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THE POLITICIZATION OF CLIMATE CHANGE

by

DEVIAN HARRIS

Under the Direction of Dr. Toby Bolsen

ABSTRACT

For decades, rhetoric has been utilized by both politicians and those in the scientific community to convey either support for or denial of the existence of climate change. This study combined two forms of rhetoric in the forms of both framing and politicization to determine which form of rhetoric is most powerful in influencing a person's attitudes and behavioral intentions. Pro climate change frames are expected to increase support for climate change action, while anti climate change politicization is expected to decrease support for climate change action. The results of this study show that select frames have the intended effect of influence on increasing support for climate change measures. Surprisingly, the results also show that politicization that questions the science of climate change has the power to both increase and decrease support for attitudinal measures with regard to climate change.

INDEX WORDS: Politicization, Framing, Attitudes, Behavior, Intention, Climate Change

THE POLITICIZATION OF CLIMATE CHANGE

by

DEVIAN HARRIS

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

in the College of Arts and Sciences

Georgia State University

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THE POLITICIZATION OF CLIMATE CHANGE

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DEDICATION

I would like to thank the Lord Jesus Christ. Through Jesus all positive dreams, wishes, and goals can become reality. I would also like to thank my parents for all of their wisdom, love, support, and guidance throughout my entire life. Additional thanks are extended to those who have been and continue to be supportive both inside and outside of my family. Genuine words of positive encouragement are always appreciated.

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1. INTRODUCTION

Since the late 1800's, scientists have noted that climate change may be progressing at an accelerated rate, and that human beings may be contributing to this accelerated rate of climate change. For those who do believe that climate change is occurring, the effects of climate change are far reaching and are not as obvious as one would expect (i.e. increased temperatures and accelerated evaporation of the Earth's water resources). Garner explains additional effects. In what is called the

> "feedback loop, the loss of ice cover reduces the ability of the Earth's surface to reflect heat, thereby intensifying warming by increasing the amount of heat absorbed. The result of rising sea levels will be flooding, initially of low-lying areas. In addition, increases in temperatures will affect vegetation and agriculture...." (Garner 2011, 27).

Garner describes a macro level view of a few of the many effects that climate change can have on the earth. Researchers have noted that there has already been an unexpected surge in natural disasters over the last few decades. Many scientists attribute these surges to climate change.

> "The number of significant flooding episodes has increased worldwide each decade from 6 in the 1950s to 26 in the 1990s. These floods cause high economic loss to developing countries, loss of life, and pollution of existing water supplies. Climate change is adding to the problem with on the one hand, heavier monsoon rain and storm surges, and on the other hand, an increase in droughts" (Shearmand and Smith 2007, 43).

Conversations surrounding global warming or climate change[1] have evolved over the years from strictly environmental conversations into highly politicized conversations. Two major items continue to be called into question with regard to climate change: 1. whether climate change is occurring at an accelerated rate or is progressing naturally 2. whether climate change has been accelerated by the actions of human beings. Since the 1990's the division in the opinions and beliefs regarding climate change has formed along a several lines. The clearest line

[1] Schuldt *et al* discuss the use of terminology on this subject. The term "climate change" is preferred, as it is aligned with general climate changes, while "global warming" is aligned with increased temperatures only. Both terms may be used here, as authors often use the terms interchangeably.

of division is along that of partisanship. This is a noticeable division that has given rise to a counter-claim that posits that climate change could actually be positive for American citizens, as those with this stance argue that "less cold weather would mean less snow shoveling, fewer days of driving on icy roads, lower heating bills…..The enrichment of the atmosphere with carbon dioxide will fertilize plants and make for more vigorous [plant] growth" (McCright and Dunlap 2000, 514). While those who subscribe to this counter claim may be correct, the vast majority of scientific research points in a different direction. Guardian notes that "[Without action being taken scientists estimate that by 2050 there will be] about 22 million additional people at risk from hunger because of climate change (over and above the expected because of population change), about 23 million additional people at risk from coastal flooding, and 110 million people living in countries with extreme water stress" (cited in Garner 2011, 27). This belief is echoed by author James Garvey, who calls climate change "a spatially smeared out, causally jumbled, intergenerational slow-motion disaster" (2010, 100).

Even though the debate rages, the majority of Americans believe that climate change is occurring at an accelerated rate. According to a December 2011 survey published by the Pew Research Center for the People and the Press, 63% of Americans polled believe that there is solid evidence of global warming (or climate change), and 65% of those polled believe that it is either a somewhat serious or very serious problem (Pew Research Center 2011). It is important to note that the percentage of Americans who believe in the existence of climate change tends to change, with many pointing to the influence of government administrations and politicians as being highly influential in the opinions of the American public with regard to climate change (see Al Gore's "An Inconvenient Truth").

Politicians and scientists have been able to influence citizen's opinions on scientific issues through the use of politicization in both the print and visual media. The politicization of science involves the use of science to promote a political agenda. Any conceivable issue can be politicized, and within the scientific world everything from stem cell research to reproductive research has been politicized. Sullivan provides a more precise definition of the term "politicization of science", by defining it as "instances in which the process and products of science are interfered with for political or ideological reasons" (1996, 462).

Even though issues are frequently politicized, it could be argued that issues are framed as often (or more often) than they are politicized. For the purpose of this research, to frame is defined as "[to take a selection of] some aspects of a perceived reality and make them more salient in communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation" (Entman 1993, 52). Frames are utilized in order to highlight or bring to the forefront a particular part of a subject that the person framing the issue believes is important. Frames have the ability to have multiple levels of framing effects. Framing effects are defined as "when, in the course of describing an issue or event, a speaker's emphasis on a subset of potentially relevant considerations causes individuals to focus on these considerations when constructing their opinions" (Druckman 2001, 1042).

Politicization and framing are both utilized as forms of rhetoric. For the purpose of this research, rhetoric is defined as "the art of using language effectively so as to persuade or influence others" (Oxford English Dictionary Online). Although previous research has looked separately at politicization and the effect of frames on opinions, it is interesting to explore what effect the combination of frames and politicization have on opinions. This is made even more

intriguing when the type of politicization that argues against the existence of climate change is paired with framing that argues for the existence of/urgency of climate change. In consideration of this pairing of two forms of rhetoric, the research question I am seeking to answer is what effect does rhetoric in the form of both frames and politicization have on people's views regarding climate change?

It is important to explore this research question because even though the majority of Americans believe in the existence of climate change, there are still a significant number of Republican politicians that do not believe that the issue is important. These politicians' opinions are influential, not only with Republican voters, but also often with Independent voters. Those who identify themselves as Independents continue to grow in number, so the implications could be huge.

Even though there is currently a Democratic president in office, his Republican predecessor effectively worked to politicize science and to weaken the voices of those in the scientific community that subscribed to a belief in the unnatural occurrence of climate change. There is also a substantial Republican presence in Congress. Personally subscribing to the belief that climate change is indeed occurring at an unnatural rate acknowledges that the effects of climate change need to be reduced as soon as possible. Climate change is a substantial issue that should be addressed by behavioral changes at both the macro and micro level. Politicians and scientists who believe in the existence of climate change must be able to hone in which forms of rhetoric are most effective in order to make their cases to the American public. The most important job at this point will be persuading those in the public who do not believe that climate change is an issue to believe that it is indeed an important issue. This is key, as public opinion is often the precursor to public policy.

American politicians and scientists should specifically be concerned about this issue, especially since "the assumption holds that climate change is caused by the increased output of carbon dioxide....(current figures show that the United States and China have the largest output [of carbon dioxide])" (Grotzke 2012, 22). If the United States has contributed the most to the climate change problem, then the United States is also responsible for making a significant contribution to the climate change solution. Climate change is an issue that has a domino effect, so the United States' actions also harm less developed nations that may not have the resources needed to mitigate the problem.

Rhetoric's Influence on Attitude and Behavior

Rhetoric has been shown to influence attitudes, and attitudes in turn have been shown to influence behavior. Rhetoric has been defined previously in this paper. Behavior is defined as "the response of an individual, group, or species to its environment" (Merriam-Webster Dictionary Online). Attitude can be defined as "these dispositions to respond with some degree of favorableness or unfavorableness to a psychological object" (Eagly and Chaiken; Azjen and Fishbein as cited in Azjen and Cote 2008, 289). Additionally, attitudes toward behavior are defined as "attitudes toward performing specific behaviors with respect to an object or target" (Ajzen and Fishbein 2005, 174).

Ajzen and Fishbein discuss how "attitudes toward the object of the behavior are assessed in a survey or questionnaire. It is assumed that favorable attitudes predispose positive responses to the object and unfavorable attitudes predispose negative responses" (2005, 178). Even though it is nearly impossible to determine a person's future behavior, there are indicators that point strongly toward the direction that future behavior will go in. Intentions that are expressed have a strong correlation with future behavior, in that existing literature has found that researchers

"should be able to predict specific behaviors with considerable accuracy from intentions to engage in the behaviors under consideration" (Azjen and Fishbein 2005, 188). It follows that if individuals are exposed to rhetoric, then there may possibly be a change in expressed intentions and expressed attitudes, which in turn correlate with a change in future behavior.

Whitmarsh highlights the importance of connecting action, intent and behavior,

> "Thus, there may be a tendency to overestimate one's contribution to mitigating climate change, as well as to underestimate one's negative impact. This strategy effectively reduces the cognitive dissonance that arises from the inconsistency between knowing one's actions are environmentally damaging and not changing one's behavior" (Whitmarsh 2009, 21).

In essence, what is necessary to fix the climate change issue is first the acknowledgement that there is indeed a problem. Previous research has discovered that "[a]ccurate knowledge of global warming is the strongest single predictor of behavioral intentions...." (Bord *et al* as cited in Kellstedt *et al* 2008, 116). The second predictor of behavioral intention is the willingness of the public to engage in activities that will lessen the effects of climate change, i.e. purchasing energy efficient vehicles. Corrective action, like behavior, is also strongly associated with attitudes. "Attitudes, values, and beliefs are also strongly associated with identification of risks and support for corrective action" (Kellstedt *et al* 2008, 115).

Politicization

Even in a world where the evidence of the existence of climate change appears to be increasing daily, the voices of those who deny either the existence of or severity of climate change continue to emerge and receive significant press coverage, as

> "a large segment of the population [is] frightened by the steady drumbeat of planetary catastrophe, and looking to scientists and political leaders for salvation- with other segments initiating the scare or taking advantage of it to advance their own interests and agendas" (Driessen 2009, 773).

The issue is that the population's faith in political leaders can be misplaced, especially when political leaders brush off or deny the mass of evidence in front of them. Author Robert Gropp notes, "Yet with each passing year it appears that there are fewer Republican members of Congress willing to embrace or act upon scientific knowledge, particularly when it relates to issues such as climate change" (2011, 106).

In today's world of economic collapses, stock market crashes, and international conflict, climate change falls low on the totem pole of priorities. It is critical that those who are considered experts in their respective fields of study deliver accurate, unaltered information as "the knowledge which [people] generate and control becomes politically important and influential when the consensus among the epistemic community is sufficient to be convincing to the external political community" (Paterson 1996, 136).

Hornstein notes why the politicization of science is an important issue,

> "In the [past] forty years, there have been so many [episodes] in which science is said to have been misused by policy makers that it is possible today for commentators to identify different patterns of distortion and to argue over which pattern best captures the current state of science-policy interaction. This argument matters because, depending on which pattern is perceived to describe reality, entirely different narratives about regulatory science can emerge. And these narratives in turn can lead to radically different political perspectives for reshaping the connections between science and policy" (2006, 103-104).

In an ideal world, scientists who both believe in and deny the existence of accelerated climate change would have the ability to conduct their research and present their research results without any hindrances. Doremus highlights what actually occurs in the scientific world, where

> "the scientific process will generate more reliable information more quickly if it is allowed to function according to its established norms, free of external political or financial momentum pushing toward one outcome or another….Politics must not be allowed to obscure a scientific consensus, but equally the technical complexities of science must not be allowed to obscure the political judgments that are ultimately at the heart of regulatory decisions" (2006, 143).

