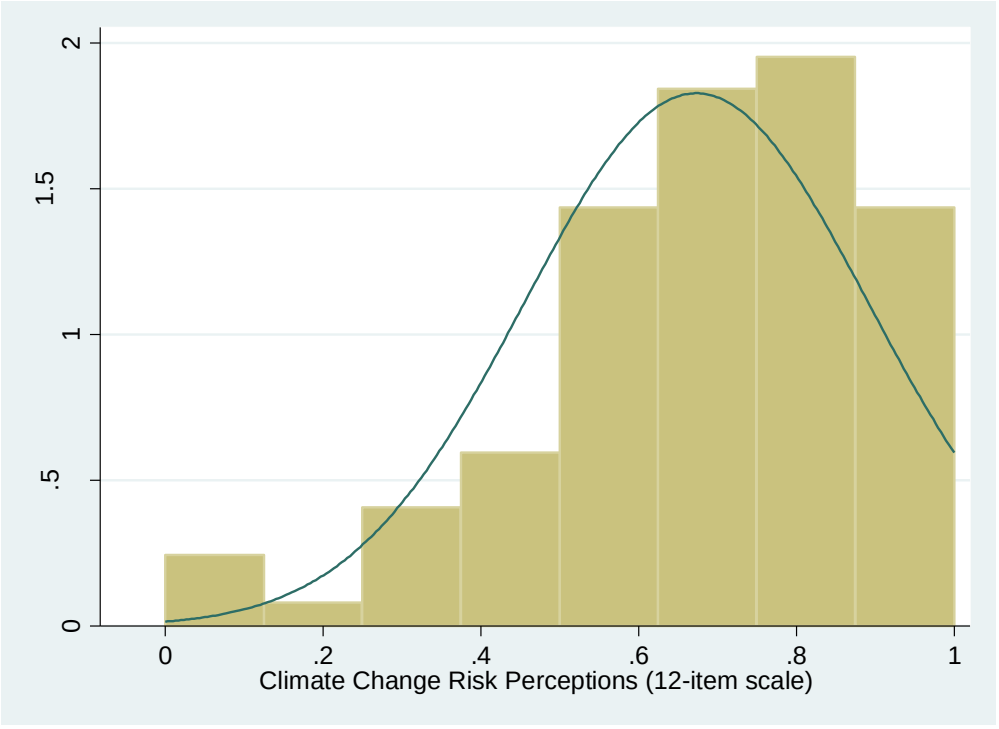


Figure 3.4 Distribution of Climate Change Risk Perception Scale



Note: The histogram describes the distribution of respondents on the climate change risk perception scale. The scale ranges from 0 to 1, with higher values indicating higher percieved risk. The overlaid curve has the same mean and standard deviation as the data.

4

Content Analysis of Democratic and Republican Leaders

In this and the next chapter, I examine the party cue perspective in detail. I begin with a content analysis to establish where party leaders stand on the issue of climate change. This establishes a basis for a closer look at public opinion in Chapter 5. If party leaders persuade ordinary partisans, which is what the party cue perspective suggests, then there should be a divergence between party leaders in how they approach climate change with Democrats calling for policies to reduce greenhouse gas emissions and Republicans leaders being hesitant. While there are good reasons to assume that elites from the two parties differ on climate change, it is still just an assumption. If party leaders do not diverge in this way, it would cast a doubt on the party cue perspective and question certain aspects of the elite influence model.

The chapter tests hypothesis 2a, which states that Democratic leaders are more in favor of climate change legislation than Republican leaders. There are primarily two reasons for this direction of the hypothesis. While they already have been discussed in the first chapter, it might be useful to summarize them briefly here. First, there is anecdotal evidence in the news of Republican leaders in opposition of climate change policies and Democratic politicians in favor.

Second, climate change policies are more in line with the values of the Democratic Party yet it clashes with those of the Republican Party. While there are climate change policies that are based on market economic principles, such as trading carbon offsets, climate change policies nevertheless tend to involve expanding governmental regulation and reach. For instance, some policies include raising taxes on coal and gasoline. Generally, politicians on the right oppose such policies while Democrats are open to them.

In examining leadership positions, I follow a similar strategy to Zaller (1992) and Berinsky (2009) in that I rely on a content analysis to examine where leaders from the two parties stand on climate change. It is important to conduct a content analysis since no one has conducted a recent and systematic study of leadership positions on climate change. While researchers have conducted several content analyses about global warming in the news media, they have not focused on party elites. Instead, they have more generally examined climate change coverage in the U.S. national news media (Boykoff and Boykoff 2007), regional news media in the U.S. (Liu, Vedlitz, and Alston 2008) and made comparisons between the coverage of climate change in the U.S. and the U.K. (Boykoff 2007). Content analysis has also been used to study whether or not Fox News and CNN cover climate change differently (Hart 2008).

Before turning to the results, I will go over the methodology of the analysis. The methodology is covered in this chapter rather than in Chapter 2 because this type of analysis is different from that of the other empirical chapters.

4.1 Methodology

4.1.1 Definition and Use of Content Analysis

Content analysis is a research method that systematically quantifies written text. Specifically, it is defined as "a research technique for making replicable and valid inference from texts (or other meaningful matter) to the contexts of their use." (Krippendorff 2004, p. 18) Accordingly, the method seeks to decouple the researcher's own potential biases from how the text is analyzed. As with any other respectable research, if another scholar conducted the same analysis on the same data, this person would reach the equivalent conclusion as the one who conducted the original study (Krippendorff 2004).

Since social scientists often study communication, it is hardly surprising that content analysis is widely used in fields such as political science, sociology, psychology and mass communication. Content analysis is a versatile tool that can be used for many goals, for example, code open-ended answers in surveys, describe characteristics of politicians, parties and groups, study content change over time, compare different media outlets, and examine attitude change (Weber 1990). As long as there is a written record, content analysis can be applied.

The advantage of using this method to examine the positions of Republicans and Democrats on climate change is that it can give an accurate estimate of not only where politicians stand in general, but also to what extent leading partisans oppose or support these policies. It thus goes beyond the anecdotal account that simply provides a hunch on where politicians position themselves on climate change.

4.1.2 Selection of News Sources

The core of the analysis is based on newspaper articles published in *The New York Times*. As is explained in the next section, there are good reasons to believe that one can get an accurate picture of what policy makers think about climate change through the coverage of this newspaper. One of the reasons is that other news outlets follow the reporting in *The New York Times*.

Nonetheless, while there are valid reasons to focus on *The New York Times*, I also study articles by the Associated Press, as an exam of a different news source strengthens the analysis. *The Associated Press* is important because many smaller news outlets rely on its reporting.

4.1.2.1 The Centrality of New York Times as a News Organization

The reason to study the coverage of politicians and climate change in *The New York Times* is that the paper is a particularly well regarded and influential news source. Since the paper with its highly regarded professionalism enjoys the utmost prestige among American news media, other news organizations turn to it when they judge what news to present and how to present them. As Graber (2010) writes, "[c]ritics derisively call this 'the jackal syndrome' or 'pack journalism'. For political news, the *New York Times* is the lion whom the jackals follow." (Graber 2010, p. 39) Similarly, *The Guardian* writes that "[i]t is hard to overstate the place that *The New York Times* holds in American journalism. It is worshipped by media professionals as the home of true, old-fashioned reporting. [I]t is vital in shaping the news agenda each morning." (Harris 2009) In other words, the influence of the newspaper is felt beyond its immediate group of readers. Even those who do not read it directly will in effect hear, listen or see its reporting as

other sources pick up their stories. In analyzing *The New York Times* because of its broad influence on the news media landscape, I rely on the same rationale as many scholars who have based their media analysis on the paper (e.g., Dearing and Rogers 1996; Kiousis 2004; Winter and Eyal 1981).[27]

Although *The New York Times* is sometimes regarded as a liberal stronghold, its news reporting is not explicitly liberal. Admittedly, the reputation of the newspaper as a liberal news source is accurate as its editorial desk is mostly left of center, but importantly, the editorial part of the paper is entirely detached from the news operation. As I will describe in the next section, editorial articles are excluded from the content analysis and the articles that I study are just plain news reports.

4.1.2.2 The Associated Press Articles

Besides *New York Times* articles, a smaller number of articles from *The Associated Press* were also sampled and analyzed. *The Associated Press* is a respected, non-profit news agency that provides content to thousands of clients from radio, television and newspapers. The news organizations subscribe to the content of AP by paying fees and in return, they can access and publish stories without having to pay for the expenses that come with having their own reporters stationed or sent to remote locations in the U.S. and around the world. Instead, they are relying on AP's around 2500 newsgatherers to produce the news.

[27] Another reason to study *The New York Times* is that it is the most widely read newspapers in the United States. Including both print and online readers, it reaches more than 30 million unique U.S. visitors (www.comscore.com). While its number of print newspaper subscribers is not as large as *Wall Street Journal* and *USA Today*, *The New York Times'* online presence more than makes up for that. Moreover, of all news media outlets in the United States – including newspapers, television, radio and online sources – *The New York Times* tops the list of the most influential among internet users. Influence can be measured in the number of links. For example, bloggers often link to sources of interest when they write a post. As a primary source of information, *The New York Times* is critical to people online because the cite and write their stories around it (Technorati.com).

It may be problematic for news media and society that many news organizations rely heavily on AP because it could undermine the diversity of reporting and therefore problems that should be uncovered may go unnoticed. However, for the purpose of this analysis, this conformity could be useful because regardless of the type of news people read, hear or see, it is likely that they will come across stories that originally came from AP. Thus, by studying AP articles, it should be possible to get an accurate view of the type of news people in America consume.

4.1.3 LexisNexis Selection of Newspaper Articles

News articles were selected from the *LexisNexis Academic* database. Under the "Power Search" in the general searching, I chose the subject index term "climate change". One of the advantages with selecting a subject is that one limits the search to a subject area and does not need to specify all possible search terms related to a topic. In effect, when choosing climate change as a subject, all articles about global warming, the greenhouse effect, global climate change, and so on, were included in this search. Therefore, rather than running the risk of leaving out articles because they discuss climate change in other terms, the subject term "climate change" includes all articles about the topic. With the help of topic experts, LexisNexis re-examines and updates the subject index terms periodically to ensure that terms remain current. In other words, if the terminology of a subject changes, LexisNexis updates how articles are classified (LexisNexis 2011).

The LexisNexis system also assigns relevance score to subject terms for each article. If the relevance score of an article is equal or higher than 85%, it is judged to be of major relevance. If it is below 85%, it is classified as of minor relevance. The relevance score depends

on term frequency and location in an article. When articles are of major relevance, it is more likely that they are pertinent to the analysis. Articles below a relevance score of 85% are more likely to mention a subject more in passing (LexisNexis 2011) To make certain that only the most relevant articles were included in the search, I searched for articles about climate change that were of major relevance.[28]

Since the purpose of this analysis is to examine the standpoints of political leaders from the two major parties, I searched for articles about either Democrats or Republicans. Any type of variation of the party names were included in the search (e.g., Democratic, Republican). Editorial articles were omitted from the search since they were opinion pieces and not news reporting. The content analysis conducted here focuses on news about what politicians say and do – how columnists perceive politicians is a different topic. To exclude editorials was only necessary for *The New York Times*. In addition, articles about Social Democrats were excluded. These articles, all about German politics, were left out because they had no relevance to the topic. The remaining articles are on U.S. politics.[29]

Two separate searches on *LexisNexis Academic* were conducted. One of the searches selected only articles from *The New York Times* and the other only articles from AP. Based on the search criteria mentioned above, 387 articles were retrieved from *The New York Times* and 337 articles from *The Associated Press*.

[28] Please see http://wiki.lexisnexis.com/academic/index.php?title=Relevance_score for info about relevance scores. Albeit not scientific, a look at the articles of minor relevance to climate change shows that the topic figures less prominently compared to those with higher relevance scores. As an example of a study that uses articles with higher relevance score, see Tan and Weaver .

[29] The search term was: "democrat! OR republican! AND NOT editorial desk AND NOT social democrat!" The exclamation mark serves as a wildcard character that replaces any character or string of characters at the end of the word.

4.1.4 Time Period of the Analysis

The articles published in *The New York Times* are from the beginning of 2000 to the end of 2009. By sampling articles from several years, I can get a better picture of the stability of elite opinion than if I would only look at the last few years. Climate change has figured in the news for many years, yet it has increasingly become more central and politicians have become more vocal on the topic. Especially the last ten years or so are marked by how often climate change has entered the news. Nonetheless, it is not vital that the analysis covers exactly ten years, but that the period is lengthy enough to include a sufficient number of articles to get a reliable picture of elite positions on climate change. During this period, party leaders faced several events that led them to reveal their attitudes. For example, whether the United States should sign the Kyoto Protocol often came up for discussion in the beginning of the period. Later in 2006, there was the première of *An Inconvenient Truth* by Al Gore and the release of the International Panel on Climate Change's fourth report in 2007. At the end of the period, there was the so-called Climategate scandal, in which climate skeptics accused climate researchers of misconduct. During events such as those, politicians from both parties spoke publicly about their views on climate change.

During the first years of the selected period, there were not as many *New York Times* articles on climate change as in later years. In 2000, there were only 12 articles, the lowest number of articles of any year examined. During the subsequent year, the number of articles increased, yet stayed relatively low until after 2005, at which point the number increased markedly. The increase of article is unsurprising given the coverage of Al Gore, IPCC and their

Nobel Peace Prize. In 2008, there were not as many articles, yet in 2009, the number reached the same level as in 2007 (Figure 4.1).

Figure 4.1 about here

To code all 387 *New York Times* articles that were selected in *LexisNexis* would be too time-consuming in light of the fine-grained and very meticulous coding. Therefore, 20 articles were sampled for each year. There were not 20 articles in either 2000 or 2004, so instead the maximum number of articles for each of those years were sampled. Out of the 387 articles, 187 were sampled and coded.

The articles from AP came from 2008 and 2009, a shorter time-period than the ten-year period, yet closer in time to the collection date of the survey data analyzed in the other chapters. While it is a shorter period, there were plenty of articles about Democrats and Republicans on climate change. One hundred sixty-four articles from 2008 and 173 articles from 2009 fulfilled the search criteria in LexisNexis. Out of them, 25 articles were sampled for each year. Thus, the coders examined 50 articles from *The Associated Press*.

4.1.5 Coding of News Articles

Two undergraduate students were recruited to conduct the coding of the articles. They were recruited by recommendation from professors at the Department of Political Science at Stony Brook University. The coders did their work in exchange for course credit, and they learned how to do basic research and content analysis. The coding took place over the summer of 2010. In the beginning, the coders received detailed instructions in how to conduct a content analysis and how to proceed with this particular research project. They also trained on the coding

using articles that were not included in the data set. However, not at any point during the project were the research assistants informed about the hypothesis. They were instead told repeatedly about the importance of staying objective during their work. They did all their work separately.

The undergraduate students used a coding sheet that was developed during the spring of 2010 with the help of another undergraduate student. The coding scheme was developed though analysis of articles by the coder and me. We coded articles independently and compared results afterwards. The problem with the early iterations of the coding sheet was that it was too complex. Moreover, the coding instructions were not detailed enough. However, at the end of the semester we reached sufficiently high levels of correlation between our work. To get a high level of inter-rater reliability is necessary because otherwise the reproducibility of the research is questioned. Having learned from the experiences of the spring semester, I settled on a coding sheet that was very simple. The coding sheet and instructions are included in the appendix. In addition to the written instructions, the undergraduate students were also given directions at several meetings. I describe below the broad details of this scheme.

All politicians in an article that were mentioned by name were coded on which position they took on climate change.[30] Coders had two options, either the politician was in favor of action or he/she was in opposition.[31] Obviously, by only having two choices, the politicians' positions were simplified since there is a range of potential ways to support or oppose climate change policies. For example, one can support relatively powerful policies like tax hikes on gas

[30] Politicians were defined as anyone elected to a political position or appointed to a central party position (e.g., a cabinet member). Advisors of politicians and employees in the bureaucracy were excluded from the analysis.

[31] Only politicians that took an explicit position on climate change were coded. Thus, if they took no position at all, they were excluded. If a politician was ambiguous, coders were instructed to consider all information about that politician in the article and make a summary coding of his or her position on climate change. My own coding and discussions with the coders indicate that ambiguous politicians were uncommon, however.

or one can give small tax credits to those who invest in more energy efficient buildings. Likewise, there is a difference between opposing regulations on light bulbs and opposing an international treaty that would reduce the country's emissions by 20%. However, while these differences are interesting, the levels of support or opposition are not vital to the current study.[32] There is a key difference between being for versus against climate change policies.

Coders were instructed to code a politician as supporting climate change action if he or she wanted policies or regulations passed. To be coded as supportive, it had to go beyond the backing of voluntary measures because it is one thing to, say, let car companies to set their own mileage standards and another to force them to do so. The policies to reduce climate change are many. For example, it could be cap and trade programs, efforts to slow deforestation, subsidies for electric vehicles, increasing mileage standards for cars, investments in mass transits, carbon capture and storage programs, money to alternative power sources such as wind and solar, energy conservation as in installing or subsidizing low-energy light bulbs, supporting international treaties (e.g., Kyoto, Copenhagen or Bali) and so on. The key point is that coders marked politicians that were in favor of any such policies as supportive of action. It was generally obvious when someone supported action, yet to illustrate further, see the examples in Table 4.1.

In contrast, if the main thrust of the politician was in opposition to action, the coder marked this. The politicians that were included in this category of the content analysis actively opposed action; they were not just discussing, say, flawed climate change research studies. Still,

[32] Coders made an attempt at coding exactly which policies politicians supported, but the coding of this turned out to be difficult. Yet more importantly, distinctions between policies are relatively trivial in this project since it is about basic differences between the parties.

in justifying their position, these politicians were often emphasizing weak or conflicting scientific evidence, the economic costs associated with climate change policies or that it would lead to too much governmental regulation. The coding sheet itself did not include examples of whether a statement was in favor or in opposition. Instead, these issues were clarified by instructions and during the training of the coders. To illustrate the type of statements that would lead to a coding against climate change action, see Table 4.1.

Table 4.1 about here

Results based on two commonly used indices of inter-rater reliability confirm that the two coders were reaching the same conclusions in their coding. The agreement between coders on whether politicians opposed or supported policies was 87% and Cohen's kappa 0.76. Both values indicate that the inter-rater reliability was high. The most frequently used metric is percent agreement, which is a very simple and intuitive index that yields values that range from 0 to 100. However, the index is sometimes criticized for being misleading since it overestimates agreement. To complement it, I also rely on Cohen's kappa, which is a better measure since it takes into account the level of agreement that would occur by chance. Cohen's kappa ranges from 0 to 1 with higher values meaning more reliability (Lombard, Snyder-Duch, and Campanella Bracken 2010).

Coders also marked the party affiliation of the politicians and they could select only Democratic or Republicans. The party of the politicians indicates the affiliation at the date when the article was published. Most politicians stayed with the same party for the duration of the study, but there were examples of politicians that switched party. For example, if an article from 2006 mentions Arlen Specter, he is coded as a Republican whereas if took a position on climate

change in 2009, he is coded as a Democrat. The politicians that switch party were rare, however. For the most part, coding party affiliation was simple and straightforward.

Since articles could, and often did, contain several politicians making statements on climate change, the coding sheet allowed for this. If a politician took a position on climate change, he or she was coded. An article in *The New York Times* published on June 5, 2008, can illustrate this situation. The story made the news because a Senate bill had been up for debate. After three and a half days of heated and long-winded discussion on the Senate floor, Democrats tried to end the debate and go to a final vote. However, since the bill did not get the necessary 60 votes to cut off the debate, it died. In response to this, Senators expressed their attitudes. One of the sponsors of the bill, Barbara Boxer, Democratic Senator from California, stated her disappointment, as can be seen in the left column of Table 4.1. She would consequently be coded as a Democratic supporter of climate change action. In contrast, Mitch McConnell, Republican of Kentucky, opposed the bill because he thought it would be too costly (see Table 4.1, right column). McConnell would be coded as a Republican in opposition.

A politician that took a position on climate change could only be coded once for that specific article. Therefore, if a politician in the opening paragraph wanted to enact a cap and trade policy and then at a later point in the same article said that he supported subsidies for the car industry to produce more electric cars, then this supportive politician would only be coded once, not twice. It is straightforward, although it effects how the unit of analysis should be described. When I examine the positions of the parties in the results section below, I specifically study the percent of distinct Republicans and Democrats in an article who supported or opposed climate change policies.

4.1.6 Status of Political Leaders

Politicians differ in status within their parties and that may influence how they affect public opinion. Some politicians are members of the House of Representatives, some are governors and some occupy the bully pulpit, as Theodore Roosevelt called the president's excellent position. Presumably, the higher the stature of politicians within a party, the higher the credibility and trustworthiness they should have, and with this comes the ability to persuade (e.g., Chaiken and Maheswaran 1994; Hovland and Weiss 1951). This higher credibility might also translate into a better ability at communicating the party's position.

Zaller's (1992) model of elite influence does not differentiate between status differences of leaders. What is important in his model is rather the sheer quantity of elite messages. Yet there are reasons to think that partisans are more affected when the leader is the president compared to other politicians. As Richard Neustad writes, "a president's authority and status give him great advantages in dealing with the men he would persuade." (Neustadt 1991, p. 30) While such language is outdated, the idea that presidents have a unique position to influence public opinion is still valid. In a study of the effect of priming on approval ratings, Druckman and Holmes (2004) find that the president's approval rating depends on presidential rhetoric. Moreover, when people know that the president takes a position on an issue that increases support for the issue position (Sigelman 1980). Compared to other elected officials, the president is also more likely to get blame or credit depending on national conditions. Even under divided government, which presumably should make people more hesitant to attribute good or bad times to the president, people hold the president responsible, not Congress (Norpoth 2001).

In an effort to go further than simply adding the positions of all politicians regardless of position, the status of the policy makers was coded as well. Politicians were separated into six categories: president, cabinet, senator, house representative, governor and state/local. By allowing for a more fine-grained analysis, it is possible to see what the central message partisans hear. The central and most credible message should in this case come from the president rather than other policy-makers.

4.2 Results

4.2.1 Democrats Support Climate Change Policies and Republicans Oppose

In the 187 sampled articles from *The New York Times*, there were 500 positions of climate change recorded, yielding an average of 2.7 distinct politicians per article. Please keep in mind that a politician could get one entry per article only, yet his or her position on climate change could be recorded multiple times if he or she took positions in other articles. Of the 500 times distinct party leaders in an article took positions on climate change, 260 (52%) were Republican and 240 (48%) were Democratic (Table 4.2).

Since the unit of analysis, i.e., distinct Republicans and Democrats in an article who supported or opposed climate change policies, is somewhat unwieldy and requires many words to describe, I will sometimes use the terminology *article distinct* instead. I use this terminology since politicians were coded only once for each specific article, but could appear many times in the dataset if he or she was took positions on climate change in several articles.

The results, based on articles from *The New York Times*, show that most Republicans opposed policies and Democrats supported them, which is exactly in line with hypothesis 2a. Given the unit of analysis, the percentages reflect the total number of times distinct politicians for each article took positions on climate change. As the total column in Table 4.2 shows, 60% of the article distinct Republicans opposed legislative action on climate change. Democrats, on the other hand, were overwhelmingly in support of action. Article distinct Democratic politicians were in favor of climate change policies 97% the times and only 3% were they in opposition. With a gap of 57 percentage points between the politicians from the two parties, there is consequently strong support for the hypothesis that Republican and Democratic elites differ on climate change. A t test shows that this difference is significant ($t_{498} = 16.20$, $p < 0.001$).[33]

Table 4.2 about here

The content analysis of *The Associated Press* articles from 2008 and 2009 yields the same conclusion. Of the Republicans within an article, 60% opposed bills and regulations that dealt with climate change whereas 40% were in favor. Among Democrats, 96% of them favored climate change policies and 4% opposed them (Table 4.3). The numbers are essentially identical to the content analysis of *The New York Times* articles, and taken together, these results strongly suggest that the parties take a fundamentally different approach to climate change. This difference is statistically significant ($t_{139} = 8.39$, $p < 0.001$)

Table 4.3 about here

[33] The results were weighted to account for the fact that years were sampled about equally (most of them 20 per year) but articles about party leaders and climate change were more frequent in the latter half of the 2000s. The weights were created based on the numbers in Figure 4.1. It should be noted, however, that the results stay essentially the same even without the weights.

Though most Republicans were opposed to action, the party seems more divided on climate change than the Democratic Party because 40% of the article distinct Republicans supported climate change action. However, attitudes on climate change policies in the Republican Party were not evenly distributed across different positions within the party, as is examined in the following section.

