

UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

HEROES AND VILLAINS: CULTURAL NARRATIVES, MASS OPINIONS, AND

CLIMATE CHANGE

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

DOCTOR OF PHILOSOPHY

By

MICHAEL D. JONES

Norman, Oklahoma

2010

HEROES AND VILLAINS: CULTURAL NARRATIVES, MASS OPINIONS, AND CLIMATE  
CHANGE

A DISSERTATION APPROVED FOR THE  
DEPARTMENT OF POLITICAL SCIENCE

BY

---

Dr. Hank C. Jenkins-Smith, Chair

---

Dr. Ronald Keith Gaddie

---

Dr. Dan M. Kahan

---

Dr. Glen Krutz

---

Dr. Paul Spicer



## TABLE OF CONTENTS

|   |   |     |
|---|---|-----|
|   | LIST OF TABLES  | vii |
|   | LIST OF FIGURES   | ix  |
|   | ABSTRACT  | x   |
| 1 | MASS OPINIONS, PUBLIC POLICY, AND CLIMATE CHANGE                    | 1   |
|   | 1.1 Public Opinion and Public Policy: Why Should We Care?           | 3   |
|   | 1.2 Climate Change and the Downsian Issue Attention Cycle           | 10  |
|   | 1.2.1 Scientific Assessment, 1827-1988                              | 13  |
|   | 1.2.2 Agenda-Setting, 1988-1992                                     | 17  |
|   | 1.2.3 Policy Frameworks, 1992-1997                                  | 20  |
|   | 1.2.4 National Targets and Timetables, 1998-2012                    | 24  |
|   | 1.3 The Science of Climate Change                                   | 33  |
|   | 1.4 Scientific Dissent: A Vocal and Well Funded Opposition          | 40  |
|   | 1.5 Public Opinion and Climate Change                               | 46  |
|   | 1.6 Scientific Consensus and Public Dissonance: Why the Difference? | 54  |
|   | 1.6.1 The Knowledge-Deficit Model                                   | 55  |
|   | 1.6.2 Sensationalistic Media Coverage and Journalistic Norms        | 58  |
|   | 1.6.3 Assessing the Models  | 63  |
|   | 1.7 Cultural Stories  | 66  |
|   | 1.7.1 Profligacy: An Egalitarian Story                              | 68  |
|   | 1.7.2 Lack of Global Planning: A Hierarchical Story                 | 69  |
|   | 1.7.3 Business as Usual: An Individualistic Story                   | 69  |
|   | 1.8 Conclusion  | 70  |
| 2 | THE CULTURAL NARRATIVE MODEL, DATA, AND RESEARCH DESIGN             | 72  |
|   | 2.1 The Cultural Narrative Model (CNM)                              | 74  |
|   | 2.1.1 Affect  | 75  |
|   | 2.1.2 II. Cognition: Online and Memory Based Processing             | 78  |
|   | 2.1.3 Endogenous Priors   | 79  |
|   | 2.1.3.1 III. Demographics   | 79  |
|   | 2.1.3.2 IV. Knowledge   | 80  |
|   | 2.1.3.3 V. Belief Systems: Partisanship and Ideology                | 81  |
|   | 2.1.3.4 VI. Belief Systems: Cultural Theory                         | 81  |
|   | 2.1.4 VII. Exogenous Stimulus: Cultural Narrative                   | 87  |
|   | 2.1.5 Mechanisms of Persuasion                                      | 90  |
|   | 2.1.5.1 Congruence and Incongruence                                 | 90  |
|   | 2.1.5.2 Narrator Trust  | 91  |
|   | 2.2 Research Design, Data, and Methodology                          | 92  |
|   | 2.2.1 Sampling and Data Collection                                  | 94  |

|   |       |   |     |
|---|-------|---|-----|
|   | 2.2.3 | RQ1: Narrative Structure  | 96  |
|   | 2.2.4 | The Control List  | 97  |
|   | 2.2.5 | Cultural Narrative Structure  | 99  |
|   | 2.2.6 | RQ2: Cultural Narrative Content   | 106 |
|   | 2.3   | CT Measures and Construct Validity  | 112 |
|   | 2.3.1 | Cultural Theory Metrics   | 113 |
|   | 2.3.2 | Cultural Narrative and Construct Validity                                       | 116 |
|   | 2.4   | Conclusion  | 118 |
| 3 |       | NARRATIVE STRUCTURE AND MASS OPINIONS ON CLIMATE CHANGE                         | 119 |
|   | 3.1   | Narrative Structure and Non-Directionally Specified Relationships               | 124 |
|   | 3.2   | Narrative Structure and Directionally Specified Relationships                   | 128 |
|   | 3.3   | Narrative Structure and Cultural (In)Congruence                                 | 136 |
|   | 3.4   | Narrative Structure, Narrator Trust, and Cultural (In)Congruence                | 137 |
|   | 3.5   | Narrative Structure, Risk, and Cultural (In)Congruence                          | 140 |
|   | 3.6   | Cultural Congruence, Cultural Type, and Character Affect                        | 142 |
|   | 3.7   | Narrative Structure, Cultural (In)Congruence, and Policy Solutions              | 151 |
|   | 3.8   | Discussion and Conclusion   | 156 |
| 4 |       | NARRATIVE CONTENT AND MASS OPINIONS ON CLIMATE CHANGE                           | 161 |
|   | 4.1   | Cultural Theory and Opinions on Climate Change                                  | 161 |
|   | 4.2   | Cultural (In)Congruence, Narrative Content, and Mass Opinions on Climate Change | 168 |
|   | 4.3   | Narrative Content, Characters, the Moral of the Story, and Congruence           | 174 |
|   | 4.4   | Discussion and Conclusion   | 183 |
| 5 |       | CHARACTERS AND NARRATIVE PERSUASION   | 189 |
|   | 5.1   | Summary Findings for Narrative Structure and Content                            | 193 |
|   | 5.2   | Character Affect and Mass Opinions on Climate Change                            | 200 |
|   | 5.3   | CNM Reconsidered: Narrative Implications for Climate Change Opinion             | 212 |
|   |       | REFERENCES  | 218 |
|   |       | APPENDIX A: GLOBAL CLIMATE CHANGE SURVEY, 2009                                  | 231 |
|   |       | APPENDIX B: CULTURAL NARRATIVE SENTENTIAL CONTENT COMPARISON                    | 267 |
|   |       | APPENDIX C: CONTROL VARIABLE DESCRIPTIVE STATISTICS                             | 275 |

|   |     |
|---|-----|
| APPENDIX D: DEPENDENT VARIABLE DESCRIPTIVES   | 279 |
| APPENDIX E: NARRATIVE STRUCTURAL DEPENDENT VARIABLES:<br>AUTHOR TRUST AND NARRATIVE AFFECT    | 284 |
| APPENDIX F: NARRATIVE STRUCTURE AND PERCEPTIONS OF RISK<br>ABOUT CLIMATE CHANGE               | 285 |
| APPENDIX G: NARRATIVE STRUCTURE, CLIMATE CHANGE OPINION, AND<br>WILLINGNESS TO REDUCE GHG'S   | 286 |
| APPENDIX H: NARRATIVE STRUCTURE AND GROUP AFFECT  | 287 |
| APPENDIX I: NARRATIVE STRUCTURE AND THE MORAL OF THE STORY                                    | 288 |
| APPENDIX J: INDIVIDUALIST CULTURAL NARRATIVE TREATMENT<br>AND CULTURAL THEORY, OLS ESTIMATES  | 289 |
| APPENDIX K: HIERARCH CULTURAL NARRATIVE TREATMENT AND<br>CULTURAL THEORY, OLS ESTIMATES       | 290 |
| APPENDIX L: EGALITARIAN CULTURAL NARRATIVE TREATMENT AND<br>CULTURAL THEORY, OLS ESTIMATES    | 291 |
| APPENDIX M: INDIVIDUALIST CULTURAL NARRATIVE TREATMENT<br>AND CHARACTER AFFECT, OLS ESTIMATES | 292 |
| APPENDIX N: HIERARCH CULTURAL NARRATIVE TREATMENT AND<br>CHARACTER AFFECT, OLS ESTIMATES      | 293 |
| APPENDIX O: EGALITARIAN CULTURAL NARRATIVE TREATMENT<br>AND CHARACTER AFFECT, OLS ESTIMATES   | 294 |

## LIST OF TABLES

|     |   |     |
|-----|---|-----|
| 1.1 | Important Events in the Evolution of Climate Policy.                                  | 16  |
| 1.2 | The Obama Campaign’s Climate Change Prescriptions, 2008.                              | 31  |
| 1.3 | Methods of Directly Assessing Climate Change.   | 36  |
| 1.4 | Proxy Data and Climate Change   | 37  |
| 1.5 | Scientific Organizations Endorsing the IPCC (2007) Report.                            | 39  |
| 1.6 | Influential Conservative Think Tanks Addressing Climate Change Between 1990 and 1997. | 41  |
| 1.7 | Major Conservative Critics of Climate Change  | 42  |
| 1.8 | General Public Objective Knowledge Measures, 1994 and 2000.                           | 49  |
| 1.9 | Public Trust of Scientists on the Environment.  | 54  |
| 2.1 | General Survey Population Demographics.   | 95  |
| 2.2 | Control and Cultural Narrative Text Comparison.                                       | 98  |
| 2.3 | Survey Progression Question Coding  | 100 |
| 2.4 | Cultural Narrative Content Variation, by Experimental Track                           | 108 |
| 2.5 | Cultural Narrative Content Comparison, by Structural Category                         | 109 |
| 2.6 | Cultural Theory Survey Questions  | 113 |
| 2.7 | Strength of Cultural Type   | 114 |
| 2.8 | Strong Cultural Type, by Experimental Track   | 115 |
| 2.9 | Strong Cultural Type Group Affective Evaluations Paired Comparisons                   | 117 |
| 3.1 | Narrative Structure Hypotheses, Survey Questions, and Measurement                     | 123 |
| 3.2 | Narrative Structure and Key Non-Directional Dependent                                 | 126 |

|     |   |     |
|-----|---|-----|
|     | Variable Summary (OLS Estimates)  |     |
| 3.3 | Narrative Structure and Key Directional Dependent Variable Summary (OLS Regression Estimates) | 131 |
| 3.4 | Narrative Structure, Author Trust, and Cultural (In)Congruence                                | 139 |
| 3.5 | Narrative Structure, Risk, and Cultural (In)Congruence  | 141 |
| 3.6 | Narrative Structure, the Cast of Characters, and Cultural (In)Congruence                      | 146 |
| 3.7 | Narrative Structure, the Moral of the Story, and Cultural Incongruence                        | 153 |
| 3.8 | Hypotheses Tests  | 157 |
| 4.1 | Cultural Theory and Opinion Related Dependent Variables, OLS Regression Estimates.            | 163 |
| 4.2 | Narrative Structure Hypotheses, Survey Questions, and Measurement.                            | 170 |
| 4.3 | Narrative Content, Cultural (In)Congruence, and Opinions on Climate Change.                   | 173 |
| 4.4 | Example of Character Treatments in Opposing Cultural Narratives.                              | 175 |
| 4.5 | Narrative Content and Cultural (In)Congruence: Characters And Policy Solutions.               | 180 |
| 5.1 | Character Affect and Opinion Related Dependent Variables, OLS Estimates.                      | 206 |



## LIST OF FIGURES

|     |  |     |
|-----|--|-----|
| 1.1 | Climate Change and the IAC.  | 12  |
| 1.2 | Climate Change Awareness, 1986-2006.   | 47  |
| 1.3 | Self-Reported Climate Change Knowledge, 1992-2007.                                 | 48  |
| 1.4 | Mass Public Belief in Anthropogenic GHG's as a Cause of Climate Change, 1997-2002. | 50  |
| 1.5 | Mass Public Belief that Climate Change is Happening, 1997-2007.                    | 51  |
| 1.6 | What the Public Believes Most Scientists Believe, 1994-2006.                       | 52  |
| 1.7 | Public Opinion of Scientific Consensus, 1997-2007.                                 | 53  |
| 1.8 | Public Perception of the Media's Perception of Climate Change 1997-2007.           | 60  |
| 2.1 | The Cultural Narrative Model (CNM).  | 76  |
| 2.2 | Cultural Theory Grid and Group Typology.   | 84  |
| 2.3 | Cultural Theory Myths of Nature.   | 86  |
| 2.4 | Experimental Progression, by Track.  | 93  |
| 5.1 | Character Affect by Cultural Narrative Treatment, Percent "Don't Know" Responses.  | 204 |

## ABSTRACT

Global climate change is easily identified as one of the most pressing and contentious policy problems facing not only the United States, but the human race. In a democratic society such as our own, understanding the public's capacities and tendencies in processing information and forming opinions about climate change has serious and far-reaching policy implications. Historically quite low, public knowledge about climate change is now on the rise, as is the importance of the issue on the public agenda (Leiserowitz, 2005). Consequently, it is not unreasonable to expect the public, for better or worse, to play a larger role in future climate policy melees. In light of the prospect of an increasingly important public role in shaping policy contours, this dissertation seeks to test how and why individuals form opinions and assessments of risk about climate change. In order to address these questions, two theories that account for both individual internal factors and external stimuli in opinion formation and change are merged to create a Cultural Narrative Model (CNM).

The first, Cultural Theory (CT), argues that there are four exclusive value orientations to which individuals subscribe based upon preferred levels of group interaction and the degree that these groups are expected to constrain the individual's beliefs and behavior. These value orientations are always present and influence how incoming information is processed (Wildavsky, 1987; Thompson et al., 1990). CT has a proven history of explaining variation in opinion and risk perceptions (Wildavsky & Dake, 1990); however, the influence of message structures in CT scholarship is lacking. This

research operationalizes narrative theory to address this gap. Seeking to determine if cultural narratives help explain variations in climate change opinion related dependent variables, two research questions are addressed:

**RQ1:** *Narrative Structure:* Does narrative structure influence opinions related to climate change?

**RQ2:** *Cultural Narrative Content:* Does cultural narrative content explain variation in opinions related to climate change?

Specific hypotheses derived from the above research questions are tested using an online internet survey with a built in experimental design. Four experimental tracks are employed, including a control list and three cultural narrative treatments. Several statistical tools, including analysis of variance and OLS regression analysis are used to assess each hypothesis. The survey sample consists of roughly fifteen-hundred nationally representative respondents surveyed from within the United States.

Findings indicate that while cultural content does not appear to influence opinions about climate change, narrative structure plays a powerful role in shaping opinion. Specifically, findings show that the vehicle through which narrative structure persuades is the hero character. Examining eleven climate change opinion related variables, as positive affect for the hero increases so too do respondent preferences and beliefs in direction specified by the cultural narrative treatments.