In reality, politics is obscuring science, and that has brought us to this discussion. Capitalism and currency rule everything, and Michaels illustrates why scientists continue to allow politicians and policy makers to politicize scientific data, even when the politicization may be untrue.

> "Virtually every academic researcher in the environmental sciences is supported by the federal government….All of the imbalances that attend to a monopoly can be expected to occur: politicization, disequilibrium between true and perceived need, and disproportionate funding of those who express agreement with the monopoly's goals. Because this monopoly is publicly funded and is administered by agencies that require congressional oversight, there is certain to be some political bias with respect to the programs that receive the most funding" (Michaels 1995, 51).

Politicization of climate change may take two forms: pro (those who support the belief that unnatural, accelerated climate change is occurring) and anti (those who challenge the belief that unnatural, accelerated climate change is occurring). This research focuses on anti-climate change politicization. Author Kevin Armitage provides insight as to what may be the origin of anti-climate change politicization,

> "Just as consciousness of the potential importance of climate change was beginning to rise in the late-1970s, environmentalism in the United States faced a profound backlash. Though events such as Earth Day were crafted to avoid political affiliation, environmentalism, with its critique of industrial modernity, skepticism of capitalist economics, and calls for government intervention in economic activity, was often seen as part of the political left. Environmental initiatives threatened core components of right-wing ideology such as the primacy of individual liberty, the absolute rights of private property, free enterprise and laissez-faire government. Right-wing think-tanks and media outlets thus began a relentless public relations campaign that attacked environmentalism as alarmist or worse" (Armitage 2005, 419).

The use of anti-climate change politicization is no accident, and the politicization has been used in a precise manner. "Right-wing politicians and think tanks have used the legacy of climate research strategically to deny the current crisis by falsely depicting greenhouse science as uncertain and contradictory" (Armitage 2005, 417). One wonders what could be gained from denying the existence of climate change. A possible reason for this denial is that funds allocated

for climate research could be reduced and ultimately directed to other projects that those who subscribe to anti-climate change politicization deem worthy.

Unsurprisingly, the Republican party has frequently utilized anti climate change politicization in various forms of discourse, including speeches. Republican Senator James Inhofe told the senate floor that "man-induced [climate change] is an article of religious faith....the debate over global warming is predicated on fear, rather than science....[global warming is] the greatest hoax ever perpetrated on the American people" (Inhofe as cited in Armitage 2005, 417). Senator Inhofe's statement is the very basis for the anti-climate change politicization utilized in this research study.

Journalists contribute to "right wing" politicization also. Media consultant Frank Luntz

> "advised Republicans to underscore 'your commitment to sound science'. Luntz suggested that politicians emphasize how 'the scientific debate' about global warming 'remains open'. According to Luntz, 'there is still a window of opportunity to challenge the science' and thus not commit to regulations" (Environmental Working Group as cited in Armitage 2005, 425).

The tactic of arguing that the debate "remains open" lends a level of ambiguity to the issue. Political candidates can continue to be vague if they are ever called on the carpet about this issue. Luntz's statement also highlights another reason that politicians may deny climate change, because it keeps politicians from needing to make a commitment to regulatory measures.

Framing

Existing literature has shown that the way an issue or event is framed can significantly affect attitudes regarding that issue or event. Chong and Druckman demonstrate how a controversial art exhibit in New York City was simultaneously framed as both "the artist's right to free speech versus the right of the government to control its public finances and tax dollars" (2001, 100). The citizens of New York City reacted very differently to the same exhibit,

depending on which frame was used to highlight the exhibit. This example of utilizing various frames for the same topic can be also applied to a variety of other subjects, including climate science. Additionally, when multiple frames are used some frames are considered "stronger" than other frames. Chong and Druckman "define a frame's strength as increasing with the given persuasiveness of a given frame. Weak frames are typically seen as unpersuasive, whereas strong frames are more compelling" (2001, 103). Based on Chong and Druckman's research, politicians and scientists will want to select frames that have been traditionally shown to be strong when they are making their cases regarding climate change.

The framing of climate change has a clear history within the American government, specifically within Republican administrations. Cass notes how the Reagan administration responded. With regard to climate change,

> "[American] public awareness increased rapidly during the 1980's....In response to growing interest, the Reagan administration advocated the continued study of climate change, but it consistently rejected calls for a policy response as premature....The Reagan administration framed climate change as a scientifically uncertain problem that required additional study" (Cass 2006, 32-33).

This frame of uncertainty was effective in diverting focus away from the subject matter, as much of the debate regarding climate change did not reemerge until the 1990's. Reagan's successor Bush did very little to advance the conversation regarding climate change. Shabecoff notes questionable testimony during the first Bush administration that further emphasized what would become a partisan divide,

> "A May 1989 dispute over the testimony of NASA scientist James Hansen provided insight into the growing conflict within the Bush administration. Following Hansen's testimony before a Senate committee, it was revealed the Office of Management and Budget had changed his testimony to make the prospects of climate change appear more uncertain" (cited in Cass 2006, 34).

So not only did the uncertain frame around climate change thrive, but the Bush administration also introduced full out deception surrounding the climate change debate.

The second Bush administration brought even more bias against the existence of climate change, as Shearman and Smith note that

> "[George W. Bush] was an oil man who appointed oil men to his cabinet and was heavily indebted to them for political donations....Bush questioned the scientific evidence of warming and said that Kyoto was unfair and too expensive for the U.S. economy....In effect Bush made the decision to increase his dependence on oil" (Shearman and Smith 2007, 27-28).

Apparently Bush's Vice President was in full agreement with the administration's stance on climate change. Pitt notes that

> "The oil economy and the freedoms of neoliberalism have created a philosophy of conquistadorial destruction of the environment, encapsulated in words attributed to Vice President Cheney that it is the God-given right of every American to consume as much cheap gas as they can while driving the largest SUVs they can find" (cited in Shearman and Smith 2007, 29).

Shearman and Smith highlight another reason why Republican administrations would deny the existence of climate change, financial gain. The second Bush administration had no problem making climate change a lesser issue, because it was in the Bush's administration's best interest to place financial contributions over the possible huge implications of climate change. The behavior of both Bush administrations confirms Henson's thoughts about the overall political history regarding climate change, as "certain conservative governments were doing their best to stop- or at least slow- the research and views flowing from their own scientists to the public" (2006, 254).

Numerous frames can be selected to highlight specific portions of the climate change debate. Taking into account Chong and Druckman's research regarding frame strength, I have selected 3 relatively strong frames: a public health frame, a morality frame, and a national

security frame. Each frame highlights a different portion of the possible, anticipated effects of accelerated climate change. The perceived strength of the public health frame lies in the fact that it is tied to both individual quality of life and the quality of the lives of other people. The strength of the morality frame lies in the fact that there are concerns about the type of world that future generations must live in. The concept is that those currently inhabiting the Earth must properly care for the Earth so that future generations will not be adversely impacted. The national security frame's strength lies in its breadth. The theory behind the national security frame is that effects of climate change will ultimately result in mass panic that will cause mass migration to the extent to which security in the form of the military will need to intervene. McDonagh illustrates why the frames that were used were selected and why they are important:

> "Climate scientists warn us that the decisions of this generation over the next 20 years will have an impact upon the future of humanity. For the peoples of the Pacific, climate change is already among the most urgent threats facing them. Rising temperatures and sea levels, and the greater intensity of storms and natural disasters, are already affecting the food and water supply for people in low-lying islands in different parts of the Pacific " (2006, 183).

Additionally, citizens must realize that even small actions do add up to create an impact on Earth's environment. McDonagh continues,

> "Individual acts of selfishness can create a society characterized by a desire for short term gain and immediate gratification over longer term needs and a wider view….In response, both individual and collective acts of selflessness are needed, of self-sacrifice for the greater good, of self denial in the midst of convenient choices, of choosing simpler lifestyles in the midst of a consumer society" (2006, 183).

This call for self-denial ties into collective action. Each person must do his or her individual part to mitigate the adverse effects of climate change, and it is important to explore the 3 individual frames to further discover how each frame could be persuasive in convincing the public of the existence of climate change. It is equally important to review the existing literature around each

frame in order to show the information that helped to form the hypotheses surrounding these frames.

Public Health Frame

Nisbet furthers Chong and Druckman's research regarding the varying strengths of frames. Nisbet found support in his research with Maibach for the strength of public health frames when he noticed "that even Americans who tend to discount climate change or are ambivalent about its relevance react favorably when the issue is re-framed in the context of public health" (2010). This is the grounding in the strength of the public health frame. While some frames will highlight issues that may effect only select members of a population, health is a topic that is consistently important both individually and collectively.

There are several adverse health effects that are anticipated as a result of climate change. O'Neill notes that there will be both direct and indirect effects of climate change on public health, including "changes in infectious disease epidemiology, particularly increases in the spread and activity of a variety of vector-borne diseases, [and] disruption of [the] freshwater supply, and perhaps sanitation, because of altered precipitation patterns and sea level rise" (2001, 166). Additionally, "rainfall not only provides the medium for the aquatic stages of the malarial mosquito's life cycle, but also may increase the relative humidity and hence increase the longevity of the adult mosquito" (Martens 1998, 45). So the life cycle of disease carrying insect will be extended. This increase of disease transmission could lead to increase death rates.

Additionally, the other major effect that is anticipated with regard to climate change is an adverse effect on agriculture.

> "[F]ood scarcity can lead to death from infectious diseases that the body is too weak to resist....Climate change is likely to affect nearly all natural systems and biogeochemical cycles that affect agriculture; as a result, agriculture is the sector placed most directly at risk by climate change.... Expected effects include greater frequency of climatic

> extremes, warming in high latitudes, possible changes in monsoon rainfall, and reduced soil water availability" (O'Neill 2001, 144, 146).

On the one hand, we have death as a result of increased disease. On the other hand, we have the reduced ability to cultivate food for an ever-growing population. Which is the lesser of the two evils?

A consistent theme throughout existing literature is the fact that climate change will not affect all nations the same way. Nations that do not have vast financial resources on hand are unfortunately expected to suffer more than wealthier nations, because in poorer areas,

> "where populations are more vulnerable, (both socially and biologically) and where public health spending is limited by available resources, mortality and morbidity conditions are likely to worsen as a result of global warming.....health conditions are likely to be worse than they would have been in the absence of climate change" (O'Neill 2001, 165).

A surprising revelation from the public health frame is the relationship between temperature and cardiovascular health. Existing research shows that even moderate climate change will even be bad for your heart.

> "The relationship between warmth (temperature equal to or higher than 16.5° C) and mortality from respiratory disease is greater than that from cardiovascular diseases, and patients with less severe respiratory disease are also at risk....Not only heat, but also moderately high temperatures are related to mortality rates.... Temperatures exceeding the comfortable [temperature] limits, both in the cold and warm range, substantially increase the risk of (predominantly cardiopulmonary) deaths" (Martens 1998, 113, 105).

When the numbers of people with existing cardiac issues are considered in the United States alone, this finding is striking. When the number of people in other nations that could be affected is considered, this news is alarming. Keatinge *et al* and Pan provide more insight on the correlation between temperature and cardiac health.

> "Several mechanisms may explain this increase mortality: increased blood pressure, blood viscosity, and heart rate, associate with physiological adjustment to cold and warmth, may explain the temperature-induced mortality of diseases of the cardiovascular system" (as cited in Martens 1998, 105).

Keatinge *et al* and Pan highlight how even those who do not have existing cardiac ailments will still be vulnerable to the adverse cardiac effects of climate change. This puts the entire human population, including those who are at peak health, at risk of declined health as a result of climate change.

Morality Frame

Author Lorraine Whitmarsh discovered while conducting her research that "self-reported motivations and correlates of intent-oriented action....[are] related principally to moral considerations...." (Whitmarsh 2009, 19). It follows that if individuals are exposed to rhetoric, then there may possibly be a change in expressed intentions and expressed attitudes, which in turn correlate with a change in future behavior. Following Whitmarsh's research, if a morality element is included within rhetoric, then rhetoric should be even more persuasive than it would have been without the morality element.