4.2.2 Party Leaders Differ on Policies Depending on Status

A broad partisan gap is visible between the parties, yet the divide is even larger between presidents, who are the policy-makers that people tend to look to the most. George W. Bush had a diametrically different approach to climate change compared to Barack Obama and Bill Clinton. George W. Bush took a position on climate change in 94 of the sampled articles from *The New York Times*. In 84% of the articles in which he appeared, he opposed such policies. In contrast, Democratic presidents never opposed action on climate change (left column of Table 4.2). Thus, the gap on policies between presidents is a gigantic 84 percentage points and statistically significant ($t_{127} = 15.33$, $p < 0.001$). The same larger gap (78 percentage points) is also visible between cabinet members of the two parties. Republican cabinet members opposed policies in 78% of the articles they appeared while Democratic cabinet members always supported them ($t_{40} = 7.81$, $p < 0.001$).

Among Republican senators, there was a notable support for climate change policies. Republican senators supported action in 51% of instances whereas Republican senators supported action in 49% of instances. One of the Republican senators most in favor of action was John McCain. In contradiction to Bush, McCain supported bills such as cap and trade to reduce climate change and was relatively often given space or time to air these views in the news.

Republican House Representatives were in general more skeptical of action than were senators, however.

For Democrats in Congress, senators generally followed the same party line as the president – 99% of the article distinct senators supported policies. The little opposition to climate change policies that did exist within the Democratic Party seems to have come from the House of Representatives. While 91% of the article distinct Representatives supported policies, 9% opposed them. The little opposition that did exist seems to have come from regions dependent on industries responsible for emitting greenhouse gases. For example, John Dingell, the Michigan Democrat, has been one of the opponents of climate change legislation, especially of automobile fuel efficiency standards (Barringer and Revkin 2007).

A remarkable finding is that among Republican governors, the support for climate change policies was very high. Note, however, that articles about Arnold Schwarzenegger's initiatives were responsible for most of this effect. Of the 27 observations on Republican governors, 15 were about the Californian governor. The New York State governor George Pataki, who also supported climate change policies, made an additional four. Both governors served in traditionally blue states, and unsurprisingly, they were in favor of more government regulation on climate change.

Some politicians in the articles were of relatively low status, such as politicians from New York Senate and other local politicians. Among the local or state Republicans, there was also support for policies yet given the low number of this group, it is difficult to say anything conclusive about them.

The content analysis of *The Associated Press* articles yields almost identical findings as those based on *The News York Times*. For example, the divide between Democratic and Republican presidents was much larger than that between Democratic and Republican senators (see Table 4.3). Since the findings are nearly the same, it is unnecessary to go over the results from the AP articles separately. The similarities in results between the news agency and *The New York Times* suggest that suspicions that the latter would be substantially different were exaggerated.

4.2.3 Not Much Change Over Time

An analysis of the articles from *The New York Times* shows that the division along party lines stayed relatively stable during the ten-year period. Between 2000 and 2004, 67% of the coded Republicans were in opposition and 33% were in favor of policies. Among Democrats, 1% of them were in opposition and 99% in favor. During the second half of the analyzed period, between 2005 and 2009, 56% of Republicans opposed and 44% were in favor of climate change policy whereas 3% of Democrats opposed and 97% were supportive.

The slight change among Republicans was driven mostly by John McCain and Arnold Schwarzenegger who were more active in the debate during the second half of the decade. The trend over time is not consistent in the direction of more support among Republicans, however. As the analysis of the articles from AP shows, the gap remained also in 2008 and 2009. Moreover, a look at *The New York Times* articles from the last two years of the analysis reveals that 69% of the coded Republicans opposed climate change policies. Thus, the conclusion that should be drawn is that Republicans and Democrats differ about as much at the end of the period as in the beginning.

4.2.4 Central Message of an Article Indicates Larger Partisan Divide

The analysis above did not distinguish between the article locations of politicians; it did not matter if a politician figured in the beginning or at the bottom of an article, they were all given equal weight. This difference between being first and later is potentially important because the most newsworthy content of articles is traditionally put first and is what people are most likely to read. This journalistic practice is sometimes thought of as the *inverted pyramid*, where the widest part at the top symbolizes the most important information. As the width diminishes, it illustrates the diminishing importance of the story. By putting the *bottom line up front*, as it is also known, readers can quickly get an idea what story is about and if they leave the story unfinished, they have still understood the news story (Scanlan 2003). Therefore, the politician mentioned first should be what people register the most.

In an effort to examine further what partisan message people were more likely to read, I examined only the positions of politicians mentioned first and excluded those mentioned later. I did not make a distinction where in the article the first mentioned politician appeared. In other words, they were not all in the first paragraph. This analysis is conducted using *New York Times* articles.

The analysis of the first-mentioned Democratic and Republican politicians reveals an even larger partisan divide between Republicans and Democrats. Of these politicians, 70% of the first-mentioned Republicans opposed climate change policies and 0% of the first-mentioned Democrats opposed them (Table 4.4). Thus, the partisan gap is 70 percentage points when only the most central politicians of the articles are examined. While still substantial, the 57-percentage points gap between the two parties, comparing all the article distinct politicians, is smaller.

While this is speculation, it appears as if journalists try to provide a balanced picture of the parties, to find a contrarian viewpoint of the dominating message. The first position of a Democratic politician was invariably a politician that supported climate change policies. Only deeper in the article were Democrats in opposition to climate change mentioned. The same tendency occurred for Republican politicians. The first mention was more likely to feature a politician in opposition to climate change policies than politicians mentioned later in the article. This analysis affirms that the parties were very different on this issue.

Table 4.4 about here

4.2.5 Politicians in the Climate Change Debate

To get a better idea of the politicians who were the most active in the debate over climate change, I counted the number of occasions they were coded as taking a position on climate change. Politicians who took positions in more than five articles are described in Table 4.5.

Table 4.5 about here

As stated previously, George W. Bush was featured in many articles. He took a position on climate change 94 times in the sampled articles from *The New York Times*. The high frequency of references to Bush is not surprising given his central role on this issue in the United States. When climate change become news, almost regardless of the reason, be it a policy proposal or a documentary movie, his position was made public. Bush was featured in 50% of the articles. He opposed policies in most of them.

Other prominent Republicans featured in the debate were Senator James Inhofe of Oklahoma (14% of all articles). He was one of the main opponents of climate change legislation

with his repeated questioning of the science behind climate change. He has played a key role in the debate when he served as the chairperson on the U.S. Senate Committee on Environment and Public Works between 2003 and 2007 yet he has also voiced his opposition against policies outside that period.

The main support for climate change policies within the Republican Party came from John McCain, who was featured in 13% of all articles. A closer look at his general standpoint shows that he supported policies 94% of the time. McCain was often featured in articles that covered his support for a cap and trade bill together with Joe Lieberman. Moreover, his presidential platform contained climate change policies that made the news. A potential reason he received this much attention in news media is that he, a Republican, tended to criticize a Republican president. Criticism of the president from his own party is more notable and newsworthy compared to praise from the president's party, and therefore news media tends to focus on criticism (Baum and Groeling 2009).

Other Republican politicians that often took positions in *The New York Times* articles were Arnold Schwarzenegger (8%), then Governor of California, John Warner (5%), the former Senator of Virginia, and Texas Representative Joe Barton (3%).

As for the most prominent Democrats, Barack Obama took a position on 36 occasions (19% of the total articles). Twenty-nine of those came when he was president and seven when he was a senator. Obama supported climate change policies on all occasions.

The other prominent Democratic politicians in the debate were Al Gore (13%), Barbara Boxer (9%), John Kerry (9%), Nancy Pelosi (8%), Joe Lieberman (7%), Edward Markey (7%), Hillary Clinton (5%), Henry Waxman (5%) and Bill Clinton (3%). Their frequency in the debate

is unsurprising given their prominence. A few of the Democrats took positions more often than one might expect based on their positions, however. One of them is Californian Senator Barbara Boxer who has made environmental issues one of her central concerns and has been the Chairperson of the Senate Environment and Public Works Committee since 2007. Edward Markey, the Massachusetts Representative, has also made the environment and energy policies one of key priorities. He has served on several committees related to climate change (e.g., House Select Committee on Energy Independence and Global Warming).

4.3 Summary of Chapter 4

The results of the content analysis strongly suggest that leaders from the Democratic and Republican parties differ in their approach to climate change. Republican leaders tend to oppose policies whereas Democratic leaders are supportive. The gap between the parties is even larger between politicians of the highest status, the presidents. Moreover, the analysis shows a wider gap between the party leaders who are the most central in the story. The results are strengthened since they rely on articles from both *The New York Times* and *The Associated Press*. In sum, there is support for hypothesis 2a.

Table 4.1 Examples of Statements by Politicians Against and For Climate Change Action

Support of Climate Change Action	Opposition Against Climate Change Action
September 29, 2000: Mr. Gore, who has long said he is willing to pay a political price for his environmental principles, has suggested that the United States needs to take drastic steps, like eliminating the internal combustion engine. In an effort to encourage conservation, Mr. Gore has also supported higher taxes on energy consumption, including a broad-based energy tax.	June 5, 2002: "I read the report put out by the bureaucracy," [President Bush] said. He said he still opposed the Kyoto treaty, which Japan ratified today. The treaty calls for the mandatory reduction of greenhouse gases by industrial nations…Mr. Bush's spokesman emphasized that the report carried numerous caveats about the uncertainty that still exists about the science of climate change.
October 17, 2007: In recent years, he has fought to introduce measures for caps on dangerous emissions. Last week, Mr. McCain promised to demand sharply higher fuel standards from the automobile industry.	November 16, 2004: Mr. Bush, citing the cost to the economy and what the administration describes as the uncertainty of the science, has opposed restrictions on carbon dioxide and other heat-trapping gases since early 2001.
November 6, 2007: Senator Hillary Rodham Clinton on Monday released her plan to combat climate change and to increase energy efficiency, which includes raising fuel standards to 55 miles per gallon by 2030 and creating five million jobs through renewable energy advancements.	June 23, 2006: Senator James M. Inhofe, Republican of Oklahoma, and Representative Joe L. Barton, Republican of Texas, have repeatedly criticized the Mann study [which was one of the first research studies showing evidence of global warming], citing several peer-reviewed papers challenging its methods.
June 5, 2008: Mrs. Boxer, the main Democratic proponent of the bill, accused the Republicans of stalling and refusing to address global warming in part to support big oil companies.	June 5, 2008: The Republican leader, Mitch McConnell of Kentucky, has expressed glee that the Democrats chose to bring up the climate bill. Mr. McConnell, like many of the bill's critics, said it would raise oil prices at a time when Americans were already furious at the high cost of gasoline.
November 19, 2008: Speaking by video to a climate conference in Los Angeles, Mr. Obama repeated his campaign vow to reduce climate-altering carbon dioxide emissions by 80 percent by 2050, and invest $150 billion in new energy-saving technologies. "Now is the time to confront this challenge once and for all," Mr. Obama said. "Delay is no longer an option. Denial is no longer an acceptable response."	December 1, 2009: Skeptics have seized upon the disclosures [of the so-called climategate scandal] to call into question years of efforts to document changes to the climate and its causes. Republicans in Congress have begun an investigation into the work of the scientists who sent the messages… "The e-mails reveal possible deceitful manipulation of important data and research," Mr. Inhofe wrote.
June 26, 2009: President Obama hailed the House passage of the bill as "a bold and necessary step." He said in a statement that he looked forward to Senate action that would send a bill to his desk "so that we can say, at long last, that this was the moment when we decided to confront America's energy challenge and reclaim America's future."	December 18, 2009: Republicans mounted a counteroffensive. Senator James M. Inhofe, Republican of Oklahoma and Congress's most vocal climate change skeptic, showed up in the press area of the Bella Center early on Thursday to deliver what he called a reality check to the proceedings here. "There is going to be no cap and trade or binding legislation in the United States," he said. "It's dead. It's not going to happen."

Note: Quotes are from articles published in *The New York Times.* Remarks within brackets are my own.

Table 4.2 Opposition or Support of Climate Change Policies among Democratic and Republican Politicians by Party Position (*The New York Times* 2000-2009)

	Republican Party						
	President	Cabinet	Senate	House	Governor	State/Local	Total
Oppose	84% (79)	78% (7)	49% (51)	84% (14)	14% (4)	17% (2)	60% (104)
Support	16% (15)	22% (2)	51% (53)	16% (3)	86% (23)	83% (8)	40% (104)
Total	100% (94)	100% (9)	100% (104)	100% (17)	100% (27)	100% (10)	100% (260)
	Democratic Party						
	President	Cabinet	Senate	House	Governor	State/Local	Total
Oppose	0% (0)	0% (0)	1% (1)	9% (5)	0% (0)	0% (0)	3% (6)
Support	100% (35)	100% (33)	99% (88)	91% (54)	100% (11)	100% (12)	97% (234)
Total	100% (35)	100% (33)	100% (89)	100% (59)	100% (11)	100% (12)	100% (240)

Note: Entries are percentages of article distinct Democrats or Republicans who opposed or supported policies to reduce climate change. Given that a politician took a position on climate change in an article, this was recorded only once per article. The top panel is about Republicans and the bottom panel about Democrats. Frequencies are in parentheses. Results are weighted to reflect the actual number of articles for a given year.

Table 4.3 Opposition or Support of Climate Change Policies among Democratic and Republican Politicians by Party Position (*The Associated Press* 2008-2009)

	Republican Party						
	President	Cabinet	Senate	House	Governor	State/Local	Total
Oppose	76% (8)	100% (1)	50% (11)	87% (10)	27% (2)	40% (1)	60% (33)
Support	24% (3)	0% (0)	50% (11)	13% (2)	73% (6)	60% (2)	40% (22)
Total	100% (11)	100% (1)	100% (22)	100% (12)	100% (8)	100% (3)	100% (55)
	Democratic Party						
	President	Cabinet	Senate	House	Governor	State/Local	Total
Oppose	0% (0)	0% (0)	8% (2)	9% (2)	0% (0)	0% (0)	4% (4)
Support	100% (26)	100% (6)	92% (22)	91% (21)	100% (7)	100% (1)	96% (82)
Total	100% (26)	100% (6)	100% (24)	100% (22)	100% (7)	100% (1)	100% (86)

Note: Entries are percentages of article distinct Democrats or Republicans who opposed or supported policies to reduce climate change. Given that a politician took a position on climate change in an article, this was recorded only once per article. The top panel is about Republicans and the bottom panel about Democrats. Frequencies are in parentheses.

Table 4.4 Position on Climate Change for Politicians First Mentioned in the Article (*The New York Times* 2000-2009)

	Republican Party	Democratic Party	Total
Oppose	70% (114)	0% (0)	33% (114)
Support	30% (48)	100% (188)	67% (236)
Total	100% (162)	100% (188)	100% (350)

Note: Entries are percentages of article distinct Democrats or Republicans who opposed or supported policies to reduce climate change. The data only includes those politicians first mentioned in an article. Frequencies are in parentheses.

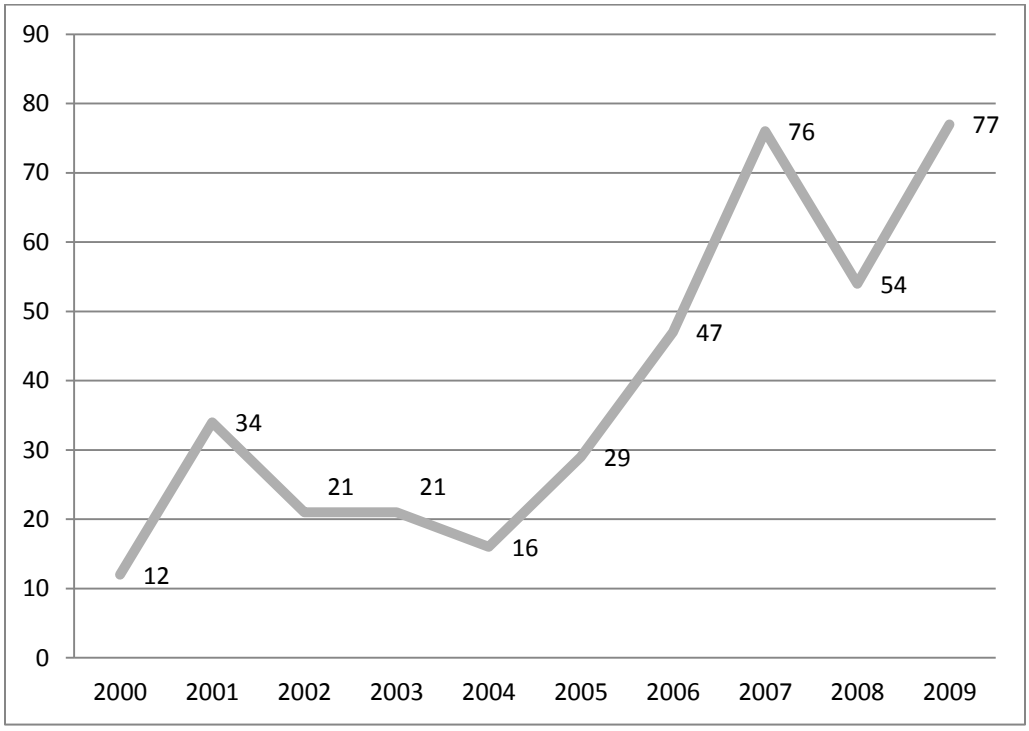
Table 4.5 The Most Active Politicians on Climate Change in *The New York Times*

Republican Politician	Freq.	Percent	Democratic Politician	Freq.	Percent
George W. Bush (R)	94	50	Barack Obama (D)	36	19
James Inhofe (R)	26	14	Al Gore (D)	24	13
John McCain (R)	25	13	Barbara Boxer (D)	17	9
Arnold Schwarzenegger (R)	15	8	John Kerry (D)	16	9
John Warner (R)	10	5	Nancy Pelosi (D)	15	8
Joe Barton (R)	5	3	Joe Lieberman (D)[a]	13	7
			Edward Markey (D)	13	7
			Hillary Clinton (D)	9	5
			Henry Waxman (D)	9	5
			Bill Clinton (D)	6	3

Note: Frequencies reflect the number of articles a particular politician took a position on climate change. Politicians featured more than five times are included in the table. Percentages are based on the total number of articles that were sampled (187). Results are weighted to reflect the actual number of articles for a given year.

[a] Joe Lieberman was re-elected to the Senate in 2006 as a third party candidate after losing the Democratic primary in the state. He is since then an "Independent Democrat".

Figure 4.1 Number of *New York Times* Articles about Politicians on Climate Change 2000-2009



Note: Number of articles per year in *The New York Times* that were of major relevance to climate change and featured Democratic or Republican politicians. Articles sampled from *LexisNexis* Academic.

5

Party Cues, Values and Climate Change Policies

The conclusion from the content analysis chapter is that party leaders differ remarkably in their positions on climate change. Republican Party leaders are against climate change policies and regulations whereas Democratic leaders support them. The same pattern of attitudes also holds for ordinary citizens, as studies based on public opinion data show. Generally, those who identify as Republicans oppose legislation to reduce climate change and Democrats support it (Malka, Krosnick, and Langer 2009; McCright and Dunlap 2011). From the perspective of the elite influence model, the story is simple; people see the positions of their leaders and adjust their own attitudes accordingly. Thus, rather than process information systematically, they use party identification as a cognitive shortcut (Berinsky 2007; Lau and Redlawsk 2001; Page and Shapiro 1992).

Though the association between party leadership positions and public opinion suggests that party identification is an important factor, it is nonetheless unclear whether elites actually cause public opinion to move. An alternative explanation is that the public sways policy-makers

rather than the opposite. According to this line of thinking, politicians are simply adjusting their message to what ordinary partisans want.

This chapter is divided into two parts. The first section examines the party cue perspective with correlational data. We know from Chapter 4 that Democratic leaders support policies and Republican leaders oppose them. Consequently, as political awareness increases, and thus the likelihood that partisans will be exposed to cues from their party leaders, Democrats and Republican identifiers should diverge more on climate change policies. In contrast, the attitudinal gap between Democrats and Republicans who are not paying much attention to politics should be comparably smaller. If the results show this pattern, then there is support for hypothesis 2b, i.e. when Democratic leaders take a position on climate change policies, then fellow Democrats are persuaded and when Republican elites express an issue position on policies, Republicans are persuaded; leaders of the opposing party are less effective at persuasion.

However, even if the hypothesis is supported by the data, it would not mean that the support is unquestionable since it is possible that the Democrats and Republicans who are more aware have reached different conclusions on climate change because they have learned more about the topic and concluded that being in opposition (if you are Republican) or being supportive (if you are Democrat) is simply more in line with their values. In other words, party cues are not causing the divide, but people's own value differences.

In the second part of the chapter, in order to understand cause and effect, I examine the party cue perspective with experimental data. Participants are exposed to persuasive messages from party leaders, Democrats or Republicans depending on the condition, and the expectation is

that Democrats will be persuaded by Democratic leaders whereas Republican leaders will persuade fellow Republicans. In other words, this chapter examines hypothesis 2b from two angles, with cross-sectional data and with experimental data.

The second part of the chapter also investigates if persuasion is contingent on values. As seen in Chapter 3, universalism influenced support for climate change policies but it was difficult to move this association around or later their perceived risks of climate change in an experimental setting. The present experiment allows me to reexamine the influence of values on climate change. Hypothesis 1c is somewhat different from the other predictions related to the value perspective because it is not about how values condition risk perceptions.[34] Nonetheless, the basic idea tested by the value perspective, i.e. that values condition how people perceive information, is tested by the prediction. Specifically, in the current study, I examine whether a message based on a humanitarian justification for or against climate change policies is more effective at persuading those who adhere to humanitarianism. Similarly, when a message uses a free enterprise justification for a position on climate change policies, then people who value this principle should be more influenced compared those who do not value it as highly.

In addition to the test of hypothesis 2b (party cues) and hypothesis 1c (values), this chapter also tests whether persuasion based on party cues is more effective when it appeals to values (hypothesis 3a). While evidence from the experiment in chapter 3 demonstrated the difficulty in altering the risks and support for climate change policies through value-based persuasion, it is important to note that those experiments did not contain political source cues.

[34] Hypothesis 1a, 1b, 1e and 1f are four predictions that, as a group, predict that three values condition individuals to perceive higher risks with climate change and consequently support climate change policies to reduce the risks. Hypothesis 1d is about the structure of the perceived risks with climate change. All these hypotheses were tested in Chapter 3.

Potentially, party leaders are better at persuasion when their message is value-laden rather than if it is based on party source cues alone. Perhaps the persuasive message must contain a trusted source before people start listening to the content of the argument.

Still, the reality might be more complex than that because attempts at persuasion with values may need to fit partisan expectations. Potentially, since Republicans have a tradition of backing market-based solutions to problems they are more persuasive than Democrats when they rely on appeals to free-market principles compared (hypothesis 3b). Likewise, Democrats have a tradition of supporting policies that help people in need and therefore they may be more effective than Republicans when making arguments based on humanitarian principles (hypothesis 3c). I begin this chapter with an investigation of the party cue perspective with cross-sectional data.

5.1 Political Awareness, Party Identification and Party Cues

Following from Zaller's (1992) *The Nature and Origins of Mass Opinion*, individuals who pay the most attention to the news, and are more politically aware, should be the most affected by elites. In the case of climate change as well as on other issues, Republican identifiers listen to Republican elites and Democratic identifiers listen to Democratic elites (Berinsky 2007). Political awareness should thus condition the effect of party identification on attitudes about climate change.[35]

An alternative explanation is that the relationship between party leaders and partisans is spurious and that something else is influencing attitudes. Given the central role of values in

[35] This explanation is brief. The theory chapter contains a lengthier discussion of how Zaller's model applies to attitudes on climate change.

politics, it is possible that values influence views of climate change. While the only evidence I have so far is the link between the value universalism and attitudes on climate change, the relationship some researchers have found between party identification might be an artifact of other variables and not be caused by party elite cues.

Chapter 4 found that Democratic and Republican Party leaders are generally divided on climate change policies. The division among party elites should have a profound influence on the way people view climate change. I examine this idea with two datasets. First, I use the adult study described in Chapter 2 and analyzed in Chapter 3 since it contains the necessary variables. Second, I replicate the findings using a nationally representative dataset from the American National Election Survey.

5.1.1 Determinants of Climate Change Attitudes: Adult Study

Two dependent variables in the adult values study, general climate change risk perceptions and climate change policies, are used to study the prediction derived from Zaller's model. Both variables were used to test predictions related to the value perspective. To reiterate, the risk perception variable is a scale based on 12 items and the climate change policies scale was created from 11 questions about climate change policies. Cronbach's alpha for the risk scale is 0.94 and 0.84 for the policy scale, which means that both scales are very reliable.