## CHAPTER 1: MASS OPINIONS, PUBLIC POLICY, AND CLIMATE CHANGE

Most Americans, including the majority of the scientific community (IPCC, 2007), believe climate change is real and are concerned about the potential consequences (Leiserowitz, 2005). Nevertheless, despite near-consensus on the reality of climate change and high levels of overall public concern, the causes, consequences and solutions for climate change continue to be hotly debated. While most scientists accept human produced greenhouse gases (GHG's) as a principal cause of climate change (IPCC, 2007), a nontrivial fraction of the public in the United States have resisted such arguments (Leiserowitz, 2005, p. 1440). Why? Certainly potential consequences here in the United States provide motivation to at least consider a reduction in GHG's:

- In the Northeast, there is 90% likelihood that coastlines will be exposed to coastal erosion.
- In polar regions such as Alaska, infrastructure and native ways of life are 80% likely to suffer significant harm from the effects of climate change.
- It is 80% likely that heat waves in cities like Chicago will increase in number, intensity, and duration during the course of the century.
- It is 66% likely that the Great Plains area will experience more severe summer droughts and a 90% likelihood that increased springtime flooding will damage crop yields.
- There is 80% certainty that warming in western mountains will lead to decreased snowpack, more winter flooding and reduced summer flows, which would increase competition for water in many western states.

—IPCC Report, 2007

However, reactions to these predictions vary. Some find them alarming; some may find them terrifying; others will find the predictions unsettling; some reject them as alarmist or will simply not care; yet others think they are deliberately deceptive. It is

within this diversity of opinions that we can begin to explain how an extraordinary problem like climate change, adorned with large-scale consequences and scientific consensus, has encountered such varied responses. In part, the historical effectiveness of the resistance can be attributed to the issue's historically low salience, which may be attributable to the public's beliefs and perceptions. Therefore, this research seeks to explain how and why individuals believe what they do in relation to this highly charged issue.

The following sections proceed as follows: first, the reasoning behind why we should be concerned about the general relationship between public opinion and public policy is addressed. Next, a brief history of the development of climate change policy and the science that accompanies it is summarized. Emphasis in these sections targets the contestable nature of these developments and how public opinion fits into and even helps shape the controversies about climate change. Following an overview of the policy and science of climate change, the next section catalogs the various explanations preceding this research for how and why mass opinions diverge from the high levels of scientific consensus on climate change. The conclusions offered by previous scholarship suggest that divergent public opinion is best explained by climate change knowledge deficits (e.g., Kellstadt et al., 2008) and directed by misrepresented scientific controversy in primary media outlets (e.g., Boykoff & Boykoff, 2007). That is, if people simply knew more and the media were more responsible, previous scholars conclude, the public would display similar levels of consensus to that of the scientific community. Arguing that there is room for improvement in our scientific understanding of the

public's opinions about climate change, this chapter concludes by summarizing recent narrative scholarship that may provide valuable insights about how and why people hold the opinions they do. The discussion of climate change narratives concludes by drawing special attention to the cognitive interactions that take place in the human mind, where one's cultural priors are theorized to heavily bias the processing of information and how the mass public may be susceptible to narratively structured messages (i.e., stories).

### **1.1 Public Opinion and Public Policy: Why Should We Care?**

*Public opinion is critical because it is a key component of the socio-political context within which policy makers operate. Public opinion can fundamentally compel or constrain political, economic and social action to address particular risks. For example, public support or opposition to climate policies (e.g., treaties, regulations, taxes, subsidies, etc.) will be greatly influenced by public perceptions of the risks and dangers of climate change. Further, successfully mitigating or adapting to climate change will require changes in the behavior of billions of human beings, who each day make individual choices that collectively have enormous impacts on the Earth's climate.*

–Anthony Leiserowitz, Public Opinion and Climate Change Scholar (2007, p. 3).

Social scientists disagree on the essential nature of public opinion and how said opinion influences governmental institutions and public policy. Succinctly summarizing these disagreements, Herron and Jenkins-Smith (2006) characterize public opinion scholarship engaging in these debates as consistent with one of two accounts: traditionalist and revisionist. The traditionalist account produces findings consistent with the notion that the public is hapless and whimsical, where public opinion is

directed by elites. On the other hand, revisionist findings suggest that although the public may come up short in substantive knowledge in most policy areas, through intellectual heuristics and cognitive short cuts, the public does consistently organize its opinions around belief systems and, at least in the aggregate, is “smart enough” to guide public policy.

Walter Lippman (1922; 1925; 1955) is the modern era intellectual grandfather of the traditionalist account. In Lippman’s earlier and broadly recognized work, titled *Public Opinion* (1922), he expresses severe doubts regarding the public’s capacities, arguing that elites must direct an apathetic and ill-informed public. Lippman later extends this pessimistic notion of the public, referring to the masses as a “bewildered herd” (1925, p. 155), by arguing that the public is prone to manipulation by special interests and likely to be mobilized for only short periods of time (1925). By 1955, Lippman’s case against public opinion extends specifically to complex policy areas, especially national security. He eloquently argues that the involvement of the public in these complex areas overwhelms governmental capacities and, in many cases, disrupts any meaningful action on the part of political institutions (1955).

Whereas Walter Lippman may be characterized as providing the modern impetus to view public opinion with distrust through elegant argumentation and qualitative research techniques, Phillip Converse’s early work can be viewed as providing the empirical ammunition to give the traditional view substantive traction (1962; 1964). Employing survey data coupled with the advanced statistical techniques of the time, Converse (1964) found that ideology, measured in terms of liberalism and

conservatism, does not structure both elite and mass opinions. Rather, elites, with their higher levels of education, employ abstract political beliefs such as ideology while the public varies in its capacity to do so, dependent upon several constraints—especially education. The disturbing conclusion of Converse’s study indicated that the vast majority of the public cannot link the abstract concept of ideology to political parties and, consequently, changes in preferences among the mass public are at worst near-random, or at best quite prone to elite manipulation. If one takes these findings seriously, which many have, the consequences for representative government are severe. Converse’s findings call into question the very possibility of representation. The normative conclusions surfacing from Converse’s findings were straightforward, which either implored political elites to act as stewards of opinion, or more cynically sought to engage in wholesale manipulation of the public. In short, Converse’s finding, building as it were on Lippman’s persuasive case, affirmed earlier fears of the masses and solidified the view in political science that pluralistic government, where group interests are represented by elite leadership, is best. Subsequent findings affirm Converse’s 1964 finding.

Studies demonstrating public ignorance are plentiful as one need not dig very deep to find that the public lacks both detailed policy knowledge and general knowledge of the American political process (see, for example, Gilens, 2001), which Converse found to be a very strong indicator of whether or not an individual displayed a coherent political belief system (i.e. ideology). Further buttressing the ominous 1964 finding, Zaller’s classic study, *The Nature and Origins of Mass Opinion* (1992), finds that



individual opinions are largely formed on the spot by survey respondents. Modeled off of Converse's 1962 and 1964 studies, Zaller finds that individuals respond to survey questions based upon current considerations, or information and attitudes that have been recently evaluated by the survey respondent. As a result, individuals are susceptible to manipulation through elite communications.<sup>1</sup> Zaller, like Converse, finds these effects are most pronounced in individuals with lower levels of policy knowledge and education (1992). Zaller's foundational study is held up as a paragon of public opinion scholarship, cited over 2,500 times since 1992.<sup>2</sup> Building upon the foundational findings of Lippman, Converse, and Zaller, a plethora of studies have been produced affirming the traditional view of public opinion (for an overview of this literature, see Converse, 2000). Despite the massive popularity of the traditionalist approach, a collection of recent findings challenge the traditional understanding of public opinion.

Dubbed the revisionist approach to public opinion (Herron & Jenkins-Smith, 2006), this collection of research generally finds that opinions do cohere around central organizing belief systems (Jenkins-Smith, Mitchell, & Herron, 2004; Hurwitz & Peffley, 1987) and that even if the public's knowledge is wanting, low-information rationality is sufficient to form durable (Page & Shapiro, 1992; Shapiro & Page, 1988; 1994) and consistent views about public policy (e.g., Lupia & McCubbins, 1998) through organizing devices such as simplifying heuristics (Sniderman, Brody, & Tetlock, 1991). Revisionist research finds that individual opinion coheres around organizing principles such as

---

<sup>1</sup> Indeed, much of the subsequent framing research following Zaller's work supports this assertion. See Druckman (2001) for a prescient discussion of framing research as it may relate to traditional and revisionist conceptions of public opinion.

<sup>2</sup> Google Scholar search performed March 24, 2009.

culture (e.g., Kahan & Braman, 2006) or public mood (Erikson, MacKuen, & Simsom, 2002), while also finding that the seemingly random individual opinion variation reported by Converse and Zaller is cancelled out in the aggregate (Stimson, MacKuen, & Erikson, 1995; Erikson, MacKuen, & Stimson, 2002). Contra traditionalist findings, revisionists demonstrate a cogent public that structures political beliefs and opinions around consistent and identifiable organizing principles. However, whether one subscribes to the traditionalist or revisionist schools of public opinion, an important question remains: does public opinion matter for public policy? If the traditionalists are correct, then a consistent relationship between public opinion and public policy would be disastrous, while a consistent relationship between public opinion and public policy for the revisionists speaks to what many would see as a normatively preferable manifestation of democratic governance.

A recent study examines our macro-understanding of the relationship between public policy and public opinion. Burstein (2003), performing a meta-analysis of thirty of the most notable and cited works in public opinion and public policy scholarship, finds that “public opinion affects public policy three-quarters of the time” (2003, p. 36). Furthermore, governmental institutions are most responsive to public opinion on issues with high salience (Burstein, 2003), while low salience policies favor special interests (Burstein, 2006). Importantly, in these high-salience policy areas, public opinion remains important even when controlling for elite behavior (Burstein, 2003).<sup>3</sup> Clearly

---

<sup>3</sup> Burstein does, however, illuminate several deficiencies in our understanding of the relationship between public opinion and public policy. In general, the studies examined by Burstein (2003; 2006) are too often cross-sectional and driven by researcher interest.

then, whether traditionalist or revisionist, public opinion influences public policy.

Importantly, that influence is likely to be largest when the issue is salient.

Is climate change a high salience issue? Recent survey data provides insight on the issue of salience as it relates to climate change in the United States. Observing trends in numerous public opinion polls in the United States, Leiserowitz (2003; 2006) finds that since the year 2000:

- 92% of Americans are aware of climate change.
- 74% believe that climate change is real and underway.
- 61% believe that there is scientific consensus on the reality of climate change
- 76% view climate change as a somewhat to very serious problem (2006, p. 46).

However, the issue of salience is not as straight forward as one might infer from the above data. Historically the issue of climate change, when ranked comparatively to other issues such as taxes, has rated quite low with the American public. Annual Gallup polls ask respondents to state which problem facing the nation is the most important. Between the years 1970 and 2005, relevant polls report less than 4% of respondents citing climate change in each year.<sup>4</sup> For example, in a 2000 "...Gallup Poll, the environment ranked 16<sup>th</sup> on Americans' list of most important problems facing the

---

As a consequence, Burstein argues that generalization is suspect as research overwhelmingly focuses on salient issues and lacks the time-series analysis necessary to state with any definitive authority that these relationships hold over time.

<sup>4</sup> The data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant number SBR 9320922, and were distributed through the Department of Government at the University of Texas at Austin and/or the Department of Political Science at Penn State University. Neither NSF nor the original collectors of the data bear any responsibility for the analysis reported here

country” (Leiserowitz, 2006, p. 46). Importantly, within the broad category of environmental issues (almost always rated lower than economic and security issues), climate change is on the rise. In 2000, climate change was rated by Americans a paltry 12<sup>th</sup> of 13 possible environmental issues (Dunlap & Saad, 2001, cited in Leiserowitz, 2005). A more recent poll conducted July 2008, finds 25% of Americans citing climate change as the number one environmental problem.<sup>5</sup> In sum, it appears that recent polling data point to a trend in climate change salience that indicate both an increasing public awareness and sense of public importance, despite the fact that climate change is not generally considered one of the more pressing national problems.

Buttressing the identified trends in polling data, highly visible entertainment events may also be contributing to public concern and awareness about climate change, pushing the issue ever closer to where past research on public opinion and public policy would predict some level of public opinion influence. For example, research finds that the Hollywood film depicting catastrophic climate change, *The Day After Tomorrow* (2004), raised viewers efficacy, knowledge, and general concern in the United Kingdom (Lowe et al., 2006), and one might easily infer similar results here in the United States. More recently, former Vice President Al Gore’s popularized and highly successful film in 2006, *An Inconvenient Truth*, grossed close to 25 million<sup>6</sup> dollars and helped Gore

---

<sup>5</sup> ABC News/Planet Green/Stanford University Poll. July 23-28, 2008. N=1000 adults nationwide. MoE +/- 3. Fieldwork by TNS: <http://www.pollingreport.com/enviro.htm>. Accessed March 24, 2009.

<sup>6</sup> <http://boxofficemojo.com/genres/chart/?id=documentary.htm>. Accessed March 24, 2009.

achieve a Grammy, an Academy Award, and a joint Nobel Peace Prize<sup>7</sup> in 2007 with the Intergovernmental Panel on Climate Change (IPCC). Although there is insufficient empirical data and analysis to link these high profile events directly to climate change salience in the United States, one may reasonably conjecture that high profile entertainment dealing with the issue of climate change contributes to raising the issue's salience.

Previous research indicates that it is under conditions of high salience that we can expect public opinion to matter most to policy design and outcomes. Climate change, at the very least, approaches this threshold and thus examining how the public forms and maintains opinions about climate change is warranted as we can expect public opinion to play some role in shaping climate change policy. Moving from the claim that understanding the relationship between public opinion and climate change is one worth making, the following section elaborates this point by summarizing the historical evolution of climate change policy and the current scientific understanding, both as they relate to public opinion.