With regard to the morality frame, the first battle in the war is convincing people that their individual actions make a difference, as some people feel that "my actions will therefore make no difference to the causation of climate change because even if I abstain from an action that emits greenhouse gases, someone else will certainly use that fossil fuel instead of me" (Caney and Bell 2011, 307). If people feel that their actions do not really matter, then they will never be convinced to make changes. The morality frame hinges on the belief that individual actions do make a difference, and collective action makes an even greater impact. Author Heinz Grotzke notes that what is even more impactful besides changing the beliefs of the public is changing the thoughts and beliefs of decision makers.

> "[The thought process of people in power] needs to be drastically changed, and their actions [need] to be governed by morality and wisdom. Blaming carbon dioxide alone for what is happening is too simple....It is, however, true that each individual person,

> through his or her actions and deeds, carries full responsibility for his or her fellow humans and for the entire earth. The question becomes the extent to which the decisions are in harmony with nature and with human moral laws and are not motivated by egoistic desires" (Grotzke 2012, 24).

The morality frame also hinges on the concept that "the universe, planet Earth and all life on it are seen as creations which all have an intrinsic value" (Wolf and Gjerris 2009, 119). Viewing this through the lens of climate change and considering the value of Earth's resources,

> "The ultimate effects of climate change on socioeconomic or ecological systems will depend on three broad factors: the characteristics of change in climate, the sensitivity of the system to a given change, and the capacity of the system to adapt to climate change. The vulnerability of a particular society is general defined by the combination of sensitivity and adaptability. Those societies or sectors that are especially sensitive or are least able to adapt are the most vulnerable" (O'Neill 2001, 25).

This is key, as many nations are not financially in place or do not have the infrastructure to effectively tackle the adverse effects of climate change. As with the public health frame, in the morality frame financial resources and preparedness ensure that nations will be unequally impacted. Researchers have noted that this puts wealthier nations in the place of being responsible for solving the bulk of the climate change issue.

> "Some countries on the planet- the richer, more developed, industrialized ones- have used up more than a fair share of the [planet's carbon-absorbing] sinks and therefore caused more of the suffering which is underway and on the cards.... The USA, with less than 5% of the world's population, is responsible for an enormous share of carbon dioxide emissions by country each year: about 20% of the global total....The US therefore has perhaps the largest obligation to do something....one would quickly be drawn to the conclusion that the rich countries have a moral obligation to reduce emissions" (Garvey 2010, 97).

In addition to tying the actions of developed nations to the impact on less developed nations, a second aspect of the morality frame involves the responsibility that the current human population has to leave the Earth in a livable condition for future generations. As Grotzke states,

> "Trying to reduce CO_2 for climate change around the world now will not bring about a fast end to climate change. The responsible people must change their attitudes and

> thinking and acknowledge the fact that the earth is an organism and, as such, has to be cared for in order to recover again for future generations" (2012, 22).

This research explores this aspect of the morality frame, the one that involves looking ahead to imagine the type of natural resources that will be left for our children and grandchildren. Wolf and Gjerris provide an example of this aspect of the morality frame,

> "Some people refer to the fact that....the Earth is only on loan from God, which means that man is obliged to look after it as God's creation and treat it responsibly....If we take no action in the face of the climate problem, we increase the harm done to our global neighbors....It is the rich nations such as the USA, which have a special moral obligation to act since they are mainly responsible for the problem and thus should do the most to mitigate the consequences" (Wolf and Gjerris 209, 120).

A great overall representation of climate change framed as a moral issue is a statement from author James Mastaler. He writes, "global climate change is not only the largest moral issue of our time, as Al Gore has notoriously opined in his documentary An Inconvenient Truth, it is also one of the largest social injustices of our time" (2011, 67).

National Security Frame

For the purpose of this research, a national security threat is defined as "a drastic event that occurs in a brief span of time, degrades our quality of life & narrows the range of policy choices available" (Ullman 1983). Besides its subject matter, what primarily sets the national security frame apart from the other two frames is the fact that the national security frame focuses on a longer-term consequence as a result of climate change. National security would be threatened only after other events such as natural disasters had already occurred.

> "Floods, being acute events, are much more likely to provoke population dislocation. Displaced populations are likely to reestablish themselves once the waters recede. Thus, while floods are more likely to produce environmental refugees than are droughts, these persons' status as refugees will not necessarily be permanent or even long term. Although droughts cause less dislocation in the near term, they can cause more significant long-term social change because of their persistence" (O'Neill 2001, 174-175).

Here again is a contest of the lesser of two evils: floods vs. droughts. O'Neill also introduces the term "environmental refugees" into the discussion. These "refugees" are expected to migrate long distances into other nations that are already inhabited. There is also an expectation that many of the "refugees" will be citizens of the "Global South" (poorer, less developed nations) that will migrate (as much as transportation allows) into areas considered the "Global North" (wealthier, more developed nations).

> "[E]conomic migrants tend to move from either South to North, from East to West, or into regional immigration poles.....Unimpeded, labor will flow from the low-wage, labor-abundant region....to the high-wage, capital-abundant region, while capital will flow in the opposite direction. The problem is that within each region there are winners and losers: the scarce factor of production loses and the abundant factor wins" (O'Neill 2001, 177).

The influx of people will also possibly add stress to existing aspects of a nation's economy. O'Neill continues by breaking down additional problems that this large influx of people can cause if the Global North chooses to take a "destructive" reaction,

> "If the current research which assigns the most serious agricultural and health impacts to developing countries is correct, under conditions of global climate change there will be increased South-North migratory pressures....The North's adjustment to these pressures, as in many of the other areas explored, can be either constructive or destructive. In the latter case, immigration policy will remain essentially ad hoc and inequitable, in which case the inevitable confusion is likely to bring about an increase in the number of illegal immigrants. Newcomers will not be integrated into host societies, and broader domestic policies relating to problems such as structural unemployment will not be implemented, resulting in xenophobia and resentment" (O'Neill 2001, 177-178).

The lack of integration of immigrants is a set up for disaster, as the resentment can trickle down into every aspect of the immigrant's daily lives. Violent riots can arise from either the original inhabitants of the nation or the un-integrated immigrant population. Then, the government involves their police force in the conflict. Detraz explains, "[n]orthern states have issue[d] policy documents outlining how climate change presents a security threat in which their militaries will likely be involved. Northern states refer to climate change as a 'threat

multiplier'....[Health related complications] are predicted to hit areas in the global South particularly hard, but Northern states will not be immune to the impacts" (Detraz 2011, 111, 113). Involving the military means that the situation has reached a critical point. This is why it is imperative that the climate change situation never gets to this point.

Author Richard Matthew breaks down the national security frame into 3 areas:

> "[C]hallenges to national security can be organized into three groupings: anything that weakens the elements of national power; contributes to state failure; or leads to, supports, or amplifies the causes of violent conflict. Climate change has the potential to have a negative impact in each of these domains....An increase in costly and hard-to-manage events such as floods, droughts....pandemics and crop failures would probably be an enormous additional burden on these countries, introducing a daunting new layer of developmental challenges and hence weakening a central element of national power" (2011, 55).

Matthew's description encompasses a larger overview of the possible implications of climate change. Similar to O'Neill's viewpoint, Matthew envisions a post climate change world that does not exist in much harmony,

> "Under conditions of either abrupt of incremental change, people may be displaced into marginal lands or unwelcoming communities, enticed by extremist ideology, compelled to resort to crime in order to survive, or take up arms, all of which risk overtaxing the government, deepening social divisions, and breeding distrust and anger in the civilian population....One can easily imagine such stress becoming implicated in violent conflict and other forms of social disruption" (Matthew 2011, 55-56).

Existing literature argues for increasing support for the use of the national security frame for climate change. Author Nicole Detraz argues for the use of national security wording.

> "This is why making strategic linkages between climate change and security should not be undertaken lightly. It is clear that actors can frame climate change as a security issue for strategic purposes. However, it is important to consider the different outcomes that can emerge from using one discourse over another....Specifically, I argue that using an environmental security discourse, primarily framing climate change as a threat to human security, is the best option for creating policies designed to address human vulnerability to a changing climate" (2011, 116, 105).

One plausible reason for Detraz's position regarding the climate change frame is the fact that security is something that politicians are specifically concerned about, regardless of their political ideology or partisanship. When an issue calls for the involvement of a nation's military, an issue that previously seemed trivial takes on new levels of significance. Detraz also notes the history of the climate change/national security connection,

> "The links between climate change and security are not necessarily new. Indeed, in June 1988 the first major global conference on climate change, held in Toronto, was entitled "The Changing Atmosphere: Implications for Global Security". The conference documents list a number of ways that climate change may negatively impact humans and the globe, including by: .....diminishing global food security [and] increasing political instability...." (2011, 108)

Of the three frames, the national security frame is the frame that has been explored the least. With the exception of Detraz's note of the mention of the initial use of national security as a frame in 1988, there seems to have been reluctance in most scientists and politicians to use this frame. In one existing example of politicians stressing the importance of linking security to climate change via the national security frame,

> "....then US Senator Al Gore argued that '[a]s a nation and a government, we must see that America's future is inextricably tied to the fate of the globe. In effect, the environment is becoming a matter of national security- an issue that directly and imminently menaces the interests of the state of the welfare of the people'" (Detraz 2011, 108).

National security can indeed be an effective frame, especially when the outcomes mentioned in previous literature are conveyed to the public. The issue is, with the exception of Senator Gore's discourse and occasional discourse from the Obama administration on the topic, the national security frame has rarely been used to influence the opinion of the general public.

Research- Independent Variables

This research involves embedding each of the three frames into surveys about attitudes and behavior related to climate change measures. The frames themselves serve as independent

variables. Additionally, there are other variables that existing literature shows may affect the way that respondents respond when exposed to the three different frames. What follows is a discussion of some of those additional variables.

Political Party and Political Ideology

As previously stated, many Democrats and Republicans have made their stances clear on the issue of climate change. With regard to climate change, often the stances of Democrats align with the stances of those within the liberal ideology, while those in the Republican party take stances that often align with the conservative ideology. The expectation is that survey respondents will answer survey questions similar to what existing research has reported for their political party/ideology. Research has shown that "democrats and persons of liberal ideology are more likely to regard climate change as risky, and are more likely to support costly risk mitigation public policies" (Zahran *et al* as cite in Kellstedt *et al* 2008, 115).

When incorporating the often overlooked opinions of the growing number of American voters that identify themselves as Independent, Borick and Rabe discovered that "both Democrats and Independents are significantly more likely than Republicans to believe that the average temperature on Earth is getting warmer, with members of the GOP nearly 30 percent more likely than Democrats to believe that global warming is not occurring" (2010, 783). While Independents have the option of aligning with either the Democratic, liberal view or with the Republican, conservative view, based on Borick and Rabe's research, the expectation will be that those who self identify as Independent will align with Democratic voters for the purpose of this research.

Race and Gender

Previous research on the effect of both race and gender on global warming concerns show that race and gender are both of importance regarding attitudes and opinions regarding climate change. Brody *et al* discovered that "white respondents are significantly less ready to alter their lifestyle to address climate change than non-white respondents" (2012, 12). Based on this, one would expect all of the other races and ethnicities to show an increased responsiveness to mitigating the adverse effects of climate change. Along a similar trajectory, Borick and Rabe's research observations found that "being younger, college educated, a female, and of a minority race marginally increases the likelihood that an American will believe that temperatures on Earth are increasing" (Borick and Rabe 2010, 783-784). So now it is also expected that women will reflect increased support for actions regarding climate change when compared to men. Interestingly, previous research has also found that women's opinions are more susceptible to allowing external forces to change their opinions regarding climate change. In one exploratory study, Borick and Rabe found that "[g]ender had a statistically significant effect on five factors, with women more likely than men to report that warm local temperatures, hurricanes, declining [numbers of] polar bears, the Gore documentary, and droughts have increased their belief in global warming" (Borick and Rabe 2010, 790).