5.1.1.1 Support for the Zaller Model

Five regression models were estimated to test the veracity of the Zaller model which, given the positions of party leaders on climate change, predicts that as awareness increases, Democrats become more supportive of climate change policies whereas Republicans express

more opposition. The model in the first column of Table 5.1 is a simple linear model without an interaction term between political awareness and party identification. The significant variables in this model are party identification, political awareness and universalism. As we have seen above, people who strongly adhere to universalism are more likely to see climate change risks than those who do not. Universalism was kept in the model because the prior models showed a strong impact of universalism on climate change attitudes. However, here the focus is not on universalism, but on party identification and political awareness. The results of this model show that the more people identify with the Democratic Party, the higher the risks they associate with climate change. The difference between strong Republicans and strong Democrats is 0.129, since the variables are coded 0 to 1. A somewhat surprising effect is that political awareness strongly leads people to see lower climate change risks. The coefficient is negative, meaning that going from the least aware to the most aware decreases risk perceptions by 0.138.

The conclusion based on the first model is misleading, however, as the results in the second column of Table 5.1 shows. This model incorporates the interaction term between party identification and political awareness (0.323), and this statistically significant coefficient shows that the effect of party identification depends on awareness ($t = 2.26$, $p = 0.025$). Substantively, it means that among Republicans, and as political awareness increases, they are less worried about climate change. In contrast, for a strong Democrat, political awareness does not decrease support. The difference in risk perceptions between opposing partisans in risk perceptions is greater the more aware they are. Figure 5.1 includes a graph of the interaction. Hence, the results yield support for the elite influence model.

Figure 5.1 about here

The dependent variable in the third, fourth and fifth columns of Table 5.1 is climate change policies. The third column excludes the interaction term, the fourth column includes it and the fifth column incorporates risk perceptions as a predictor variable. While the results may not be as strong as in the prior model, the pattern is the same. The interaction term in column four (0.171) is significant and substantial ($t = 1.70$, $p = 0.046$, one-tailed test). The one-tailed test is appropriate given the direction of the prediction. Again, as political awareness increases, Republicans are less likely to support climate change policies, but this is not the case for Democrats. Among the less politically aware, there is a relatively small difference between Republicans and Democrats, yet this difference grows with political awareness (see Figure 5.2).

The rightmost model in Table 5.1 shows that when general climate change risks (the 12-item scale) is included as an independent variable, it is not only highly significant and causes people to support climate change policies, it also appears to somewhat reduce the effect of the interaction between party identification and political awareness. The interaction is nonetheless marginally significant ($t = 1.56$, $p = 0.06$, one-tailed test).

Universalism is again a significant predictor of risk perceptions and support for climate change policies. In fact, Table 5.1 shows that universalism is one of the strongest determinants in the models. In addition, higher educational attainment is related to more support for climate change policies. Since both universalism and education are coded 0-1, one can see that the marginal effect of education is nowhere near that of universalism.

Table 5.1 about here

Figure 5.2 about here

5.1.2 Determinants of Climate Change Attitudes: ANES

While the adult study relies on quota sampling to get variation on key demographic variables, it is nevertheless not a random sample. To deal with this potential problem, and to replicate the findings from above, I conduct an analysis with a sample that generalizes to the general population. Besides being valuable as a replication, by using a representative sample we can get an idea of the magnitude of the effect.

In order to replicate the analysis, I rely on publicly available data. A problem with such data, however, is that it must contain the key variables of interest. This is sometimes a problem with the political awareness variables, which tends not to be included in surveys conducted by commercial polling organizations. Moreover, the public data must include questions related to climate change. Party identification is usually asked in most political surveys so that is not a big concern. Fortunately, the American Election Studies (ANES) ask about political awareness and recently it has begun asking specific questions about climate change policies. The most recent ANES study that includes all relevant variables is the 2008-2009 Panel Study, which I use to conduct the study.

The respondents in the ANES 2008-2009 Panel Study were recruited via telephone using random-digit dialing. Two cohorts were recruited for the panel, one in late 2007 and one during the summer of 2008. Participants received $10 per month to complete up to 21 monthly internet surveys from early 2008 to the fall of 2009. Those without access to computers and/or internet access were provided necessary resources for the duration of the study (DeBell, Krosnick, and Lupia 2010).

5.1.2.1 Dependent and Independent Variables

The dependent variable is an additive scale based on the following three branched questions in the ANES:

- Power plants put gases into the air that could cause global warming. Do you favor, oppose, or neither favor nor oppose the federal government lowering the amount of these gases that power plants are allowed to put into the air?
- Do you favor, oppose, or neither favor nor oppose the federal government requiring automakers to build cars that use less gasoline?
- Do you favor, oppose, or neither favor nor oppose increasing taxes on gasoline so people either drive less or buy cars that use less gas?

After each of these questions, unless participants said neither favor nor oppose, they were asked, "Do you [favor/oppose] that a great deal, moderately, or a little?" The answers produced three seven-point variables, which were then combined to create a climate change policy scale that ranges from zero to one ($M = 0.64$, $S.D. = 0.20$).[36]

The political awareness scale was generated by combining the answers to six questions about public figures and politics ($M = 0.78$, $S.D. = 0.25$). For example, the questions were the following: "What state does U.S. Senator Barack Obama represent in Congress?" and "Before he was elected to the U.S. Congress, where did John McCain work?"[37]

Party identification was measured with the traditional branched ANES-question to produce a seven-point scale.[38]

[36] ANES variables for climate change policies: w10s9, w10s10a, w10s10b; w10s11, w10s12a, w10s12b; w10s13, w10s14a, w10s14b. When the three variables are combined to form a scale, the alpha is relatively low ($\alpha = 0.46$) – it is higher when the gas tax question is excluded ($\alpha = 0.57$). Scales with low reliability may attenuate effect sizes, so this potential problem works against the hypothesis. Yet, importantly, the results in the subsequent analysis do not depend on whether or not the scale includes the gas tax item.

[37] ANES variables for political awareness: w9v1, w9v2, w9v3, w9v4, w9v5, w9v6. Cronbach's alpha is 0.68.

[38] ANES variable for party identification: der08w10

In addition, a number of control variables were included in the model. The controls were selected to be as close as possible to the variables that were included in the adult study models. There are a few differences between the models, however. Universalism was not asked in the ANES and was therefore excluded. ANES did not ask whether participants were born in the U.S. This variable was replaced by a question about whether English was the participant's first language at home. Other than that, the variables in the models are very similar.[39]

5.1.2.2 The Party Identification and Political Awareness Interaction Replicated

First, turning to the model that excludes the party identification and political awareness-interaction, we see that as people identify more with the Democratic Party, they are more supportive of climate change policies (0.066), all else equal ($t = 2.21$, $p = 0.03$). Moreover, people who follow politics are also more supportive of climate change policies, 0.084 ($t = 3.18$, $p = 0.002$). However, these results are misleading because they do not look at the way political awareness conditions the effect of party identification.

The results in the second column of Table 5.2 show that the central interaction (0.270) between party identification and political awareness is significant, substantial and in the right direction ($t = 3.24$, $p = 0.001$). Interactions are often easier to see in graphs and for that reason the interaction is plotted in Figure 5.3. The effect means that as people become more politically aware, partisans diverge in their support of climate change. Thus, a gulf separates strong Democrats and strong Republicans. As for the odd predicted values on the far left of the political awareness scale, they should be interpreted with caution. Looking at the graph, it seems like

[39] ANES control variables: ideology: der09w1; gender, der01; age: der02; white ethnicity: der04; English as the first language at home: cpq14a; education: cpq15; household income: der06

strong Democrats who are the least politically aware are less supportive of climate change policies than the most politically aware strong Republicans are. Such a conclusion would be premature because the mean for political awareness is high (M = 0.77, $S.D.$ = 0.20, on a 0-1 scale) meaning that not many people are below the crossover point of the interaction.

Table 5.2 about here

Figure 5.3 about here

The ANES results replicate the findings of the adult study with the exception that the ANES results finds that more sophisticated Democrats increase their support for climate change policies. The adult study did not see a positive slope for this group. Moreover, in the adult study, independents decreased their support for policies with increased awareness, but with the ANES data, they become slightly more positive. Given the more representative data of the ANES, there is reason to believe that the ANES results give more accurate depiction of public opinion than the adult study on this issue. This is a relatively minor concern, however, as the key point is that the interaction replicates.

In sum, also with the ANES data, there is strong support for the elite influence model. The effect of party identification is completely contingent on political awareness. Models that fail to consider this will draw misleading conclusions. Combined, the results above indicate that Republicans who follow the news, and therefore listen to their party leaders' position on climate change, are substantially less likely to see risks with a changing climate. They are also less likely to support policies that reduce climate change. Democrats, in contrast, become more supportive of policies the more they listen to their leaders. The partisan divide is less visible among the less

politically attentive, presumably because the less attentive partisans are not exposed to cues from their party leaders.

5.1.3 Summary

The results in the section provide support for the party cue perspective and hypothesis 2b. The central idea of this perspective, supported with data from the adult study and ANES, is that people are influenced by leaders from their own party. The results build on the assumption that higher political awareness is associated with exposure to partisan arguments. When leaders diverge on an issue, as they do on climate change, it is expected to influence the most politically aware partisans, leading to a larger gap between the more aware Republican and Democratic identifiers. Partisans who do not follow the news as closely are in contrast less likely to pick up these party cues.

However, as we know, correlation does not mean causation. In the second section of this chapter I therefore turn to experimental data to examine the causal link between party leaders and fellow partisans. In the next section, I also reexamine the value perspective.

5.2 Experimental Design of the Party Cue and Values Study

Since a main concern with prior research on public opinion on climate change policies is linked to the question of causality, I rely on two very similar experiments embedded in one survey to study the problem. The experimental design of the study is described in greater depth in Chapter 2, yet it may be helpful to underscore its feature once more. Experiment 1 is the more

important of the two studies and concerns how party source cues and values influence attitudes on climate change policies.

The second experiment is designed to influence attitudes on carbon capture and storage (CCS), a relatively obscure issue. The reason to pick a fairly complicated and unknown issue is that the parties may not have politicized CCS as much as other climate change policies (e.g., cap and trade). The obscurity of CCS may lead people to turn to their values instead of party cues. Alternatively, since the issue is new and unknown, the safe solution might be to look towards leaders rather than using values. Regardless, the second experiment provides an opportunity to examine attitudes on climate change further.

While the experimental design of experiment 2 is almost the same as experiment 1, it is different because the treatments of the second came at the end of the questionnaire rather than in the beginning. The relative lateness of experiment 2 might be problematic because participants have read and responded to many questions about climate change, which may make it harder to persuade people because of two reasons. One, respondents will want to express attitude consistency across questions, and, two, they will have thought a lot about climate change at that point and thus have firmer beliefs. Another difference between the two experiments is that the experimental treatments of the second experiment were much shorter.

Since the designs of the two experiments were almost identical, and the first experiment was more centrally located in the survey, contained longer and presumably more powerful treatments, and had a greater number of outcome variables, I examine the results of experiment 1 primarily and include analysis of data from the second experiment in the appendix. The results from experiment 1 and 2 are in effect the same.

5.2.1 Counter-attitudinal Information on Climate Change

All participants read a text that contained counter-attitudinal information on climate change. In other words, climate change skeptics received a message in favor of climate change policies and climate change believers received a message against policies. There are two reasons to focus on counter-attitudinal persuasion. First, scientists who study climate change strongly believe that humans are causing the changing climate and that we therefore should do something about it. Still, many citizens would rather not do anything about this problem. The challenge is therefore to persuade ordinary people that some form of climate change legislation is necessary. While it may be controversial to take this position, just as it may be controversial to say that science classes should teach evolution and not intelligent design, it is from a science perspective the same thing. Science tells us that climate change is a serious problem that should be addressed.

The second reason to focus on counter-attitudinal persuasion is of practical nature. Many people already support climate change policies, yet rather than trying to persuade these individuals that they should support such legislation even more, and therefore run up against ceiling effects, this group was exposed in the experiment to a message that *opposed* climate change policies rather than supported them. The responses of these individuals let us understand persuasion just as well as those who do not think climate change is happening, only that the direction of persuasion is the opposite.

In order to be able to present information that ran counter to participants' attitudes, one of the first questions in the questionnaire measured participants' position on climate change with

the following item: “Which of the following statements reflects your view of when the effects of global warming will begin to happen?” Respondents had the following response options:

F) They have already begun to happen.
G) They will start happening within a few years.
H) They will start happening within your lifetime.
I) They will not happen within your lifetime, but they will affect future generations.
J) They will never happen.

Those who said, “A) They have already begun to happen”, which, from a scientific perspective is the accurate answer, were exposed to a text where politicians said that we should not pass climate change legislation. Respondents who selected answers B to E read a text with politicians supporting climate change policies.

5.2.2 Experimental Conditions

The experiment had two between-group factors. It manipulated source cue (Democratic leaders vs. Republican leaders) and the value content (free enterprise vs. humanitarianism vs. control/no value). The source cue was either Republican leaders or Democratic leaders. These leaders tried to persuade participants with a message that either was based on the values of humanitarianism or free-market capitalism, or was not value-laden. Consequently, there were six types of messages: Democratic (no value), Republican (no value), Humanitarian Democratic, Humanitarian Republican, Free-market Democratic or Free-market Republican. Participants were randomly assigned to these conditions. The experimental design is outlined in Table 5.3. Please refer to the methodology chapter for the experimental material.

Table 5.3 about here

Table 5.3 also shows the number of participants by conditions. The main disparity between the cells is because more people said that climate change is happening now than those who did not. Of the 392 total participants, 242 (62%) read an argument in favor of taking action on climate change and 150 participants (38%) read an argument in favor of taking action on climate change. Because of random assignment, the cells within each direction of persuasion are not equal in numbers.[40]

Yet before turning to the results of the study, it is important to know that the experimental treatments were perceived to be based on the correct values. This was studied in a separate small survey, a pretest of experimental manipulations.

5.2.2.1 Pretest of Value-infused Experimental Manipulations

The goal of the pretest was to test whether the arguments evoked the correct values in the full experiment. The 88 respondents recruited for the pretest survey rated four value-laden texts about climate change; two of them advocated that we should not take any action on climate change and two texts argued that we should take action now. [41] For each position (against or for action), the texts differed in how they justified their position. One type of justification was grounded in humanitarianism whereas the other type was based on concerns about making the market economy work effectively. Humanitarianism was defined to participants as "people have

[40] Participants were recruited for the experiment on Craigslist and Facebook. A link in the advertisements took them to the web-survey. The advertisement informed potential participants that they could only take the survey if they were at least 18 years old. See Table 2.1 in the methodology chapter for sample characteristics.

[41] I acquired the sample by advertising the web survey on Facebook and Craigslist. The data was collected between April 5, 2010 and April 12, 2010. The median age in the sample was 41 years old (age ranged from 18 to 71). The sample gender distribution was 44 percent males and 56 percent females. Whites made up 63 percent and minorities 37 percent. Nineteen percent were foreign-born. The median household income was $45,000-49,999. Fifty-one percent of the participants had a bachelor's degree or higher. Thirty-five percent identified as Republicans (includes leaners) 16 percent as independents and 49 percent as Democrats (includes leaners).

responsibilities toward their fellow human beings, and should come to the assistance of others in need" and free enterprise as "for a free market system, and against governmental interference with business and trade." The pretest was conducted without any party cues embedded.

Before reading the statements, which were presented in a random order, the participants read, "There has been a lot of recent discussion in the news media on the issue of climate change. People give various reasons for supporting or opposing bills and proposals that deal with climate change. We are interested in learning what principles, beliefs or values such stories evoke. Please read the following statements carefully and then rate to what extent they seem principle-based to you."

After each text, respondents marked to what extent they thought it evoked humanitarianism and free enterprise with the following scale: agree strongly, agree moderately, agree slightly, disagree slightly, disagree moderately or disagree strongly.

5.2.2.2 Value-laden Messages Pretest Results

The statements evoked the values they were supposed to.[42] Turning first to the statements against climate change action, the data shows that the humanitarian text was perceived to be based more on the principle of humanitarianism than on free enterprise (humanitarianism, M = 0.69; free enterprise M = 0.55, $p < 0.001$). Respondents rated the free enterprise justification as more pro-capitalism than humanitarian (free enterprise, M = 0.82; humanitarianism, M = 0.47, $p < 0.001$). The value statements for action on climate change also differed in predictable ways. The humanitarian message was more humanitarian than based on the principle of free enterprise

[42] Please see the methodology chapter, section 2.4.3, for the texts (marked by italics) that were rated.

(humanitarianism, $M = 0.79$; free enterprise, $M = 0.46$, $p < 0.001$). The smallest difference between the value-laden messages was on the free enterprise text for climate change policies. While participants said that it stressed capitalism more (free enterprise, $M = 0.65$; humanitarianism, $M = 0.57$, $p = .06$), the difference is not of the same magnitude as the other messages. Nevertheless, the effect is marginally significant and together with the other strong results, the pretest was successful; it showed that the treatments are evoking the right values. Knowing this, I can next turn to the experiment.

Figure 5.4 about here

5.3 Results

5.3.1 Dependent Variable: Climate Change Policies

The main dependent variable is climate change policies, a five-item scale of attitudes on climate change policies. The items and their frequency distribution are described in Table 5.4 below. Three policies were equally popular among respondents. Seventy-nine percent expressed support or strong support for a policy to increase vehicle mileage standards. The same percentage were behind the idea that the U.S. should take an active role in international negotiations. Seventy-eight percent supported the proposal that states should have the right to set stricter climate standards. The support for the cap and trade policy was slightly lower, with 66 percent support. The introduction of a gas taxes was the least liked proposal – only 40 percent of the respondents supported this policy. Overall, the support for the policies was higher than the

opposition, with the exception of the gas tax policy. That said, with the four response options, there is substantial variance on all questions.

Table 5.4 about here

Factor analysis reveals that all policy attitude items fall on one factor and that the scale is reliable. The eigenvalue of the first factor is 2.08, and the eigenvalues of the following factors are all below 0.01. Moreover, the scree plot reveals a clear break between the first and second factors. The loadings of the items on the scale are all above 0.5, so there is no reason to adjust the scale because of poor items. The scale is reliable ($\alpha = .78$), with all items contributing to a higher alpha. Thus, all items should be kept in the scale.

The scale is coded to range from zero to one, with higher values meaning more support. For example, someone who scores one on the scale said "strongly support" to all five questions. The mean of the scale is 0.61 and the standard deviation is 0.22.

5.3.2 Party Source Cue Persuasion

If party elites are driving public opinion on climate change, then it should also be possible to influence participants by experimentally altering whether a persuasive message comes from Republican or Democratic political elites. This idea is expressed by hypothesis 2b. If the treatment works, then we should see people who share the party of the leaders to be most influenced by the message.

The hypothesis is tested with OLS regression using climate change policies as the outcome variable. The key independent variables are the experimental factor party source cue (coded 0 for Republican leaders and 1 for Democratic leaders), party identification of the

respondent (coded 0-1, with higher values meaning more Democratic), direction of persuasion (coded 0 when the persuasion is against policies and 1 when it is for policies) and product terms of the three variables. For the hypothesis to have support, the interaction of these three variables must be significant and positive. It means that the effect of the party source cue, for analytical purposes the focal independent variable, is moderated by the party identification of the respondent and the direction of persuasion. Another way to think of this is that party identification moderates the effect of party source cues, yet this effect is further moderated by the direction of persuasion. When the direction of persuasion is against policies, then leaders should be more effective at reducing support among fellow partisans whereas when the direction of persuasion is for policies, then leaders should increase the support of fellow partisans.

The crucial finding, and what yields support for the party cue hypothesis, is the statistically significant three-way interaction, 0.24 ($t = 2.06$, $p = 0.04$), of party leader source cue, party identification and the direction of persuasion on climate change action (Table 5.5, left column). As expected, the effect of the experimental treatment is moderated by both party identification of the respondent and the direction of persuasion by the politicians in the experiment.[43]

The significant interaction means that the coefficients in the table are conditional and should thus be interpreted with this in mind. Rather than interpreting the coefficient for the party source cue as an effect on policy support regardless of party identification and direction of persuasion, it depends on the values of these two moderating variables. The coefficient for the

[43] In addition, I ran a model that did not distinguish between Republicans and Democrats but simply looked at whether the message came from a fellow partisan (scored 1 if it did and 0 otherwise). This variable interacted with direction of persuasion was also significant ($p < 0.04$) and in the right direction. It meant that party leaders of the same party were more persuasive, also supporting the party cue hypothesis. Pure independents were excluded from this analysis.

party source cue variable is 0.09 in Table 5.5 (left column) which means that a one unit change in party source cues, i.e., from Republican leaders to Democratic leaders because of the coding of that variable, increases support for climate change policies by this much. Importantly, the variable only has this effect when party identification = 0 (i.e. among strong Republicans), and when direction of persuasion = 0 (i.e., among participants who read a message against climate change policies). In other words, the coefficient reflects the fact that support for climate change policies became lower when the source cue was Republican compared to if it was a Democratic source cue. This effect among strong Republicans who read a message against climate change policies makes sense since Republicans are hypothesized to be more likely to listen to Republican leaders. The effect is marginally significant ($t = 1.60$, $p = 0.06$).[44]

To get a better understanding of the effects of the party cue at different levels of party identification and direction of persuasion, I followed a recommendation by Jaccard and Turrisi (2003) and recoded the variables to appropriate values, recalculated the interactions and ran the models again. When party identification is recoded so that strong democrats = 0 and persuasion is against policies = 0, the Democratic Party cue reduces the support by 0.06 units ($t = -1.60$, $p = 0.06$), as predicted since Democratic leaders are expected to be more effective at persuading Democratic identifiers. When the party identification variable's zero-value equals strong Republicans and the direction of persuasion is for policies (the dummy variable recoded so that 0 = for policies instead of against policies), then the effect of the source cue is -.009, and non-significant ($t = -0.17$, $p = 0.87$). Thus, at this level of the moderating variables, the source cue was not effective. Lastly, when strong Democrats = 0 on party identification and direction of

[44] The p-values in this and the following paragraph are one-tailed given the direction of the expectations. Unless noted, p-values are two-tailed.

persuasion is for policies, Democratic leaders are 0.09 more effective, as predicted, at increasing support than Republican leaders ($t = 1.65$, $p = 0.05$). Overall, the effects at different levels of the moderating variables are not overwhelming but they produce a pattern of result that is consistent with hypothesis 2b.

Substantively, the significant omnibus interaction means that when Democratic leaders tell Democratic identifiers that climate change is unimportant, they lower their support for climate change policies, but if Republican leaders tell Democrats to reduce support they do not reduce it to the same degree. As for the opposite side of the scale of party identification, when Republican elites tell Republican identifiers to reduce their policy support, they are more effective at doing that compared to if the fictional politicians are Democratic leaders (Figure 5.5, left panel). When Democratic policy-makers tell fellow Democrats to support climate change action, depicted by the right panel in Figure 5.5, they increase their support more than if Republican leaders try to do the same. Overall, Democrats are convinced by Democrats and Republicans are convinced by Republicans; party cues from of the opposing party are unpersuasive.

Figure 5.5 about here

The strength of interaction effects can be assessed in several ways. One popular method to examine the unstandardized effect is to look at the value of the coefficient of the interaction (0.24 in Table 5.5). Since all variables range from 0 to 1, it is easy to see that this coefficient has a substantial effect. A standardized measure of the interaction strength can be calculated by comparing how much additional variance the higher-order interaction effect explains (Jaccard and Turrisi 2003). The model that excludes the three-way interaction, or the reduced model,

accounts for 0.33 of the variance in policy attitudes whereas the full model explains 0.34. Thus, the three-way interaction accounts for one percent of the variance. It should be noted that interaction effects often produce relatively small standardized effects even though the coefficients are large (McClelland and Judd 1993).

As for the other significant coefficients in the left column of Table 5.5, party identification is related to more positive views of climate change policies. A one unit change in party identification, going from strong Republican to strong Democrat, leads to a 0.25 increase in support ($t = 4.44$, $p < 0.001$). In addition, the coefficient for direction of persuasion is statistically significant ($t = -3.86$, $p < 0.001$). It means that those who read a text in favor of climate change policies were 0.22 less favorable towards climate change policies. This effect is unsurprising since those who read the text in favor of climate change policies were the ones who initially doubted the existence of climate change. Yet, to reiterate, given a different coding of the variables, these variables would have had different values and standard errors.

Table 5.5 about here

5.3.3 Value-based Persuasion Re-examined

As for value-based persuasion, there is little support for this idea. Even though the pretest revealed that participants saw real differences between the messages in terms of values, value-infused messages do not resonate more among those who adhere to those values. For this prediction to be true, one or both of the three-way interaction between values, value conditions (humanitarianism or free enterprise) and direction of persuasion would have had to be significant. Again, the thinking is that the effect of the value-infused message is conditional on

the values of the respondent and the direction of persuasion. Looking at the middle column of Table 5.5, the coefficient for the free enterprise interaction is 0.07 (t = 0.46, p = 0.64) and the coefficient for the humanitarianism interaction is 0.03 (t = 0.14, p = 0.892). Both variables are non-significant.