## **1.2 Climate Change and the Downsian Issue Attention Cycle**

The Downsian Issue Attention Cycle (IAC) is a common organizing framework or heuristic to discuss the evolution of issues and their relevant policies (Downs, 1972), especially as that evolution relates to public opinion. Observing that the American public's attention is finite and is captured by different domestic issues in varied

---

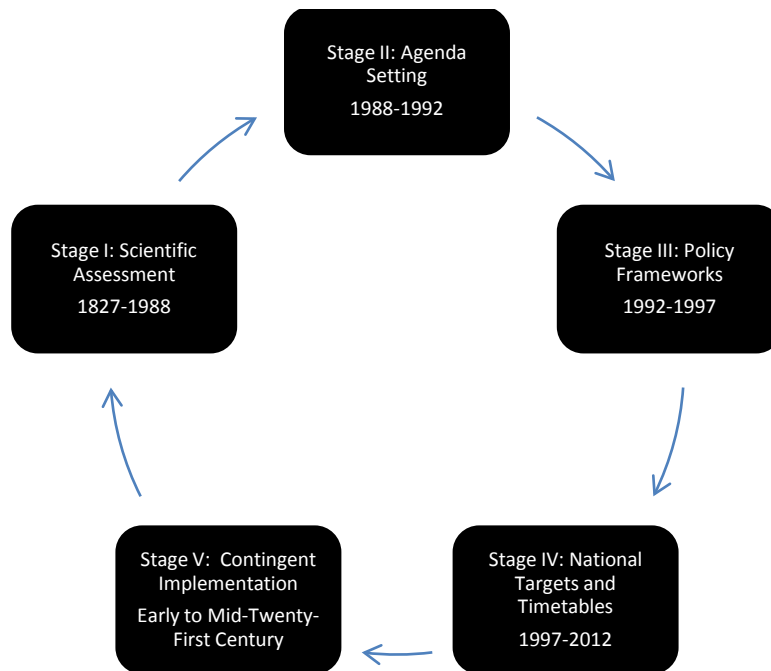
<sup>7</sup> [http://nobelprize.org/nobel\\_prizes/lists/all/](http://nobelprize.org/nobel_prizes/lists/all/). Accessed March 24, 2009.

contexts, Downs defined issues as developing along a cycle of attention, where the issue occupies one of five stages (1972, p. 38-39). Downs defined these sequential stages (1972, pp. 39-41):

1. **The Pre-problem stage:** Downs argued that during the pre-problem stage some highly undesirable social condition exists, but has yet to capture the public's attention (p. 39).
2. **Alarmed Discovery and Euphoric Enthusiasm:** The public suddenly becomes aware of the issue through some focusing event or other means. This increased awareness is coupled with a sense of optimism that the problem can be solved, if only the proper amount of resources are allocated.
3. **Realizing the Cost of Significant Progress:** The public becomes aware of the costs associated with the potential solutions. These costs usually expand beyond monetary and detail sacrifices that will have to be made. The optimism of the earlier phase begins to fade.
4. **Gradual decline of Intense Public Interest:** As the costs become clear, public interest declines as individuals act in one of three ways: "some people just get discouraged; others feel positively threatened by thinking about the problem...others simply become bored" (Downs, 1972 p. 40). At this time some other issue is entering stage two and displacing this issue.
5. **The Post-Problem Stage:** The issue has been displaced by other issues. However, it is likely that public institutions and programs have been developed to address perceived threats and problems. These institutions endure, allowing the issue to gain more attention than others in the pre-problem stage (e.g., the War on Poverty). The success of these policies and programs is sporadic, often contingent on catching the public's attention again.

The IAC has been employed to detail both the general evolution of environmental policy (Downs, 1972; also see Parsons, 1995, p.116) and, more specifically, climate change (Hempel, 2003; McComas & Shanahan, 1999; Trumbo, 1996). As this research is concerned with linkages between climate change public opinion and climate change public policy, the IAC is an appropriate heuristic for detailing the history of climate

**Figure 1.1** Climate Change and the IAC. *Source:* Modeled from Hempel, 2003.



change policy and science as the IAC “...focuses largely on the level and nature of public attention rather than on the responses of government” (Peters & Hogwood, 1985, p.239) The following interpretation of the historical development of climate change policy and science in the United States employs an IAC framework, leaning primarily on the work of Hempel (2003), supplemented by other authors.<sup>8</sup> Figure 1.1 illustrates a slightly modified version of Hempel’s (2003) adaptation of the IAC framework to the issue evolution of climate change as that evolution relates to public attention.

---

<sup>8</sup> General climate change knowledge, detailing historical findings and policy developments, is summarized based on a number of sources: (Weart 2003; 2008a; 2008b; Hempel, 2003; Leiserowitz 2003; 2005; 2006; 2007; and Kraft, 2007). Direct citations are used when author insights or findings are used directly. However, commonly known facts related to the development of climate change are not cited as they are widely available to the general public.

### **1.2.1 Stage I: Scientific Assessment, 1827-1988**

Typical of the IAC pre-problem phase, stage I (1827-1988) is characterized by an incremental progression of the scientific understanding of the various inputs to the climate system that facilitate climate change, and much later in stage I, a feel for what the consequences of climate change might entail. The warming effect of increased greenhouse gasses on the planet was first identified by Jean-Baptiste Fourier in 1827 (Leiserowitz, 2007). Linking this effect to human activity, the first calculations indicating that man made CO<sub>2</sub> would facilitate global warming were produced in 1896 by a Swedish chemist Svante Arrhenius (Dessler & Parson, 2006; Weart, 2008a; Leiserowitz, 2007). Arrhenius, similar to present day predictions, predicted that doubling the amount of CO<sub>2</sub> in the atmosphere would lead to temperature increases of 5-6 degrees centigrade (Leiserowitz, 2007). However unlike today, Arrhenius predicted the changes would take place thousands of years in the future and looked forward to these changes, as he equated warming with prosperity—producing more abundant crops and more livable conditions (Weart, 2008a).

Some fifty years later and working out of Mauna Loa Observatory in Hawaii in 1957, Charles Keeling found that there were empirically verifiable increases in atmospheric CO<sub>2</sub> (Leiserowitz, 2007, p. 2). In that same year, an oceanographer named Charles Revelle found that the additional CO<sub>2</sub> produced by human beings could not be adequately absorbed by the world's oceans (Weart, 2008a). Both findings provided valuable insights into what human induced increases in CO<sub>2</sub> may entail for the global climate. Shortly thereafter in 1958 an astronomy finding related to our neighboring



planet Venus provided an ominous picture of what a runaway greenhouse effect could do to a planet. Data demonstrated that the greenhouse effect on Venus had raised the planet's surface to temperatures exceeding 800 degrees Fahrenheit, temperatures that far exceed conditions necessary for life. Further forecasting the potential consequences of climate change, subsequent studies in 1968 of the Antarctic suggested that the melting of polar ice sheets would result in a rise in sea levels (Weart, 2008a). Given that a large percentage of the world's population live in areas in close proximity to coastlines, these findings began to generate concern in the scientific community that even a modest increase in global temperatures could generate significant problems for a substantial percentage of the human race. These findings converged in the assessment years to provide the impetus to identify climate change as a problem.

Indeed, some have suggested that the rise of climate change as a potential problem, among many more salient environmental issues, contributed to the inauguration of an era of bi-partisan cooperation between Republicans and Democrats in American politics concerning environmental issues during the late 60's and throughout the 70's (Dunlap et al. 2001; also see Webber, 2008). Correlated to the increased bipartisanship, nongovernmental actors, buttressed by very high levels of public support, became increasingly involved in environmental policy in the United States. During this same time period, environmental groups such as Greenpeace (est. 1971) and environmental research groups such as the Worldwatch Institute (est. 1974) established themselves as fixtures in American politics (Gough & Shackley, 2001). Increasingly, many of these groups were able to market themselves as "representing a

portion of public opinion that is not adequately represented elsewhere in the policy process” (Gough & Shackley, 2001, p. 329).

Events in the mid to late 70’s contributed to both a better understanding of climate change processes and an increasing sense within the general public that climate change was a problem worth dealing with. Contributing to a better understanding of climate change inputs, during the 1970’s chlorofluorocarbons (CFC’s)(1975), ozone (1976), and deforestation were all identified as contributing factors to the greenhouse effect (Weart, 2008a). In 1979 the oil embargo by OPEC and the subsequent crisis that forced many Americans to pass their days in lengthy lines for gasoline began to merge discussions of energy and environmentalism, drawing positive attention to renewable energy while simultaneously generating negative attention for nuclear energy (Weart, 2008a). By 1979, institutional actions parallel public sentiment as the UN Environmental Program formally established the World Climate Program and sponsored the first World Climate Conference (Hempel, 2003). However, as the United States entered the 1980’s, shifts in the political landscape would inhibit climate change’s rise on the public agenda.

Brown (1994) finds that partisan shifts in government have substantial influence over the substance and frequency of environmental policies. In the case of climate change, Brown’s findings hold true. The election of Republican Ronald Regan in 1980 illustrates Brown’s point. Reagan’s administration was openly hostile to environmental regulation, effectively associating conservative ideology with anti-environmentalism and much of the goodwill and cooperation of the 1970’s began to dissipate. That is, the

**Table 1.1.** Important Events in the Evolution of Climate Policy. *Source:* Hempel, 2003, pp. 304-306.

**Stage I**

1979 World Meteorological Organization and UN Environmental Program Establish World Climate Program and sponsor first World Climate Conference.

**Stage II**

1988 Summer weather disasters are linked by news media to climate change; NASA scientist James Hansen testifies about climate threats before the US Senate (July); United Nations establishes Intergovernmental Panel on Climate Change (IPCC).

1989 Leaders participating in the G-7 Summit endorse proposal for an international climate protection treaty.

1990 IPCC First Assessment released, projecting mean global temperature increases of 3.5-8 C by the year 2050; Second World Climate Conference convened; UN establishes International Negotiating Committee to draft Framework Convention on Climate Change.

1992 Framework Convention on Climate Change signed by more than 150 nations meeting at the Earth Summit in Rio de Janeiro.

**Stage III**

1993 Clinton proposes energy consumption tax—the “BTU tax”—which is opposed by a majority in Congress; Clinton observes Earth Day with pledge to stabilize U.S. greenhouse gas emissions at 1990 levels by 2010 (April); United States announces Climate Change Action Program based on voluntary actions (October).

1995 First Conference of the Parties (COP-1) is held in Berlin (March-April) resulting in Berlin mandate, which exempts developing countries from any limits on emissions adopted in the near future.

1996 Parties attending COP-2 in Geneva (May) endorse second IPCC Assessment, which includes projections of mean global temperature increases of 1.8-6.3 C by 2100 and a statement that “discernable human influence” on climate systems was now evident. The U.S. in a reversal of position, endorses idea of binding emissions reduction targets.

1997 Clinton addresses special session of the United Nations, calling for “realistic and binding limits” on emissions, but offering no specific targets for the U.S. (June). Senate Resolution passed 95-0 instructing the Clinton administration to refrain from signing any forthcoming protocol that does not include measures to be undertaken by developing countries (July). Clinton announces that the U.S. will commit to reducing emissions to 1990 levels by 2012 and then pursue further reductions (October). COP-3 is held in Kyoto, Japan (December), leading to agreements in concept on a protocol for binding emissions targets and timetables.

**Stage IV**

1998 The Kyoto Protocol is signed by the U.S. at COP-4 in Buenos Aires, Argentina (November). Parties develop rules for achieving legally binding emissions reductions, averaging 6-8 percent below 1990 levels, by sometime between the years 2008-2012.

1999 COP-5 takes place in Bonn, Germany, (October-November). Parties consider technical and political mechanisms needed to implement the Kyoto Protocol.

2000 Talks collapse at COP-6 in the Hague, Netherlands (November) because of disagreements between the U.S. and the European Union over “flexibility mechanisms.”

2001 President George W. Bush rejects the Kyoto Protocol but pledges unspecified support for climate research and future action. U.S. National Research Council releases report (June) indicating climate change impacts may become severe by the end of the century. Talks resume in Bonn (July), with most parties agreeing to proceed without U.S. support. The IPCC’s Third Assessment is released, providing new and stronger evidence of climate risks. COP—7 in Marrakech Morocco, ends with late-hour agreement on rules to implement Kyoto protocol.

2002 Bush administration announces voluntary climate change plan to achieve modest improvements in U.S. emissions intensity (ratio of greenhouse gas emissions t total gross domestic product)

consensus approach to environmental policy begins to rapidly fade as Reagan's administration made party lines more distinct at the elite level which quickly translated to the public writ large (Dunlap et al., 2001).

Despite the steady partisan politicization of climate change and other environmental issues, a 1983 report by the US National Academy of Sciences and the Environmental Protection Agency continued to help elevate the issue of climate change in the public eye. However, and relative to future media coverage of climate change, overall media attention directed at climate change remained low (Trumbo, 1996). Ultimately, the incremental discoveries revealing the various inputs on climate change and the role of human actions in facilitating those inputs during this first stage inspired an increasingly alarmed reaction in the scientific community. However, due to the increasing partisan division over climate change, the public as a whole was slow to embrace the scientific community's assessment and it wasn't until 1988 that climate change would come to be considered a genuine threat by a sizable portion of the American public.

### **1.2.2 Stage II: Agenda Setting, 1988-1992**

Both climate change scholars (e.g., Trumbo, 1996; Hempel, 2003) and historians (e.g., Weart, 2003; 2008a) agree that several events of 1988 converged to catapult climate change from its status of relative obscurity to one of truly contending for public and institutional attention. In 1988 we begin to see climate change legitimately competing amongst a host of other more perennial episodic issues such as the Contras of Nicaragua

and more stable issue concerns such as the economy (Weart, 2008a). Many natural events primed the public to pay attention to the issue of climate change in the US as 1988 was a year characterized by record droughts and record heat (Weart, 2008a). At the time, 1988 was the hottest year on record since the mid-1800s (Leiserowitz, 2007). These localized weather conditions had a tendency to prompt news outlets to cover climate change (Shanahan & Good, 2000). Indeed, the droughts and heat waves (Weart, 2008a) and catalytic events such as the fires that raged through Yellowstone National Park September that year (Trumbo, 1996) were all linked by media outlets to climate change. In the case of the Yellowstone fires, the linkages were erroneous (or at the very least, spurious), but nevertheless they were made and climate change was increasingly pushed to the forefront of American discourse.

If any one event can be characterized as the moment climate change manifested officially on the national agenda, it occurred in July 1988. James Hansen, director of the NASA Goddard Institute of Space Studies, testified to Congress that the greenhouse effect was in fact a reality and that its effects were occurring now (Hempel, 2003; Leiserowitz, 2007, p. 3; Weart, 2003; 2008a). This testimony became front page news across not only the United States, but the globe (Leiserowitz, 2007, p.3). This testimony, primed as it was by the various events of that year, provided a clear point of demarcation where media attention given to climate change was far greater than any previous coverage (Trumbo, 1996). Climate change was officially on the public's radar, and now vying for governmental attention. In terms of the Downsian IAC, 1988

epitomizes a period of alarmed discovery, where the following few years can be viewed as a brief period of euphoric optimism.

Institutional responses, at least internationally, followed the sentiments set forth by the scientific community and increasingly embraced by international constituencies. In 1988 the United Nations established the Intergovernmental Panel on Climate Change (IPCC) (Hempel, 2003). Nearly a year later, in 1989, government leaders from around the world endorsed a proposal for an international climate protection treaty at the G-7 summit (Hempel, 2003). However, as public opinion became increasingly important in climate change debates, forces opposing change quickly mobilized. In 1989 the Global Climate Coalition was formed. This group, "...a hard line group of multinationals, aggressively resisted moves to restrict fossil fuel use..." (Gough & Shackley, 2001, p.334). This opposition tended to manifest itself as attacks on science, focusing on the uncertainty of findings and "recklessly" cost-prohibitive solutions (Weart, 2008a). For example, one of arguments that received some traction advanced in 1991 argued that climate change was caused by solar influences (Weart, 2008a). Despite efforts by this group and others, the institutional infrastructure to deal with climate change continued to grow, yet, and as the Downsian IAC would predict, the cost of progress was increasingly a focus—especially by forces opposed to taking action.