Trust in People and Government

Trust in people is an interesting variable to study because the results of this research are based not only on rhetoric, but also on how individuals process that rhetoric. Whether people accept the rhetoric as fact, fiction, or ramblings can hinge on how much that individual feels that he or she can trust the individual or individuals conveying the information. This applies to every individual on this planet, and applies even more so to those in government and in the

scientific community, as the decisions made in the political and scientific world can have important, far-reaching implications for the entire populace. Marty illustrates this point,

> "While most discussions of mistrust of distrust and trust involve trained and professional elites, such as doctors, lawyers, ministers, teachers, or diplomats, every member of the public is engaged in daily negotiations and experiences that concern trust. 'We' the public outnumber the members of those elite professions by thousands to one, so we are often affected when trust is broken or when it is kept, when it is fragile or when it is firm" (Marty 2010, 161).

As Marty points out, even though the general populace has strength in numbers, those in government, though fewer in number, are able to do the most harm if the public discovers that trust in them is not warranted.

Importance of Religious Faith and Christianity

The inclusion of religion as an independent variable may be surprising to some. Existing literature has shown that religion does indeed have a distinct relationship to views on climate change. These views vary, so the importance of religious faith is anticipated to be an important variable that will effect survey responses in differing ways. Mastaler notes the evolving relationship between religion and climate change,

> "Though some in the faith community cling to the notion that climate change is a myth, those voices are quickly becoming weaker and fewer. Meanwhile, Christian ministers like Jim Ball are standing alongside Jews and Muslims and others in the collective moral call to create and pursue solutions to climate change" (Mastaler 2011, 67).

This collective agreement on the issue of climate change bodes well for those scientists and politicians whose voices may have previously been drowned out by conservative administrations. It is even more striking that members of completely different religious faiths are able to find common ground on such an important issue.

Two distinct groups have emerged from the community of faith, one group known as "earthy evangelicals" versus another group known as conservatives.

> "The earthy evangelicals [also known as the activists] and the conservatives come to their vastly different perspectives from a similar starting point. Both subscribe to the Biblical view of humans as stewards of Earth. Both express concerns over the fate of Earth's poorest residents, especially in the developing world....The activists note that 'millions of people could die in this century because of climate change, most of them our poorest global neighbors', while the rival group claims that the money presumably required to reduce greenhouse emissions could lift millions out of poverty" (Henson 2006, 256).

So the two groups diverge along the proper allocation of financial resources. Henson makes note of the assumptions that both groups make,

> "Of course, this presumes that a giant pot of money is at hand, ready to be spent on either climate-change protection or poverty relief. In truth, of course, policymakers seldom put such big goals side by side in setting budgets. Indeed it could end up being the risk to the world's biggest economies, rather than its poorest people that motivates real action on climate change" (2006, 256).

Henson's stance on this issue is probably the most feasible of all possibilities. Ultimately, the decision of major powers to help mitigate the effects of climate change may not be an altruistic decision, but may be a decision of self-preservation.

An additional, interesting viewpoint that has emerged from the religious community comes from those who are part of the Interfaith Stewardship Alliance (ISA) who

> "believe that larger homes, greater consumption, and general material prosperity are a reflection of [the] progress [toward perfection]. In addition, those with this perspective believe that the earth cannot be hurt. God's design of creation has positive and negative feedback mechanisms that minimize or quickly repair environmental damage, so increased consumption does not hurt the earth" (Curry 2008, 159).

Republican Representative John Shimkus has a view similar to the ISA standpoint in that Shimkus "has used religion to argue against government action on climate change. 'The Earth will end only when God declares it's time to be over....Man will not destroy this Earth'" (Gropp 2011, 106). The ISA standpoint is the antithesis of the earthy evangelical standpoint. The ISA view is even more extreme than the conservative view, because not only does the ISA viewpoint believe that climate change is not a problem, this stance also argues that God has created a world

that will heal itself. Unfortunately, the sharp increase in natural disasters in recent years appears to discredit the ISA view.

The majority of research on the correlation between climate change and religion has focused specifically on the Christian religion. McDonagh illustrates the connection,

> "….these reflections flow from the basic tenets of the Christian faith. This includes God's love and concern for creation and the poor of the earth....[For Christians], [h]umans are now called to bioresponsibility" (2006, 156, 174). This bioresponsibility denotes that Christians should feel that it is up to them to care for the poor and to maintain the resources of Earth which allow the poor to survive. Christianity is often intertwined with the morality frame, as "Christian moral convictions demand our response to the climate change problem" (cited in Henson 2006, 256).

Based on this, there is an expectation that those who self identify as Christian will show a significant increase in attitudinal measures that denote support for future action on climate change if they are exposed to the morality frame, as the morality frame hinges on the very core of the Christian faith.

Research- Dependent Variables

To test the effects of the three frames (and other pertinent independent variables), each survey includes an identical set of questions asking respondents about their attitudes, behaviors, and intention regarding climate change. The responses to these survey questions serve as the dependent variables in this research study. It is important to explore some of those dependent variables to discuss how existing literature sets the stage for this research.

Climate Change- Is it Occurring?

It is important to note that even with the partisan divide on the climate change issue, there are still a few Republicans that do believe in the existence of climate change and believe that climate change is indeed an issue. Even when looking at the minority of Republicans that do believe in the existence of climate change,

> "Democrats are much more likely than Republicans to claim that their acceptance of global warming was affected by most forms of evidence that were not produced through their own observations (e.g., declining polar ice and species), but when it comes to personal experiences with weather changes (e.g., warmer temperatures), Republicans are as likely as Democrats to attribute their beliefs in global warming to changes that they have personally observed. This reliance on personal observations among Republicans is consistent with their substantial skepticism regarding the way that global warming is projected by both the media and the scientific community" (Borick and Rabe 2010, 796-797).

Interestingly, Schuldt *et al* found that

> "Republican respondents were more skeptical that global climate change is a real phenomenon when an otherwise identical question was worded in terms of "global warming" rather than "climate change"; no other political group (Democrats, Independents, and Others) was significantly affected by question wording....whereas a majority of Republican respondents (56.0%) doubted the existence of "global warming", a majority of Republicans (60.2%) also endorsed that "climate change" was real" (2011, 122).

This is a bizarre yet intriguing finding. If the same exact information can be presented in a slightly different way and accepted when the information was originally rejected, then this highlights the power of rhetoric. Even with this research, it is anticipated that the question as to whether global warming is happening or not will be affected by the independent variables previously discussed.

The media has also been instrumental in the climate change debate. There is such a mass of scientific research and information, and often scientific results may be conflicting. Someone or some group of people has to take on the role of sifting through all of that information to deliver what is deemed both believable and important. As the media takes on this key role, they have the opportunity to steer the public toward the direction of believing climate change is occurring. Bannon et al have noted,

> "The impetus for a meaningful US climate policy is growing....This has been reflected in greatly heightened attention by the news media. The overall result is that a large and growing share of the US population now believes that government action is warranted" (as cited in Stavins 2009, 197).

Just as the media can support the existence of climate change, the same media can also doubt the existence of climate change. Whether climate change is occurring or not is an important dependent variable because it will create a gauge that tells whether the independent variables, specifically the rhetoric included in the three frames of public health, morality and national security or the rhetoric of politicization, are able to effectively change individual's attitudes and beliefs regarding climate change.

Climate Change- Causes

An area in which even those individuals who believe in the existence of climate change are often divided on is what exactly is causing climate change, and whether climate change is progressing based on natural means or due to human involvement.

> "As with overall belief in global warming, there is also a substantial partisan gap in terms of perceptions of its causes among individuals who believe that the planet is warming. Republicans are over twice as likely as either Democrats or Independents to attribute climate change completely to natural patterns" (Borick and Rabe 2010, 783).

Again, it is expected that there will be significant differences among those who self identify as Republican/conservative vs. those individuals who self identify as Democratic/liberal. Global warming- causes is an important dependent variable because those using rhetoric in support of climate change need to be able to understand the views of their constituents prior to attempting to persuade those constituents that humans are indeed accelerating climate change.

Trust in Science

Since the basis of both the pro climate change and anti climate change rhetoric is science, it is important to gauge whether people trust the scientific information they are presented with and if they trust the members of the scientific community who are delivering that information. Marty notes the importance of this variable.

> "[Also of importance] are trust issues among and between those represented by the words "science" and "religion" and these are transacted in public life....The decline in the power of religious institutions and the measurements of positive religious interest have drastically declined, in most of the world the old religions have revived and become assertive. Often their rise has led many among them to challenge science and the institutions devoted to it" (2010, 162-163).

Marty's statement intertwines the dependent variable of trust in science with one of the independent variables, the importance of religious faith. Based on Marty's work, those who self identify as believing in an increased level of the importance of their religion will show significant increases in responses to variables that will question the science of climate change, i.e. individuals who believe that their religion is important or very important will show increased support when they are exposed to the politicization of climate change.

Even when religion is taken out of the equation, the scientific world can still suffer from lost or misplaced trust from the public. Revolutionary results are published one month, and six months later another revolutionary study is published that completely disproves the previous revolutionary study. Also, scientists and their research are subject to public scrutiny just as politicians are. The difference is that politicians are represented more frequently in the media via sound bites and speeches, and the mass of scientific information being published can sometimes keep a scientific scandal from being brought to the public's attention for some time. Nowotny notes,

> "Public controversies have, for a variety of reasons, lead to a pervasive sense of distrust of the independence and impartiality of scientific expertise, side by side with the distrust of political authorities and of industry. The credibility of scientists, even if the public still judges it higher than that of politicians or other interest groups, is in decline. Science is no longer seen as independent and standing above vested interests. In contrast to science's public self-image as neutral, its image has become contaminated by what are perceived as too close ties to state and industrial interests" (2005, 2).

Brooks adds to Nowotny's discussion by adding how funding sources also undermine individual's trust in science. Brooks notes that

> "about 70 percent of all scientists and engineers work for private industry, many of them under contract with the federal government. Not more than 12 percent work for universities and independent nonprofit institutions, and even this segment has its research predominantly funded by the federal government" (1980, 108).

This makes it almost impossible for scientists to conduct scientific research as they were trained to in colleges in universities. Scientists often find themselves held hostage to the will and agendas of those outside of the scientific world. Brooks also notes the level of distrust among scientific institutions. "To a large extent, I think that the distrust of science that exists is not a distrust of science itself, or of the scientific method of knowing reality, but a distrust of the institutions which are the main employers of science and scientists" (Brooks 1980, 108). As discussed in the political party/ideology section, the scientific world in the United States has gained somewhat of a reputation in the last two decades. Both Bush administrations' overt manipulation of scientific findings and testimonies have led to an increasing distrust around overall science, particularly climate change science. Based on this information, it would be expected that those who self identify as Republican/conservative may have an increased trust in science, while those who self-identify as Democratic/liberal or Independent may have a decreased trust in science. Individuals are considering the overall implications of the deception that results when government gets too involved in the scientific world. Looking at the scientific manipulation that has been uncovered, one wonders how much additional scientific information has been manipulated by the government and has not been revealed?

Scientists would like to present their work as unbiased so that they have the public's trust. Glotz discusses the responsibilities that scientists have to the public,

> "Science can no longer deny that it has practical and political, as well as ethical, consequences. The scientists, because of their technical knowledge, must be the first to give warning, since they can anticipate the problems that result from a successful application of their work" (1980, 11).

Scientists also have a responsibility to be truthful with the public no matter the consequences the government may threaten, because scientists deal with information that affects the very existence of life and Earth's resources.

There is additional literature on climate change and trust/confidence in scientists. Kellstedt's work looks at confidence in scientists as an independent variable, although it is explored as a dependent variable for the purpose of this research. Previous studies found that "confidence in scientists has unexpected effects: respondents with high confidence in scientists feel less responsible for global warming, and also show less concern for global warming" (Kellstedt *et al* 2008, 113). Kellstedt *et al* explain this surprising finding further,

> "Respondents who showed a great deal of confidence that scientists understand global warming and climate change showed significantly less concern for the risks of global warming than did those who have lower trust in scientists. Though this effect differs from our expectations, it is consistent with the notion that people trust that scientists will be able, somehow, to devise technical solutions to any problems that arise because of global warming and climate change" (2008, 121).