There are significant variables in the value interactions model, however. Those who adhere to the principle of free enterprise are more likely to oppose climate change policies. In fact, going from the lowest value to the highest on this scale, one unit change, the support is reduced by 0.22 (t = -3.47, p = 0.001). In contrast, humanitarianism increases support for climate change policies; a one unit increase leads to 0.22 more support for policies (t = 2.55, p = 0.011). In addition, the interaction coefficient between free enterprise and direction of persuasion, -0.19, is marginally significant (t = -1.90, p = 0.06), which means that free enterprise has a stronger negative effect among those who read a text with politicians promoting climate change policies. This might be a type I error or it could be a case of counter arguing, with free enterprise becoming more salient when participants encountered politicians in favor of climate change policies, which is something that proponents of free enterprise tend to oppose. It should be noted that this significant interaction is not giving support for hypothesis 1c.

The results of the full model, shown in the right-most column in Table 5.5, include all interactions and it again gives support for hypothesis 2b without supporting hypothesis 1c. Even when the other interactions are included in the model, the three-way party identification, party source cue and direction of persuasion interaction (0.27) remains significant (t = 2.29, p = 0.023). The curious marginally significant two-way interaction between direction of persuasion

and free enterprise is no longer significant in this model, which could indicates that its effect, seen in the middle column of Table 5.5, is not very robust.

5.3.4 Trustworthiness of Fictional Politicians Depending on Party Source Cues and Party Identification

A way to corroborate the support for hypothesis 2b is by looking at how trustworthy participants rated the fictional politicians. This was measured after participants rated their support or opposition to climate change policies. Trustworthiness was measured by one question, "How trustworthy did the politicians mentioned in the text seem to you?" with the response options, "extremely trustworthy, very trustworthy, somewhat trustworthy, not too trustworthy, not trustworthy at all." The variable was coded to range from 0 to 1, with higher values meaning higher trustworthiness.

If the party cue perspective is correct, we should see Republican identifiers saying that they think the Republican politicians in the story seemed more trustworthy than the Democratic leaders and vice versa for Democratic identifiers. The interaction should be significant and positive since the coding of the variables is the same as in Table 5.5. The variable direction of persuasion is excluded from this analysis because it is unrelated to ratings of the politicians. Thus, rather than interpreting three-way interactions, the subsequent analysis is about two-way interactive effects.

As expected, participants viewed the politicians very differently depending on their party identification and the party of the leaders. The coefficient for this statistically significant two-way interaction is 0.31 ($t = 4.62$, $p < 0.001$) and it means that Democrats trusted Democrats and

Republicans trusted Republicans (Table 5.6, the left column). Figure 5.6 illustrates the results. The effect matches the finding that policy preferences are influenced by party leaders while conditional on party identification. It also suggests a mechanism for that effect; people are persuaded by leaders they trust.

The results in Table 5.6, left column, are conditional on the zero value of party identification meaning strong Republicans. Thus, the statistically significant party source cue coefficient, -0.18 (t = -3.87, $p < 0.001$) is valid only among this type of Republicans. It means that a one unit change in party source cue, i.e. from a Republican source cue to a Democratic source cue, decreases trust by this much. Unsurprisingly, strong Republicans do not trust Democratic leaders. When party identification is re-coded so that strong Democrats = 0 on party identification, the coefficient for party source cue is 0.13 and statistically significant (t = 3.80, $p < 0.001$). It means that strong Democrats trust Democratic leaders more than Republican leaders.

Table 5.6 about here

Figure 5.6 about here

As for the value perspective, it does not get much support here either as none of the two interactions (free enterprise X free enterprise condition or humanitarianism X humanitarianism condition) is statistically significant (see Table 5.6, middle and right columns). The experiment in Chapter 3 could not activate values and they could not be activated here either.

Still, one possibility that could give support for the value perspective is that the effect of party cues may depend on the value content of messages. This idea is expressed by hypotheses 3a, 3b and 3c, and in the next section, these hypotheses are examined in more detail.

5.3.5 Effects of Party Cues Moderated by Party Identification and Value-infused Messages

5.3.5.1 Party Cues Infused with Values

This section of the chapter examines the support for hypothesis 3a, how the effect of party cues on is moderated by party identification and value-infused persuasion. Due to the complex nature of the interactions – it requires a four-way interaction to examine the hypothesis – I decided to run separate models for, on the one hand, those who read a message with politicians in favor of climate change policies, and, on the other hand, participants who were exposed to a message by politicians in opposition to policies. Thus, the highest order interactions in the subsequent analysis are three-way interactions rather than four-way interactions. Granted, this type of separation reduces the statistical power because the sample size is lower, and that makes it more likely to commit type II errors. Importantly, when I examined a model that included the four-way interaction, the key coefficient was non-significant ($t = 0.81$, $p = 0.42$).[45] If that interaction would have been significant, I would have been hesitant to look at targeted interactions.

The expectation is that the value-infused message should have a stronger effect when participants share their leaders' party compared to if the message is not value-infused. Specifically, if the source cue is Democratic, then the value-infused message should have a stronger effect the more participants identify with the Democratic Party; if the source cue is Republican, then the value-infused message should have a stronger effect the more participants

[45] I examined this by regressing climate change policies onto the product term of party source cue, party identification, value-infused message and direction of persuasion. Lower order interactions and simple main effects of those variables were also included in the model.

identify with the Republican Party. When the message is against climate change policies, the value-infused message should lower support when partisans and leaders share party and when the message is for policies, it should increase support.

The results in Table 5.7 give no support to hypothesis 3a, as the lack of significant three-way interactions demonstrates. The coefficient for the three-way interaction is -0.134 (t = -0.83, p = 0.41) among the participants that read a message against climate change policies and 0.07 (t = 0.34, p = 0.733) among those who were exposed to fictional politicians that promoted climate change policies (see the left and the middle columns of Table 5.7, respectively). The models are illustrated by Figure 5.7 and Figure 5.8.

Table 5.7 about here

Figure 5.7 about here

Figure 5.8 about here

Given the ability of the variable trustworthiness in the fictional politicians to register the effect of the party source cue treatment, it is plausible that this variable would pick up an effect if value-infused messages were effective. However, as the right column in Table 5.7 shows, the three-way interaction is -0.227 and non-significant (t = -1.62, p = 0.11). The effect approaches statistical significance but it is in the wrong direction. Figure 5.6 displays the results. The only variable that is significant is the interaction between party cues and party identification, again giving support to the party cue perspective.

Figure 5.9 about here

5.3.5.2 Party Cues Infused with the Values Humanitarianism and Free Enterprise

A potential reason that hypothesis 3a concerning the effect of value-infused messages by party leaders did not find support is that rather than assume any type of value-infused message resonates among partisans, it is plausible that free enterprise arguments work better among Republican identifiers (hypothesis 3b) and that humanitarian arguments resonate more among Democrats (hypothesis 3c). Just as in the prior section, I run separate models depending on direction of persuasion and the separation does not alter the results.

Hypothesis 3b is not supported by the data, regardless of whether the direction of persuasion is against climate change policies or for them, as is indicated by the non-significant three-way interactions between party source cues, party identification and the free enterprise condition. The coefficient among those who read a message against policies is -0.129 (t = -0.86, p = 0.388) and 0.087 (t = 0.34, p = 0.731) among those who were exposed to politicians in favor (see Table 5.8, the two columns to the left). Figure 5.10 shows the results of the model of those who read a message against climate change policies. Graphically, for hypothesis 3b to have support, the red line (the free enterprise condition) in Figure 5.10 should have been well below the blue line (baseline) among Republican identifiers when the source cue was Republican leaders (left panel) while such an effect not being as pronounced among Democratic identifiers or when the source cue came from Democratic leaders (right panel). Therefore, the data does not support the idea that when persuasion attempts by Republican leaders are based on free enterprise arguments they resonate more among Republican identifiers.

Table 5.8 about here

Figure 5.10 about here

The interactions that test hypothesis 3c, the product terms of party cues, party identification and the humanitarianism condition, are non-significant when the direction of persuasion is against policies, 0.074, (t = 0.42 , p = 0.67) or for them, 0.053, (t = 0.25, p = 0.803) (see Table 5.8, the two middle columns). Thus, the results do not support the expectation that Democrats are more likely to be persuaded on climate change policies by Democratic leaders when the arguments are based on humanitarian concerns.

The expectations above were tested using reduced models that only focused on a particular type of value (free enterprise in the two columns to the left of Table 5.8 and humanitarianism in the middle columns of Table 5.8) because I wanted to keep the models simple. However, to make sure that the non-significant effects are unrelated to model specification, I included all of the product terms, lower-order interactions and simple main effects in the two columns to the right in Table 5.8. As it turns out, the key three-way interactions that would give support for hypothesis 3b or 3c remain non-significant in the full models, too.

Finally, as an additional test of hypothesis 3b and 3c, I regressed the perceived trustworthiness of the politicians in the experiment on the key interactions, but even with this alternative dependent variable, there is no support for hypotheses because the interactions are non-significant. The coefficient that tests hypothesis 3b is -0.168 (t = -1.16, p = 0.248) and the coefficient that tests hypothesis 3c is -0.077 (t = 0.42, p = 0.672) (see Table 5.9). Including all variables in the full model does not alter the conclusion since the interaction terms stay non-significant (see the right column of Table 5.9)

Table 5.9 about here

5.4 Summary of Chapter 5

The party cue hypothesis suggests that citizens rely on cognitive shortcuts to simplify their decisions, and rather than seek out information, listen to all sides of an issue, and weighting pros and cons of a specific position, people look towards trustworthy sources to help them make sense of the political world. Party leaders play an especially important role. When Democratic elites take a position on an issue such as climate change, then those who identify as Democrats tend to take the same position, and when Republican leaders take an issue position, fellow Republican are moved in the same direction.

I found strong support for this perspective in the chapter. Hypothesis 2b was supported by two studies that examined how political awareness moderates the effect of party identification. Since Democratic leaders support policies and Republican elites oppose them, the partisans who are the most likely to hear this should polarize the most. Both my own data and data from the ANES showed that as partisans become more politically aware and thus more likely to hear party cues, the more polarized they get. Thus, the largest attitudinal gap on climate change policies is between the most aware Democrats and Republicans.

By relying on experimental data, I found additional support for hypothesis 2b. My data showed that party leaders are more effective at persuading fellow partisans. Republican leaders were able to persuade Republican identifiers and Democratic leaders influenced Democrats. When the roles were reversed, the political leaders were less effective; Republican elites were relatively ineffective at persuading participants who identified with the Democratic Party and Democratic leaders were unsuccessful at swaying the positions of Republicans. Granted, the effects of the treatments were relatively small, but the important point is that the party leaders

could generate this effect at all. By establishing cause and effect, the experiment makes the findings based on cross-sectional data considerably more persuasive.

The results from the adult value study showed that both party cues and the value universalism influenced attitudes on climate change. Yet, the point is that values are extremely difficult to activate experimentally in order to alter attitudes on global warming. Hypothesis 1c was not supported since participants who adhered to a specific value (e.g., humanitarianism) were not more persuaded when politicians justified their arguments with the same specific value. There was no support for hypothesis 3a either; partisans were not more persuaded when their political leaders relied on messages infused with values compared to if they did not. Moreover, the data did not give support for the idea that free enterprise arguments are more persuasive when Republican leaders rely on them to persuade fellow Republicans (hypothesis 3b). Finally, the results gave no support for the prediction that Democratic leaders are more persuasive among fellow Democrats when they rely on arguments based on humanitarianism (hypothesis 3c). In other words, it was not needed to infuse arguments with values in order to find party cue effects.

Table 5.1 Determinants of Climate Change Risk Perceptions and Policies in Adult Study

	Climate Change Risk Perceptions	Climate Change Risk Perceptions	Climate Change Policies	Climate Change Policies	Climate Change Policies
Party ID (Democrat)	**0.129 (0.055)**	-0.045 (0.097)	0.034 (0.038)	-0.061 (0.070)	-0.070 (0.066)
Political awareness	**-0.138 (0.046)**	**-0.322 (0.087)**	**-0.132 (0.032)**	**-0.227 (0.061)**	**-0.214 (0.059)**
Political awareness * PID	-	**0.323 (0.143)**	-	0.171[a] (0.101)	0.150 (0.097)
Universalism	**0.377 (0.080)**	**0.381 (0.079)**	**0.429 (0.055)**	**0.432 (0.055)**	**0.304 (0.056)**
Ideology (Liberal)	-0.023 (0.069)	-0.041 (0.068)	0.087 (0.048)	0.080 (0.048)	0.058 (0.046)
Age	0.001 (0.001)	0.001 (0.001)	**0.001 (0.001)**	**0.001 (0.001)**	0.001 (0.001)
White	-0.022 (0.033)	-0.017 (0.033)	0.043 (0.023)	0.044 (0.023)	0.028 (0.022)
Female	0.015 (0.026)	0.012 (0.025)	-0.004 (0.018)	-0.005 (0.018)	-0.003 (0.017)
U.S. Born	-0.062 (0.039)	-0.063 (0.039)	0.013 (0.027)	0.013 (0.027)	0.016 (0.026)
Household Income	-0.049 (0.055)	-0.059 (0.054)	-0.007 (0.039)	-0.011 (0.039)	-0.010 (0.037)
Education	0.044 (0.056)	0.052 (0.055)	**0.089 (0.039)**	**0.089 (0.039)**	**0.084 (0.037)**
Climate Change Risk Perceptions	-	-	-	-	**0.208 (0.033)**
Constant	**0.460 (0.087)**	**0.575 (0.100)**	**0.229 (0.061)**	**0.287 (0.071)**	**0.270 (0.068)**
Adj R-Squared	0.19	0.20	0.26	0.26	0.36
N	236	236	232	232	232

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of $p < 0.05$, two-tailed test. [a] Significant $p < 0.05$, one-tailed test. The dependent variable risk perceptions is the 12-item risk scale. It ranges from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk. The dependent variable climate change policies is a 11-item policy scale. Party ID ranges from strong Republican (0) to strong Democrat (1). Four items measure political awareness, with higher values meaning more awareness. The interaction term is party identification multiplied with political awareness. Universalism is measured by five items and goes from 0 to 1 with 1 meaning strongest adherence. Ideology goes from extremely conservative (0) to extremely liberal (1). Age ranges between 18-89. White is a dummy for white ethnicity, minority ethnicity is the baseline. Female is a dummy for female, with male as the excluded category. U.S. born is a dummy meaning born in the United States, coded zero for otherwise. Household income is coded in 22 categories with less than $4,999 as the lowest category and more than $200,000 as the highest. Education is measured by a 7-point scale with higher values indicating higher education. Both household income and education range from 0 to 1.

Table 5.2 Determinants of Climate Change Policies in ANES 2008-2009 Panel Study

	Climate Change Policies	**Climate Change Policies**
Political awareness	**0.066 (0.030)**	-0.068 (0.051)
Party ID (Democrat)	**0.086 (0.027)**	-0.115 (0.068)
Political awareness * PID	-	**0.270 (0.083)**
Ideology (Liberal)	**0.146 (0.034)**	**0.125 (0.035)**
Female	0.028 (0.016)	0.028 (0.016)
Age	0.000 (0.001)	0.000 (0.001)
White	0.004 (0.022)	0.001 (0.021)
English as first language	-0.052 (0.030)	-0.050 (0.030)
Education	0.102 (0.069)	0.092 (0.069)
Household Income	0.024 (0.037)	0.019 (0.037)
Constant	**0.393 (0.066)**	**0.518 (0.076)**
R-Squared	0.16	0.17
N	1041	1041

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of $p < 0.05$, two-tailed test. Party ID ranges from strong Republican (0) to strong Democrat (1). Four items measure political awareness, with higher values meaning more awareness. The interaction term is party identification multiplied with political awareness. Ideology goes from extremely conservative (0) to extremely liberal (1). Age ranges between 18-90. White is a dummy for white ethnicity, minority ethnicity is the baseline. Female is a dummy for female, with male as the excluded category. English as a first language is a dummy for English spoken as a first language, coded zero for otherwise. Household income is coded in 19 categories with less than $4,999 as the lowest category and more than $175,000 as the highest. Education is measured by a 7-point scale with higher values indicating higher education. Both household income and education range from 0 to 1. The results are weighted using variable wgtcs10.

Table 5.3 Experimental Design and Number of Participants in Each Cell

	Participant: "Climate change **is** happening now" and therefore politicians in experiment **against** climate change policies		Participant: "Climate change **is not** happening now" and therefore politicians in experiment **for** climate change policies	
	Democratic Source Cue	Republican Source Cue	Democratic Source Cue	Republican Source Cue
No Value	**Democratic Against** **(34)**	**Republican Against** **(44)**	**Democratic For** **(32)**	**Republican For** **(23)**
Humanitarianism	**Humanitarian Democratic Against** **(46)**	**Humanitarian Republican Against** **(30)**	**Humanitarian Democratic For** **(25)**	**Humanitarian Republican For** **(26)**
Free Enterprise	**Free Enterprise Democratic Against** **(44)**	**Free Enterprise Republican Against** **(44)**	**Free Enterprise Democratic For** **(25)**	**Free Enterprise Republican For** **(19)**

Note: The table describes the experimental design of the party cue and values experiment. The experiment was a 2 (party cue: Democratic leaders or Republican leaders) X 3 (value-based justification: free-enterprise, humanitarianism or control/no value) between-subjects factorial design. The numbers in parentheses are the numbers of participants who received that type of treatment.

Table 5.4 Frequency Distribution of Climate Change Policy Attitudes

	Strongly Oppose	Oppose	Support	Strongly Support
Give states the right to set stricter global warming policies than those required by federal law.	6	16	51	27
Introduce an economy-wide market-based cap-and-trade program that would set a limit on greenhouse gas emissions and allow industries to buy and sell their rights to emit. Companies are given a fixed number of permits and can sell their extra permits if they reduce their emissions.	14	21	49	17
Introduce a higher federal mileage standard on vehicles to increase fuel efficiency.	9	13	38	41
Increase the price of fossil fuels (like gasoline) through taxation to encourage people to save energy.	27	34	25	15
The U.S. government should actively engage and lead international negotiations on climate change.	10	11	46	33

Note: Cell entries are percentages.

Table 5.5 Determinants of Climate Change Policy Support

	PID Interaction Model	Value Interactions Model	PID and Value Interactions Model
Party Identification	**0.25 (0.06)**		**0.17 (0.06)**
Party Source Cue	0.09 (0.06)		0.06 (0.06)
PID X Party Source Cue	-0.15 (0.08)		-0.11 (0.08)
Direction of Persuasion	**-0.22 (0.06)**	0.09 (0.12)	0.01 (0.14)
Direction of Persuasion * PID	0.07 (0.08)		0.03 (0.09)
Party Source Cue X Direction of Persuasion	-0.10 (0.08)		-0.10 (0.08)
PID X Direction of Persuasion * Party Source Cue	**0.24 (0.12)**		**0.27 (0.12)**
Free Enterprise		**-0.22 (0.06)**	**-0.20 (0.06)**
Free Enterprise Condition		-0.02 (0.05)	-0.02 (0.05)
Free Enterprise * Free Enterprise Condition		0.10 (0.09)	0.10 (0.09)
Direction of Persuasion * Free Enterprise		-0.19 (0.10)	-0.05 (0.10)
Direction of Persuasion * Free Enterprise Condition		-0.09 (0.11)	-0.08 (0.10)
Direction of Persuasion * Free Enterprise * Free Enterprise Condition		0.07 (0.16)	0.07 (0.15)
Humanitarianism		**0.22 (0.09)**	**0.17 (0.08)**
Humanitarianism Condition		0.01 (0.12)	-0.01 (0.12)
Humanitarianism * Humanitarianism Condition		0.07 (0.16)	0.06 (0.15)
Direction of Persuasion * Humanitarianism		-0.10 (0.13)	-0.15 (0.12)
Direction of Persuasion * Humanitarianism Condition		-0.08 (0.17)	-0.12 (0.16)
Direction of Persuasion * Humanitarianism * Humanitarianism Condition		0.03 (0.23)	0.09 (0.22)
Constant	**0.51 (0.04)**	**0.59 (0.08)**	**0.52 (0.08)**
N	387	376	376
Adjusted R-squared	0.32	0.31	0.37

Note: Entries are coefficients with standard errors in parenthesis. Bold indicates a significance level of p<.05, two-tailed test. The dependent variable, climate change policies, is a scale measured by five items, with higher values meaning more support. Party identification was measured with the same branched question that the ANES uses. It is scored on a seven-point scale, with higher values indicating stronger Democrat. The variable Party Source Cue is the experimental factor of leadership cues (Republican leaders = 0, Democratic leaders = 1). Direction of persuasion indicates whether the politicians favored climate change legislation and regulations or if they did not (against = 0, for = 1). The values of free enterprise was measured with a 4-item scale and humanitarianism was measured with a 4-item scale. The humanitarianism condition and free enterprise condition are dummy variables (both scored 1), with the no value control group as the baseline. All variables range from zero to one.

Table 5.6 Determinants of Trust in Politicians

	PID Interaction Model	Value Interactions Model	PID and Value Interactions Model
Party Identification	-0.06 (0.05)		**-0.10** **(0.05)**
Party Source Cue (0=Rep, 1=Dem)	**-0.18** **(0.05)**		**-0.20** **(0.05)**
PID X Party Source Cue	**0.31** **(0.07)**		**0.33** **(0.07)**
Free Enterprise		-0.08 (0.05)	-0.08 (0.05)
Free Enterprise Condition		0.01 (0.05)	0.01 (0.05)
Free Enterprise * Free Enterprise Condition		0.05 (0.08)	0.07 (0.08)
Humanitarianism		-0.03 (0.07)	-0.06 (0.07)
Humanitarianism Condition		-0.08 (0.10)	-0.10 (0.09)
Humanitarianism * Humanitarianism Condition		0.21 (0.13)	0.23 (0.12)
Constant	0.38 (0.03)	0.38 (0.07)	0.46 (0.08)
N	388	377	376
Adjusted R-squared	0.06	0.02	0.08

Note: Entries are coefficients with standard errors in parenthesis. Bold indicates a significance level of $p<.05$, two-tailed test. The dependent variable is perceived trust in politicians in the experiment, which was measured by one question that had five response options. Higher values mean more trust. Party identification was measured with the same branched question that the ANES uses. It is scored on a seven-point scale, with higher values indicating stronger Democrat. The variable Party Source Cue is the experimental factor of leadership cues (Republican leaders = 0, Democratic leaders = 1). Direction of persuasion indicates whether the politicians favored climate change legislation and regulations or if they did not (against = 0, for = 1). The value free enterprise was measured with a 4-item scale and the value humanitarianism was measured with a 4-item scale. The humanitarianism condition and free enterprise condition are dummy variables (both scored 1), with the no value control group as the baseline. All variables range from zero to one.

Table 5.7 Conditional Effects of Value-infused Treatments on Climate Change Policies and Trust in Fictional Politicians

	Treatment: AGAINST climate change policies	Treatment: FOR climate change policies	Trust in Fictional Politicians
Party Identification	**0.238 (0.080)**	**0.360 (0.115)**	-0.120 (0.074)
Party Source Cue	-0.030 (0.100)	-0.009 (0.093)	**-0.286 (0.075)**
Value Condition	-0.010 (0.076)	0.006 (0.087)	-0.024 (0.065)
Value Condition * PID	0.021 (0.105)	-0.057 (0.147)	0.086 (0.096)
PID X Party Source Cue	-0.040 (0.135)	0.046 (0.162)	**0.458 (0.112)**
Value Condition * Party Source Cue	0.156 (0.119)	0.000 (0.127)	0.163 (0.096)
Value Condition * PID * Party Source Cue	-0.134 (0.162)	0.071 (0.209)	-0.227 (0.140)
Constant	**0.517 (0.056)**	**0.291 (0.063)**	**0.391 (0.048)**
N	240	147	388
Adjusted R-squared	0.097	0.254	0.067

Note: Entries are coefficients with standard errors in parenthesis. Bold indicates a significance level of p<.05, two-tailed test. The dependent variable of the first two columns, climate change policies, is a scale measured by five items, with higher values meaning more support. The dependent variable of the third column, perceived trust in fictional politicians, was measured by one question, with higher values meaning more trust. Party identification was measured with the same branched question that the ANES uses. It is scored on a seven-point scale, with higher values indicating stronger Democrat. The variable Party Source Cue is the experimental factor of leadership cues (Republican leaders = 0, Democratic leaders = 1). Value condition is a dummy indicating that participants were assigned either the humanitarianism condition or the free enterprise condition. All variables range from zero to one.