In 1990, the IPCC issued its First Assessment. Projections from the first assessment predicted mean global temperature increases of 3.5-8 degrees centigrade (Hempel, 2003). During that same year the Second World Climate Conference took place, and a committee was established to draft the Framework Convention on Climate Change

(Hempel, 2003). In 1992, the Framework Convention on Climate Change took place at the Earth Summit in Rio de Janeiro, Brazil (Hempel, 2003). One-hundred and fifty nations signed the treaty (Hempel, 2003), including the United States (Dolsak, 2001).

Overall the agenda-setting phase of the climate change issue is characterized by increased institutional response capabilities for climate change issues, coupled with increasing discussion of the possible policy solutions in the United States. However, concurrent with these specified characterizations, the issue of climate change also became increasingly politicized, with anti-climate change forces in the United States increasingly associated with conservatism and the Republican Party. In short, the agenda-setting period is characterized by increased media attention (McComas & Shanahan, 1999; Trumbo, 1996), moving away from the consequences centered coverage of the late 80's and steadily moving toward a more politicized discourse, centering on scientific uncertainty and economic considerations (McComas & Shanahan, 1999).

### **1.2.3 Stage III: Policy Frameworks, 1992-1997**

Relative to the previous era, the third stage of the Downsian Issue Attention Cycle is characterized by a sharp decline in media attention from 1992 to 1994 (Trumbo, 1996). It is also worth mentioning that environmental issues as a whole did not take center stage during the early 1990's. McComas et al. (2001) find that between 1991 and 1997, fictional and non-news environmental programming peaked in 1993, and stabilized at relatively low levels in the late 1990's. However, in relation to other

programming, the overall environmental content was quite low, leading McComas et al. (2001) to conclude that by 1997, “environmental issues are not a frequent source material for US television narratives” (p.539). Moreover, of the top six environmental issues receiving the publicity of television narratives, climate change was not one of them (McComas et al., 2001). Despite the relatively low salience of environmental issues and climate change with the public (relative to the previous era), policy makers were increasingly taking advantage of the institutional infrastructure created since 1988.

In 1993 the Clinton administration proposed a BTU tax designed to tax energy consumption (Hempel, 2003). During that same year, President Clinton pledged to stabilize greenhouse gasses to their 1990 levels by 2010—on Earth Day no less (Hempel, 2003). Towards the end of that year, the US announced the Climate Change Action program, relying primarily on voluntary as opposed to coercive measures (Hempel, 2003). However, and contrary to the trend in the US to accommodate industry interests, the UN Framework Convention on Climate Change (FCCC) took effect as international law in 1994 (Bodansky, 1995, p. 426). Seen by many as the world’s primary institutional response to climate change, the FCCC’s approach was to produce legally-binding (i.e., coercive) policies that would resist carbon emissions (Brunner, 2001).

Organized interests in United States, such as the Global Climate Coalition vehemently resisted any attempt at coercive measures or policies. The organized presence of such powerful anti-climate change forces produced a discourse in the US



that was markedly different from that of other Western countries (see McCright & Dunlap, 2003), where the reality of global climate change was rarely questioned (Leiserowitz, 2007). By 1994, the issue of climate change had become sufficiently politicized in the United States that scientists were being cited less frequently than interest group and political sources by various outlets, and the dimension of the debate had shifted from “a presentation of the issue in terms of its causes and problematic nature and toward a presentation more grounded in political debate and the proposal of solutions” (Trumbo, 1996, p. 281). Perhaps fortuitously for the anti-climate change regulation forces, the Republicans took congress in 1994. Climate change had become a full-fledged and contested political issue in the US.

While anti-climate change forces were gaining traction, the scientific community, working through existing institutional structures, inched closer to a more precise understanding of climate change. In 1995, the IPCC produced a second report indicating that a doubling of atmospheric CO<sub>2</sub> was likely to take place around the middle of the 21<sup>st</sup> century, and that these changes are likely related to human activity (Weart, 2008). Concurrently, scientific findings and media reports of the breakup of Arctic ice sheets begin shaping the public’s opinion about the potential consequences of warming to coastal areas (Weart, 2008a). Deliberative processes inched along as well. During March and April of that same year, the First Conference of Parties (COP-1) is held in Berlin, resulting in a mandate that exempted developing countries from soon to be adopted emissions limits (Hempel, 2003). In 1996, the second conference of Parties (COP-2) endorses the second IPCC assessment and the notion that humans are causing

global climate change (Hempel, 2003). The US, moving policy prescriptions away from simple voluntary solutions, agrees to legally-binding emissions targets (Hempel, 2003). This move by the US is clearly a move away from the conservative position that had recently dominated U.S. policy. However, along with exemptions for developing countries, what many in the U.S. perceived to be coercive policy measures provided powerful argumentative ammunition against climate change regulations that anti-regulation forces were able to capitalize on.

In December, 1997, the third Conference of Parties (COP-3) was held in Kyoto, Japan. Prior to the conference, President Bill Clinton, speaking at a special session of the UN, called for “realistic and binding limits” on greenhouse gas emissions (Hempel, 2003, p. 305). July of that year and prior to the Kyoto meeting, the U.S. Senate performed an unprecedented action and passed the Hagel-Byrd resolution (95-0) instructing the Clinton administration to not sign any agreement that does not bind developing nations as well (Hempel, 2003; McCright & Dunlap, 2003). The negotiations in Kyoto nearly broke down; however, the United States, under the guidance of a pro-emissions regulation Clinton Administration, did eventually agree to exempt poorer countries from the emissions standards, at least temporarily (Weart, 2008a). The treaty still needed to be ratified by a conservative Senate.

In the fall of 1997, the Clinton administration launched a public relations campaign designed to garner support for the Kyoto treaty. Despite large levels of preexisting public support for the values imbedded in the Kyoto protocol, the conservative non-regulation movement, having developed considerable inertia since

1990, was able to effectively rely on its hardened partisan base and considerable resources to sell an effective counter message (McCright & Dunlap, 2003). The message of the anti-regulatory forces was three-fold:

1. The evidence for climate change was weak and uncertain;
2. even if the weak evidence were accurate, the effects of climate change would likely be beneficial; and
3. any solution to a evidentiary weak problem, that may be beneficial to boot, would simply be too costly in terms of both resources and sacrifices to our way of life (McCright & Dunlap, 2003 p. 354).

Stage III is characterized by increased institutional capacities in both an international and a domestic sense for action on climate change. Through these institutions various policy responses were formulated and attempted, but little policy was actually implemented in the U.S. Much of this failure can be attributed to anti-regulatory interests. Although certainly stunting meaningful action on the scientific understanding of climate change as a problem, the anti-regulation interests were able to muster sufficient resources to refocus attention on the costs of potential solutions and, ultimately, moderate the initial enthusiasm expressed by the American public. In short, policy frameworks were in place, but both media and public attention had declined and, to some extent, policy makers were less willing to endorse coercive regulatory approaches to the perceived problem.

#### **1.2.4. Stage IV: National Targets and Timetables, 1998-2012**

Foreshadowing to many the fruits climate change might yield, 1998 produced a rare El Nino event, which in turn was critically linked to potent weather disasters and

produced the hottest year ever recorded (Weart, 2008a). Perhaps facilitated by this rare climate setting and despite objections from a Republican dominated legislature, the Clinton administration signed the Kyoto Protocol at COP-4 in Buenos Aires in November, 1998 (Kraft, 2007, p.261), signifying a new phase of the IAC, where climate change solutions manifest in national targets and timetables (Hempel, 2003). Indicative of this phase is a more focused response by pro-regulation forces, arguing more forcefully for coercive regulatory measures. For example, by signing the Kyoto Protocol, the Clinton Administration parts ways with past approaches and agrees to coercive legally-binding regulations for emissions standards and also agrees to a reduction of GHG's that is 6-8 percent below the greenhouse gas levels of 1990 by a tentative timetable falling somewhere between 2008 and 2012 (Hempel, 2003). Attempting to circumvent the obvious resistance such a treaty would invoke from conservative forces in the United States, however, the plan endorsed by the Clinton Administration embraced extensive opportunity for emissions trading between U.S. companies and developing nations (Kraft, 2007, pp. 261-262). The process, however, of forming a Kyoto treaty that is enforceable proves a difficult task. In 1999, COP-5 in Bonn, Germany provides some headway into providing such a treaty as technical and political mechanisms for enforcing Kyoto are discussed; however, in 2000 talks break down at COP-6 over disagreements about these mechanisms (Hempel, 2003). At the end of the Clinton Administration in 2000 the Kyoto protocol had still not been ratified by the U.S. Senate.

Despite what might be labeled as systemic or institutional resistance to climate change regulation (i.e., a Republican Congress), several developments suggest that anti-

regulation forces were steadily losing ground. In 2000, the same year Georg W. Bush was elected to the Presidency, the Global Climate Coalition (GCC) dissolves as many companies defect in the face of more compelling scientific evidence and a groundswell of support emanating from the American public convinced of the reality of climate change begins to emerge (Weart, 2008a). The insurance industry, for example, found it increasingly difficult to ally itself with the GCC as the insurance companies have an inherent interest in understanding the types of disasters climate change is likely to produce (Weart, 2008a).

Notwithstanding pro-regulation support, conservative institutional obstacles thwarted attempts to effectively both acknowledge climate change and take meaningful action in the United States. Most notably, in 2001 the new Bush Administration openly rejects Kyoto, arguing that:

...the agreement would weaken the U.S. economy and create inequities by exempting developing nations from the treaty's requirements. In its place, the administration called for additional scientific research and urged U.S. companies to set voluntary targets for reduction in GHG's (Kraft, 2007, p. 262).

Offering ambiguous commitments to support climate change research and unenthusiastic commitments to future action (Hempel, 2003), the administration quietly aligned itself with the fossil fuel industry by promoting policies that increased the use of fossil fuels (Kraft, 2007, p. 262). While the Bush Administration is ratcheting up policies that increase fossil fuel consumption, potential climate change consequences are forecasted by the U.S. National Research Council, which issues reports strongly indicating that climate change effects may become severe by the end of the 21<sup>st</sup> century

(Hempel, 2003). Internationally and moving forward despite institutional resistance in the U.S., talks continue in Bonn, Germany, and the IPCC releases its third assessment (Hempel, 2003).

In 2002 the political winds seemingly shift in favor of the pro-regulation forces as the Bush administration publicly acquiesces to pressure and openly acknowledge climate change may be a problem worth consideration; perhaps symbolically, the administration announces a voluntary plan for U.S. industries to reduce emissions (Hempel, 2003). In spite of public acknowledgements such as the aforementioned voluntary plan, the administration was still quite hostile to emissions regulation and sought to discipline administrative and bureaucratic subordinates who disagreed publicly with the administration's position on regulation. Kraft (2007) describes the plight of one subordinate who deviated from message:

...the Bush administration sought to replace Dr. Robert T. Watson, who for six years had served as the chair of the UN-sponsored Intergovernmental Panel on Climate Change (IPCC). Responding to pleas from energy and automobile industry lobbyists, the White House and State Department pressed for someone who was less outspoken on climate change issues (Kraft, 2007, p. 262).

To many observers the half-hearted acknowledgements of the Bush Administration were largely symbolic, but by 2003 it is becoming increasingly difficult to resist the pressures put on the administration by pro-regulation forces. First, scientific data was piling up indicating that the collapse of ice sheets in Antarctica and Greenland could raise sea levels significantly and rapidly in some scenarios (Weart, 2008a). Second and indicative of each of the IAC phases, catalytic weather and climate events continued to elevate the salience of climate change. For example, a scorching summer heat wave

in 2003 engulfed Europe. The European heat wave had the effect of exacerbating differences between U.S. and European policy stances on climate change (Weart, 2008a), as well as the public's perceptions of the issue (Leiserowitz, 2007). And third, by 2004, climate change had migrated to entertainment in the form of books, art, and movies (Weart, 2008a). For example, in May, 2004, the film *the Day After Tomorrow* was released. The film depicts a rapid and very unlikely climate change event where the world is plummeted into an ice age in a matter of days. The film has the dual effect of raising awareness levels and viewer's expressed levels of interest in acting on climate change (Balmford et al., 2004; Lowe, et al. 2006). However, due to the dramatizations within the film, individuals were no more knowledgeable about agreed upon scientific findings (actual changes in temperature, for example) (Balmford et al., 2004; Lowe et al., 2006).

By 2005, it is becoming incredibly difficult for individuals and groups to deny the scientific position that finds average global temperature increases and that humans have a role in those increases (Kraft, 2007, p. 262). Evidencing this point, even previously ardent deniers begin to join the believers. Kriz, (2005) describes this conversion for Pete Domenici, a Republican of New Mexico (July, 2005):

I have come to accept that something is happening with the Earth's climate," Sen. Pete Domenici, R-N.M., chairman of the Senate Energy and Natural Resources Committee, declared at a July 21 hearing on climate change. "I am looking for a solution, but I am not going to join the crowd that thinks it will be simple, [or] that thinks Kyoto was the solution.... So, we've got to talk about something else (Kriz, 2005).

In line with Domenici, the Senate Passes a non-binding resolution: "...saying to combat climate change the United States must turn to mandatory restrictions on

Greenhouse Gases” (Kraft, 2007, pp. 262-263). Although non-binding, the resolution’s symbolic nature is amplified by visible defections from the ranks of anti-regulatory forces as major corporations such as Dupont and GE begin to openly recognize the need to deal with climate change (Kraft, 2007, p. 263, citing Kriz, 2005), as do traditionally conservative groups, such as many Christian denominations (Kraft, 2007, p. 263). Individual states appear to be following suit as well as many begin to adopt and implement policies designed to deal with the perceived threat of climate change. Kriz (2005) summarizes these policies:

Twenty-one states and the District of Columbia require their electricity providers to get part of their power from renewable or other low-pollution sources of energy. In June, California Gov. Arnold Schwarzenegger issued an executive order calling on state officials to slash greenhouse-gas emissions to 80 percent below 1990 levels by 2050; the California Legislature favors a less ambitious goal. Arizona, New Mexico, and North Carolina have proposed or are studying ways to reduce emissions of greenhouse gases within their borders (Kriz, 2005).