Brooks also notes this unexpected effect with regards to trust in science is also occurring simultaneously in that,

> "....there seems to also be an increasing belief that scientists can accomplish almost anything if the public is willing to hold their feet to the fire....Thus the paradox is that distrust of science and faith in science go hand in hand. The public feels it can stop particular technologies because, somehow or other, the technical community can always come up with alternatives, and technology can be channeled with money alone or with sufficient political will. The other side of the coin is that the problems facing humanity in the next fifty years appear irresolvable without a heavy input from science and technology" (1980, 109-110).

So, in one scenario the public has become skeptical of scientists and their work. In another scenario, individuals have this unfailing faith that scientists will deliver truthful information, as long as those scientists are aware of the possibility of being called on the carpet. The question is: how much of this scientific information is actually getting to the general public? Even if the

public takes issue with scientific findings, what are the implications for scientists, especially if the findings correspond with the wishes of those in government who are funding the research?

Brooks makes the important note that even when considering the attitudes and beliefs of the public regarding this issue, the individuals who are considered to be members of the "public" are extremely diverse, and their diversity could influence responses and opinions on climate change.

> "The evidence on public attitudes towards science and technology is very mixed. Furthermore, one cannot talk about a single public; there are many different publics- the "man in the street" with a low level of consciousness about science, the literary intellectual of the mass media, the average educated man largely represented in professional groups, the disadvantaged individual from a minority group, today's woman, the young person. Each of these has distinctive attitudes" (Brooks 1980, 97).

Of the different "publics" that Brooks notes, this research utilizes a "public" comprised of undergraduate students. It will be helpful in future research to duplicate this research with an even more diverse group that reflects individuals at multiple education levels and multiple levels of understanding regarding science, as Brooks mentions.

Scientific Information vs. Risks

Another way to gauge whether individuals have faith in the results of the scientific world besides explicitly asking individuals about their level of trust in science is to ask them whether they believe that the information science provides to the public is outweighed by any risks involved in that research (or vice versa). With regards to trust and risks, Kellstedt *et al* found that "trust has been shown to be an important correlate of interpretations of risk and resultant support or opposition to policy choices in the face of risk" (Kellstedt *et al* 2008, 115).

Even though both trust in science and scientific information vs. risks are dependent variables in this research, results similar to the trust in science variable are expected for the scientific information vs. risks variable, with Republican/conservatives expected to show an

increased support for the scientific information vs. risks variable, while Democrats/liberals and Independents are expected to show decreased support for the scientific information vs. risks variable. With regard to race and gender, "research consistently shows that women and racial minorities are more fearful of the risks of climate change" (Bord *et al* and O'Conner *et al* as cited in Kellstedt *et al* 2008, 114). Based on this finding, it is expected that women and minorities will show decreased support for the scientific information vs. risks variable when compared to Caucasian males.

Hypotheses

Although I have noted expected interaction effects in the previous sections of this paper, the main hypotheses are related to the three climate change frames: public health, morality, and national security. Based on existing literature on climate change, politicization, framing, attitudes and behavior, I propose four hypotheses. First, that exposure to rhetoric (via frames in the form of the public health, morality and national security frames) will increase attitudinal measures that denote support for future action on climate change. Second, I hypothesize that once politicization that introduces skepticism regarding climate change is added individually to each of the climate change frames, support will decrease in attitudinal measures for future action on climate change. Third, with respect to the three frames I hypothesize that the morality frame will create more of an increase in attitudinal measures that denote support for future action on climate change than either the public health or national security frame. Fourth, I also hypothesize that the public health frame will create more of an increase in attitudinal measures that denote support for future action on climate change than the national security frame will, but the public health frame will not create more of an increase in attitudinal measures that denote support for future action on climate change than the morality frame will. To summarize the third

and fourth hypotheses, frame strength from *least to greatest* will be: national security< public health< morality.

2. EXPERIMENT

Research Methods/ Experimental Design

This study utilized the research method of descriptive surveys. Attitudes and behavior were operationalized via a survey questionnaire. Rhetoric was operationalized by the use of specific frames that support the existence of climate change and by the use of politicization that does not support the existence of climate change. Since this research involved human subjects, an application with Georgia State's Institutional Review Board (IRB) was submitted. The IRB application was approved. Table 1 displays the verbiage utilized in the survey.

Table 1: Rhetoric to Measure Affects on Attitude and Behavior

Rhetoric	Verbiage
Public Health Frame	Climate change poses a danger to public health. It will lead to an environment where deadly conditions such as cholera thrive. Increased temperatures will damage plant life, which will in turn reduce the amount of food available to the human population.
Morality Frame	Climate change is a moral dilemma and future generations will suffer the most severe consequences. We don't inherit the earth from our ancestors; we borrow it from our children. Caring about our children and their progeny is part of what makes us human.
National Security Frame	Climate change will pose profound strategic and security challenges to the United States in coming decades, raising the prospect of military intervention to deal with the effects of violent storms, drought, mass migration and pandemics.
Politicization	Skeptics argue that the climate-change-models scientists use to predict long-term weather patterns rely on a number of questionable assumptions. Politicians often cite such arguments in debates about whether climate change is really happening. The mixed evidence suggests that this debate will continue because the science appears to be unresolved.

Survey questions utilized randomized combinations of select parts of the verbiage in table 1, and survey questions were modeled to represent each of 8 individual conditions:

1. Control group (No frames and no politicization)
2. Public health frame + no politicization
3. Morality frame + no politicization
4. National security frame + no politicization
5. Politicization + no frame
6. Politicization + public health frame
7. Politicization + morality frame
8. Politicization + national security frame

Effect on attitudes was measured by asking specific questions after each treatment, and effect on behavior was measured by that individual's survey response, which indicated that individual's intention to perform that behavior. Therefore, the main independent variable was politicization (which will deny the existence of climate change) and each of the three frames (which all support the existence of climate change), while the dependent variables will be both attitudes regarding climate change and behaviors regarding climate change measured based on respondents' survey answers. Appendix A contains both the survey questions/statements and the corresponding possible survey responses.

3. RESULTS

Findings and Data Analysis

For this study, data was collected in the form of paper survey questionnaires distributed to undergraduate students. An equal number of surveys in each of the 8 conditions were printed. The number of the condition (1 through 8) was denoted in the lower right hand corner of the last page of the survey so that respondents would not be distracted by the survey number. The surveys were then manually placed in order from conditions 1 through 8, followed by another set of conditions 1 through 8, etc. Table 2 notes the conditions and their corresponding number.

Table 2: Corresponding Variable Labels for Experimental Conditions

Variable	Condition
Control	Control (1)
Phealthonly	Public Health Frame Only (2)
Moralonly	Morality Frame Only (3)
Nsecuronly	National Security Frame Only (4)
Policonly	Politicization Only (5)
Phealthpolic	Public Health Frame + Politicization (6)
Moralpolic	Morality Frame + Politicization (7)
Nsecurpolic	National Security Frame + Politicization (8)

335 students completed the surveys, and the data was entered into a Microsoft Excel spreadsheet. The data was then transferred directly into the STATA statistics program, in which t-tests were run to make a pairwise correlation between each condition of the experiment in comparison to the control group. The next step was determining what type of regression was most appropriate to analyze the survey data. The proportional odds/parallel regression assumption of ordinary least squares regression was violated by the fact that surveys have non-interval outcome [dependent] variables. Since OLS regression was ruled out, the pairwise correlations discovered by the t-tests were further explored via ordered probit regression in

STATA. Since the four hypotheses are directional, the results of one tailed t-tests were reported.

Results

There were a total of 15 dependent variables. Survey responses were collected on all of the dependent variables reviewed in the theory portion of this research paper. While the results of the variables were interesting, for the purpose of this research the focus was narrowed down to the results of four variables: gwarmcause, trustscientists, threatindhealth, and threatsec. Descriptive statistics listing the question or statement correlated with each variable are listed in appendix C.

Frames

When revisiting the four hypotheses regarding the frames in conjunction with viewing the results listed in the appendix B, interesting results emerge. Hypothesis one was that exposure to rhetoric (via frames in the form of the public health, morality and national security frames) will create an increase (positive coefficient) in attitudinal measures that denote support for future action on climate change. Tables 10 and 11 show that hypothesis one was supported in that exposure to the public health, morality frame, and national security frame (coefficients 0.41 & 0.41; 0.50 & 0.48; and 0.46 & 0.51 respectively) increased the belief in respondents that climate change is an actual threat to national security. This result between the three frames and the threatsec dependent variable is expected, especially with regards to the national security frame, which includes rhetoric that speaks directly to climate change's possible threat to national security. The other two frames use rhetoric that purports climate change as an issue of morality or a threat to an individual's health, so both of those frames also should show positive coefficients for the threatsec dependent variable.

Hypothesis two was that once politicization that introduces skepticism regarding climate change is added individually to each of the climate change frames, support would decrease for attitudinal measures for future action on climate change. Tables 4 and 5 show that exposure to the combination of the national security frame and politicization resulted in a significant, negative coefficient (coefficients -0.37 and -0.38 respectively) for the variable gwarmcause, meaning that those respondents were more likely to believe that global warming is caused by human activity as opposed to natural causes. This result could be related more to the fact that the respondent pool was heavily Liberal/Democratic.

With regard to hypothesis two, many interesting results also emerged. Tables 4 and 5 reflect that exposure to the morality frame for the variable gwarmcause (coefficients -0.34 and -0.32 respectively) resulted in respondents being more likely to believe that global warming is caused by human activity as opposed to natural causes. Unexpectedly, tables 6 and 7 show that politicization, the combination of the public health frame and politicization, and the combination of the morality frame and politicization (coefficients 0.36 & 0.39; 0.42 & 0.43; and 0.41 & 0.41 respectively) increased agreement with the statement, "Scientists can be trusted to deliver correct and accurate information to citizens about global warming". Tables 8 and 9 reflect that exposure to politicization, the combination of the public health frame and politicization, the combination of the morality frame and politicization, and the combination of the national security frame and politicization (coefficients 0.56 & 0.57; 0.38 & 0.38; 0.38 & 0.40; and 0.44 & 0.50 respectively) actually made respondents more likely to believe that climate change is a threat to their individual health. This result was anticipated with the frames were present without politicization, but the result also occurred once politicization was introduced into the survey. Tables 10 and 11 show that exposure to politicization, the combination of the public health frame

and politicization, the combination of the morality frame and politicization, and the combination of the national security frame and politicization (coefficients 0.54 & 0.52; 0.63 & 0.61; 0.40 & 0.46; and 0.61 & 0.66 respectively) caused respondents to report an increased belief in the perception of climate change as an actual threat to national security

Hypothesis three was that with respect to the three frames the morality frame will create more of an increase in attitudinal measures that denote support for future action on climate change than either the public health or national security frame. Hypothesis three is supported by the fact that morality was the only frame of the three frames in tables 6 and 7 that had a significant coefficient for the variable trustscientists, with the morality frame also standing as the only frame to result in a significant, positive coefficient. Table 10 also supports hypothesis three, in that the positive coefficient for the morality frame (0.50) is higher than the coefficients for the public health (0.41) and national security (0.46) frames. The higher coefficient denotes increased belief in the perception of climate change as an actual threat to national security. Table 11 shows slightly different results, as the coefficient for the morality frame (0.48) is higher than the coefficient for the public health frame (0.41), but is lower than the coefficient for the national security frame (0.51). This was expected in that the morality frame is rooted in the belief that individual actions do have an effect on the climate and the belief that current generations must be good stewards over the environment so that the environment will be in sufficient condition for future generations. The morality frame may have had a larger effect on the dependent variable trustscientists than the other two frames did because those exposed to the morality frame may feel the need to trust the science that is being presented to them so that they will know how to properly maintain the Earth for future generations.