Table 5.8 Conditional Effects of Humanitarianism and Free Enterprise Conditions on Climate Change Policies

	Free Enterprise		Humanitarianism		Combined	
	Treatment: AGAINST climate change policies	Treatment: FOR climate change policies	Treatment: AGAINST climate change policies	Treatment: FOR climate change policies	Treatment: AGAINST climate change policies	Treatment: FOR climate change policies
Party Identification	**0.220 (0.066)**	**0.345 (0.077)**	**0.268 (0.059)**	**0.307 (0.092)**	**0.238 (0.081)**	**0.360 (0.115)**
Party Source Cue	0.049 (0.073)	0.004 (0.071)	0.087 (0.060)	-0.029 (0.077)	-0.030 (0.100)	-0.009 (0.094)
PID X Party Source Cue	-0.093 (0.096)	0.098 (0.114)	-0.165 (0.084)	0.073 (0.128)	-0.040 (0.136)	0.046 (0.162)
Humanitarianism Condition			0.088 (0.110)	-0.091 (0.089)	0.070 (0.117)	-0.055 (0.095)
Humanitarianism Condition * PID			-0.108 (0.138)	0.049 (0.142)	-0.078 (0.149)	-0.004 (0.158)
Humanitarianism Condition * Party Source Cue			-0.015 (0.138)	0.053 (0.135)	0.102 (0.160)	0.033 (0.146)
Humanitarianism Condition * PID * Party Source Cue			0.074 (0.176)	0.053 (0.210)	-0.051 (0.206)	0.080 (0.233)
Free Enterprise Condition	-0.055 (0.078)	0.169 (0.119)			-0.039 (0.082)	0.145 (0.127)
Free Enterprise Condition * Party Identification	0.083 (0.108)	-0.196 (0.187)			0.065 (0.118)	-0.210 (0.207)
Free Enterprise Condition * Party Source Cue	0.096 (0.108)	-0.113 (0.159)			0.174 (0.128)	-0.100 (0.172)
Free Enterprise Condition * Party Identification * Party Source Cue	-0.129 (0.149)	0.087 (0.252)			-0.182 (0.177)	0.139 (0.279)
Constant	**0.533 (0.050)**	**0.268 (0.047)**	**0.499 (0.041)**	**0.327 (0.055)**	**0.517 (0.057)**	**0.291 (0.064)**
N	240	147	240	147	240	147
R-squared	0.082	0.265	0.091	0.264	0.087	0.250

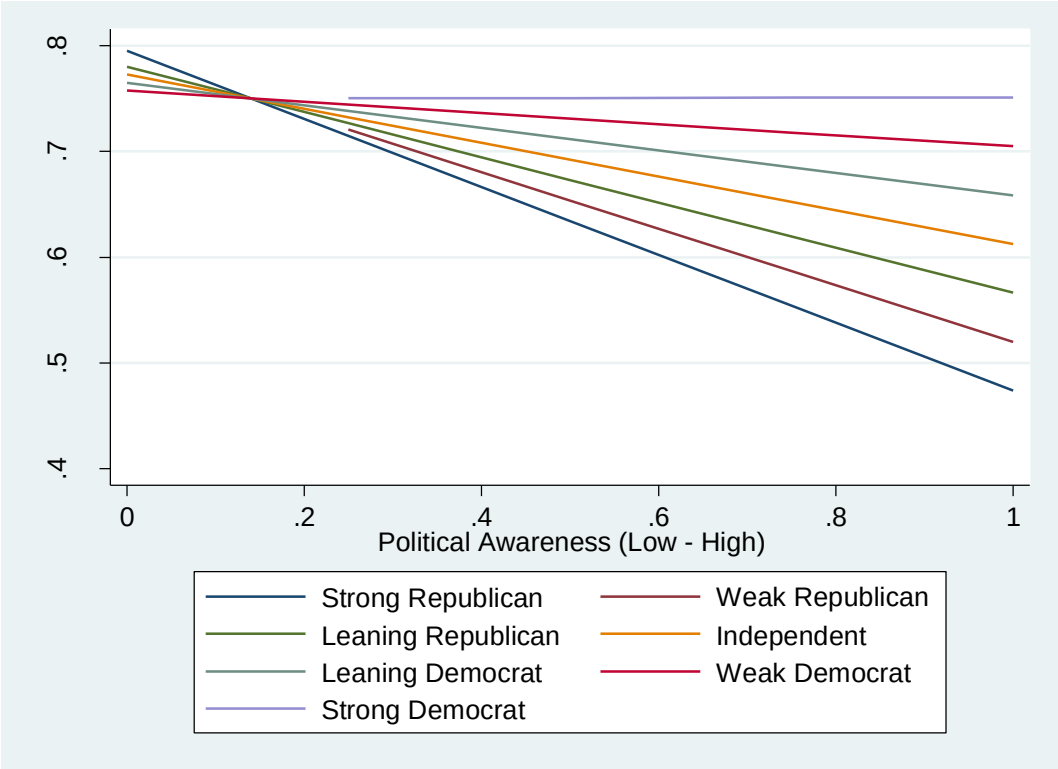
Note: Entries are coefficients with standard errors in parenthesis. Bold indicates a significance level of p<.05, two-tailed test. The dependent variable, climate change policies, is a scale measured by five items, with higher values meaning more support. Party identification was measured with the same branched question that the ANES uses. It is scored on a seven-point scale, with higher values indicating stronger Democrat. The variable Party Source Cue is the experimental factor of leadership cues (Republican leaders = 0, Democratic leaders = 1). The humanitarianism condition and free enterprise condition are dummy variables (both scored 1). All variables range from zero to one.

Table 5.9 Conditional Effects of Humanitarianism and Free Enterprise Conditions on Trust in Fictional Politicians in Experiment

	Free Enterprise	Humanitarianism	Combined
Party Identification	-0.078 (0.055)	-0.077 (0.057)	-0.120 (0.074)
Party Source Cue	**-0.206** **(0.057)**	**-0.206** **(0.055)**	**-0.286** **(0.075)**
PID X Party Source Cue	**0.363** **(0.081)**	**0.324** **(0.081)**	**0.458** **(0.112)**
Humanitarianism Condition		-0.019 (0.074)	-0.027 (0.079)
Humanitarianism Condition * PID		0.041 (0.102)	0.083 (0.112)
Humanitarianism Condition * Party Source Cue		0.099 (0.104)	0.179 (0.116)
Humanitarianism Condition * PID * Party Source Cue		-0.077 (0.144)	-0.211 (0.164)
Free Enterprise Condition	-0.011 (0.073)		-0.023 (0.079)
Free Enterprise Condition * Party Identification	0.050 (0.106)		0.092 (0.117)
Free Enterprise Condition * Party Source Cue	0.076 (0.100)		0.156 (0.111)
Free Enterprise Condition * Party Identification * Party Source Cue	-0.168 (0.145)		-0.263 (0.165)
Constant	**0.379** **(0.038)**	**0.383** **(0.038)**	**0.391** **(0.048)**
N	388	388	388
R-squared	0.058	0.061	0.062

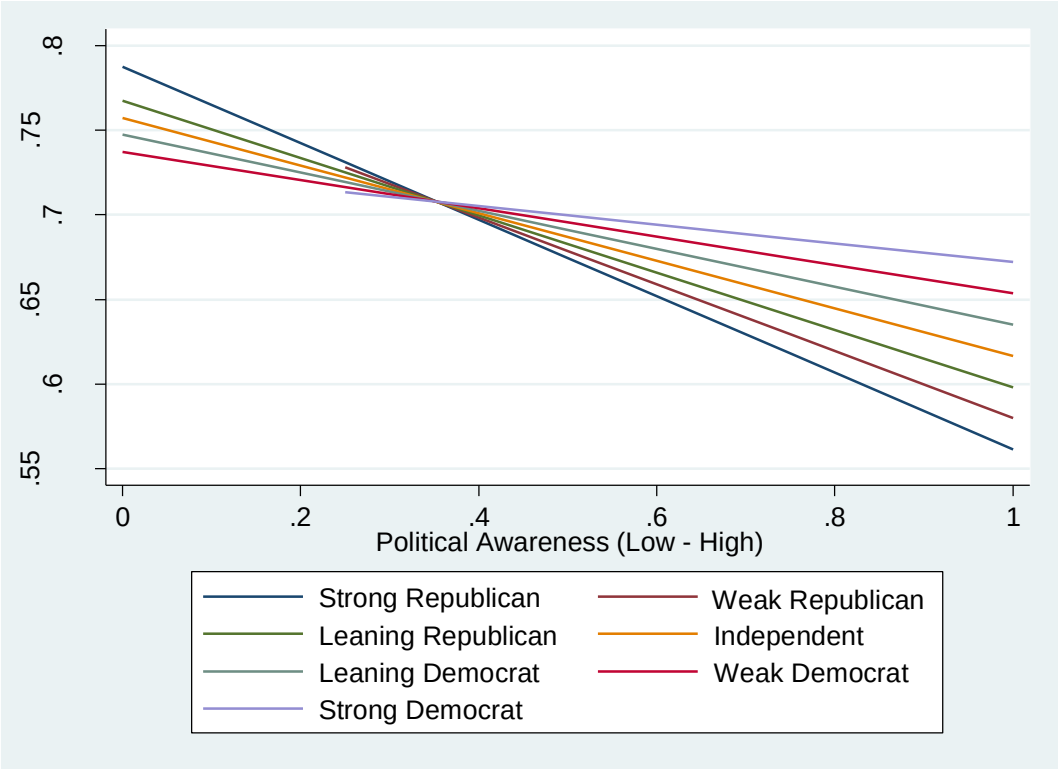
Note: Entries are coefficients with standard errors in parenthesis. Bold indicates a significance level of p<.05, two-tailed test. The dependent variable of the third column, perceived trust in fictional politicians, was measured by one question, with higher values meaning more trust. Party identification was measured with the same branched question that the ANES uses. It is scored on a seven-point scale, with higher values indicating stronger Democrat. The variable Party Source Cue is the experimental factor of leadership cues (Republican leaders = 0, Democratic leaders = 1). The humanitarianism condition and free enterprise condition are dummy variables (both scored 1). All variables range from zero to one.

Figure 5.1 Effect of Party Identification and Political Awareness on Climate Change Risk Perceptions, Adult Study



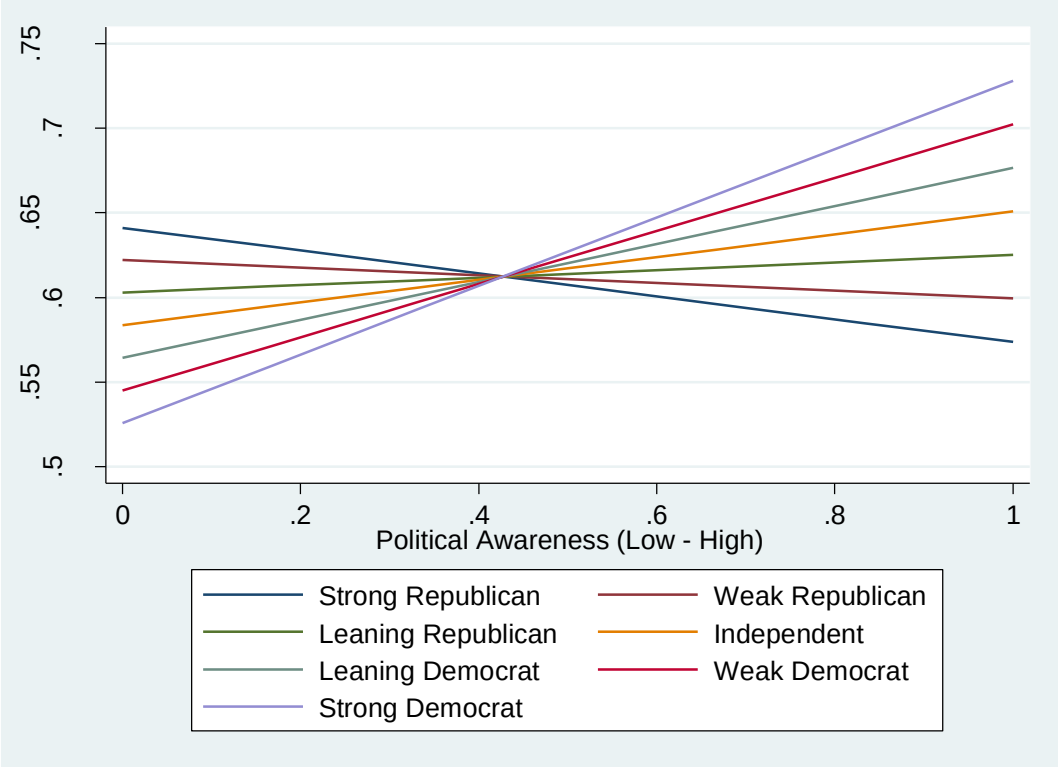
Note: The graph depicts how political awareness conditions the effect of party identification on climate change risk perceptions. Political awareness is on the x-axis and type of party id in the graph. Risk perceptions are on the y-axis, with higher values meaning greater perceived risk. These are predicted probabilities with all other variables in the model at their mean.

Figure 5.2 Effect of Party Identification and Political Awareness on Climate Change Policies, Adult Study



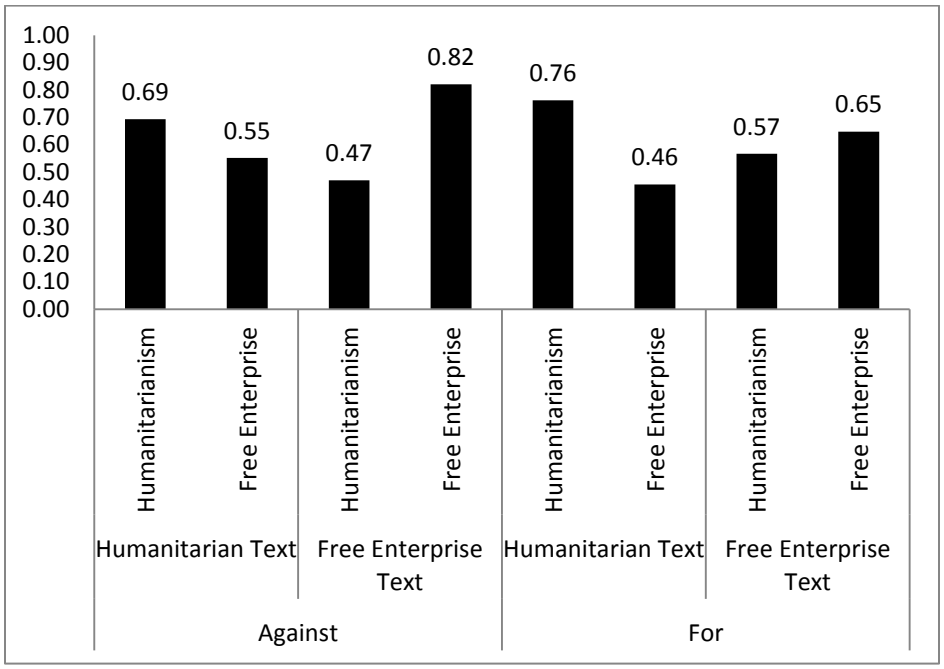
Note: The graph depicts how political awareness conditions the effect of party identification on climate change policies. Political awareness is on the x-axis and type of party id in the graph. Support for policies is on the y-axis, with higher values meaning more support. These are predicted probabilities with all other variables in the model at their mean.

Figure 5.3 Effect of Party Identification and Political Awareness on Climate Change Policies, ANES



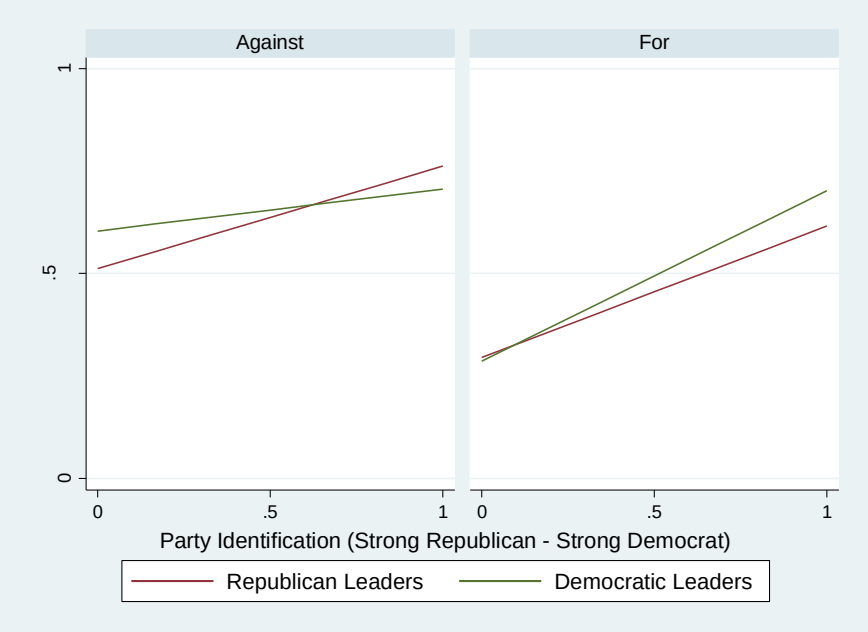
Note: The graph depicts how political awareness conditions the effect of party identification on climate change policies. Political awareness is on the x-axis and type of party id in the graph. Support for policies is on the y-axis, with higher values meaning more support. These are predicted probabilities with all other variables in the model at their mean.

Figure 5.4 Pre-test Study Ratings of Value-laden Justifications For and Against Climate Change Policies



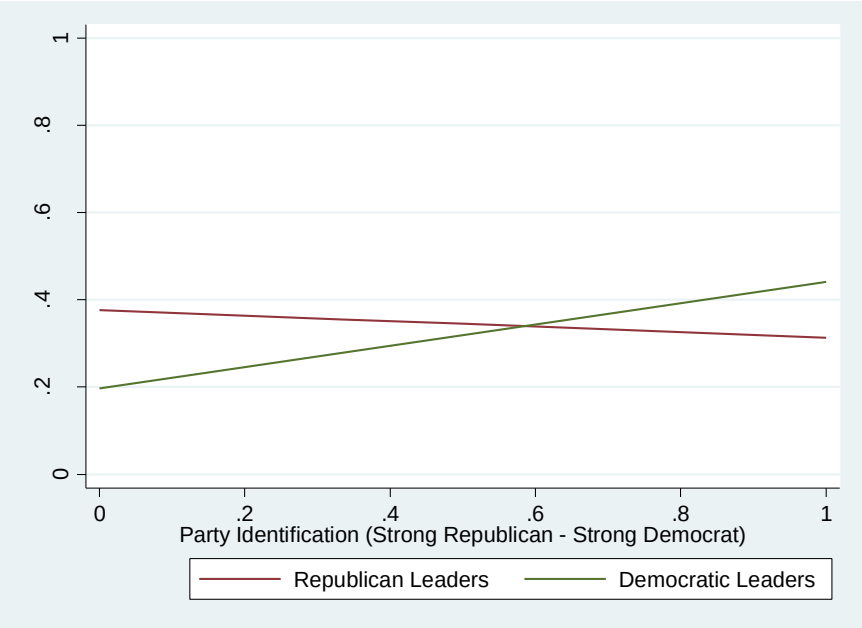
Note: All ratings are coded to range 0-1, with higher scores meaning that the message was perceived to be based on that specific value. N=88

Figure 5.5 Conditional Effects of Party Source Cues on Policy Attitudes



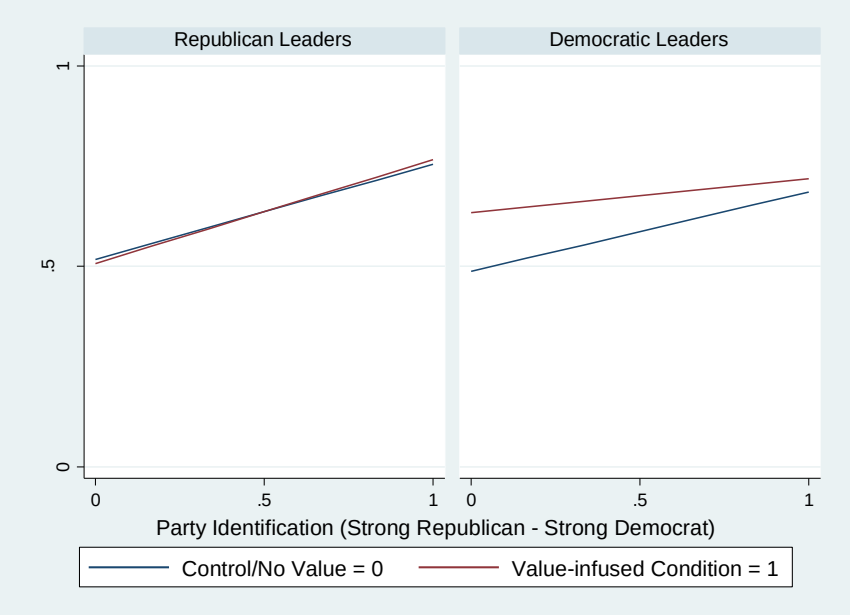
Note: The x-axis is party identification, with higher values meaning more Democratic identification. The y-axis is climate change policy attitudes, with higher values meaning more support. The left panel shows participants who received a message against climate change policies and the right panel displays those who read the message for climate change policies. The lines in the figure indicate party source cue, an experimental factor.

Figure 5.6 Conditional Effects of Party Source Cues on Trust in Fictional Politicians



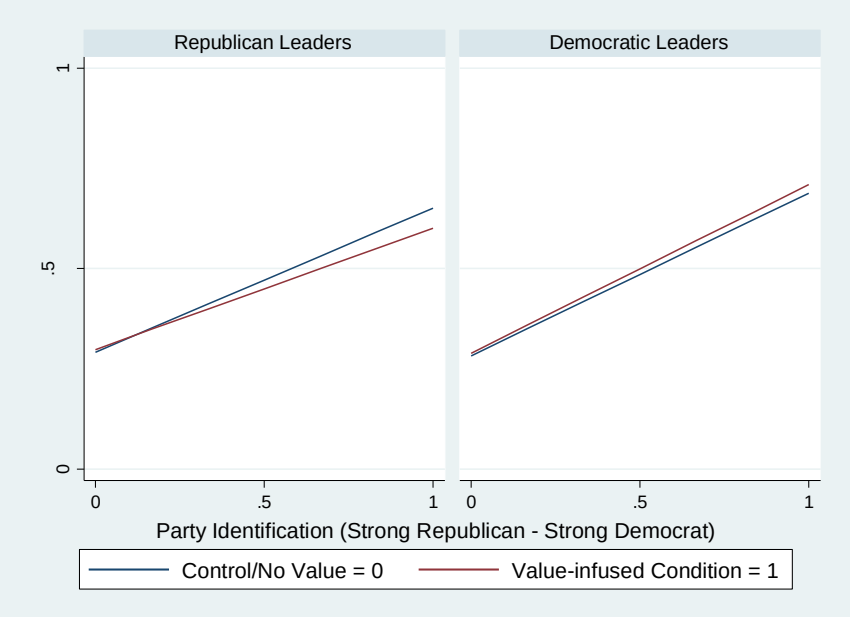
Note: The x-axis is party identification, with higher values meaning more Democratic identification. The y-axis is perceived trust in politicians in the experiment, with higher values meaning more trust. The lines in the figure indicate party source cue, an experimental factor.

Figure 5.7 Message Against Climate Change Policies: Conditional Effects of Value-infused Experimental Treatment on Policy Attitudes



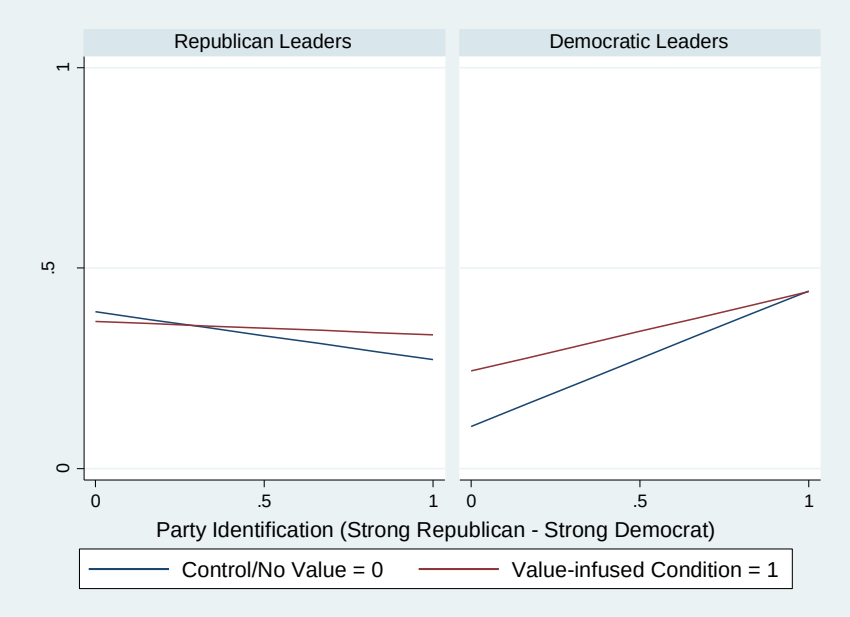
Note: The x-axis is party identification, with higher values meaning more Democratic identification. The y-axis is climate change policy attitudes, with higher values meaning more support. The left panel shows participants assigned to a Republican source cue and the right shows those assigned a Democratic source cue. The lines in the figure indicate whether the message was experimentally value-infused or not.