Perhaps crystallizing the reality of climate change in the minds of both citizens and policy makers, yet again a rare weather event is linked by various outlets to climate change when hurricane Katrina tears through the states bordering the Gulf of Mexico in 2005 (Weart, 2008a). 2005 was a defining year for those advocating policies that would deal with climate change.

Building on the momentum of the previous couple of years, the fourth IPCC report was released in 2007 on the heels of yet another catalytic heat wave that swept across Europe in 2006. The report, more so than ever before, linked the reality of mean global temperature increases to human generated greenhouse gasses. More



importantly, the report also emphasized anticipated costs and benefits as it made clear the cost of doing something now about climate change would go a long way in offsetting the damage that doing nothing would cause in the future (IPCC, 2007; Weart, 2008a). The reality of an increase in global mean temperatures had set in and the belief that human beings were a significant cause of it, by 2007, had become the dominant opinion of the scientific community and resonated with much of the American public (discussed more in a subsequent section). The policy solutions and options were also becoming increasingly clear. Writing in 2007, Selin & Vandeever predicted that US climate change policy would take on the following characteristics:

1. A national cap on GHG's
2. A national market based cap-and-trade GHG emissions trading scheme
3. Mandatory renewable energy standards
4. Increased national product standards for energy efficiency
5. Increased vehicle fleet energy efficiency standards
6. Increased federal incentives for research and development on energy efficiency issues and renewable energy development (Selin & Vandeever, 2007 p. 18).

Selin and Vandeever's predictions were correct. The newly elected Obama administration took office January, 2009. United under three themes including a pledge to eliminate U.S. dependence on foreign oil, the generation of jobs in a newly generated green sector of the economy, and a commitment to reduce greenhouse gasses, the Obama policy prescriptions for climate change mirror those predicted by Selin and Vandeever (2007). Table 2 summarizes the Obama campaigns promises. These campaign promises reflect a newly invigorated effort on the part of the U.S. government to regulate carbon emissions.

**Table 1.2.** The Obama Campaign’s Climate Change Prescriptions, 2008. *Source:* Obama Campaign pledges, [http://my.barackobama.com/page/content/newenergy\\_more#emissions](http://my.barackobama.com/page/content/newenergy_more#emissions) (Accessed April 13, 2009)

**Eliminate Our Current Imports from the Middle East and Venezuela within 10 Years**

|   |  |
|---|--|
| Increase Fuel Economy Standards.                                    | Obama and Biden will increase fuel economy standards 4 percent per year while providing \$4 billion for domestic automakers to retool their manufacturing facilities in America to produce these vehicles.   |
| Create a New \$7,000 Tax Credit for Purchasing Advanced Vehicles.   |  |
| Get 1 Million Plug-In Hybrid Cars on the Road by 2015.              | These vehicles can get up to 150 miles per gallon. Barack Obama and Joe Biden believe we should work to ensure these cars are built here in America, instead of factories overseas.  |
| Establish a National Low Carbon Fuel Standard.                      | Obama and Biden will establish a National Low Carbon Fuel Standard (LCFS) to reduce the carbon in our fuels 10 percent by 2020. Obama and Biden will also require 60 billion gallons of advanced biofuels to be phased into our fuel supply by 2030.                                       |
| A “Use it or Lose It” Approach to Existing Oil and Gas Leases.      | Obama and Biden will require oil companies to develop the 68 million acres of land (over 40 million of which are offshore) which they have already leased and are not drilling on.   |
| Promote the Responsible Domestic Production of Oil and Natural Gas. | An Obama-Biden administration will establish a process for early identification of any infrastructure obstacles/shortages or possible federal permitting process delays to drilling in the Bakken Shale formation, the Barnett shale formation, and the National Petroleum Reserve-Alaska. |

**Create Millions of New Green Jobs**

|  |  |
|--|--|
| Ensure 10 percent of Our Electricity Comes from Renewable Sources by 2012, and 25 percent by 2025. |  |
| Deploy the Cheapest, Cleanest, Fastest Energy Source -- Energy Efficiency.                         | Obama and Biden will set an aggressive energy efficiency goal -- to reduce electricity demand 15 percent from projected levels by 2020.  |
| Weatherize One Million Homes Annually.   | Obama and Biden will make a national commitment to weatherize at least one million low-income homes each year for the next decade, which can reduce energy usage across the economy and help moderate energy prices for all. |
| Develop and Deploy Clean Coal Technology.  | Obama’s Department of Energy will enter into public private partnerships to develop five “first-of-a-kind” commercial scale coal-fired plants with clean carbon capture and sequestration technology.                        |
| Prioritize the Construction of the Alaska Natural Gas Pipeline.                                    | As president, Obama will work with stakeholders to facilitate construction of the pipeline. Not only is this pipeline critical to our energy security, it will create thousands of new jobs.                                 |

**Reduce our Greenhouse Gas Emissions 80 Percent by 2050**

|  |   |
|--|---|
| Implement an economy-wide cap-and-trade program to reduce greenhouse gas emissions 80 percent by 2050. | The Obama-Biden cap-and-trade policy will require all pollution credits to be auctioned, and proceeds will go to investments in a clean energy future, habitat protections, and rebates and other transition relief for families.   |
| Make the U.S. a Leader on Climate Change.  | Obama and Biden will re-engage with the U.N. Framework Convention on Climate Change (UNFCCC) -- the main international forum dedicated to addressing the climate problem. They will also create a Global Energy Forum of the world’s largest emitters to focus exclusively on global energy and environmental issues. |

While the governmental institutions, including the newly elected administration, have come to regard climate change and carbon emissions as a problem worthy of action, one might expect that the public would fall more in line with institutional responses and elite cues. For the most part the public has, but the strong current of public support for anti-regulatory efforts generated in the 80's and 90's has left a substantial residue of skepticism, producing non-trivial public resistance to policies such as those proposed by the Obama Administration. It is this resistance, and how that resistance influences policy, that will shape the final phase of the IAC as specified by Hempel (2003).

The final phase of the IAC, Stage V, Hempel (2003) characterizes as taking shape subsequent to a full articulation of timetables and national targets. Stage V (contingent implementation), Hempel suggests, will be an era of climate change policy development defined by the effectiveness of the remaining resistance (2003, p.315). In a sense, the research offered in this dissertation attempts to help us understand how effective that resistance may continue to be. To be sure, the remaining climate change deniers in the United States cannot be characterized as a majority, but the amount of individuals in the general public that do not agree with the scientific community's assessment is not trivial either. Importantly, many individual deniers carry significant public clout such as Senator James Inhofe of Oklahoma and will most certainly present significant obstacles to regulatory efforts.

The next several sections of chapter one attempt to better illuminate both the magnitude and substance of the differences between the scientific community and the American public. Therefore, the next section briefly outlines what evidence science has come to accept as compelling in relation to climate change. Emphasis in this section culminates in a discussion of what evidence has been contested and who and potentially why the evidence has been challenged. It is not as straightforward as some might anticipate. Next, the evolution of public opinion on several dimensions of climate change is discussed. Finally, the major social scientific explanations for the differences between scientific and public opinion are detailed, with a focus on why there may be room for improvement. This final discussion focuses on cultural narratives and transitions to the thrust of the research offered in this dissertation, which endeavors to integrate the successes of previous social scientific models, while also adequately accounting for deficiencies.

### **1.3 The Science of Climate Change**

Since the early 1980s a robust international consensus about the reality and seriousness of climate change has emerged, as evidenced by several comprehensive reports from the National Academy of Sciences (National Research Council 1983, 2001), Intergovernmental Panel on Climate Change (1990, 1995, 2001), and World Climate Program (1985). By the early 1990s, the environmental community in the United States— comprised of members of the environmental movement, sympathetic climate scientists, and environmental policy makers— successfully defined climate change, or anthropogenic (human-induced) climate change, as a legitimate social problem.

—McCright & Dunlap, 2003, p. 348

“The Earth’s temperature is determined by the relationship between incoming radiation the Earth absorbs from sunlight and the radiation it emits back to space” (Dessler & Parson, 2006, p. 7). Given the Earth’s distance from the sun, a warming effect is necessary to produce the comfortable conditions that allow for the prevalence of life on the planet. Without a warming effect the Earth’s temperature would be approximately -20 degrees Celsius (Dessler & Parsons, 2006, p. 8). The Earth’s warming effect is caused by the cloak of greenhouse gasses constituting the atmosphere. The greenhouse gasses trap or inhibit the reflection of solar radiation back into space. The current and (for the most part) historical balance of these greenhouse gasses with other gasses allows for a comfortable mean temperature around the globe of roughly 15 degrees Celsius. Our two closest solar system neighbors evidence both the importance and power of the greenhouse effect. Venus, enveloped in a dense shroud of greenhouse gasses has an atmosphere hot enough to melt lead (450 Celsius); Mars has a negligible veil of greenhouse gasses producing a mean surface temperature of -50 Celsius (Desser & Parsons, 2006, p. 8). Common greenhouse gases include methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), halocarbons (CFC’s), and carbon dioxide (CO<sub>2</sub>). CO<sub>2</sub> is not the most powerful of these heat trapping gasses, but it is the gas that has earned much of the climate change attention. The reason for CO<sub>2</sub>’s high profile is straightforward and compelling.<sup>9</sup>

From 1000 AD to 1800 AD, the parts-per-million (ppm) of CO<sub>2</sub> in the atmosphere remained roughly static, hovering around 280 ppm. Beginning with the industrial

---

<sup>9</sup> That is not to say that other contributing greenhouse gasses are unimportant. In fact, molecule for molecule, gasses such as methane are more powerful greenhouse gasses, trapping more heat. However, these gasses have not been the primary public focus of efforts to deal with climate change. Therefore, the focus here is on CO<sub>2</sub>.

revolution, the concentration of CO<sub>2</sub> in the atmosphere has steadily increased with the burning of fossil fuels, which produce CO<sub>2</sub>. The most recent IPCC (2007) report cites CO<sub>2</sub> at 379 ppm in 2005. That is roughly a 35% increase in CO<sub>2</sub> in a 200 year span, which correlates with a 1.2 to 1.4 degree Fahrenheit increase in global average temperature in the last 100 years (EPA website). Most importantly, this correlation has come to be interpreted as a causal relation with human activities post industrial revolution considered a primary, if not the primary, contributor to the climate change trend. These are the established facts that the vast majority of scientists agree upon. The next sections focus on what findings scientists have come to trust, relying primarily on a summary work provided by Dessler and Parson (Chapter 3, 2006). These findings, in total, have influenced the major IPCC reports as well as overall scientific opinion. Table 1.3 summarizes Dessler and Parson's (2006) review of the most direct methods of assessing the relationship between climate change and greenhouse gasses.

The summary categories of evidence for climate change presented in Table 1.3 are the most direct methods of addressing questions regarding average temperature increases driving the climate change discourse. A second category of evidence, titled climate proxies by Dessler and Parsons (2006, p. 56), provide a more indirect measure of climate change based upon "past climate variation imprinted on some long-lived physical, chemical, or biological system" (p.56). These indirect measures, summarized in Table 1.4, support findings found by more direct scientific assessments presented in table 1.3.

**Table 1.3.** Methods of Directly Assessing Climate Change. *Source:* Note: Table is a summary of Dessler and Parson (2006), presented in chapter 3.

|                                       |   |
|---------------------------------------|---|
| <b>The Surface Thermometer Record</b> | Longitudinal data acquired through temperature readings at numerous locations around the globe provide one of the most direct means to track temperature variation. Temperature readings are numerous and frequent and the technology is reliable. The surface thermometer record indicates that mean global temperatures have increased by 1.2 to 1.4 degrees Fahrenheit. However, temperatures taken in different contexts and variable methods for acquiring temperature data introduce error.   |
| <b>The Glacier Record</b>             | Glaciers cover roughly 10% of the Earth. They expand when the temperature is cooler and contract when it is warmer. Glacier expansions and contractions have been recorded for several centuries. According to these records, glaciers have been receding since roughly 1800, and the rate of recession dramatically increased starting in 1850. These data and observations suffer from being derived from a relatively small area of the globe under conditions that are cooler than conditions elsewhere.  |
| <b>Sea Level</b>                      | When temperatures increase glaciers melt and water expands. Measurements of sea level have become both more reliable and more frequent in recent history. However, the farther one goes back in time the less reliable are the data. Both frequencies of historical measurements and less accurate measurement techniques are an issue the farther one goes back in human history. Additionally, areas along coastlines (such as in Louisiana) where the land is actually sinking may inflate estimates of sea level rise, especially if not accounted for correctly.                                       |
| <b>Sea Ice</b>                        | Frozen seawater found in the polar regions of the globe produce regular amounts of sea ice. Since the 1970's, longitudinal measurements of sea ice thickness indicate that the mean depth of this ice has decreased from 3 meters to 2 meters. During this same time period mean sea ice coverage has decreased by 2.8% per decade. Data and findings, however, only apply to the arctic region of the globe. This remains an issue as we simply do not know if the same trends are occurring in the Antarctic.   |
| <b>Sub-Surface Ocean Temperatures</b> | Since the late 1940's subsurface temperatures of the ocean have been regularly recorded in high frequencies around the globe. Measuring the temperatures of the top 1000 feet or so of the ocean, these data indicate a warming trend of .037 degrees Celsius per decade. The trends in sub-surface ocean temperature increases are much smaller than the surface thermometer recorded. However, water is incredibly effective at both storing and dissipating heat, these increases are not slight. Importantly, increases in sub-surface ocean temperatures are consistent with greenhouse-gas increases. |

**Table 1.4. Proxy Data and Climate Change.** *Source:* Note: Table is a summary of Dessler and Parson (2006), presented in chapter 3.

|                        |   |
|------------------------|---|
| <b>Tree Rings</b>      | Trees tend to grow more when warmer and less when cooler, producing historical records of that growth in the form of tree rings. Linking tree growth via tree rings to local conditions produces data that can be used to assess macro-level climate variation. However, these methods are without flaw. Intervening variables such as rainfall certainly play a role and trees do not cover the entire surface of the planet, so areas without tree coverage are, by definition, omitted from analysis.  |
| <b>Ice Cores</b>       | Glaciers in the north and south poles date as far back as four hundred thousand years. Air bubbles trapped in the glaciers preserve data about the composition of the Earth's atmosphere when the air was initially trapped. By extracting ice cores and measuring green house gas composition such as CO <sub>2</sub> within the air bubbles, longitudinal data of how much of these gasses are found in the Earth's atmosphere at a given point in time are obtained. Although CO <sub>2</sub> variation has been large in the past, these data show that CO <sub>2</sub> increases since the beginning of the industrial revolution correspond with temperature increases. |
| <b>Corals</b>          | Like ice cores, the chemical composition of corals give information dating back thousands of years. The "chemical composition of these cores provide information about ocean temperatures, precipitation, salinity, sea level, storm incidence, and volume of nearby freshwater runoff "(Dessler &Parson, 2006, p. 59).   |
| <b>Ocean Sediments</b> | Like both ice cores and corals, sediment at the bottom of the ocean provides strong historical data dating back thousands of years. By sampling this sediment and measuring and recording chemical composition, skeletal compositions of marine life, variations in sizes of those species tell us water temperatures, salinity, dissolved oxygen, nearby continental precipitation, the predominant wind strength and direction, as well as the nutrient composition" (Dessler & Parson, 2006, p. 59).   |
| <b>Boreholes</b>       | Different temperature measurements taken at different points under the Earth's surface allow scientists to infer surface temperature variation in the past (Dessler & Parson, 2006, 59). Borehole data, compiled from several hundred boreholes scattered about the planet, show ground temperatures that "has increased by about 0.5 degrees Celsius during the twentieth century, and about 1 degree Celsius since 1500, and that the twentieth century was the warmest of the past five centuries" (Dessler & Parson, 2006, p. 60).  |

Taken one at a time, each climate proxy may generate significant skepticism as all of the proxies present various threats to both validity and generalization to other contexts.<sup>10</sup>

<sup>10</sup> Other proxy data not discussed here due to space considerations include satellite temperature measurements, orbital variations, tectonic activity, volcanoes, solar variability, and internal variability. See Dessler and Parson 2006, chapter 3.