Hypothesis four was that the public health frame will create more of an increase in attitudinal measures that denote support for future action on climate change than the national security frame will, but the public health frame will not create more of an increase in attitudinal measures that denote support for future action on climate change than the morality frame will. To summarize the third and fourth hypotheses, frame strength from least to greatest was expected to be: national security< public health< morality. There were not significant results for all three frames for most variables so comparison of the three variables with respect to hypothesis four is limited. In scenarios where all three frames were significant, tables 10 and 11 reflect that the coefficient for the public health frame was actually lower than the coefficient for the national security frame (0.41 vs. 0.46 and 0.41 vs. 0.51 respectively) for both models with regard to the dependent variable threatsec. While this finding does not align with hypothesis four, this finding does align with the fact that the national security frame would be expected to reflect a large positive coefficient for the dependent variable that it is directly related to, threatsec.

Covariates

Descriptive statistics providing additional information on each covariate are listed in appendix C. Table 4 shows that for the variable gwarmcause, those respondents who self identified as conservative and Republican resulted in a positive coefficient (0.26 and 0.25 respectively), which meant that those respondents are more likely to believe that global warming is due to natural causes as opposed to being due to human activities. This aligns with existing literature. The negative coefficient (-0.48) in table 5 for those who self identified as liberal supports existing literature in that a negative coefficient for the variable gwarmcause means that those respondents were more likely to believe that climate change is due to human activities.

Table 8 reflects that respondents who self identified as liberal (coefficient 0.41) were more likely to believe that climate change is a threat to their individual health, and table 9 reflects that respondents who self identified as conservative (coefficient -0.66) were less likely to believe that climate change is a threat to their individual health. Table 10 shows that respondents who self identified as Democrat (coefficient 0.38) show increased belief in the perception of climate change as an actual threat to national security. When looking at ideology, table 11 shows that respondents who self identified as conservative (-0.28 coefficient) showed a decreased belief in the perception of climate change as an actual threat to national security. Table 7 reflects that respondents who self identified as Republican showed decreased belief that "scientists can be trusted to deliver correct and accurate information to citizens about global warming". This may stem from the fact that much of scientific research has shown an accelerated level of climate change, while Republicans often believe that climate change is progressing at a standard, natural rate. Republicans are reluctant to trust scientists who deliver results that do not align with their own beliefs. Nowotny's previous literature on the topic of trust in science may be coming into play here.

Other interesting results emerged from this study. Table 8 shows that those who self identified as Caucasian showed a decreased belief (coefficient -0.47) that climate change is a threat to their individual health. Table 11 shows that those who self identified as Caucasian also showed a decreased belief (coefficient -0.44) in the perception of climate change as an actual threat to national security. Both results regarding those who self identified as Caucasian align with the research of Brody *et al*. A surprising result is the negative coefficient displayed in table 6 (-0.21) among respondents who self identified as female with regard to the variable trustscientists. This denotes that women were less likely to believe that "scientists can be trusted

to deliver correct and accurate information to citizens about global warming". This is somewhat of a divergence from Borick and Rabe's research on gender. Table 7 also reflects that African Americans are less likely to believe that "scientists can be trusted to deliver correct and accurate information to citizens about global warming". Table 6 also shows that respondents who self identified as liberal (coefficient 0.43) showed increased belief that "scientists can be trusted to deliver correct and accurate information to citizens about global warming". This result was unexpected considering the existing literature on the politicization and manipulation of science amongst Republican administrations.

4. CONCLUSIONS

Discussion

The most surprising finding from this study is that while framing rhetoric was occasionally found to significantly increase attitudinal measures that denote support for future action on climate change, politicization was found to be influential in its own right. Politicization that questioned the science of climate change has the power to both increase and decrease support for attitudinal measures with regard to climate change. In this research, politicization often amplified support for attitudinal measures that denote support for future action on climate change. One reason for this could be the exclusion of source information. The politicization that questioned the science of climate change was not accompanied by a speaker's name, and the speaker's political party and political ideology were not attached to the politicization. Often the source of information can have an additional effect on public opinion, i.e. if the politicization questioning the science of climate change comes from former President George W. Bush, then his constituents in the Republican party would be expected to be more receptive to the information as opposed to if the information came from a rare Democratic politician who would question the science surrounding climate change. This source information effect would also be expected from Democrats receiving rhetoric from elected officials within their party vs. the same rhetoric from elected officials from the opposing party.

The results regarding framing and politicization when combined could be due to several factors. The first factor is that the frames are more influential on attitudes and behavioral intention than politicization is. Another factor for this unexpected finding could be that respondents were already so firmly grounded in their attitudes toward climate change that even the addition of politicization could do little to nothing to changing their attitudes. Ultimately, the

models show that while politicization was hypothesized to have an expected counter effect on the power of frames, framing rhetoric ultimately was more influential in changing attitudes and behavioral intentions when framing and politicization were both presented simultaneously to survey respondents.

It is also important to note that the descriptive statistics table in appendix C shows that almost 44% of the survey respondents self identified as Democrat while less than 17% of the survey respondents self identified as Republican. Existing literature points to several expected outcomes based on partisanship. The majority of the results here align with that existing literature regarding partisanship, with conservatives/Republicans showing a belief that climate change is due more to natural causes, and liberals/Democrats are reporting a belief that climate change is due more to human activities.

Azjen and Cote's research provide insight on why many of the results returned either null or as the opposite of the intended result via Azjen's theory of planned behavior.

> "Briefly, according to the theory of planned behavior [TPB], human action is influenced by three major factors: a favorable or unfavorable evaluation of the behavior (attitude toward behavior), perceived social pressure to perform or not perform the behavior (subjective norm), and perceived capability to perform the behavior (self-efficacy; Bandura 1997, or perceived behavioral control). In combination, attitude toward behavior, subjective norm, and perception of behavioral control lead to the formation of a behavioral intention" (2008, 301).

This explanation, especially the portion regarding subjective norms, can be utilized to explain the research findings here. Students were the respondents in this study, and designated times to take the surveys were confirmed with instructors prior to administering the survey. Students could have possibly viewed the survey as "something extra" to do, especially because the students were not promised the incentives that they may be familiar with when completing surveys, namely extra course credit. In having knowledge of the survey ahead of time, students may have

decided not to answer questions seriously or may have decided to not respond as they normally would if there had been some type of reward attached. The opinions of fellow students may have been influential before the students even took the survey.

Conclusion

This study has contributed to existing research on framing and politicization rhetoric, specifically with regard to climate change. Previous research looked at the effect of either frames or politicization on respondent's opinions regarding climate change. This research contributes to that body of research by simultaneously looking at both frames and politicization to test the influential power of both forms of rhetoric. The findings of this study show that frames are able to change attitudes and behavior in select cases. The results reported here also contribute to the small body of research that has discussed the impact of politicization of science on political behavior. While this research found that politicization is not as influential in changing attitudes and behavioral intentions when politicization is combined with framing rhetoric, and politicization may possibly even have the opposite expected effect in changing attitudes and behavior, this finding is still valuable in that it adds to the guidelines that scientists and politicians can utilize when forming discourse around climate change.

Future research could take several different paths: the use of different frames, a politicization statement that is worded differently, and the survey of respondents who are older (to check for an effect of age on the morality frame results). Future research could also include a larger sample size in order to capture a more balanced political party/political ideology representation that would reflect an increased Republican party presence. Different dependent variables that measure different attitudes and behavioral intentions toward climate change action could also be explored. It would also be interesting to add the name and political affiliation of

the speaker with which the frame and politicization originated to see the effect that the origin of the rhetoric has on the results. An even more interesting experiment would be to transpose the originators of the statements to see if respondents within the same political party would react differently to the same exact statement coming from a person with different political ideologies from their own political ideologies.

Climate change continues to be such a controversial issue that one wonders whether those in government will ever arrive at enough of a consensus to take any action that will truly mitigate the issue. So far, much of the time has been spent arguing over the existence of or causes of climate change. All the while increasingly erratic weather patterns and the spike in the number of natural disasters seem to clearly support one side of the climate change debate. The bottom line is that it is becoming increasingly difficult for even the biggest climate change skeptics to deny what is happening to our world.

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APPENDICES

Appendix A

(Condition 1: Control)

Survey Questions

Part 1. For each question or statement please indicate your choice below by placing an "x" above your response (unless instructed otherwise).

Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or something else?

_____	_____	_____	_____
Democratic	*Republican*	*Independent*	*Something Else*

Do you think of yourself as closer to the Republican Party or to the Democratic Party?

_____	_____	_____
Closer to the Republicans	*Closer to the Democrats*	*Neither*

How important is your political party to you personally?

_____	_____	_____	_____	_____	_____	_____
Extremely Unimportant	*Very Unimportant*	*Somewhat Unimportant*	*Neither Important Nor Unimportant*	*Somewhat Important*	*Very Important*	*Extremely Important*

Are you male or female?

_____	_____
Male	*Female*

Are you of Hispanic or Latino descent?

_____	_____	_____	_____	_____	_____	_____
No, I'm Not	*Yes, Mexican*	*Yes, Puerto Rican*	*Yes, Cuban*	*Yes, Central American*	*Yes, South American*	*Yes, Other*

Please place an "x" next to one or more categories below to indicate your race and ethnicity.

- ☐ Multi-Racial
- ☐ Asian/Pacific Islander
- ☐ African American
- ☐ Caucasian American
- ☐ Native American or Alaska Native
- ☐ Other Ethnicity

Please write in your response. What year were you born?

_____

Are you currently married, widowed, divorced, separated or never married?

_____	_____	_____	_____	_____
Married	*Widowed*	*Divorced*	*Separated*	*Never Married*

When it comes to politics, would you describe yourself as liberal, conservative, or neither liberal nor conservative?

_____	_____	_____	_____	_____	_____	_____
Very Conservative	*Somewhat Conservative*	*Slightly Conservative*	*Moderate*	*Slightly Liberal*	*Somewhat Liberal*	*Very Liberal*

Often things come up and people are not able to register to vote. Would records from any state show that you are currently registered to vote, or like many others are you not registered at this time?

_____	_____	_____
Yes, I am a registered voter	*No, I am not a registered voter.*	*Not Sure*

Now using a scale from zero to ten, where zero means not at all important and ten means extremely important, how important is religious faith in your life? Please place an "x" inside the circle next to your choice.

- ○ 0 - Not at all important
- ○ 1
- ○ 2
- ○ 3
- ○ 4

- ○ 5
- ○ 6
- ○ 7
- ○ 8
- ○ 9
- ○ 10 - Extremely important

Aside from weddings and funerals, how often do you attend religious services? More than once a week, once a week, one or twice a month, a few times a year, seldom or never?

_____	_____	_____	_____	_____	_____
More Than Once a Week	*Once a Week*	*Once or Twice A Month*	*A Few Times A Year*	*Seldom*	*Never*

Would you describe yourself as either a "born-again" or evangelical Christian?

_____	_____
No	*Yes*

Generally speaking, how often do you feel that you can trust other people?

_____	_____	_____	_____	_____
Always	*Most of the time*	*About half the time*	*Once in a while*	*Never*

Would you say that the government is pretty much RUN BY A FEW BIG INTERESTS looking out for themselves or that the government is run for the BENEFIT OF ALL THE PEOPLE?

_____	_____
Government run by a few big interests	*Government for the benefit of all*

How much of the time do you think that you can trust the federal government in Washington to make decisions in a fair way?

_____	_____	_____	_____	_____
Never	*Rarely*	*Sometimes*	*Quite Often*	*Very Often*

Part 2. For each question or statement please indicate your choice below by placing an "x" above your response (unless instructed otherwise).

We will next ask you some questions related to your opinions about climate change.

Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years and may be increasing more in the future. What do you think? Do you think that global warming is happening?

_____	_____	_____	_____	_____	_____	_____
Definitely is NOT	*Very Likely NOT*	*Probably is NOT*	*Not Sure*	*Probably is*	*Very Likely is*	*Definitely is*

If global warming is happening, to what extent do you think it is caused by human activities, as opposed to natural changes in the environment?