Figure 5.8 Message For Climate Change Policies: Conditional Effects of Value-infused Experimental Treatment on Policy Attitudes



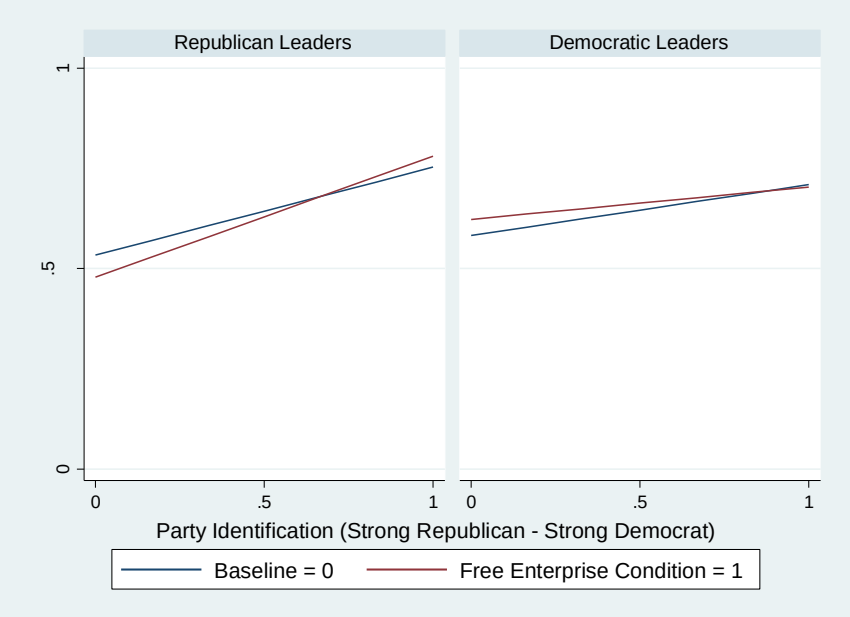
Note: The x-axis is party identification, with higher values meaning more Democratic identification. The y-axis is climate change policy attitudes, with higher values meaning more support. The left panel shows participants assigned to a Republican source cue and the right shows those assigned a Democratic source cue. The lines in the figure indicate whether the message was experimentally value-infused or not.

Figure 5.9 Conditional Effects of Value-infused Experimental Treatment on Trust in Politicians



Note: The x-axis is party identification, with higher values meaning more Democratic identification. The y-axis is perceived trust in politicians in the experiment, with higher values meaning more trust. The left panel shows participants assigned to a Republican source cue and the right shows those assigned a Democratic source cue. The lines in the figure indicate whether the message was experimentally value-infused or not.

Figure 5.10 Message Against Climate Change Policies: Conditional Effects of the Free Enterprise Condition on Policy Attitudes



Note: The x-axis is party identification, with higher values meaning more Democratic identification. The y-axis is climate change policy attitudes, with higher values meaning more support. The left panel shows participants assigned to a Republican source cue and the right shows those assigned a Democratic source cue. The lines in the figure indicate whether the message was experimentally infused with free enterprise or not.

6

Conclusion and Discussion

The ten warmest years on record (since 1880) have all occurred in the last thirteen years (NOAA 2011). Undoubtedly, the global climate is changing and human activities are responsible, as an overwhelming majority of scientist have concluded (Anderegg et al. 2010; IPCC 2007).

Nonetheless, the U.S. public is divided over whether or not climate change is a problem that needs to be addressed. While public opinion data shows that many Americans think climate change is indeed happening and are willing to make sacrifices to reduce the threat, many Americans think that climate change is a non-issue (Nisbet and Myers 2007).

Yet, to know that the public is divided is only a starting point, as the more interesting question is why Americans disagree on this fundamentally important issue. After a literature search that covered several disciplines, including political science, psychology and environmental research, I put forward two approaches to explain the factors that influence public opinion on climate change: the value perspective and the party cue perspective. This dissertation examined empirically how well these two perspectives explain American attitudes on climate change.

While I found some evidence in favor of the value perspective, it was mixed and not supported by experimental data. In contrast, the party cue perspective was strongly supported by the content analysis of political leaders in news media, by cross-sectional data from two datasets and by data from an experiment. I found that when ordinary Democrats hear that Democratic Party leaders are supportive of climate change policies, they consequently support climate change policies. The same relationship holds for Republicans. Generally, Republican Party leaders treat climate change as a non-issue and oppose climate change policies. When Republican identifiers learn this, they likewise oppose policies aimed to reduce the effects of climate change. The parties are thus simplifying the complex task of learning about political issues and weighing cons and pros. Partisans just need to look to their party leaders for cues.

6.1 Causal Evidence for the Party Cue Perspective and Effect Sizes

Building on the Zaller-model of elite influence, I examined how political awareness moderates the effect of party identification on support for climate change policies. As expected, I found that among Republican identifiers, higher political awareness leads to more opposition to climate change policies, whereas for Democratic identifiers, awareness leads to more support. However, this type of analysis was based on correlational data and it was therefore needed to establish a causal link between party leaders and fellow partisans with an experiment.

I manipulated party source cues in an experiment to provide stronger evidence for the party cue perspective. In the survey, I first measured if participants' thought that climate change was happening now or not. Those who said it is not happening were exposed to politicians who supported climate change policies while participants who said that it is happening encountered

politicians who were against climate change policies. I found that Democratic identifiers were persuaded on policies by Democratic leaders and Republican identifiers were influenced by Republican elites. I also found that Democratic identifiers trusted the party leaders mentioned in the experimental material more if the leaders were Democratic and that Republicans were more likely to trust Republican leaders. Unlike prior research (e.g., McCright and Dunlap 2011), which just assumes a causal connection, I thereby establish a causal link between party leaders and ordinary partisans.

A potential criticism of the party cue experiment is that the effects are relatively weak, especially if we believe that an experimental setting is the ideal environment to create strong effects (Kinder 2007). One might therefore call these small effects into question. While it is true that they are small, the point of the experiment was not to mimic the magnitude of real world effects, but to show that a relationship exists between party cues and attitudes on climate change policies. The purpose was to test a theory, not to generalize effect sizes (for a further discussion, see Mook 1983). An experimental setting like the one I provided can probably never achieve the effects of the real world since the participants only read one short story. If the interest is to study the size of the effects, then a more useful method is to examine the results from the ANES study in Chapter 5. One can compare the partisans who are, say, two standard deviations below the mean on political awareness with the partisans who are two standard deviations above the mean. The Democrats and Republicans at the low end of political awareness have presumably been exposed to very few party cues whereas the most aware Democrats and Republicans have been getting the party cues repeatedly. The difference is substantial, as Figure 5.1 shows.

6.2 Origins of Party Differences and Paths to the Recognition of Climate Change

Yet why do elites from the two parties disagree on climate change? Part of the answer seems to be that there are real ideological differences between the parties and they color how elites perceive climate change. The Republican Party's right-leaning platform, with its focus on economic deregulation and support for market-based solutions, provides a compelling reason to treat climate change as a non-issue. The existence of climate change would cast doubts on the usefulness of economic deregulation and the efficiency of the invisible hand of the market because the existence of climate change forces one to admit market failure, and thus the need to regulate the economy. These two ideas, climate change and laisser-faire economics, are in conflict with one another. To reduce this type of uncomfortable cognitive dissonance (Festinger 1957), it might be easier to discount global warming than to admit weaknesses in one's political belief-system.

In comparison with Republicans, leaders of the Democratic Party more readily accept the existence of global warming, perhaps because the party is more cautious about the market economy. From a Democratic perspective, the market economy constantly needs supervision and regulation in order to function efficiently. Thus, the existence of climate change does not give rise to the type of dissonance that Republican leaders may experience.

A factor that might fuel the Republican Party's resistance to accept climate change research is that powerful business interests use their resources to lobby against climate change legislation. These interests, which include the energy sector, rely heavily on their ability to emit greenhouse gases. If greenhouse gases are regulated, it threatens to undermine their economic growth. Accordingly, they work against climate change policies, partially by supporting

Republicans, which they view as an ideological ally. While interest groups scholars caution against assuming that lobbing produces large effects (Baumgartner et al. 2009), corporate spending on lobbying nonetheless is effective as it reduces tax rates (Richter, Samphantharak, and Timmons 2009).

Another potential reason for the Republican Party's opposition of climate change policies is that some of its prominent political adversaries, such as Al Gore, have taken a highly visible and opposing stand on the issue. In a political environment that is more polarized than before (Hetherington 2001), and where political opponents are perceived to be wrong on most other issues, they must be wrong on climate change as well, according to this line of thinking. If the parties had been less polarized and the discussion on climate change less heated, it might have been easier for Republican leaders to accept the scientific consensus on climate change. An acceptance of the scientific consensus now means not only that one publicly might be viewed as a flip-flopper but also an admission that political opponents were right.

These three factors together – a Republican Party deeply entrenched in right-wing principles, supported by the economic muscle of business interests and filled with anti-Gore sentiments – seem responsible for the elite-level disagreement that, in turn, is influencing public opinion along party lines.

Under what circumstances might the Republican Party accept the scientific consensus on climate change? Two paths seem likely. First, Republican elites may be more willing to accept climate change if its effects become so drastic and tangible that it no longer can be ignored. Presently, it is not very costly to ignore climate change for politicians because its implications

are not felt in the same way as, say, a terrorist attack.[46] When there are sweeping changes in the climate that can only be attributed to global warming, politicians can no longer treat it as a non-issue. Attitude change at the elite level because of extreme weather may take a long time, however, since the more extreme changes are predicted to happen in decades (IPCC 2007).

Second, Republicans might become more accepting of climate change if alternative energy becomes so cheap that business interests no longer need to rely on sources that emit greenhouse gases in order to sustain economic growth. One of the major fears with climate change regulation is thus alleviated. Research and development of alternative energy is growing all over the world, and eventually renewable energy is likely to become cheaper than traditional fuel sources, partly because fossil fuels are gradually becoming scarcer. However, this development is a slow process since the development of cheap alternative resources takes time and investments.

6.3 Party Cues on Scientific Issues and the State of U.S. Democracy

Given these results, that show overwhelming support for the party cue perspective, what do they say about the U.S. democracy? For one thing, they show that people listen to their leaders rather than to learn about political issues. This is not as bad as it might seem since it is normally a very efficient way of making sense of politics. After all, party leaders share our party for a good reason. However, sometimes party cues lead us astray, which is what seems to have happened on climate change. Many Americans, a majority of them Republicans, think that

[46] That is, unless climate change is severely amplified by positive feedback, such as if the permafrost in the Arctic regions thaws and releases its stored methane. The release of methane into the atmosphere would speed up further climate change since methane is a greenhouse gas.

climate change is a non-issue. Meanwhile, the scientific evidence strongly indicates that climate change is a very serious problem, caused by humans, and it needs to be dealt with immediately.

Yet the problem is deeper than that of people listening to party leaders. It makes sense to pay attention to party leaders on issues such as health care reform or affirmative action because on these issues there are usually not answers that are right or wrong. However, when it comes to issues that are scientific at their core, such as climate change, people should mostly disregard what their party leaders say. Rather than to follow leaders on complicated scientific issues, partisans should listen to scientists, not politicians. Note that this is not a tirade against Republicans, as Democrats are equally likely to follow source cues. It is not even an attack on the use of party source cues. It is simply a call to keep political and scientific issues separate. Now, given that scientific and political issues so entangled in the United States, why is that? What is different with the United States compared to other countries? I discuss this in the following section.

6.4 Public Opinion in the U.S. an Outlier on Climate Change and Scientific Issues

Public opinion on climate change in the United States stands out as very different from public opinion in most other countries. People in the United States are much more likely to doubt that humans are responsible for climate change in comparison to similar countries. In April 2011, Gallup polled adults in 111 countries with the following question: "And from what you have heard or read, do you believe increases in the Earth's temperature over the last century are due more to the effects of pollution from human activities, or natural changes in the environment that are not due to human activities?" In the United States, 34% say that global warming is a result of

human activities while 47% blame nature. Fourteen percent blame both (a volunteered response) and 4% are not aware of climate change. The average across all 111 countries is 35% blaming human activities and 14% blaming natural changes. The rest blame both (13%) or report that they are unaware of global warming (36%). Thus, globally, if you are aware of global warming, then you are much more likely to blame humans than natural causes. In the United States, in contrast, you are more likely to blame natural causes. In Canada, a comparable country to the United States, the belief that humans are responsible for global warming is 56% while 24% blame natural causes and in Western Europe, 49% believe humans are causing climate change whereas 23% think natural causes are to blame (Ray and Pugliese 2011).

Climate change is not the only issue that should have been left to scientists, but has entered the political debate in the United States. For example, consider attitudes towards evolution. It is well established among scientists that humans have evolved from basic life forms. However, in the United States, about as many people think that evolution is false (39%) as those who believe that evolution is true (40%). Twenty percent are uncertain. In comparable industrialized countries, such as France and Denmark, more than 80% believe that evolution is true. Creationism is strongly related to religiosity, especially in the United States. Among Catholics and mainstream Protestants in Europe, the Genesis is generally not understood literally but as a metaphor, yet in the United States, the view is more literal, which means that there is a conflict between evolution and religion for many Americans (Miller, Scott, and Okamoto 2006).

Importantly, evolution has become a political issue and a dividing line between the two major U.S. parties. This happened gradually over the second half of the last century when the Republican Party attempted to shore up support in the South and in the Midwest by incorporating

creationism in their party platform. The United States is an anomaly in this sense because no major parties in other countries have adopted creationism as a political issue. Consequently, public opinion research shows that a right-wing ideology is associated with anti-evolution beliefs in the U.S. but not in other countries (Miller, Scott, and Okamoto 2006).

A political environment that allows, or even encourages, mainstream parties to make anti-science messages part of their platform may have contributed to the general skepticism of climate change and other scientific issues. Overall, attitudes on scientific issues such as climate change would benefit from further analysis in a comparative study. Such a study would need to include religion as a factor since its effect varies between countries (Miller, Scott, and Okamoto 2006). In the United States, literal beliefs in the Bible are associated with lower scientific understanding (Sherkat 2011) but that does not need to be true in other countries. Moreover, party elite attitudes would need to be modeled as they have such a strong effect. A comparative study would obviously also need to look at the other factors that vary between countries, such as G.D.P., media environment, and so on. In addition, the study would need to include factors at the individual level, e.g., education. A study such as this, based on multilevel modeling and international survey data, would be a natural extension of my dissertation project.

6.5 Boundaries of the Party Cue Effect

While I showed strong party cue effects on climate change, it is important to note that the effect of source cues varies. Motivation is a central factor that conditions how much people rely on source cues. If citizens are motivated to be accurate on an issue, then they seek out more issue-relevant information and rely less on heuristics. However, if it is more important to be

efficient than accurate, then citizens rely on cognitive shortcuts instead. The motivation to reach decisions economically is powerful and tends to trump accuracy motivation (Basinger and Lavine 2005; Fiske and Taylor 1991).

Probably few political issues are important enough to motivate citizens to learn new information constantly rather than to rely on party cues. The state of the economy may be one of few exceptions, however. While even the economy is viewed through a partisan lens (Bartels 2002), voters nonetheless get a partially objective understanding of the economy and this view of the economy has a strong effect on election outcomes. During good times, the vote share for the incumbent party increases whereas it decreases during bad times (Kramer 1971). Yet beyond following the economy, the public is simply not motivated to engage in effortful processing on most issues.

At times, however, people rely less on cognitive shortcuts. A of the factor that motivates people to consider facts and arguments thoughtfully is personal relevance. When an issue is less personally relevant, cognitive shortcuts such as party positions are effective. However, when personal relevance increases, then people become motivated to process information more thoughtfully (Eagly and Chaiken 1993; Petty and Cacioppo 1986; Petty, Cacioppo, and Goldman 1981).[47] Climate change is not personally important for most Americans. Therefore, people are not motivated to spend the extra effort it takes to understand the facts. If global warming would touch American citizens personally, as it is likely to do eventually, it is possible that Americans would override their penchant for party cues on this issue.

[47] Psychologists often distinguish between two modes of persuasion. According to these dual-process models, persuasion based on cognitive shortcuts is called peripheral or heuristic. Effortful processing is referred to as central or systematic. A number of factors determine whether peripheral/heuristic or central/systematic processing is used (Eagly and Chaiken 1993; Petty and Cacioppo 1986).

Yet before one assumes that personal relevance will immediately lead to a better understanding of the facts about climate change, it is important to remember that the topic is very complex. Unless people have the ability to process information systematically, they will likely continue to rely on cognitive shortcuts (Eagly and Chaiken 1993; Petty and Cacioppo 1986). Thus, unlike on issues that may be simpler, such as on some foreign policy problems, increased personal relevance may not reduce the reliance on cognitive shortcuts. However, at least among groups that have sufficient cognitive ability to process complex issues systematically (e.g., educated individuals), a better understanding of the facts is likely to occur when personal relevance increases.

The use of party source cues also depends on whether or not people have a clear-cut partisan affection. For those who feel partisan ambivalence, party source cues are less useful. When partisans lack a strong affection for either party, they instead need to rely on other, more costly, criteria. Interestingly, highly politically aware and ambivalent voters are more likely to ignore party source cues and focus on issue positions and ideology (Basinger and Lavine 2005). Note, however, that the reliance on ideology does not mean that people automatically will accept scientific facts. Ideological thinking may mean that people perceive information through a different filter that might also leads them astray on scientific issues.

Another factor that influences the reliance on source cues is affect. According to the theory of Affective Intelligence, anxiety indicates that something is different in our environment, that we need to reduce our dependence on cognitive shortcuts and that we should increase information seeking and learning. In contrast, anger reduces information seeking and increases the reliance on cognitive shortcuts (Lerner and Tiedens 2006; MacKuen et al. 2010; Marcus,

Neuman, and MacKuen 2000; Valentino et al. 2008).[48] Therefore, if global warming events become anxiety provoking, it is possible that people learn more about the science. Yet, if they provoke anger, a better understanding of the facts is less likely.

6.6 The Value Perspective

My data showed that people who adhere to the value universalism are more likely to support climate change policies. How did universalism get associated with policy support in the first place? Presumably, as information on climate change has gradually become more available over the last couple of decades, those who value universalism have reached the conclusion that enacting policies to reduce the threat of climate change is the best way to protect their cherished value. The conclusion is accurate, since some of the worst effects of climate change are likely to affect people who are already living in difficult circumstances. In this case, it does seem like "[v]alues guide the selection or evaluation of actions, policies, people, and events." (Schwartz 2007)

An experiment sought to uncover if the links between values and attitudes on climate change could be activated. If views on climate change are conditional on values (i.e. if people use their values to evaluate information on the topic), then people should react to information about climate change differently depending on their own values. However, the experimental conditions did not make people who adhered to the targeted values more supportive of policies.

[48] Yet see Huddy et al. 2005 for a different account on the effects of anxiety. In their study about the effects of the terrorist attacks on 9/11, anxiety actually decreases learning.

In the section on risk perceptions, I found that universalism was positively related with risk perceptions. In addition, when I regressed climate change polices onto risk perceptions while controlling for universalism, I found that higher risk perceptions were strongly associated with more policy support. Thus, the theoretical model found support by the meditational analysis. Still, I only found this relationship with universalism, and not with other values.

One of the lessons from the experimental studies is that it is tremendously difficult to increase risk perceptions and support for climate change policies with values. Even the link that does exist between universalism and climate change attitudes was unaffected by the experimental treatments. I conducted an extensive analysis to see if at least some groups were affected by the experiment (e.g., participants who could correctly recall the content of the manipulation or those who took sufficient time to fill out the questionnaire) but no specific groups were influenced by the treatments.

It is possible that the experimental treatments were too weak to affect a public that has heard about climate change for many years. Presumably, most people have been exposed to information about climate change many times and the willingness to process information may have diminished over the years. Thus, when participants in the experiments read the information, they did not make any connections to their values because they think they already know how climate change relates to their belief-system. People have determined that universalism applies to climate change but other values are unimportant.

The results gave cautious support for the value perspective because universalism was found to affect risk perceptions and consequently policy support. This fact is not entirely surprising since news media have emphasized the threats towards poor people in remote

countries (Leiserowitz 2005; Lorenzoni et al. 2006; Nisbet 2009). Still, it is important to underline that the experimental treatments were unsuccessful, so any certain conclusion about cause and effect from values to policy attitudes via risk perceptions would be premature. Had it been another issue, one that is less politicized by the political parties, then the experimental treatments might have been more successful at activating values, yet now in the polarized U.S. political environment, people seem less inclined to apply their values.

6.7 The Structure of Climate Change Risks

I also conducted a study on the structure of climate change risks. Given the multifaceted risks with global warming, it was deemed plausible that people distinguish between the subjective risks of climate change. After weighing the evidence, I concluded that people differentiate between risks. However, even though the results showed that the tripartite model of risk had a better fit than the model that treats all climate change risks as unitary, the latter model has the advantage of being more parsimonious. Moreover, the fit of the one-dimensional model was acceptable (although not good) so I did not discard the one-dimensional model completely.

The fact that people see differences between climate change risks has the potential to have real world implications. Policy attitudes were found to be strongly affected by risk perceptions. Given this, and that perceptions of risks are separate, it opens up different ways to influence policy attitudes. By affecting any of these risk factors, one should be able to influence policy support. Rather than targeting on just general climate change risks, one could increase the risks separately and thus be more effective. Thus, there is an untapped potential for persuasion.

The finding that there is structure in how people perceive climate change risks is an indication that people may see different types of risks also in other domains. Other types of threats pose multifaceted risks in our society as well, e.g., terrorism and nuclear power. There is further need to examine if these types of threats are separate or unitary.

6.8 Combined Party Cues and Values

In Chapter 5, I examined data from an experiment that manipulated both values and party cues. That is, persuasion attempts came from party leaders (Democrats or Republicans) who justified their positions on climate change policies in terms of values. One type of justification was based on humanitarian concerns and another type of justification was based on concern for free enterprise.

Again, I did not find support for the idea that value-based arguments are more effective among those who adhere to these values. Those who valued humanitarianism were not more persuaded on climate change policies by humanitarian arguments. Similarly, participants who valued free enterprise were not more persuaded by free enterprise arguments. Moreover, party leaders were not more persuasive when they used values to justify their positions, regardless of the type of justifications they used. Thus, as in prior experiments that tested if values condition how people perceive information on climate change, there was no support for the idea.

Overall, argument content matters little compared to party cues. Since climate change is of low personal relevance, a very complex topic and thoroughly politicized, it is no wonder that people use party source cues instead of assimilating complex information. It makes sense that

citizens look to their trusted political leaders for help rather than to process information carefully in order to understand how it applies to their values.

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Appendices

Appendix A: Student Values Study

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NEWS | OPINIONS | SPORTS | ARTS & LIVING | Discussions | Photos & Video | CLASSIFIEDS

By Paul Kane
Washington Post Staff Writer
Wednesday, September 17, 2008

Climate Changing 'Faster, Stronger, Sooner'

The rise in global carbon dioxide emissions last year outpaced international researchers' most dire projections, according to figures being released today, as human-generated greenhouse gases have continued to build up in the atmosphere.

The new assessment – which took more than 200 experts to complete – paints "a bleak picture," leaders of the project wrote in a paper being published in the journal Science.

In 2007, carbon released from greenhouse gases increased 2.9 percent over that released in 2006, according to scientists that track emissions. This output is at the very high end of scenarios outlined a few years ago by the scientific community and could translate into a global temperature rise of more than 9 degrees Fahrenheit by the end of the century, according to the new estimates.

Global warming is likely to have serious negative consequences to people across the globe according to the report.

Warming temperatures could result in food shortages for 230 million people across Asia and Africa by 2050. Much of the area would become too hot and dry for agriculture. The people most affected by global warming are living in countries that have done little to create the problem. Climate change could cause potentially catastrophic problems in Africa, wiping out one of the continent's staple crops altogether, according to the report.

The report estimates that people in Africa are especially vulnerable to the effects of climate change. The fallout from a swiftly warming planet – extreme weather, flooding, rising sea levels, erosion of coastal areas, migration and expanding deserts – will only exacerbate troubles in the world's poorest continent. Countries in Africa are particularly vulnerable because they are lacking in governmental capacity to combat the changing weather.