For example, coral reef measurements apply to the chemistry of tropical oceans and ice cores measure historical concentrations of gasses (or lack thereof) of GHG's. However, if climate proxies are taken in total, the direction and strength of these data all move in one direction toward the same conclusion. Global mean temperature has increased and carbon dioxide levels have increased substantially. Both are significantly correlated with human activity. Dessler and Parson (2006) summarize the combined proxy findings:

From the year 1000 to 2000 in the Northern Hemisphere, the combined record shows a gradual cooling trend through most of the millennium, with an abrupt warming beginning around 1900. These records suggest that the 1990's were the warmest decade, and 1998 was the warmest year, not just over the past 150 years, but of the past 1000 years (p.61).

Taken in total, direct temperature measurements and climate proxy data have compelled the vast majority of scientists to affirm that climate change is occurring and that human activity is a principal cause of that change. The IPCC reports, summarizing climate change findings, have concluded the same. The most recent 2007 report has had overwhelming scientific support. Table 1.5 summarizes some of scientific groups and organizations, including estimated memberships of each where available, which have endorsed the IPCC summaries and reports.

Research on scientific publications and scientific opinion further validate the position that there is a general level of consensus in the scientific community. An oft-cited demonstration of the scientific consensus of climate change, Oreskes (2004) examines 928 refereed scientific publications addressing climate change between 1993 and 2003. Of those 928, not a single paper rejected the consensus opinion. Oreskes concludes that "politicians, economists, journalists, and others may have the impression

**Table 1.5.** Scientific Organizations Endorsing the IPCC (2007) Report. *Source:* List compiled from logicalscience.com and Orsekes (2004) and then independently verified by the author. Group sizes were compiled by author from organizational websites and reflect organizational estimates of group size and/or readership.

| Organization  | Est. Membership       | URL   |
|---|-----------------------|---|
| American Association for the Advancement of Science | >1 million readership | <a href="http://www.aaas.org">http://www.aaas.org</a>   |
| American Academy of Pediatrics                      | unknown               | <a href="http://www.aap.org/">http://www.aap.org/</a>   |
| American Association of State Climatologists        | 150                   | <a href="http://www.stateclimate.org/">http://www.stateclimate.org/</a>   |
| American Association of Wildlife Veterinarians      | unknown               | <a href="http://www.aawv.net/">http://www.aawv.net/</a>   |
| American Astronomical Society                       | 7022                  | <a href="http://aas.org/">http://aas.org/</a>   |
| American Chemical Society                           | 160,000               | <a href="http://portal.acs.org/portal/acs/corg/content">http://portal.acs.org/portal/acs/corg/content</a>       |
| American College of Preventive Medicine             | 2,000                 | <a href="http://www.acpm.org/">http://www.acpm.org/</a>   |
| American Geophysical Union                          | 50,000                | <a href="http://www.agu.org/">http://www.agu.org/</a>   |
| American Institute of Physics                       | >100,000              | <a href="http://www.aip.org/">http://www.aip.org/</a>   |
| American Medical Association                        | 240,000               | <a href="http://www.ama-assn.org/">http://www.ama-assn.org/</a>   |
| American Meteorological Society                     | 14,000                | <a href="http://www.ametsoc.org/">http://www.ametsoc.org/</a>   |
| American Physical Society                           | 46,000                | <a href="http://www.aps.org/">http://www.aps.org/</a>   |
| American Public Health Association                  | 50,000                | <a href="http://www.apha.org/">http://www.apha.org/</a>   |
| American Quaternary Association                     | unknown               | <a href="http://www.amqua.org/">http://www.amqua.org/</a>   |
| American Society of Microbiology                    | 43,000                | <a href="http://www.asm.org/">http://www.asm.org/</a>   |
| American Statistical Association                    | 18,000                | <a href="http://www.amstat.org/">http://www.amstat.org/</a>   |
| Arctic Council                                      | unknown               | <a href="http://www.arctic-council.org/">http://www.arctic-council.org/</a>                                     |
| Environmental Protection Agency                     | NA                    | <a href="http://www.epa.gov/">http://www.epa.gov/</a>   |
| Federal Climate Change Science Program              | NA                    | <a href="http://www.climatechange.gov/">http://www.climatechange.gov/</a>                                       |
| Geological Society of America                       | 22,000                | <a href="http://www.geosociety.org/">http://www.geosociety.org/</a>   |
| International Arctic Science Committee              | 19 member countries   | <a href="http://www.arcticportal.org/iasc/">http://www.arcticportal.org/iasc/</a>                               |
| Intergovernmental Panel on Climate Change           | >2000                 | <a href="http://www.ipcc.ch/">http://www.ipcc.ch/</a>   |
| NASA's Goddard Institute for Space Studies          | Unknown               | <a href="http://www.giss.nasa.gov/">http://www.giss.nasa.gov/</a>   |
| National Center for Atmospheric Research            | Unknown               | <a href="http://www.ncar.ucar.edu/">http://www.ncar.ucar.edu/</a>   |
| National Oceanic and Atmospheric Administration     | Unknown               | <a href="http://www.noaa.gov/">http://www.noaa.gov/</a>   |
| National Research Council                           | 6,000                 | <a href="http://sites.nationalacademies.org/nrc/index.htm">http://sites.nationalacademies.org/nrc/index.htm</a> |
| Pew Center on Climate Change                        | Unknown               | <a href="http://www.pewclimate.org/">http://www.pewclimate.org/</a>   |
| Society of American Foresters                       | Unknown               | <a href="http://www.safnet.org/">http://www.safnet.org/</a>   |
| Union of Concerned Scientists                       | >250,000              | <a href="http://www.ucsusa.org/">http://www.ucsusa.org/</a>   |
| US Geological Survey                                | Unknown               | <a href="http://www.usgs.gov/">http://www.usgs.gov/</a>   |

of confusion, disagreement, or discord among climate scientists, but that impression is incorrect” (2004, p. 1686). Assessing the opinion of the scientific community in a survey of over 3000 academics and scientists, Doran and Zimmerman (2009) find that over 90% concur with the findings that average global temperatures have increased and that human activity is a significant contributing factor to that rise. Moreover, many academic studies document and chronicle the scientific community’s path to consensus on climate change (e.g., Dispensia & Brulle, 2003; Kellstedt et al. 2008) and it is increasingly common to treat the scientific consensus on climate change as a given, not bothering to detail what appears to so many as obvious. However, that is not to say there is zero dissent. Dissent is best characterized as small in number but gifted with a voice that carries.

#### **1.4 Scientific Dissent: A Vocal and Well Funded Opposition**

As discussed in a previous section detailing the evolution of climate change public policy, throughout the 1990’s conservative organizations and think tanks were successful in drawing attention to the uncertainties of climate change findings (McCright & Dunlap, 2003). Table 1.6 lists the more prominent and prolific conservative think tanks identified in a 2003 study performed by McCright and Dunlap. These groups played a central role in effectively dissenting against the prevailing scientific opinion.

At the national level, these conservative think tanks were identified to have significant influence over a powerful counter-narrative that attempted to usurp environmental arguments more broadly, but also brought specific attention to the

**Table 1.6.** Influential Conservative Think Tanks Addressing Climate change between 1990 and 1997. *Source:* Table reproduced from McCright and Dunlap, 2003.

| <b>Conservative Think Tank</b>                                  | <b>Official Web Site</b>   |
|---|--|
| American Enterprise Institute (AEI)                             | <a href="http://www.aei.org">www.aei.org</a>   |
| Cato Institute  | <a href="http://www.cato.org">www.cato.org</a>   |
| Citizens for a Sound Economy Foundation (CSEF)                  | <a href="http://www.csef.org">www.csef.org</a>   |
| Claremont Institute Competitive Enterprise Institute (CEI)      | <a href="http://www.claremont.org">www.claremont.org</a>   |
| Foundation for Research on Economics and the Environment (FREE) | <a href="http://www.cei.org">www.cei.org</a><br><a href="http://www.free-eco.org">www.free-eco.org</a> |
| Heartland Institute   | <a href="http://www.heartland.org">www.heartland.org</a>   |
| Heritage Foundation   | <a href="http://www.heritage.org">www.heritage.org</a>   |
| Hoover Institution  | <a href="http://www.hoover.stanford.edu">www.hoover.stanford.edu</a>                                   |
| Marshall Institute  | <a href="http://www.marshall.org">www.marshall.org</a>   |
| National Center for Policy Analysis (NCPA)                      | <a href="http://www.ncpa.org">www.ncpa.org</a>   |
| National Center for Public Policy Research (NCPPR)              | <a href="http://www.nationalcenter.org">www.nationalcenter.org</a>                                     |
| Pacific Research Institute (PRI)                                | <a href="http://www.pacificresearch.org">www.pacificresearch.org</a>                                   |
| Reason Public Policy Institute (RPPI)                           | <a href="http://www.reason.org">www.reason.org</a>   |

weaknesses of the arguments for action against climate change (McCright & Dunlap 2000; McCright & Dunlap, 2003, p. 353). Analyzing some 224 documents generated by the above listed groups between 1990 and 1997, McCright and Dunlap (2003) found that the counter message produced by these groups centered around three major counterclaims:

1. First, the conservative movement claimed that the evidentiary basis of climate change is weak, if not wrong.
2. Second, conservatives argued that the net effect of climate change would be beneficial should it occur.
3. Third, conservatives argued that the policies proposed to ameliorate the alleged problem of climate change would do more harm than good (McCright & Dunlap, 2003, p. 354).

These three counterclaims were frequently made through expert point men, who helped generate and maintain the powerful counter message that climate change was

at best uncertain and, at worst, outright fraud. McCright and Dunlap (2003), surveying the recent literature, further identify the five most visible climate change critics as: Sallie Baliunas, Robert Balling, Jr., Richard Lindzen, Patrick Michaels and S. Fred Singer (p. 359). Each has been affiliated with conservative think tanks in terms of position and/or funding. Table 1.7 lists these major critics and their conservative affiliations:

**Table 1.7. Major Conservative Critics of Climate Change.** *Source:* Table produced using information provided in McCright and Dunlap, 2003, pp. 358-360.

| <b>Name</b>        | <b>Position</b>  | <b>Conservative Think-tank Affiliation(s)</b>   |
|--------------------|--|---|
| Sallie Baliunas    | Astrophysicist at the Harvard-Smithsonian Center for Astrophysics  | Robert Wesson Fellow in Scientific Philosophy and Public Policy at the Hoover Institution<br><br>Chair of the Science Advisory Board at the Marshall Institute  |
| Robert Balling Jr. | Director of the Office of Climatology at Arizona State University  |   |
| Richard Lindzen    | Atmospheric Scientist, MIT   | Science Advisory Board of the Marshall Institute  |
| Patrick Michaels   | Virginia's State Climatologist                                     | Senior Fellow in Environmental Studies at the Cato Institute  |
| S. Fred Singer     | Retired professor of Environmental Science, University of Virginia | advisory editor for the Cato Institute's quarterly magazine <i>Regulation</i><br><br>Senior Fellow at the Heritage Foundation<br><br>Distinguished Visiting Fellow at the Hoover Institution<br><br>Robert Wesson Fellow in Scientific Philosophy and Public Policy at the Hoover Institution |

The scholars associated with these conservative think tanks provided credible sources through which these groups could levy their foundational arguments against climate change. In total, these scholars have regularly testified in front of Congress written publications, and presented arguments for various media outlets (McCright & Dunlap, 2003, p. 357). This group of dissenting scholars is frequently discredited and maligned on the grounds of their partisan funding by mainstream sources that view their opinions and findings as necessarily biased. However, a more meaningful criticism focuses on how these dissenting scholars have circumvented the traditional peer-review process and frequently published anti-climate change findings through non-peer review methods, such as conservative think-tank presses (McCright & Dunlap, 2003). Based on these two criticisms it has become quite commonplace to implicitly dismiss climate change critics by simply focusing on the perceived scientific consensus (e.g., Grundman, 2006; Kellstadt, 2008).

Importantly, however, for the non-climate specialist—or the lay person—it is an extraordinarily difficult task to determine whether or not the substance of the criticisms levied by the dissenters is legitimate or not. I briefly illustrate this point by focusing on two skeptic publications: Singer and Avery (2008) and Lindzen (2008). Singer and Avery (2008) acknowledge that the earth has been warming in recent history (6). However, in their estimate, warming is not caused by carbon dioxide; rather, increased warming is the result of a natural 1,500 year cycle. The authors argue that it is solar activity that has induced increased mean temperatures and not human activity:

The key amplifier is cosmic rays. The sun sends out a 'solar wind' that protects the Earth from some of the cosmic rays bombarding the rest of

the universe. When the sun is weak, however, more cosmic rays get through to the Earth's atmosphere. There they ionize air molecules and create cloud nuclei. These nuclei then produce low wet clouds that reflect solar radiation back into outer space. This cools the Earth....The second amplifier is ozone chemistry in the atmosphere. When the sun is more active, more of its ultraviolet rays hit the Earth's atmosphere, shattering more oxygen (O<sub>3</sub>). The additional ozone molecules absorb more of the near-UV radiation from the sun, increasing temperatures in the atmosphere. Computer models indicate that a 0.1 percent change in the sun's radiation could cause a 2 percent change in the Earth's ozone concentration, affecting atmospheric heat and circulation (p.6).

A book written for the layperson, the first version of this argument was a *New York Times* bestseller.