_____	_____	_____	_____	_____	_____	_____
Definitely Human	*Very Likely Human*	*Probably Human*	*Not Sure*	*Probably Natural*	*Very Likely Natural*	*Definitely Natural*

Indicate the extent to which you agree or disagree with the following statement: "Scientists can be trusted to deliver correct and accurate information to citizens about global warming."

_____	_____	_____	_____	_____
Strongly Disagree	*Disagree*	*Neither Agree Nor Disagree*	*Agree*	*Strongly Agree*

Indicate the extent to which you agree or disagree with the following statement: "If everyone does his or her part and works together, we can reverse the adverse effects of global warming."

_____	_____	_____	_____	_____
Strongly Disagree	*Disagree*	*Neither Agree Nor Disagree*	*Agree*	*Strongly Agree*

How willing would you be to purchase an energy efficient vehicle, even if it costs significantly more money to purchase?

_____	_____	_____	_____	_____	_____	_____
Extremely Unwilling	*Moderately Unwilling*	*Somewhat Unwilling*	*Neither Willing Nor Unwilling*	*Somewhat Willing*	*Moderately Willing*	*Extremely Willing*

To what extent do you oppose or support laws and regulations that would limit the nation's green-house gas emission, even if these laws were costly to consumers and businesses?

_____	_____	_____	_____	_____	_____	_____
Strongly Oppose	*Moderately Oppose*	*Slightly Oppose*	*Neither Oppose Nor Support*	*Slightly Support*	*Moderately Support*	*Strongly Support*

Would you be interested in receiving more information (in the form of one email message) about steps you can take to reduce your carbon output?

_____	_____
Yes	*No*

Opinions are often mixed on the advantages of science when compared to the risks involved. To what extent do you believe that any risks in science are outweighed by the information gained from scientific research?

_____	_____	_____	_____	_____
not at all	*to a small extent*	*to a moderate extent*	*to a great extent*	*to a very great extent*

To what extent do you feel that the information gained from scientific research is outweighed by the risks?

_____	_____	_____	_____	_____
not at all	*to a small extent*	*to a moderate extent*	*to a great extent*	*to a very great extent*

How much faith do you have in the ability of science to solve society's problems?

_____	_____	_____	_____	_____	_____	_____
1	*2*	*3*	*4*	*5*	*6*	*7*
Little Faith			*Not Sure*			*Great Faith*

To what extent do you perceive climate change to be an actual threat to Earth and Earth's natural resources?

_____	_____	_____	_____	_____
not at all	*to a small extent*	*to a moderate extent*	*to a great extent*	*to a very great extent*

To what extent do you perceive climate change to be an actual threat to your individual health?

_____	_____	_____	_____	_____
not at all	*to a small extent*	*to a moderate extent*	*to a great extent*	*to a very great extent*

To what extent do you perceive climate change to be an actual threat to the health of other people on the planet?

_____	_____	_____	_____	_____
not at all	*to a small extent*	*to a moderate extent*	*to a great extent*	*to a very great extent*

To what extent do you perceive climate change to be an actual threat to national security?

_____	_____	_____	_____	_____
not at all	*to a small extent*	*to a moderate extent*	*to a great extent*	*to a very great extent*

To what extent do you believe it is your responsibility to maintain and/or improve upon the Earth and its natural resources for future generations?

_____	_____	_____	_____	_____
not at all	*to a small extent*	*to a moderate extent*	*to a great extent*	*to a very great extent*

The seven remaining conditions contained the same information plus the addition of a statement in the form of a frame, politicization or the combination of both in bold font directly underneath the "We will next ask you some questions related to your opinions about climate change" statement in part 2 of the survey.

(Condition 2: Public Health Frame Only)

Climate change poses a danger to public health. It will lead to an environment where deadly conditions such as cholera thrive. Increased temperatures will damage plant life, which will in turn reduce the amount of food available to the human population.

(Condition 3: Morality Frame Only)

Climate change is a moral dilemma and future generations will suffer the most severe consequences. We don't inherit the earth from our ancestors; we borrow it from our children. Caring about our children and their progeny is part of what makes us human.

(Condition 4: National Security Frame Only)

Climate change will pose profound strategic and security challenges to the United States in coming decades, raising the prospect of military intervention to deal with the effects of violent storms, drought, mass migration and pandemics.

(Condition 5: Politicization Only)

Skeptics argue that the climate-change-models scientists use to predict long-term weather patterns rely on a number of questionable assumptions. Politicians often cite such arguments in debates about whether climate change is really happening. The mixed evidence suggests that this debate will continue because the science appears to be unresolved.

(Condition 6: Public Health Frame and Politicization)

Climate change poses a danger to public health. It will lead to an environment where deadly conditions such as cholera thrive. Increased temperatures will damage plant life, which will in turn reduce the amount of food available to the human population.

On the other hand, skeptics argue that the climate-change-models scientists use to predict long-term weather patterns rely on a number of questionable assumptions. Politicians often cite such arguments in debates about whether climate change is really happening. The mixed evidence suggests that this debate will continue because the science appears to be unresolved.

(Condition 7: Morality and Politicization)

Climate change is a moral dilemma and future generations will suffer the most severe consequences. We don't inherit the earth from our ancestors; we borrow it from our children. Caring about our children and their progeny is part of what makes us human.

On the other hand, skeptics argue that the climate-change-models scientists use to predict long-term weather patterns rely on a number of questionable assumptions. Politicians often cite such arguments in debates about whether climate change is really happening. The mixed evidence suggests that this debate will continue because the science appears to be unresolved.

(Condition 8: National Security and Politicization)

Climate change will pose profound strategic and security challenges to the United States in coming decades, raising the prospect of military intervention to deal with the effects of violent storms, drought, mass migration and pandemics.

On the other hand, skeptics argue that the climate-change-models scientists use to predict long-term weather patterns rely on a number of questionable assumptions. Politicians often cite such arguments in debates about whether climate change is really happening. The mixed evidence suggests that this debate will continue because the science appears to be unresolved.

Appendix B

Table 3: T-Tests: Conditions Relative to Control

***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Dependent Variable	Condition/Condition #	Mean/Standard Deviation
Gwarmhap	National Security Frame and Politicization (8)	6 (0.98)***
Gwarmcause	Morality Frame (3)	2.67 (1.51)**
	Politicization (5)	2.66 (1.33)**
	National Security Frame and Politicization (8)	2.59 (1.18)***
Trustscientists	Morality Frame (3)	3.56 (1.03)**
	Politicization (5)	3.59 (0.11)***
	Public Health Frame and Politicization (6)	3.54 (0.92)**
	Morality Frame and Politicization (7)	3.5 (0.86)**
Revwarming	Morality Frame (3)	3.63 (1.09)***
	Politicization (5)	3.73 (0.95)***
	Public Health Frame and Politicization (6)	3.46 (1.10)**
	Morality Frame and Politicization (7)	3.43 (0.80)**
Effvehicles	No significant conditions	N/A (N/A)
Emissionlaws	National Security Frame (4)	4.33 (1.52)*
	Public Health Frame and Politicization (6)	5.02 (1.62)*
Moreinfo	Morality Frame (3)	1.81 (0.39)***
Scirisksinfo	Public Health Frame (2)	3.12 (0.75)***
	Politicization (5)	3.17 (0.86)***
	Public Health Frame and Politicization (6)	3.19 (0.75)***
	National Security Frame and Politicization (8)	3.19 (0.87)***
Sciinforisks	No significant conditions	N/A (N/A)
Faithscience	Public Health Frame (2)	4.44 (1.67)*
	Morality Frame (3)	4.44 (1.62)**
	National Security Frame (4)	4.70 (1.54)***
	Public Health Frame and Politicization (6)	4.90 (1.45)***
	Morality Frame and Politicization (7)	4.5 (1.38)**
	National Security Frame and Politicization (8)	4.37 (1.44)*
Threatearth	Politicization (5)	3.95 (0.92)***
	Morality Frame and Politicization (7)	3.74 (1.11)*
	National Security Frame and Politicization (8)	3.68 (0.88)*
Threatindhealth	Public Health Frame (2)	3.37 (1.02)**
	Politicization (5)	3.66 (1.09)***
	Public Health Frame and Politicization (6)	3.4 (1.03)**
	National Security Frame and Politicization (8)	3.43 (0.84)***

Table 3. Continued T-Tests: Conditions Relative to Control
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Dependent Variable	Condition/Condition #	Mean/Standard Deviation
Threathlthothers	Public Health Frame (2)	3.59 (1.05)***
	Morality Frame (3)	3.44 (0.18)**
	Politicization (5)	3.73 (1.00)***
	Public Health Frame and Politicization (6)	3.71 (0.87)***
	Morality Frame and Politicization (7)	3.40 (1.15)*
	National Security Frame and Politicization (8)	3.61 (0.83)***
Threatsec	Public Health Frame (2)	2.73 (1.07)***
	Morality Frame (3)	2.79 (1.30)***
	National Security Frame (4)	2.70 (1.06)***
	Politicization (5)	2.85 (1.06)***
	Public Health Frame and Politicization (6)	2.85 (1.01)***
	Morality Frame and Politicization (7)	2.60 (1.04)***
	National Security Frame and Politicization (8)	2.85 (1.04)***
Responearth	Public Health Frame (2)	3.81 (0.93)**
	National Security Frame (4)	3.72 (1.00)***
	Politicization (5)	3.88 (0.90)*
	Public Health Frame and Politicization (6)	3.80 (0.93)**
	Morality Frame and Politicization (7)	3.74 (0.99)**

Table 4: Determinants of Support for the Causes of Global Warming, Model 1
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Variable (Condition #)	Coefficient (Standard Error)
Phealthonly (2)	-0.09 (0.24)
Moralonly (3)	-0.34 (0.23)*
Nsecuronly (4)	0.05 (0.23)
Policonly (5)	-0.24 (0.23)
Phealthpolic (6)	-0.01 (0.23)
Moralpolic (7)	-0.04 (0.22)
Nsecurpolic (8)	-0.37 (0.23)*
Yeschristian	0.02 (0.13)
Conservative	0.26 (0.17)*
Male	0.12 (0.12)
Republican	0.25 (0.19)*
Caucasian	0.02 (0.14)
Log-Likelihood/N	-561.79 / 334

Table 5: Determinants of Support for the Causes of Global Warming, Model 2
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Variable (Condition #)	Coefficient (Standard Error)
Phealthonly (2)	-0.09 (0.24)
Moralonly (3)	-0.32 (0.23)*
Nsecuronly (4)	0.02 (0.23)
Policonly (5)	-0.26 (0.24)
Phealthpolic (6)	-0.04 (0.23)
Moralpolic (7)	-0.06 (0.23)
Nsecurpolic (8)	-0.38 (0.24)*
Female	-0.08 (0.12)
Not Christian	-0.04 (0.13)
African American	0.06 (0.13)
Democratic	0.02 (0.13)
Liberal	-0.48 (0.13)***
Log-Likelihood/N	-532.22 / 321

Table 6: Determinants of Trust in Scientists, Ordered Probit Model 1
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Variable (Condition #)	Coefficient (Standard Error)
Phealthonly (2)	0.20 (0.24)
Moralonly (3)	0.32 (0.24)*
Nsecuronly (4)	0.11 (0.24)
Policonly (5)	0.36 (0.24)*
Phealthpolic (6)	0.42 (0.23)**
Moralpolic (7)	0.41 (0.23)**
Nsecurpolic (8)	0.07 (0.24)
Notchristian	0.15 (0.13)
Female	-0.21 (0.12)**
Asian	0.10 (0.18)
Democratic	-0.03 (0.13)
Liberal	0.43 (0.13)***
Log-Likelihood/N	-415.40 / 322