"It's extremely clear and is very explicit that the cost of inaction will be huge compared to the cost of action," said Jeffrey Sachs, head of Columbia University's Earth Institute. “We need to start acting now."

"Slowing – and reversing – these threats are the defining challenge of our age," Sachs said upon the report's release.

The new assessment also shows that climate change is likely to drive up rates of malaria, malnutrition and diarrhea throughout the world. The regions most at risk include the Asian and South American Pacific coasts, as well as the Indian Ocean coast and sub-Saharan Africa. Climate-sensitive diseases such as malaria and dengue fever put people living in these regions disproportionally at risk, according to the report. The number of deaths and illnesses due to these effects is estimated to double by 2030.

"The sense of urgency when you put these pieces together is new and striking," said Martin Parry, a climate expert who was co-chairman of the delegation that wrote the report.

"Some of the things we projected to occur in 2050 are likely happening already in the next few decades. What we didn't get is how fast and how big it is, and the degree to which people across the globe would be influenced," Parry said in an interview. “Our mistake was in underestimation.”

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In 2007, carbon released from greenhouse gases increased 2.9 percent over that released in 2006, according to scientists that track emissions. This output is at the very high end of scenarios outlined a few years ago by the scientific community and could translate into a global temperature rise of more than 9 degrees Fahrenheit by the end of the century, according to the new estimates.

Global warming is likely to have serious negative consequences to people in the United States according to the report.

Warming temperatures, causing earlier snow runoff and consequently drier summer conditions, could result in rampant wildfires in the western United States over the next decades. In the future, catastrophic fires such as those that have devastated portions of California may become commonplace. Wildfires will not only destroy property, but also place further strain on the national economy.

The report estimates that American coastal areas, such as the Gulf Coast, are especially vulnerable to the effects of climate change. Hurricanes and tropical storms have always bedeviled the coasts, but global warming are making matters a lot worse. Sea levels are rising and will continue to rise as oceans warm and glaciers melt, leading to higher storm surges, coastal flooding and storm damage along the United States coasts. In addition, the associated heavy rains can extend hundreds of miles inland, further increasing the risk of flooding. The damages are very likely to lead to injuries, fatalities and high reconstruction costs.

"It's extremely clear and is very explicit that the cost of inaction will be huge compared to the cost of action," said Jeffrey Sachs, head of Columbia University's Earth Institute. “We need to start acting now."

"Slowing – and reversing – these threats are the defining challenge of our age," Sachs said upon the report's release.

The new assessment also shows that climate change is likely to drive up rates of West Nile virus, Lyme disease and dengue fever in the United States. Mosquitoes, ticks, mice and other carriers of diseases are surviving warmer winters and expanding their range, bringing health threats with them. Americans who are elderly or very young are disproportionally at risk, according to the report. The number of deaths and illnesses due to these effects is estimated to double by 2030.

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Global warming is likely to have serious negative consequences to ordinary people according to the report.

Warming temperatures are expected to have real impact on the personal economy of most people in this country. Because of climate variability, there could be as much as a 30 percent reduction in agricultural productivity, which will increase food prices across the board affecting not only lower income people but also the middle-class. Regular people will notice the effects of climate change on their pocketbook in other ways as well. Insurance costs will rise because of damage due to extreme weather such as hurricanes and tropical storms, which are expected to increase along the eastern seaboard, reaching as far north as Boston, according to the report.

The report estimates that because of the rising sea levels associated with global warming, coastal development, including buildings and roads will be substantially more vulnerable. These effects influence the lives of ordinary people in the Northeast directly as, for example, transport systems are likely to be disrupted.

“It's extremely clear and is very explicit that the cost of inaction will be huge compared to the cost of action,” said Jeffrey Sachs, head of Columbia University's Earth Institute. “We need to start acting now."

“Slowing – and reversing – these threats are the defining challenge of our age,” Sachs said upon the report's release.

The new assessment also shows that climate change is likely to drive up rates of West Nile virus, Lyme disease and dengue fever among ordinary people. Mosquitoes, ticks, mice and other carriers are surviving warmer winters and expanding their range, bringing health threats with them. Many health experts believe it is only a matter of time before diseases such as malaria and dengue fever are found across the country, including the Northeast. These effects put everyday people at risk, according to the report. The number of deaths and illnesses due to these effects is estimated to double by 2030.

“The sense of urgency when you put these pieces together is new and striking,” said Martin Parry, a climate expert who was co-chairman of the delegation that wrote the report.

“Some of the things we projected to occur in 2050 are likely happening already in the next few decades. What we didn't get is how fast and how big it is, and the degree to which ordinary people would be influenced,” Parry said in an interview. “Our mistake was in underestimation.”

Appendix B: Adult Values Study

Impoverished People Abroad Affected by Climate Changing Faster than Expected

By Paul Kane

The rise in global carbon dioxide emissions last year outpaced international researchers' most dire projections, according to figures being released today, as human-generated greenhouse gases have continued to build up in the atmosphere. According to the report, global warming is likely to have many serious negative consequences for people across the globe. Ironically, the people most affected by global warming are living in countries that have done little to create the crisis in the first place.

The new assessment – which took more than 200 scientists to complete – paints "a bleak picture," leaders of the project wrote in a paper being published in the journal *Science*.

In 2008, carbon released from greenhouse gases increased 2.9 percent over that released in 2007, according to scientists that track emissions. This output is at the very high end of scenarios outlined a few years ago by the scientific community and could translate into a global temperature rise of more than 9 degrees Fahrenheit by the end of the century, according to the new estimates.

Warming temperatures could result in food shortages for 230 million people across Asia and Africa by 2050. Much of the area would become too hot and dry for agriculture. Many crops in the regions are already being grown just under the maximum temperatures they can tolerate. Climate change could cause potentially catastrophic problems in sub-Saharan Africa, wiping out wheat, one of the region's staple crops altogether, according to the report.

The report states that people in Africa are especially vulnerable to the effects of climate change. The fallout from a swiftly warming planet – extreme weather, flooding, rising sea levels, erosion of coastal areas, migration and expanding deserts – will only exacerbate troubles in the world's poorest continent. Countries in Africa are particularly vulnerable because they are lacking in governmental capacity to combat the changing weather.

"It's extremely clear and is very explicit that the cost of inaction will be huge compared to the cost of action," said Jeffrey Sachs, head of Columbia University's Earth Institute. "We need to start acting now."

"Slowing – and reversing – these threats are the defining challenges of our age," Sachs said upon the report's release.

The new assessment also shows that climate change is likely to drive up rates of malaria, malnutrition and diarrhea throughout the world. The immediate hazard of the heavier downpours associated with global warming is drowning, but the larger problem is waterborne-disease outbreaks as sewer systems overflow into water supplies. The regions most at risk include the Asian and South American Pacific coasts, as well as the Indian Ocean coast and sub-Saharan Africa. Climate-sensitive diseases such as malaria and dengue fever put people living in these regions disproportionally at risk, according to the report. The number of deaths and illnesses due to these effects is estimated to double by 2030.

"The sense of urgency when you put these pieces together is new and striking," said Martin Parry, a climate expert who was co-chairman of the delegation that wrote the report.

"Some of the things we projected to occur in 2050 will most likely happen in the next few decades. What we didn't get is how destructive global warming would be, and the degree to which poor people across the globe would be influenced," Parry said in an interview. "Our mistake was in underestimation." The potential impact on poorer countries is huge. They will suffer most because they are least equipped to deal with rapid change.

Climate Changing Faster than Expected in the United States, Americans Facing Dramatic Consequences

By Paul Kane

The rise in global carbon dioxide emissions last year outpaced international researchers' most dire projections, according to figures being released today, posing a direct threat to the United States. According to the report, global warming is likely to have many serious negative consequences for Americans. Millions of Americans will face extreme weather, wildfires, and other dire consequences as human-generated greenhouse gases continue to build up in the atmosphere.

The new assessment – which took more than 200 American scientists to complete – paints "a bleak picture," leaders of the project wrote in a paper being published in the journal *Science*.

In 2008, carbon released from greenhouse gases increased 2.9 percent over that released in 2007, according to scientists that track emissions. This output is at the very high end of scenarios outlined a few years ago by the scientific community and could translate into a temperature rise across the United States by as much as 9 degrees Fahrenheit by the end of the century, according to the new estimates.

The report states that American coastal areas, such as the Gulf Coast, are especially vulnerable to the effects of climate change. Hurricanes and tropical storms have always bedeviled the coasts, but global warming is making matters a lot worse. The economic costs of Hurricane Katrina exceeded $150 billion and around 2000 Americans lost their lives. The higher sea temperatures associated with global warming are making such catastrophes more likely.

In addition, sea levels are rising and will continue to rise as oceans warm and glaciers melt, leading to higher storm surges, coastal flooding and storm damage along the United States coasts. The associated heavy rains are likely to extend hundreds of miles inland, further increasing the risk of flooding. The damages are very likely to lead to injuries, fatalities and high reconstruction costs.

Warming temperatures, causing earlier snow runoff and consequently drier summer conditions, will likely result in rampant wildfires in western states over the next decades. In the future, fires such as those that have devastated portions of California may become commonplace. Wildfires will not only destroy property, but also place further strain on an already weak national economy, according to the report.

"It's extremely clear and is very explicit that the cost of inaction will be huge compared to the cost of action," said Jeffrey Sachs, head of Columbia University's Earth Institute. "We need to start acting now."

"Slowing – and reversing – these threats are the defining challenges of our age," Sachs said upon the report's release.

The new assessment also shows that climate change is likely to drive up rates of West Nile virus, Lyme disease and dengue fever in the United States. Mosquitoes, ticks, mice and other carriers of disease are surviving warmer winters and expanding their range, bringing health threats with them. The immediate hazard of the heavier downpours associated with global warming is drowning, but the larger problem is waterborne-disease outbreaks as sewer systems overflow into water supplies. Americans who are elderly or very young are disproportionally at risk, according to the report. The number of deaths and illnesses due to these effects is estimated to double by 2030.

"The sense of urgency when you put these pieces together is new and striking," said Martin Parry, a climate expert who was co-chairman of the delegation that wrote the report.

"Some of the things we projected to occur in 2050 will most likely happen in the next few decades. What we didn't get is how destructive global warming would be, and the degree to which people in the United States would be influenced," Parry said in an interview. "Our mistake was in underestimation." Americans are very likely to feel the human and economic costs because of the increasingly intense and more frequently occurring natural disasters that will make previous ones pale in comparison.

Ordinary People in the Northeast Affected by Climate Changing Faster than Expected

By Paul Kane

The rise in global carbon dioxide emissions last year outpaced international researchers' most dire projections, according to figures being released today, as human-generated greenhouse gases have continued to build up in the atmosphere. According to the report, global warming is likely to have many serious negative consequences for ordinary people. Taxes will increase and insurance premiums will rise because of the damages caused by more extreme weather.

The new assessment – which took more than 200 scientists to complete – paints "a bleak picture," leaders of the project wrote in a paper being published in the journal *Science*.

In 2008, carbon released from greenhouse gases increased 2.9 percent over that released in 2007, according to scientists that track emissions. This output is at the very high end of scenarios outlined a few years ago by the scientific community and could translate into a temperature rise of more than 9 degrees Fahrenheit by the end of the century, according to the new estimates.

Warming temperatures are expected to have a real impact on the personal finances of most people in this country. Because of climate variability, there could be as much as a 30 percent reduction in agricultural productivity, which will increase food prices – affecting not only lower income people but also the middle-class. Food prices have already reached unprecedented levels and the evidence indicates that global warming is contributing. Although food prices may have fallen slightly recently, prices are still 13% higher than they were in December 2007 and 60% higher than in December 2006.

Regular people will notice the effects of climate change on their pocketbook in other ways as well. Home insurance costs will most likely rise because of damage due to extreme weather. Hurricanes and tropical storms are expected to increase along the eastern seaboard, reaching as far north as Boston, according to the report.

The report states that because of the rising sea levels associated with global warming, coastal development, including buildings and roads will be substantially more vulnerable. These effects influence the lives of residents in the Northeast directly as, for example, transportation systems are more likely to be disrupted.

"It's extremely clear and is very explicit that the cost of inaction will be huge compared to the cost of action," said Jeffrey Sachs, head of Columbia University's Earth Institute. "We need to start acting now."

"Slowing – and reversing – these threats are the defining challenges of our age," Sachs said upon the report's release.

The new assessment also shows that climate change is likely to drive up rates of West Nile virus, Lyme disease and dengue fever among ordinary people. Mosquitoes, ticks, mice and other carriers are surviving warmer winters and expanding their range, bringing health threats with them. Many health experts believe it is only a matter of time before diseases such as malaria and dengue fever are found across the country, including the Northeast. The immediate hazard of the heavier downpours associated with global warming is drowning, but the larger problem is waterborne-disease outbreaks as sewer systems overflow into water supplies. These effects put nearly everyone at risk, according to the report. The number of deaths and illnesses due to these effects is estimated to double by 2030.

Because of the strain put on the health care system, it is probable that most people will notice the effects of global warming also through higher health insurance costs.

"The sense of urgency when you put these pieces together is new and striking," said Martin Parry, a climate expert who was co-chairman of the delegation that wrote the report.

"Some of the things we projected to occur in 2050 will most likely happen in the next few decades. What we didn't get is how destructive global warming would be, and the degree to which ordinary people would be influenced," Parry said in an interview. "Our mistake was in underestimation." Ultimately, when the dots are connected, it will be the average taxpayer who bears the burden for global warming. Repairs and reconstruction costs associated with global warming will likely be paid through tax dollars and increasing home insurance costs.

Appendix C: Party Cues and Values Study – Climate Change Policies (Experiment 1)

For Climate Change Policies – Humanitarianism, Democratic Cue:

Leading Democrats Support Climate Change Policies

The same human economic activity that brought us immense prosperity has also increased the amount of carbon in the atmosphere. While the scope and the long-term consequences are the subject of ongoing scientific research, common sense dictates that the United States should take measured and reasonable steps today to reduce climate change, say leading Democrats.

Polls also suggest that the public is ready to move forward in this area, with more people than ever calling for investments in new energy, according to the latest national survey by the Pew Research Center for the People and the Press. "I'm just an ordinary American, but I feel that right now is the time to invest in green technology. It seems like a way to get this country back on track," one of the respondents said.

In light of such sentiments, Democrats emphasize that climate change legislation needs to be passed now. During a week that featured numerous meetings between policy-makers, Democratic Senate Majority Leader Harry Reid (D-Nev.) and Tim Kaine, chair of the Democratic National Committee, met with Senators and Representatives from their own party to formulate a clear position on climate change.

"As part of our climate change strategy, we must take full advantage of renewable energy sources like wind and solar, two of our largest contributors of emissions-free power. Such investments will directly benefit low-income people because they lead to more blue-collar jobs," Reid and Kaine said.

"Moreover, in our effort to reduce emissions, we will make substantial investments in public transit systems so that mass-transit becomes affordable and accessible for everyone. Extreme weather hits the most vulnerable in our society the hardest. The job of the government is to care for them. Our strategy means that big corporations and the very rich will pay higher energy taxes. Yet more importantly, it helps and protects those in need," the senior Democrats told reporters.

"While many of us have had doubts over claims about climate change in the past, the evidence is unambiguous now. We immediately need to reduce greenhouse gases," said the Democratic leaders.

For Climate Change Policies – Free Enterprise, Democratic Cue:

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"As part of our climate change strategy, we support solutions that rely on the power of capitalism to reduce emissions. Right now, there is a strong demand for renewable energy. To reduce emissions, the government needs to

support free enterprise because the search for profit leads to innovation. We should trust the market to develop alternative energy sources and new technologies," Reid and Kaine said.

"Besides reducing emissions, investments in green technology will also help grow the economy. By taking the lead in this sector, our businesses will be globally competitive. Higher taxes are not the solution to climate change. Instead, we should encourage companies to innovate and invest in green technology," the senior Democrats told reporters.

"While many of us have had doubts over claims about climate change in the past, the evidence is unambiguous now. We immediately need to reduce greenhouse gases," said the Democratic leaders.

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"Moreover, in our effort to reduce emissions, we will make substantial investments in public transit systems so that mass-transit becomes affordable and accessible for everyone. Extreme weather hits the most vulnerable in our society the hardest. The job of the government is to care for them. Our strategy means that big corporations and the very rich will pay higher energy taxes. Yet more importantly, it helps and protects those in need," the senior Republicans told reporters.

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Against Climate Change Policies – Humanitarianism, Democratic Cue:

Leading Democrats Put Climate Change on the Backburner

Climate change is a reality, but now is not the time to pass climate change legislation. The current proposals involve raising the price of energy, which would be costly for ordinary Americans. Americans are not supportive of such changes and we should respect the voice of the people on this matter, say leading Democrats.

The priority placed on climate change has fallen off among the public, according to the latest national survey by the Pew Research Center for the People and the Press. Meanwhile, strengthening the economy is a higher priority today than it has been at any point over the past decade. "I'm just an ordinary American, but I feel that we should deal with climate change later, and not now when we should put all our efforts to get this country back on track," one of the respondents said.

In light of such sentiments, Democrats emphasize that climate change legislation needs to wait. During a week that featured numerous meetings between policy-makers, Democratic Senate Majority Leader Harry Reid (D-Nev.) and Tim Kaine, chair of the Democratic National Committee, met with Senators and Representatives from their own party to formulate a clear position on climate change.

"In the middle of an economic downturn, when we have a widening economic gap between the rich and the poor, it is not the time to add an extra burden on low-income people," Reid and Kaine said.

"A climate change bill would lead to higher energy prices, and they hit the weakest in society the hardest. There are already too many impoverished people in our country. Our focus should be on social justice and reducing inequalities, not sticking the needy with excessive utility bills. Therefore, efforts to reduce climate change will have to wait," the senior Democrats told reporters.

"Good policy is going to be left behind by the insistence that the climate change has to be addressed first. Other domestic worries are simply too important and they force us to think very carefully about our priorities," said the Democratic leaders.

Against Climate Change Policies – Free Enterprise, Democratic Cue:

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"In the middle of an economic downturn, when businesses across the country are struggling, it is not the time to add an extra burden on them," Reid and Kaine said.

"A climate change bill would lead to higher energy prices, and that puts American corporations at a disadvantage compared to foreign companies. It also leads to more regulation and bigger government. Our focus should be on making capitalism work, not expanding government reach and cutting economic growth. Therefore, efforts to reduce climate change will have to wait," the senior Democrats told reporters.

"Good policy is going to be left behind by the insistence that the climate change has to be addressed first. Other domestic worries are simply too important and they force us to think very carefully about our priorities," said the Democratic leaders.

Against Climate Change Policies – Control/No Value, Democratic Cue:

Leading Democrats Put Climate Change on the Backburner

Climate change is a reality, but now is not the time to pass climate change legislation. The current proposals involve raising the price of energy, which would be costly for ordinary Americans. Americans are not supportive of such changes and we should respect the voice of the people on this matter, say leading Democrats.

The priority placed on climate change has fallen off among the public, according to the latest national survey by the Pew Research Center for the People and the Press. Meanwhile, strengthening the economy is a higher priority today than it has been at any point over the past decade. "I'm just an ordinary American, but I feel that we should deal with climate change later, and not now when we should put all our efforts to get this country back on track," one of the respondents said.

In light of such sentiments, Democrats emphasize that climate change legislation needs to wait. During a week that featured numerous meetings between policy-makers, Democratic Senate Majority Leader Harry Reid (D-Nev.) and Tim Kaine, chair of the Democratic National Committee, met with Senators and Representatives from their own party to formulate a clear position on climate change.

"Good policy is going to be left behind by the insistence that the climate change has to be addressed first. Other domestic worries are simply too important and they force us to think very carefully about our priorities," said the Democratic leaders.

Against Climate Change Policies – Humanitarianism, Republican Cue:

Leading Republicans Put Climate Change on the Backburner

Climate change is a reality, but now is not the time to pass climate change legislation. The current proposals involve raising the price of energy, which would be costly for ordinary Americans. Americans are not supportive of such changes and we should respect the voice of the people on this matter, say leading Republicans.

The priority placed on climate change has fallen off among the public, according to the latest national survey by the Pew Research Center for the People and the Press. Meanwhile, strengthening the economy is a higher priority today than it has been at any point over the past decade. "I'm just an ordinary American, but I feel that we should deal with climate change later, and not now when we should put all our efforts to get this country back on track," one of the respondents said.

In light of such sentiments, Republicans emphasize that climate change legislation now needs to wait. During a week that featured numerous meetings between policy-makers, Republican Senate Minority Leader Mitch McConnell (R-KY.) and Michael Steele, chair of the Republican National Committee, met with Senators and Representatives from their own party to formulate a clear position on climate change.

"In the middle of an economic downturn, when we have a widening economic gap between the rich and the poor, it is not the time to add an extra burden on low-income people," McConnell and Steele said.

"A climate change bill would lead to higher energy prices, and they hit the weakest in society the hardest. There are already too many impoverished people in our country. Our focus should be on social justice and reducing inequalities, not sticking the needy with excessive utility bills. Therefore, efforts to reduce climate change will have to wait," the senior Republicans told reporters.

"Good policy is going to be left behind by the insistence that the climate change has to be addressed first. Other domestic worries are simply too important and they force us to think very carefully about our priorities," said the Republican leaders.

Against Climate Change Policies – Free Enterprise, Republican Cue:

Leading Republicans Put Climate Change on the Backburner

Climate change is a reality, but now is not the time to pass climate change legislation. The current proposals involve raising the price of energy, which would be costly for ordinary Americans. Americans are not supportive of such changes and we should respect the voice of the people on this matter, say leading Republicans.

The priority placed on climate change has fallen off among the public, according to the latest national survey by the Pew Research Center for the People and the Press. Meanwhile, strengthening the economy is a higher priority today than it has been at any point over the past decade. "I'm just an ordinary American, but I feel that we should deal with

climate change later, and not now when we should put all our efforts to get this country back on track," one of the respondents said.

In light of such sentiments, Republicans emphasize that climate change legislation now needs to wait. During a week that featured numerous meetings between policy-makers, Republican Senate Minority Leader Mitch McConnell (R-KY.) and Michael Steele, chair of the Republican National Committee, met with Senators and Representatives from their own party to formulate a clear position on climate change.

"In the middle of an economic downturn, when businesses across the country are struggling, it is not the time to add an extra burden on them," McConnell and Steele said.

"A climate change bill would lead to higher energy prices, and that puts American corporations at a disadvantage compared to foreign companies. It also leads to more regulation and bigger government. Our focus should be on making capitalism work, not expanding government reach and cutting economic growth. Therefore, efforts to reduce climate change will have to wait," the senior Republicans told reporters.

"Good policy is going to be left behind by the insistence that the climate change has to be addressed first. Other domestic worries are simply too important and they force us to think very carefully about our priorities," said the Republican leaders.

Against Climate Change Policies – Control/No Value, Republican Cue:

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"Good policy is going to be left behind by the insistence that the climate change has to be addressed first. Other domestic worries are simply too important and they force us to think very carefully about our priorities," said the Republican leaders.

Appendix D: Party Cues and Values Study – Carbon Capture and Storage (Experiment 2)

For Carbon Capture and Storage – Humanitarianism, Democratic Cue:

Senior Democratic policy makers strongly endorse the development and usage of this technology. "Fossil fuels will remain an important part of domestic energy consumption in the 21st century. With carbon capture technologies, these fuels would provide clean and affordable energy. It is critical to keep energy costs low because higher costs would hit impoverished people hard and cause additional suffering for the weakest in society," Democratic leaders say.

For Carbon Capture and Storage – Free Enterprise, Democratic Cue:

Senior Democratic policy makers strongly endorse the development and usage of this technology. "Fossil fuels will remain an important part of domestic energy consumption in the 21st century. With carbon capture technologies, these fuels would provide clean and affordable energy. It is critical to keep energy costs low because higher costs would hit American businesses hard and curb economic growth," Democratic leaders say.

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Senior Republican policy makers strongly endorse the development and usage of this technology. "Fossil fuels will remain an important part of domestic energy consumption in the 21st century. With carbon capture technologies, these fuels would provide clean and affordable energy. It is critical to keep energy costs low because higher costs would hit impoverished people hard and cause additional suffering for the weakest in society," Republican leaders say.

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Senior Republican policy makers strongly endorse the development and usage of this technology. "Fossil fuels will remain an important part of domestic energy consumption in the 21st century. With carbon capture technologies, these fuels would provide clean and affordable energy," Republican leaders say.

Against Carbon Capture and Storage – Humanitarianism, Democratic Cue:

However, senior Democratic policy makers are highly skeptical of carbon capture and storage. "Carbon capture technologies are not cost-effective. Adding these technologies to the electricity generation process would increase the cost of electricity by up to 100 percent. These additional costs would hit impoverished people hard and cause additional suffering for the weakest in society," Democratic leaders say.