Spencer Weart (2008b) is a commonly cited believer in anthropogenic greenhouse gasses as a cause of climate change and generally regarded as a credible source. Interestingly though, in refuting Singer and Avery (2008), Weart draws attention only to an urban heat island effect that Singer and Avery erroneously claim gave credence to raising temperatures, when no rise in temperatures existed (p.159). Weart is also quick to point out that "...[Singer] founded an environmental policy group supported by conservative foundations" (Weart, 2008, p. 159). This is the only reference in Weart's book that addresses Singer and Avery's bestseller criticism of climate change models, and the rebuttal is hinged on discrediting Singer and Avery as partisan hacks and not refuting the substance of their argument. Importantly, Singer and Avery (2008,p. 6) claim only that not accounting for the urban heat islands inflates mean climate change estimates; they do not claim that there is no warming whatsoever (2008, p. 6).

Richard S. Lindzen, another prominent climate change skeptic, attests that increased CO<sub>2</sub> is spuriously correlated with warming and that we simply do not have enough evidence to establish CO<sub>2</sub> as a causal driver of warming (2008, p.21). A major component of Lindzen's criticism of climate change science focuses on the natural forcing and curve fitting assumptions built into the various climate models. Lindzen describes forcing as a perhaps necessary element of climate modeling that attempts to account for various phenomenon that are inherently susceptible to researcher/modeler discretion (p. 25). Particularly disturbing for Lindzen is the 'forcing' treatment of aerosols in the models, which the effects of are as of yet really unknown and where we may not even know the direction of the relationship (ie., heating or cooling) between various aerosols and global temperatures (Lindzen, 2008, p. 26). Admittedly, the discussions of appropriate forcing protocols and urban heat islands rings of discussions between diehard sports fans debating the baseball pitcher's ERA statistic or the NFL's obscure quarterback rating system. That is precisely the point.

Who should the public believe? I even find myself, equipped with years of graduate school training and more than a minor interest in climate change, to be ill suited to pass judgment on the scientific merits of either Weart , Singer and Avery, or Lindzen's positions. It is also worth mentioning that I have no intention of deciding who is right or wrong; rather, the point made is that although we may as individuals be quite willing to dismiss or accept the skeptic's criticisms, even a shallow probing of the arguments presented against climate change indicates that very specialized knowledge of how climate change models are constructed is needed to truly evaluate the paucity or



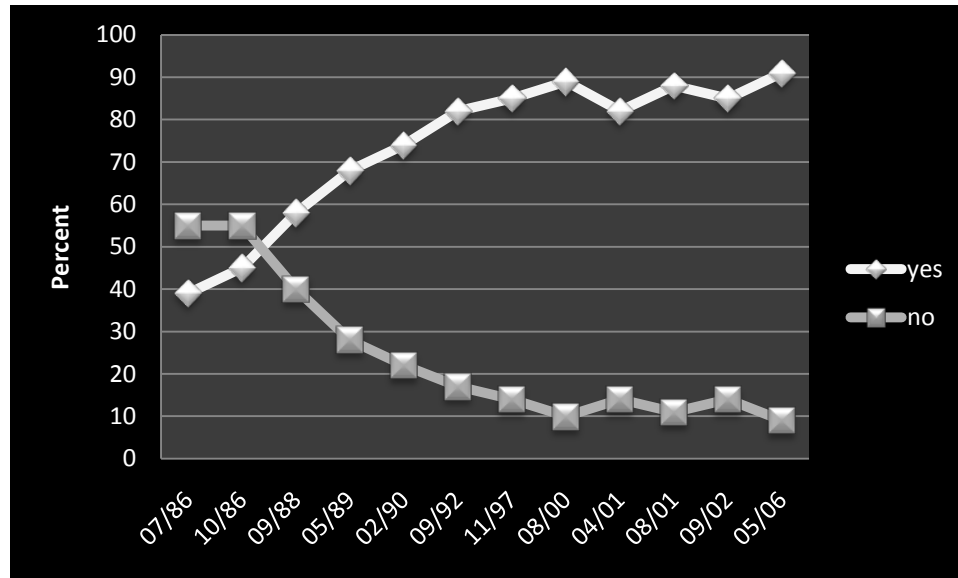
robustness of these criticisms. Despite the immense complexity involved in the science of climate change and the intricacies of the debate, however, individuals can and do decide who and what to believe.

## **1.5 Public Opinion and Climate Change**

The previous sections have set forth a case that given the historical development of climate change policy and science that opinions about climate change and climate change policy are likely to influence said policy. Summaries of the history and science of the development of climate change as both a policy issue and area of scientific concern have also been provided. Noting the immense complexity of the science behind climate change, it should come as no surprise that the general public has not tracked with scientific opinion. The prevailing explanation for this divergence is that antiregulatory conservative dissenters were able to manufacture public dissent. Relying primarily upon a climate change public opinion summary article (Nisbet & Myers, 2007), the following section summarizes in more detail the development of public opinion on key climate change related issues. This macro-assessment of public opinion about climate change and matters relevant to climate change transcends many of the previously discussed IAC stages, but serves the purpose of providing the reader a broader understanding of how public opinion has evolved. Importantly, the following discussion details how and on what dimensions public opinion and scientific opinion have diverged.

Opinions between the scientific community and public opinion writ large clearly diverge. However and as Figure 1.2 illustrates, currently most of the American public is

**Figure 1.2.** Climate Change Awareness, 1986-2006. *Source:* Nisbet and Myers, 2007.

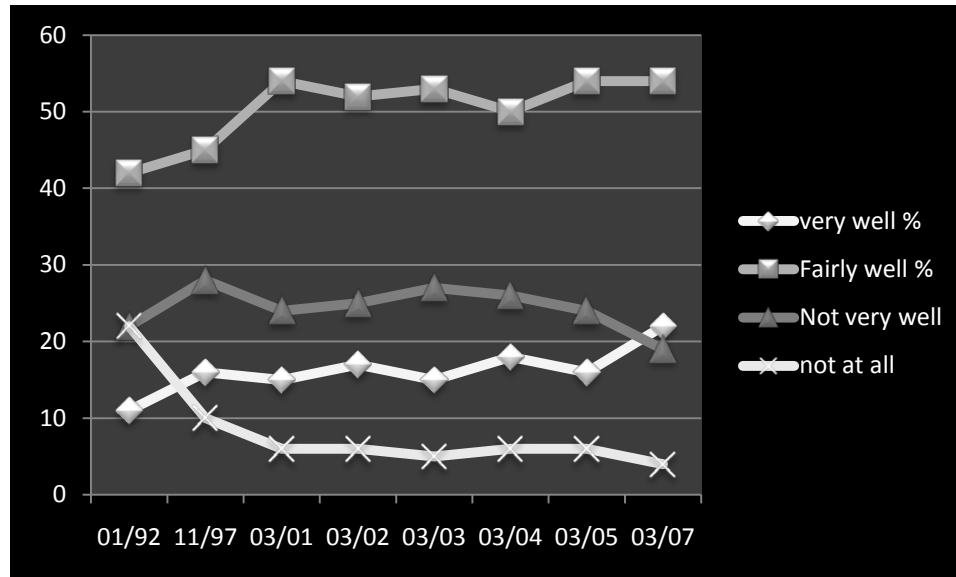


*Question: Have you heard or read anything about the "greenhouse effect," or not?*

aware of climate change. Public opinion polls demonstrate that prior to 1988 a majority of American's had not heard or read anything about the greenhouse effect (Nisbet & Myers, 2007). Since 1988, the number of Americans that are aware of the greenhouse effect has been steadily increasing with nine-tenths of Americans reporting having read or heard about the greenhouse effect by 2006 (Nisbet & Myers, 2007). In terms of the Downsian attention cycle, then, 1988 provides an appropriate demarcation point between the pre-1988 pre-problem stage and the 2<sup>nd</sup> stage of alarmed discovery and euphoric enthusiasm, referred to by Hempel (2003) as the policy frameworks stage.

In conjunction with the rise in self-reported awareness, so too has there been a rise in self-reported knowledge of climate change. Figure 1.3 illustrates the rise in self-reported knowledge. In the early 90's, over 20% of Americans reported no knowledge of climate change, while in 2007, that number had fallen below 5% (Nisbet & Meyers,

**Figure 1.3.** Self-Reported Climate change Knowledge, 1992-2007. *Source:* Nisbet and Myers, 2007.



Question: *Next, thinking about the issue of climate change, sometimes called the “greenhouse effect,” how do you feel you understand this issue?*

2007); concurrently, those that reported understanding the issue *very well* has remained steadily over 50% for the past decade.

Despite high levels of self-reported knowledge, objective measures demonstrate some confusion on the part of the public regarding the causes of climate change (Nisbet & Myers, 2007). Table 1.8 reports polls taken in 1994 and 2000 on two questions related to the public’s objective understanding of climate change. Importantly, 39% (1994 and 2000) were unable to make a definitive link between fossil fuels and the greenhouse effect. Additionally, 57% (1994) and 54% (2000) erroneously linked the causes of climate change to a hole in the atmosphere. The confusion between a hole in

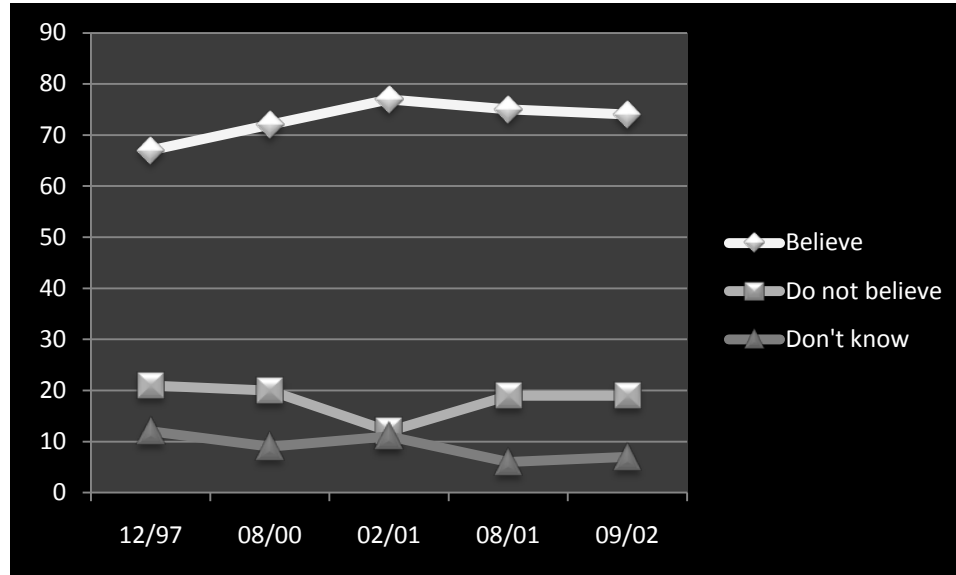
**Table 1.8.** General Public Objective Knowledge Measures, 1994 and 2000. *Source:* Nisbet and Myers, 2007.

| Survey Statement  | Response                                    | Date          |                |
|---|---|---------------|----------------|
| <b><i>Every time we use coal or oil or gas, we contribute to the greenhouse effect.</i></b> |   | January, 1994 | February, 2000 |
|   | <b><i>Definitely True (correct)</i></b>     | <b>14</b>     | <b>18</b>      |
|   | <b><i>Probably True (correct)</i></b>       | <b>47</b>     | <b>44</b>      |
|   | <i>Probably Not True</i>                    | 21            | 19             |
|   | <i>Definitely Not True</i>                  | 4             | 5              |
|   | <i>Can't Choose</i>                         | 14            | 15             |
| <b><i>The Greenhouse effect is caused by a hole in the Earth's atmosphere.</i></b>          |   |               |                |
|   | <i>Definitely True</i>                      | 16            | 17             |
|   | <i>Probably True</i>                        | 41            | 37             |
|   | <b><i>Probably Not True (correct)</i></b>   | <b>16</b>     | <b>18</b>      |
|   | <b><i>Definitely Not True (correct)</i></b> | <b>11</b>     | <b>12</b>      |
|   | <i>Can't Choose</i>                         | 17            | 16             |
| <b>N</b>  |   | 2992          | 2817           |

the atmosphere and climate change is quite common, as previous research finds that members of the public conflate the problem of the hole in the ozone layer with climate change (Bord et al., 1998; Read et al. 1994). Moreover, events dramatizing climate change, both fictionalizing the issue and increasing its salience, have contributed to fact confusion regarding climate change (e.g., Lowe et al., 2006).

Despite fairly low performances on objective knowledge measures, American citizens are increasingly in line with scientists on two major facets of the climate change debate: 1) most believe that increased carbon dioxide is a significant cause of climate

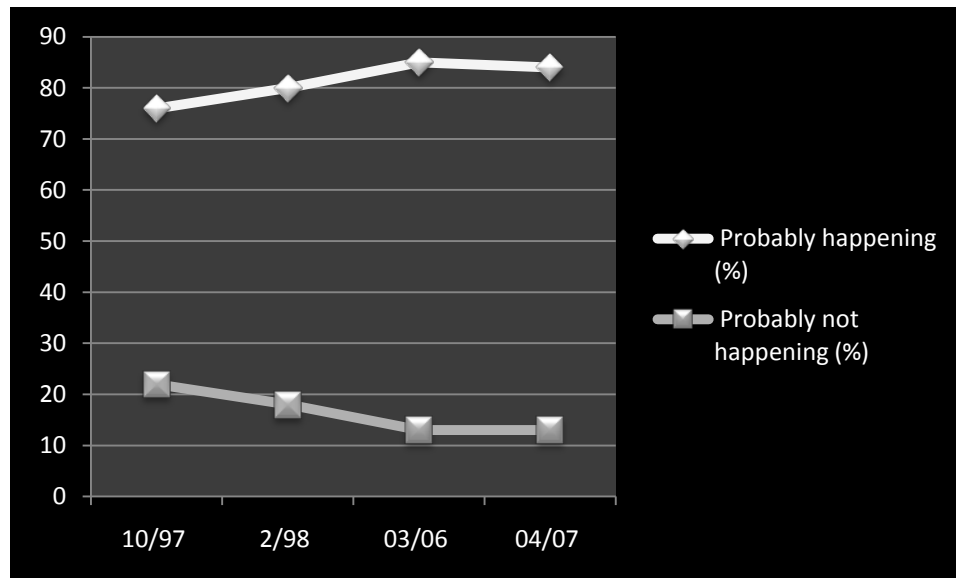
**Figure 1.4.** Mass Public belief in Anthropogenic GHG's as a Cause of Climate Change, 1997-2002. *Source: Nisbet and Myers, 2007.*



*Do you believe the theory that increased carbon dioxide and other gases released into the atmosphere, will, unchecked, lead to climate change and an increase in average temperatures or not?*

change (Figure 1.4) and 2) most agree that climate change is probably happening (Figure 1.5). Since 1997 the percentage of American's that believe that increased carbon dioxide in the atmosphere will lead to climate change has risen to over 70%, and that number has remained a relatively stable floor. Since 1997, the number of polled respondents has increased to over 80% and steadfastly remained above that 80% floor. Despite this seemingly informative data that speaks to the public's agreement with the scientific community on these two very foundational components of climate change