Table 7: Determinants of Trust in Scientists, Ordered Probit Model 2
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Variable (Condition #)	Coefficient (Standard Error)
Phealthonly (2)	0.22 (0.24)
Moralonly (3)	0.41 (0.24)**
Nsecuronly (4)	0.11 (0.23)
Policonly (5)	0.39 (0.24)**
Phealthpolic (6)	0.43 (0.24)**
Moralpolic (7)	0.41 (0.24)**
Nsecurpolic (8)	0.08 (0.24)
Yeschristian	-0.08 (0.13)
Africanamerican	-0.20 (0.13)*
Conservative	-0.21 (0.17)
Republican	-0.24 (0.19)*
Log-Likelihood/N	-419.33 / 322

Table 8: Determinants of Threats to Individual Health, Ordered Probit Model 1
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Variable (Condition #)	Coefficient (Standard Error)
Phealthonly (2)	0.28 (0.24)
Moralonly (3)	0.08 (0.24)
Nsecuronly (4)	0.11 (0.24)
Policonly (5)	0.56 (0.23)***
Phealthpolic (6)	0.38 (0.23)*
Moralpolic (7)	0.38 (0.24)*
Nsecurpolic (8)	0.44 (0.23)**
Yeschristian	-0.06 (0.13)
Female	-0.01 (0.12)
Liberal	0.41 (0.12)***
Caucasian	-0.47 (0.13)***
Log-Likelihood/N	-446.11 / 319

Table 9: Determinants of Threats to Individual Health, Ordered Probit Model 2
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Variable (Condition #)	Coefficient (Standard Error)
Phealthonly (2)	0.28 (0.24)
Moralonly (3)	0.10 (0.24)
Nsecuronly (4)	0.07 (0.24)
Policonly (5)	0.57 (0.24)***
Phealthpolic (6)	0.38 (0.24)**
Moralpolic (7)	0.40 (0.24)**
Nsecurpolic (8)	0.50 (0.24)**
Conservative	-0.66 (0.15)***
Notchristian	-0.07 (0.13)
Multiracial	0.10 (0.14)
Male	-0.03 (0.12)
Log-Likelihood/N	-448.50 / 319

Table 10: Determinants of Threats to Security, Ordered Probit Model 1
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Variable (Condition #)	Coefficient (Standard Error)
Phealthonly (2)	0.41 (0.24)**
Moralonly (3)	0.50 (0.24)**
Nsecuronly (4)	0.46 (0.24)**
Policonly (5)	0.54 (0.24)***
Phealthpolic (6)	0.63 (0.24)***
Moralpolic (7)	0.40 (0.24)**
Nsecurpolic (8)	0.61 (0.24)**
Notchristian	0.02 (0.13)
Moderate	0.07 (0.12)
Multiracial	0.13 (0.14)
Democratic	0.38 (0.12)***
Male	0.10 (0.12)
Log-Likelihood/N	-459.29 / 321

Table 11: Determinants of Threats to Security, Ordered Probit Model 2
***=P<0.01; **=P < 0.05; * P= < 0.10 Based on one tailed t-tests

Variable (Condition #)	Coefficient (Standard Error)
Phealthonly (2)	0.41 (0.24)**
Moralonly (3)	0.48 (0.24)**
Nsecuronly (4)	0.51 (0.24)**
Policonly (5)	0.52 (0.24)**
Phealthpolic (6)	0.61 (0.24)***
Moralpolic (7)	0.46 (0.24)**
Nsecurpolic (8)	0.66 (0.24)***
Female	-0.10 (0.12)
Yeschristian	-0.03 (0.13)
Independent	-0.07 (0.14)
Conservative	-0.28 (0.15)**
Caucasian	-0.44 (0.13)***
Log-Likelihood/N	-455.91 / 321

Appendix C

Table 12: Descriptive Statistics for Control Variables, Independent Variables and Dependent Variables

Variable	Question/Distribution	Mean/Standard Deviation
PartyId	Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or something else? (1= Democratic (43.7%); 2= Republican (16.5%); 3= Independent (25.2%); 4= Other = (14.7%)	N/A
AlgmtParty	Do you think of yourself as closer to the Republican Party or to the Democratic Party? (1= Closer to Republicans (25.1%); 2= Closer to Democrats (58.2%); 3= Neither (16.7%)	1.92 (0.64)
ImpParty	How important is your political party to you personally? (1= Extremely Unimportant (6.6%); 2= Very Unimportant (9.3%); 3= Somewhat Unimportant (17.4%); 4= Neither Important or Unimportant (9.5%); 5= Somewhat Important (29.6%), 6= Very Important (13.2%); 7= Extremely Important (4.5%)	N/A
Gender	Are you male or female? (Male = 39.4%, Female = 60.6%)	N/A
Hispanic	Are you of Hispanic or Latino descent? (No= 89.3%, Yes = 10.8%)	N/A
Race	Please place an “x” next to one or more categories below to indicate your race and ethnicity. (Multi-Racial or Other Ethnicity = 23%, Asian/Pacific Islander = 12.7%, African American = 34.4%, Caucasian American = 29.9%)	N/A
Birth Year	Please write in your response. What year were you born?	1987 (8.09)
Marital Status	Are you currently married? (Married = 11.4%, Unmarried = 88.6%)	N/A
PolIdeo	When it comes to politics, would you describe yourself as liberal, conservative, or neither liberal nor conservative? (Conservative = 22.5%, Moderate = 35.1%, Liberal = 42.3%)	N/A

VoteRegister	Often things come up and people are not able to register to vote. Would records from any state show that you are currently registered to vote or like many others are you not registered at this time? (Yes = 70.8%, No = 29.3%)	N/A
ImpReligion	Now using a scale from zero to then, where zero means not at all important and ten means extremely important, how important is religious faith in your life? Please place an "x" inside the circle next to your choice. (Not at all (0) = 9.6%, (1) = 3.6%, (2) = 5.1%, (3) = 5.1%, (4) = 2.7%, Moderately important (5) = 8.4%, (6) = 4.8%, (7) = 8.7%, (8) = 9.3%, (9) = 9.6%, Extremely important (10) = 33.4%)	6.65 (3.47)
RelAttend	Aside from weddings and funerals, how often do you attend religious services? More than once a week, once a week, one or twice a month, a few times a year, seldom or never? (Once a week or more = 29.4%, Once or twice a month = 17.4%, A few times a year = 44.1%, Never = 9%)	N/A
Christian	Would you describe yourself as either a "born-again" or evangelical Christian? (No = 69.2%, Yes = 30.8%)	N/A
TrustPeople	Generally speaking, how often do you feel that you can trust other people? (Always or most of the time = 29.3%, About half of the time = 37.3%, Rarely = 27.2%, Never = 6.3%)	N/A
GovtBenefit	Would you say that the government is pretty much RUN BY A FEW BIG INTERESTS looking out for themselves or that the government is run for the BENEFIT OF ALL THE PEOPLE? (Few big interests = 79.4%, Benefit of all = 20.6%)	N/A
TrustGovt	How much of the time do you think that you can trust the federal government in Washington to make decisions in a fair way? (Rarely or never = 32.2%, Sometimes = 56.3%, Often = 11.5%)	N/A
GWarmHap	"Do you think that global warming is happening?" (1= Definitely is not (1.2%); 2= Very likely not (2.7%); 3= Probably is not (3.3%); 4= Not Sure	5.65 (1.39)

	(12.2%); 5= Probably is (18.8%); 6= Very likely is (27.2%); 7= Definitely is (34.6%)	
GWarmCause	"If global warming is happening, to what extent do you think it is caused by human activities, as opposed to natural changes in the environment?" (1= Definitely human (15.6%); 2= Very likely human (31.4%); 3= Probably human (22.8%); 4= Not Sure (16.5%); 5= Probably natural (6.3%); 6= Very likely natural= (6%); 7= Definitely natural (1.5%)	2.90 (1.46)
TrustScientists	Agreement with "Scientists can be trusted to deliver correct and accurate information to citizens about global warming." (1= Strongly disagree (2.7%); 2= Disagree (11.9%); 3= Neither agree nor disagree (36.7%); 4= Agree (37.3%); 5= Strongly agree (11.3%)	3.43 (0.94)
RevWarming	Agreement with "If everyone does his or her part and works together, we can reverse the adverse effects of global warming." (1= Strongly disagree (2.7%); 2=Disagree (17.6%); 3= Neither agree nor disagree (29.9%); 4= Agree (37.3%); 5= Strongly agree (12.5%)	3.39 (1.00)
EffVehicles	"How willing would you be to purchase an energy efficient vehicle, even if it costs significantly more money to purchase?" (1= Extremely unwilling (5.1%); 2= Moderately unwilling (8.7%); 3= Somewhat unwilling (15.5%); 4= Neither Willing nor unwilling (11.9%); 5=Somewhat willing (32.2%); 6= Moderately willing (17.9%); 7= Extremely willing (8.7%)	4.46 (1.60)
EmissionLaws	"To what extent do you oppose or support laws and regulations that would limit the nation's green-house gas emission, even if these laws were costly to consumers and businesses?" (1= Strongly oppose (3.3%); 2= Moderately oppose (6.6%); 3= Slightly oppose ;(9.9%) 4= Neither oppose nor support (22.4%); 5= Slightly support (23.9%); 6= Moderately support (21.5%); 7= Strongly support (12.5%)	4.72 (1.54)
MoreInfo	"Would you be interested in receiving more information (in the form of one email message) about steps you can take to reduce your carbon output?" (1= Yes (34.6%); 2= No (65.4%)	1.65 (0.48)

SciRisksInfo	"To what extent do you believe that any risks in science are outweighed by the information gained from scientific research?" (1= Not at all (4.2%); 2= To a small extent (17.4%); 3= To a moderate extent (55.1%); 4= To a great extent (17.1%); 5= To a very great extent (6.3%)	
SciInfoRisks	"To what extent do you feel that the information gained from scientific research is outweighed by the risks?" (1= Not at all (7.3%); 2= To a small extent (18.7%); 3= To a moderate extent (51.1%); 4= To a great extent (19.3%); 5= To a very great extent (3.6%)	2.93 (0.90)
FaithScience	"How much faith do you have in the ability of science to solve society's problems?" (1= Little faith (5.4%); 2= (7.5%); 3= (9.9%); 4= Not sure (23%); 5= (29.9%); 6= (17.3%); 7= Great faith (7.2%)	4.45 (1.52)
ThreatEarth	"To what extent do you perceive climate change to be an actual threat to Earth and Earth's natural resources?" (1= Not at all (3%); 2= To a small extent (10.5%); 3= To a moderate extent (30.5%); 4= To a great extent (34.1%); 5= To a very great extent (21.9%)	3.61 (1.03)
ThreatIndHlth	"To what extent do you perceive climate change to be an actual threat to your individual health?" (1= Not at all (5.1%); 2= To a small extent (16.3%); 3= To a moderate extent (37.4%); 4= To a great extent (25.9%); 5= To a very great extent (15.4%)	3.30 (1.07)
ThreatHlthOthers	"To what extent do you perceive climate change to be an actual threat to the health of other people on the planet?" (1= Not at all (3%); 2= To a small extent (13.8%); 3= To a moderate extent (33.5%); 4= To a great extent (32.6%); 5= To a very great extent (17.1%)	3.47 (1.02)
ThreatSec	"To what extent do you perceive climate change to be an actual threat to national security?" (1= Not at all (14.4%); 2= To a small extent (29.6%); 3= To a moderate extent (35.3%); 4= To a great extent (13.8%); 5= To a very great extent (6.9%)	2.69 (1.09)

ResponEarth	"To what extent do you believe it is your responsibility to maintain and/or improve upon the Earth and its natural resources for future generations?" (1= Not at all (1.8%); 2= To a small extent (6%); 3= To a moderate extent (24%); 4= To a great extent (38.9%); 5= To a very great extent (29.3%)	3.88 (0.96)
Condition	1= Control (12.8%); 2= Public Health Frame Only (12.2%); 3= Morality Frame Only (12.8%); 4= National Security Frame Only (12.8%); 5= Politicization Only (12.2%); 6= Public Health Frame and Politicization (12.2%); 7= Morality and Politicization (12.5%); 8= National Security and Politicization (12.2%)	N/A (N/A)