Against Carbon Capture and Storage – Free Enterprise, Democratic Cue:

However, senior Democratic policy makers are highly skeptical of carbon capture and storage. "Carbon capture technologies are not cost-effective. Adding these technologies to the electricity generation process would increase the cost of electricity by up to 100 percent. These additional costs would hit American businesses hard and curb economic growth," Democratic leaders say.

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However, senior Republican policy makers are highly skeptical of carbon capture and storage. "Carbon capture technologies are not cost-effective. Adding these technologies to the electricity generation process would increase the cost of electricity by up to 100 percent," Republican leaders say.

Appendix E: Student Study Results

The effects of the experimental treatments are essentially the same in the student study as in the adult study. Since the results of the adult study have already been covered in Chapter 3, the results of the student study are not discussed in the same detail in this appendix.

How Values Influence Attitudes on Climate Change Policies

Attitudes on climate change policies were measured by ten questions. Factor analysis of the student data shows that policy attitudes fall on one dimension. Admittedly, factor analysis might not be advisable since the sample size is small, but given that the adult study also shows that attitudes on climate change policies are one-dimensional, it is safe to assume that they do so in the student study as well. Cronbach's alpha for the scale is 0.78, which indicates that the scale is very reliable.

Hypothesis 1a suggests that there are standing associations between universalism, benevolence and self-enhancement. This is only supported by the significant effect of universalism on policy attitudes ($t = 4.54$, $p < 0.001$). One unit change in universalism increases support for policies by 0.359, all else equal. The other values are non-significant (Table E.1). Hence, there is partial support for hypothesis 1a, just as in the adult study.

Table E.1 about here

Relative to the control condition, the experimental conditions did not successfully increase support for climate change policies, as Table E.2 shows. All the means in the table share the same superscript, which indicates non-significant differences between the groups. The

biggest difference is between the control condition (M = 0.53) and the self-enhancement condition (M = 0.60), but this is a non-significant difference.

Table E.2 about here

As for hypothesis 1b, how conditions and values influence attitudes on climate change policies there is no support for the hypothesis because the interactions between conditions and values are non-significant (Table E.3).

Similarly as in other models that include the value universalism, the effect of the value is strong and it is statistically significant (t = 4.09, p < 0.001). Since both the dependent variable and the value are scored 0-1, it is easy to see that one unit change in universalism, 0.349, increases support for polices substantially.

Table E.3 about here

How Values Influence Climate Change Risk Perceptions

Cronbach's alpha for the entire risk perception scale (11 items) is 0.88, which means that it is a very reliable scale. The alpha values for the separate risk dimensions are lower, but not poor (risks to humankind α=0.74, risks to nation α=0.77, risks to self α=0.67).

Since the results of the risk study supported hypothesis 1d and indicated that there are three types of climate change risks, they are separated as dependent variables in the subsequent analysis. A general climate change risk perception scale is also included since the risk study did not completely reject the idea of risks as unitary.

Hypothesis 1e is supported if the three standing values universalism, benevolence and self-enhancement are positively related to higher risk perceptions. The results, presented in Table

E.4, show again that universalism has a strong effect on the dependent variables. As for its effect on the risks to humankind variable, universalism (0.156) has a comparably weak effect, however. Given the directional hypothesis, the coefficient is statistically significant in a one-tailed test but the coefficient is not as substantial as in the adult study. Nonetheless, on the broad measure of climate change risk perceptions, the effect of universalism is strong. A one unit change in universalism increases risk perceptions by 0.284, controlling for other variables. Benevolence and self-enhancement do not increase risk perceptions, however. In other words, the support for hypothesis 1e is mixed; universalism supports it while benevolence and self-enhancement do not.

Table E.4 about here

A meditational analysis with the student data also reaches the conclusion that the effect of universalism on attitudes on climate change policies is mediated by risk perceptions. All the three steps that should be fulfilled for partial mediation are met. First, universalism predicts support for policies (see Table E.1 above). Second, universalism increases the overall perceived risks with climate change (Table E.4, second column from the right). Third, as the rightmost column in Table E.4 shows, risk perceptions influence climate change policies while controlling for universalism. The coefficient for risk perceptions is 0.249 and statistically significant (t = 3.26, p = 0.002). The *p-value* for the Sobel test is 0.02, which means that the null hypothesis (i.e. no mediation) is rejected.

Main Effects of Experimental Treatments on Risk Perceptions

None of the experimental treatments was significantly different from the control condition. In fact, none of the conditions differs from each other. The largest difference is between the benevolence condition and the control condition on perceived risks to the nation, but

it is not significant by conventional standards (Benevolence condition, $M = 0.72$; Control condition, $M = 0.63$, $t_{63} = 1.87$, $p = 0.07$). The lack of significant differences is indicated by the shared superscript (see Table E.5). Since there were no differences on the three different climate change risk scales, it is unsurprising that the experimental treatments did not produce any differences in general climate change risk perceptions.

Table E.5 about here

For hypothesis 1f to get support, the values and corresponding experimental conditions will have to be significant and positive. However, regardless how the dependent variable is specified (i.e., if it is separated into three types of risks or if it is the general risk perception scale), the interaction coefficients do not support hypothesis 1f. The benevolence interaction is significant in the first column of Table E.6, but it is in the wrong direction, which means that those who were assigned the benevolence condition saw lower risks to humankind as they scored higher on benevolence. This result can most likely be disregarded as a chance finding since it does not replicate with the other dependent variables or in the adult study.

The only significant coefficient is the value universalism. The variable has a substantial effect on two of the risk variables. As for general climate change risk perceptions in the rightmost column of Table E.6, a one unit change in universalism increases risk perceptions by 0.254, all else equal.

Table E.6 about here

Table E.1 Determinants of Climate Change Policies in Student Study

	Climate Change Policies
Universalism	**0.359 (0.079)**
Benevolence	-0.043 (0.077)
Self-enhancement	0.055 (0.064)
Party Identification (Democrat)	-0.045 (0.053)
Ideology (Liberal)	0.095 (0.069)
Age	0.009 (0.006)
White	-0.021 (0.024)
Female	-0.012 (0.026)
U.S. Born	-0.003 (0.027)
School Year	-0.083 (0.045)
Constant	0.172 (0.143)
Adj R-Squared	0.23
N	114

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05. The dependent variable is climate change policies, a 10-item scale, which ranges from 0 to 1, with higher values meaning higher policy support. Universalism is measured by four items, benevolence by three items and self-enhancement by four items. Values range from 0 to 1 with 1 meaning strongest adherence. Party identification ranges from strong Republican (0) to strong Democrat (1). Ideology goes from extremely conservative (0) to extremely liberal (1). Age ranges between 18-89. White is a dummy for white ethnicity, minority ethnicity is the baseline. Female is a dummy for female, with male as the excluded category. U.S. born is a dummy meaning born in the United States, coded zero for otherwise. School year is coded 0-1, and ranges from freshman to super senior.

Table E.2 Main Effects of Conditions on Attitudes on Climate Change Policies in Student Study

	Climate Change Policies
Control Condition (no story)	0.53[a]
Universalism Condition	0.54[a]
Benevolence Condition	0.54[a]
Self-enhancement Condition	0.60[a]
N	127

Note: Means that share a superscript are not significantly different at p<.05, two-tailed test. Climate change policies are measured by a 10-item scale, coded 0-1, with higher values meaning more support.

Table E.3 Climate Change Policies Regressed on Conditions and Values in Student Study

Universalism	**0.349 (0.085)**
Benevolence	0.051 (0.091)
Self-enhancement	-0.033 (0.074)
Universalism Condition	-0.009 (0.096)
Benevolence Condition	0.166 (0.104)
Self-enhancement Condition	-0.116 (0.100)
Universalism * Universalism Condition	0.016 (0.139)
Benevolence * Benevolence Condition	-0.249 (0.151)
Self-enhancement * Self-enhancement Condition	0.260 (0.157)
Constant	**0.293 (0.088)**
Adj R-Squared	0.21
N	127

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05. The dependent variable is climate change policies, a 10-item scale, which ranges from 0 to 1, with higher values meaning higher policy support. Of the conditions, the control is the baseline category. Values range from 0 to 1 with 1 meaning strongest adherence.

Table E.4 Effects of Values on Risk Perceptions and Climate Change Policies in Student Study

	CC Risks to Humankind (4 items)	**CC Risks to Nation (4 items)**	**CC Risks to Self (3 items)**	**CC Risk Perceptions (11 items)**	**Climate Change Policies**
Universalism	0.156 (0.084)	**0.335** **(0.135)**	**0.388** **(0.125)**	**0.284** **(0.097)**	**0.288** **(0.079)**
Benevolence	0.011 (0.082)	-0.193 (0.131)	-0.113 (0.122)	-0.097 (0.095)	-0.019 (0.074)
Self-enhancement	0.100 (0.068)	0.051 (0.108)	0.043 (0.101)	0.067 (0.078)	0.038 (0.061)
Party Identification (Democrat)	0.045 (0.056)	-0.067 (0.090)	-0.051 (0.084)	-0.022 (0.065)	-0.040 (0.050)
Ideology (Liberal)	0.081 (0.073)	0.113 (0.117)	0.181 (0.109)	0.120 (0.085)	0.065 (0.066)
Age	0.000 (0.007)	-0.004 (0.011)	-0.012 (0.010)	-0.005 (0.008)	0.010 (0.006)
White	-0.009 (0.025)	**-0.087** **(0.041)**	**-0.099** **(0.038)**	**-0.062** **(0.029)**	-0.006 (0.023)
Female	0.053 (0.027)	0.030 (0.044)	0.026 (0.041)	0.037 (0.032)	-0.021 (0.025)
U.S. Born	-0.014 (0.029)	0.019 (0.047)	-0.053 (0.043)	-0.012 (0.034)	0.000 (0.026)
School Year	-0.019 (0.048)	0.036 (0.077)	0.092 (0.072)	0.031 (0.056)	**-0.091** **(0.043)**
Climate Change Risk Perceptions (11-item scale)	-	-	-	-	**0.249** **(0.076)**
Constant	**0.622** **(0.152)**	**0.614** **(0.244)**	**0.644** **(0.227)**	**0.625** **(0.176)**	0.016 (0.145)
Adj R-Squared	0.14	0.05	0.20	0.16	0.30
N	114	114	114	114	114

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05. The dependent variables for risk perceptions are three types of risk perceptions about climate change and general risk perceptions about climate change. The dependent variables range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk. The dependent variable climate change policies is a 10-item scale, which ranges from 0 to 1, with higher values meaning higher policy support. Universalism is measured by four items, benevolence by three items and self-enhancement by four items. Values range from 0 to 1 with 1 meaning strongest adherence. Party identification ranges from strong Republican (0) to strong Democrat (1). Ideology goes from extremely conservative (0) to extremely liberal (1). Age ranges between 18-89. White is a dummy for white ethnicity, minority ethnicity is the baseline. Female is a dummy for female, with male as the excluded category. U.S. born is a dummy meaning born in the United States, coded zero for otherwise. School year is coded 0-1, and ranges from freshman to super senior.

Table E.5 Main Effects of Conditions on Risk Perceptions in Student Study

	Risks to Humankind (4 items)	**Risks to Nation (4 items)**	**Risks to Self (3 items)**	**General Risk Scale (11 items)**
Control Condition (no story)	0.85[a]	0.63[a]	0.58[a]	0.70[a]
Universalism Condition	0.86[a]	0.63[a]	0.61[a]	0.71[a]
Benevolence Condition	0.89[a]	0.72[a]	0.66[a]	0.77[a]
Self-enhancement Condition	0.87[a]	0.69[a]	0.66[a]	0.75[a]
N	127	127	127	127

Note: Means that share a superscript are not significantly different at p<.05, two-tailed test. The dependent variables are perceptions of climate change risk to humankind, risks to nation risks to self and general risks. The variables range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk.

Table E.6 Risk Perceptions Regressed on Conditions and Values in Student Study

	Risks to Humankind (4 items)	**Risks to Nation (4 items)**	**Risks to Self (3 items)**	**General Risk Scale (11 items)**
Universalism	0.086 (0.103)	0.221 (0.143)	**0.368 (0.138)**	**0.254 (0.102)**
Benevolence	0.158 (0.110)	-0.071 (0.152)	0.002 (0.147)	0.044 (0.108)
Self-enhancement	0.057 (0.090)	0.007 (0.124)	0.086 (0.121)	0.038 (0.089)
Universalism Condition	-0.163 (0.117)	-0.120 (0.161)	-0.119 (0.156)	-0.149 (0.115)
Benevolence Condition	**0.294 (0.126)**	0.240 (0.174)	0.289 (0.169)	0.240 (0.125)
Self-enhancement Condition	-0.019 (0.121)	-0.013 (0.167)	0.102 (0.162)	0.036 (0.120)
Universalism * Universalism Condition	0.266 (0.169)	0.162 (0.233)	0.203 (0.226)	0.263 (0.167)
Benevolence * Benevolence Condition	**-0.383 (0.183)**	-0.233 (0.253)	-0.328 (0.245)	-0.238 (0.181)
Self-enhancement * Self-enhancement Condition	0.056 (0.190)	0.087 (0.263)	-0.094 (0.255)	0.015 (0.188)
Constant	**0.652 (0.107)**	**0.534 (0.147)**	**0.297 (0.143)**	**0.485 (0.105)**
Adj R-Squared	0.05	0.03	0.09	0.07
N	127	127	127	127

Note: Entries are coefficients with standard errors in parenthesis. Bold indicate a significance level of p<.05. The dependent variables are perceptions of climate change risk to humankind, risks to nation risks to self and general risks. The variables range from 0 to 1, with 1 indicating the highest risk and 0 the lowest risk. Of the conditions, the control is the baseline category. Values go from 0 to 1 with 1 meaning strongest adherence.

Appendix F: Content Analysis Instructions and Coding Scheme

Coding Scheme Overview

Since the goal is to get a better understanding of the general positions of politicians, the coding sheet is supposed to be very simple. After filling out some basic information about the article itself, each article is coded on whether it mentions one or several politicians expressing attitudes on climate change or if it does not. By attitudes, I mean if the article contains politicians who support or oppose any type of climate change policy or regulation. If it does, then you use the rest of the coding scheme to identify their positions on climate change. If the main thrust is in opposition to action, then you mark this. If there is general expressed support of action, mark it as support. Often many politicians with opposing viewpoints and parties are mentioned in one article. Since this provides valuable information, you will have to code all politicians and viewpoints.

Coding Instructions

Write your first name. Write the number of the article [all articles have numbers at the top that identify them]. Write in the date of the article (MM/DD/YY or Month DD, YYYY, e.g. 03/14/02 or March 14, 2002).

Does the article mention American politician(s) making statements on climate change? Only code it as **YES** if there is mention of Democratic or Republican politicians AND if their position (support/oppose) on climate change is obvious. Politicians include currently elected politicians and high profile former politicians, such as a President or a Vice-President. The typical politicians you will come across are George W Bush, Barack Obama, Hillary Clinton, James Inhofe, and Al Gore. Do not include articles if the only politicians mentioned are independents or from another party.

If **YES** to the former question, next write in the name(s) of the politician(s). List them in order of mention. **THEY MUST ALL SHARE THE SAME PARTY AND POSITION ON CLIMATE CHANGE**.

The next step is to code politicians on whether they oppose or support action on climate change. How do you know if the politician opposes or supports climate change regulation? First, you should look at quotes in the article by politicians. They reveal what politicians say more directly than when their statements are being interpreted by journalists. Nevertheless, quotes are sometimes difficult to interpret on their own. Instead, you may need to look at how the journalist is describing the situation. Often text and quotes complement each other so you will need to look at both. Only when it is **ABSOULTELY CLEAR** that the politician supports or opposes mandatory climate change policies should you mark it. If there is a case with a politician only supporting voluntary action on climate change, **DO NOT** code this as support.

In what order should politicians and positions be coded? Code the first mentioned politician first (and group anyone sharing the same party and position with him or her). Then

move to the next politician who differs in party or position (and group anyone sharing this position and party). Do the same until you have exhausted all positions and parties. There will be a maximum of four politicians/groups of politicians (i.e. Democrat support, Democrat oppose, Republican support and Republican oppose).[49]

You will fill out the coding sheet online.

It is important that I and other researchers can retrace the coding you did. Therefore, I want you to color code each article and coding. You do not need to mark the text extensively, just highlight words and parts of sentences. Use the following scheme:

Blue: support climate change action

Red: oppose climate change action

Coding Sheet

First name of coder:_____

Number of the article (written on the file): ____

Date of the article (MM/DD/YY or Month DD, YYYY):_____

Does the article mention one or more American politicians making statements about climate change, global warming or greenhouse gases?

- Yes
- No

[If No, coding of the article ends]

Politician's/Politicians' name(s): _____
[Could list up to ten different politicians.]

Politician's/Politicians' party affiliation:

- Republican
- Democrat

Position on climate change action:

- Oppose
- Support

Does the article mention other politicians with different opinions and/or different party affiliation?

- Yes
- No

[49] The politicians were coded in groups rather than each one separately in order to make the coding less burdensome. After being coded in groups, they were then separated in the analysis that I conducted.

[If No, coding of the article ends]

Politician's/politicians' name(s): _____
[Could list up to ten different politicians]

Politician's (or group's party affiliation)
- Republican
- Democrat

Position on climate change action:
- Oppose
- Support

Does the article mention other politicians with different opinions and/or different party affiliation?
- Yes
- No

[If No, coding of the article ends]

Politician's/politicians' name(s): _____
[Could list up to ten different politicians]

Politician's (or group's party affiliation)
- Republican
- Democrat

Position on climate change action:
- Oppose
- Support

Does the article mention other politicians with different opinions and/or different party affiliation?
- Yes
- No

[If No, coding of the article ends]

Politician's/politicians' name(s): _____
[Could list up to ten different politicians]

Politician's (or group's party affiliation)
- Republican
- Democrat

Position on climate change action:

- Oppose
- Support

[Coding of the article ends]

Appendix G: Carbon Capture and Storage Experiment and Results

Experimental Design: Carbon Capture and Storage

The second experiment in the questionnaire looked at how attitudes on carbon capture and storage (CCS) [50] were influenced by party cues and values. It had the same experimental design as the first experiment in the survey with random assignment to conditions, yet it differed in that the second experiment came late in the survey, the experimental treatments were shorter and the issue unfamiliar.

Just as in the first experiment, this experiment also examined counter-attitudinal persuasion. To know what would be counter-attitudinal, participants' attitudes on CCS were measured by the following question: "Carbon capture and storage is a technology proposed to address global warming. Carbon dioxide from power plant exhaust is captured and then stored in underground reservoirs. Do you think the federal government should or should not rely on carbon capture and storage?" Response options were "should" and "should not". If they answered, "should", the politicians in the experiment advocated that we *should not* use CCS. In contrast, if the answer was "should not", the politicians promoted the technology as something we *should* embrace.

The experiment was introduced to participants in the following manner: "We have one last question about climate change. Carbon capture and storage aims to reduce the climate impact of burning fossil fuels by capturing carbon dioxide from power station smokestacks and disposing of it underground." The paragraph directly below this introduction contained the experimental treatment. The exact wording of the treatments are included in chapter 2.

Directly afterwards, participants were asked about a policy proposal on this topic: "The US Government has recently announced that it will spend $3.4 billion to demonstrate the carbon and capture and storage technology at coal-fired power stations and other industrial facilities. What is your view of this proposal?" The answering options were strongly support, support, neither support nor oppose, oppose and strongly oppose.

Results

The results of experiment 2 are similar to those of experiment 1 although they are somewhat weaker.[51] The left column of Table G.1 shows that the three-way interaction between

[50] CCS is a technology that promises to reduce the amount of greenhouse gases that are produced when we burn fossil fuels in power plants. With this technology, the greenhouse gases are captured before they enter the atmosphere and then stored underground permanently.

[51] The relative weakness of the effect led me to focus on respondents who were more likely to have read the treatments carefully. The analysis relies on participants who took seven minutes or more to complete the questionnaire. Forty-seven respondents took 6:59 minutes or less to complete. The participants that clicked thought the questionnaire at a higher speed had a lower political awareness score ($M = 0.44$) than those who took more seven minutes or more ($M = 0.44$). A t test shows that this difference is significant ($t_{389} = 2.20$, $p = 0.028$). The lower correct number of responses is one indication that they did not read the questions and options as carefully. Another

party source cues, party identification and direction of persuasion is 0.210. The coefficient is marginally significant ($t = 1.33$, $p = 0.09$, one-tailed test). When all interactions are included (see Table G.1, the right column), the effect of party source cues is conditional on party identification of the respondent and the direction of persuasion, yielding a significant and positive three-way interaction, 0.331 ($t = 1.84$, $p = 0.03$, one-tailed test). These three-way interactions in experiment 2 thus replicate the findings of experiment 1.

The somewhat weaker results should be examined in the light of the differences of experiment 2 compared to experiment 1. The dependent variable was only measured by one item, unlike the five that measured the effect of the experiment 1. Thus, there is more measurement error in this model. Moreover, the experimental treatment was much shorter and presumably less powerful. Lastly, the experiment came late in the survey, after many questions about climate change had already been asked and a previous text about climate change (experiment 1) had already been read. Thus, to get these effects in spite of impediments, speaks to the powerful nature of party cues.

The value perspective gets no support by experiment 2, which is exactly the same result as in experiment 1 (see Table G.1, middle column). The three-way interactions would have needed to be significant, but they are not.[52]

Table G.1 about here

difference is that correlations between scale items that were reverse-coded and regular scale items are lower among those who took less time than those who took longer. For example, the free enterprise item "Putting government regulations on business does not endanger personal freedom" is reverse coded and the free enterprise item "The less government gets involved with business and the economy, the better" is coded regularly. If a person breezes though the questionnaire, he/she will not see the difference to the same extent as those who read the questions. The correlation between these two items for the quick respondents was only 0.21 whereas it was 0.46 for the rest.

[52] I also tested the support for hypothesis 3a, 3b and 3c with the data from experiment 2. These hypotheses are not supported, thus yielding the same conclusion as in experiment 1.

Table G.1 Determinants of Carbon Capture and Storage Support (Experiment 2)

	PID Interaction Model	Value Interactions Model	PID and Value Interactions Model
Party Identification	**0.172 (0.080)**		**0.236 (0.114)**
Party Source Cue (0=Rep, 1=Dem)	-0.061 (0.089)		0.001 (0.103)
PID X Party Source Cue	-0.052 (0.121)	-0.003 (0.177)	-0.109 (0.141)
Direction of Persuasion (0=Against, 1=For)	**-0.220 (0.083)**		0.142 (0.208)
Direction of Persuasion X PID	-0.065 (0.112)		**-0.315 (0.145)**
Party Source Cue X Direction of Persuasion	-0.037 (0.115)		-0.120 (0.127)
PID X Direction of Persuasion X Party Source Cue	0.210 (0.158)		0.331 (0.180)
Free Enterprise		-0.065 (0.136)	0.045 (0.143)
Free Enterprise Condition		0.055 (0.099)	0.067 (0.099)
Free Enterprise X Free Enterprise Condition		-0.084 (0.187)	-0.156 (0.188)
Direction of Persuasion X Free Enterprise		-0.265 (0.165)	**-0.370 (0.177)**
Direction of Persuasion X Free Enterprise Condition		0.043 (0.136)	0.030 (0.135)
Direction of Persuasion X Free Enterprise X Free Enterprise Condition		0.000 (0.243)	0.063 (0.243)
Humanitarianism		0.051 (0.139)	-0.012 (0.142)
Humanitarianism Condition		0.236 (0.194)	0.242 (0.196)
Humanitarianism X Humanitarianism Condition		-0.351 (0.264)	-0.364 (0.267)
Direction of Persuasion X Humanitarianism		-0.142 (0.185)	-0.065 (0.187)
Direction of Persuasion X Humanitarianism Condition		-0.193 (0.244)	-0.175 (0.245)
Direction of Persuasion X Humanitarianism X Humanitarianism Condition		0.344 (0.329)	0.317 (0.332)
Constant	**0.552 (0.077)**	**0.599 (0.132)**	**0.487 (0.158)**
N	339	326	325
Adjusted R-squared	0.20	0.19	0.21

Note: Entries are coefficients with standard errors in parenthesis. Bold indicates a significance level of p<.05, two-tailed test. The dependent variable, carbon capture and sequestration policy, is based on one question, with higher values meaning more support. Party identification was measured with the same branched question that the ANES uses. It is scored on a seven-point scale, with higher values indicating stronger Democrat. The variable Party Source Cue is the experimental factor of leadership cues (Republican leaders = 0, Democratic leaders = 1). Direction of persuasion indicates whether the politicians favored climate change legislation and regulations or if they did not (against = 0, for = 1). The values of free enterprise was measured with a 4-item scale and humanitarianism was measured with a 4-item scale. The humanitarianism condition and free enterprise condition are dummy variables (both scored 1), with the no value control group as the baseline. All variables range from zero to one.