**Figure 1.5.** Mass Public Belief that Climate change is Happening, 1997-2007. *Source:* Nisbet and Myers, 2007.

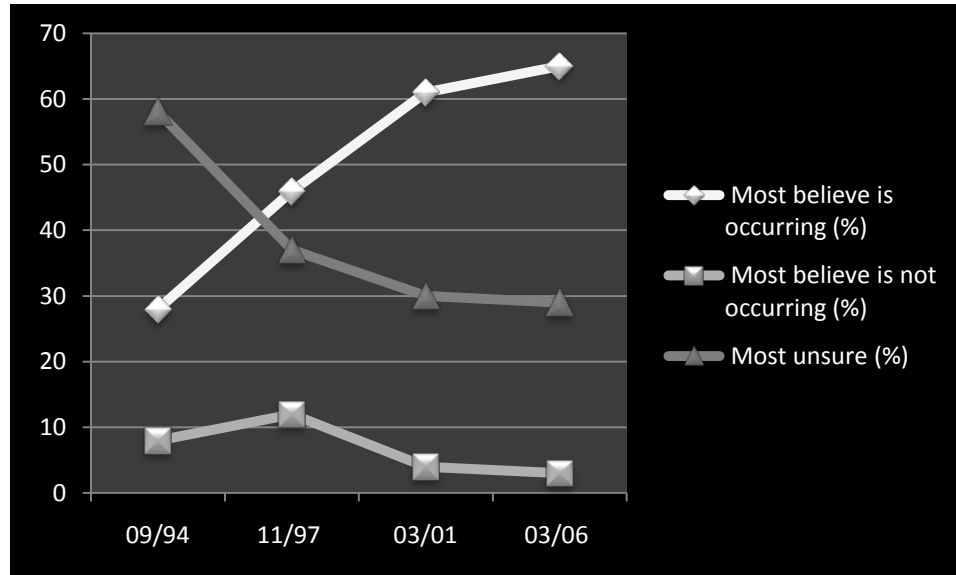


*You may have heard about the idea that the world's temperatures may have been going up slowly over the past 100 years. What is your personal opinion on this—do you think this is probably been happening, or do you think it probably hasn't been happening?*

theory, the public appears quite off target in assessing exactly what the scientific community thinks.

Since 1994, roughly 30% or more of the public believes that most scientists are unsure about climate change, while a majority (70+ %) hold that most scientists believe climate change is occurring (Figure 1.6). A somewhat conflicting poll reports results in the opposite direction, with a steady number of over 50% of respondents from 1997 to 2007 contending that there is a lot of disagreement about the reality of climate change (Figure 1.7). This is not the only contradiction. Sterman and Sweeney (2007) find that

**Figure 1.6.** What the Public Believes Most Scientists Believe, 1994-2006. *Source:* Nisbet and Myers, 2007.

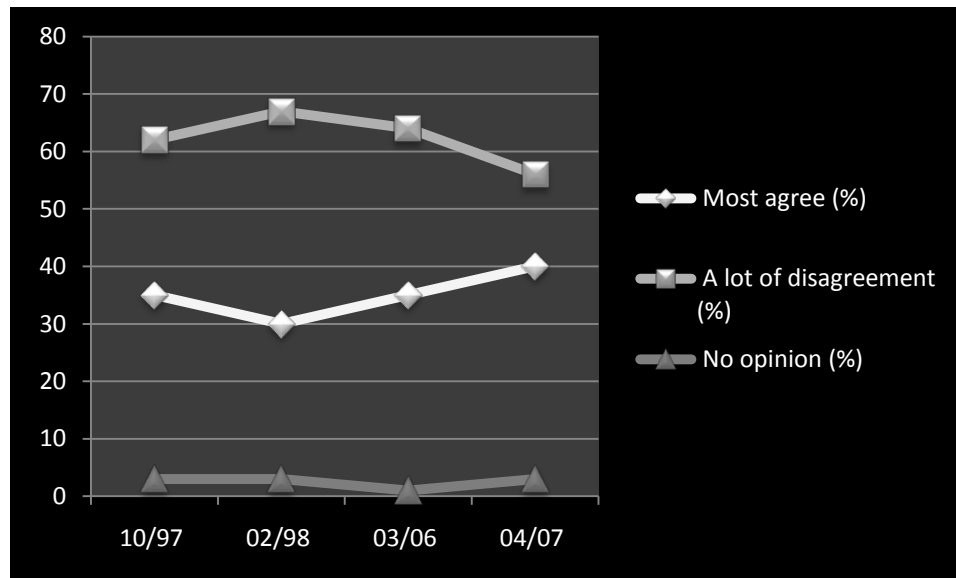


*On the Environmental Issue Known as climate change, just your impression, which one of the following statements do you think is accurate: most scientists believe that climate change is occurring, or most scientists believe that climate change is not occurring, or most scientists are unsure about whether climate change is occurring or not?*

although most Americans believe climate change is a problem, most believe curtailing GHG's can be deferred to the future. Perhaps shedding some light on the conflicting polling information provided in figures 1.6 and 1.7, Table 1.9 reports levels of trust that the public has for scientists and what they report on climate change.

Recent scholarship suggests some of the mistrust may be warranted. Sundberg (2007) finds that climate change funding agencies and funding seekers engage in a sort of game where “both know funds are likely to be used for something other than what is

**Figure 1.7.** Public Opinion of Scientific Consensus, 1997-2007. *Source:* Nisbet and Myers, 2007.



*Do you think most scientists agree with one another about whether or not climate change is happening, or do you think there is a lot of disagreement among scientists on the issue?*

proposed” (474). Of course, the implication here is that grant funding is being siphoned away to the researchers more pressing interest under the auspices of climate change. In short, the public does not completely trust scientific information about the environment, with only 31% of polled respondents reporting more than a moderate level of trust, nor do they trust the models they employ (Yearley, 1999).

The previous summary of public opinion data offers several revealing conclusions about the current state of the public’s understanding of climate change. The vast majority of members of the American public are aware of climate change and the greenhouse effect. A majority of Americans also self-report that they understand how



**Table 1.9. Public Trust of Scientists on the Environment. Source: Nisbet and Myers, 2007.**

|                     | 03/06 | 04/07 |
|---------------------|-------|-------|
| Completely (%)      | 5     | 5     |
| A Lot (%)           | 27    | 27    |
| Moderate amount (%) | 41    | 43    |
| A Little (%)        | 22    | 19    |
| Notatall (%)        | 5     | 5     |
| <i>N</i>            | 1,002 | 1,002 |

*How much do you trust the things that scientists say about the environment—*

*completely, a lot, a moderate amount, a little, or not at all?*

the greenhouse effect works, although substantial numbers of those polled are unable to link fossil fuels to greenhouse gasses and frequently conflate the hole in the ozone layer with climate change. Despite erroneously identifying causes of climate change, a sizable majority of Americans believe that greenhouse gasses are a cause of climate change. Polled respondents also generally believe climate change is probably happening, but at the same time believe there is some disagreement in the scientific community with as many as 3 in 10 scientists are unsure if climate change is a reality. Importantly, the public does not generally trust the scientific community when it reports on this issue.

### **1.6 Scientific Consensus and Public Dissonance: Why the Difference?**

The previous sections have demonstrated that the relationship between public opinion and public policy is important, particularly in cases where the policy issues are salient with the general public. The previous analysis has also demonstrated that

climate change salience, at a minimum, is on the rise. It has also been empirically demonstrated that there is a scientific consensus on the reality of climate change and that most scientists, except for a few deniers, believe human beings are a significant cause of that change. It is important to note that no stance has been taken on the rightness or wrongness of this consensus. Science has been wrong in the past and it is possible that science could be wrong here, however unlikely that may be. However, despite that scientific consensus, a non trivial component of the public neither believes that climate change is real, nor that human beings are the cause. In fact, the public can be characterized as not trusting the scientists that provide that information. Why? Public opinion and climate change research offers three categories of explanations for the disjunction between science and the public on the issue of climate change. The two dominant explanations offered by previous scholarship suggest that divergent public opinion is best explained by climate change knowledge deficits (e.g., Kellstadt et al., 2008) and directed by misrepresented scientific controversy in primary media outlets (e.g., Boykoff & Boykoff, 2007). That is, if people simply knew more and the media were more responsible, previous scholars conclude, the public would display similar levels of consensus to that of the scientific community.

### **1.6.1 The Knowledge-Deficit Model**

The foundation of the knowledge-deficit model is a well-documented difference between lay people's and expert opinions across a multitude of complex issues (Kellstedt et al. 2008, p. 114), such as genetically modified foods (e.g., Hansen et al.,

2003; Qin & Brown, 2006). Typical to complex issue areas, the scientific community, embedded as it is in practices designed to understand the issue, possesses a far greater array of facts and knowledge related to the relevant issue, while the lay public frequently relies upon truncated versions of this knowledge provided by intermediaries, such as the media (Boycoff & Boycoff, 2007). Kellstedt et al. (2008) provide a concise specification of the knowledge-deficit model as it relates to climate change. The authors argue that the central premise of the knowledge-deficit model is that “scientific assessments of risk are both correct and objective, and then, by implication, the public’s perceptions of risks are both inaccurate and subjective “(p.114). Findings illuminating the relationship between lay-opinions and climate change offer support for this assumption.

As indicated in the analysis of public opinion polls in the previous sections, research indicates that there is a general and stable level of awareness amongst the public about climate change (Bord et al. 1998; Stamm et al. 2000). Furthermore, the public has demonstrated the capacity to evaluate complicated scenarios about climate change (Berk & Schulman, 1995). Examining 600 residents in Southern California, Berk & Shulman (1995) find that when respondents are exposed to complicated climate scenarios, including multiple dimensions of concern (e.g., precipitation and temperature), respondents are capable of reasonably anticipating change and assigning an individual cost to that change. Although able to associate individual cost with anticipated climatic change, there is, however, a lack of willingness by the public to pay a substantial immediate price to deal with climate change—the tendency is to defer

costs to a future time (Bord et al., 1998). Supporting the knowledge-deficit model, these studies show individuals are able to form rational opinions about climate change policy when exposed to accurate scenarios and information. Absent the stimulus, though, these policy opinions are based upon something other than the findings most scientists agree with.

Recent research shows that distinguishing between potential consequences for individual respondents is often difficult (Berk & Fovell, 1999; Stamm et al. 2000). Stamm et al. (2000), in their study of a cross-section of the Seattle population, find the respondent's have difficulty in accurately discerning the causes and potential consequences of climate change. In this study, respondent's tended to incorrectly identify deforestation as a primary cause of GHG's and also made the mistake of linking a reduction in *aerosol can* use as a solution to climate change—which is more commonly associated with the problem with the ozone layer. The *aerosol can* misidentification is indicative of a larger issue with the public's understanding of climate change. That is, individuals often show a lack of understanding about the causes of climate change (e.g., Read et al., 1994), frequently confuse climate change with general pollution models (Bord et al., 1998), particularly the hole in the ozone layer (Read et al., 1994). Perhaps the natural outcome of the various knowledge deficiencies just cataloged and discussed in the previous section detailing the evolution of public opinion about climate change, knowledge-deficit studies show that the most important determinant in predicting a willingness to act on climate change is correct knowledge of the causes (e.g., Bord et al., 2000). Importantly, when educated about climate change, the public's views become

remarkably similar to that of the scientific community (Doble, 1995). The knowledge-deficit model presumes that shifts in opinion that make the public more like the scientific community are also shifts in the correct direction.

### **1.6.2 Sensational Media Coverage and Journalistic Norms**

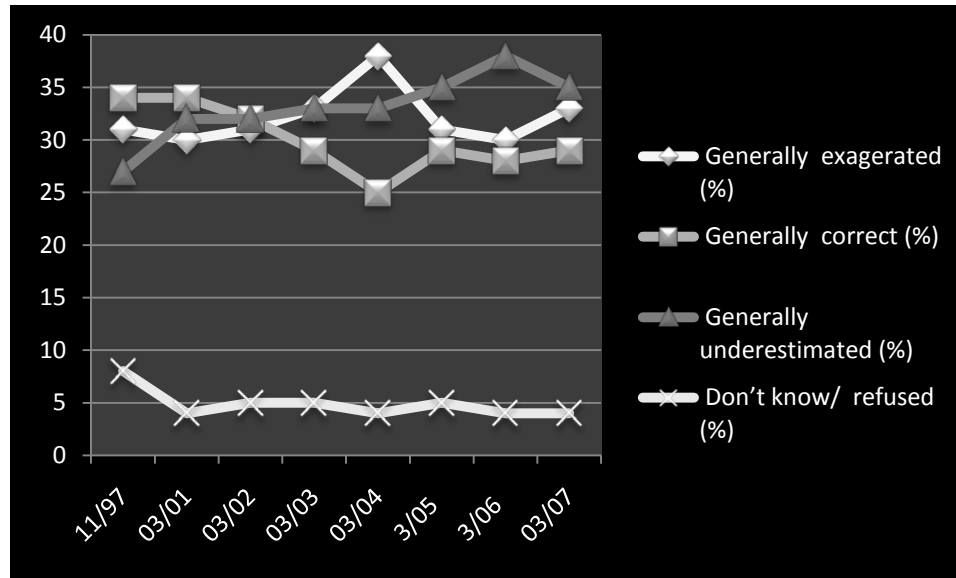
Whereas the knowledge-deficit model explains the division between public and scientific opinion by a lack of accurate knowledge on the part of the public, a second prominent model explains the difference as a product of sensationalistic media coverage. The term sensational is understood here to mean a focus by media outlets on particular dimensions of issues to draw forth sustained attention from the public. In practice, this means media outlets have shown strong tendencies to focus on conflict and debate (Gans, 1979; Graber, 1997), as opposed to the alternative proposed by the knowledge-deficit model, which would prescribe a more “neutral and objective” reporting of agreed upon scientific findings. By focusing on conflict and debate, media coverage is deemed problematic because coverage may present issues as being more contested than they really are. This tendency to focus on conflict has manifested itself in media coverage of climate change.

Compared to other countries such as France (Broussard et al. 2004), New Zealand, and Finland (Dispensia & Brulle, 2003), media coverage of climate change in the United States has a much greater tendency to focus on the conflict between scientists and politicians (Boycoff & Boycoff, 2007). Where the previous sections on the science and policy history of climate change have demonstrated a high degree of

consensus, media outlets have been able to focus on conflict by focusing on both scientific uncertainty (Zehr, 2000) and partisan dimensions of the debate (Boycoff & Boycoff, 2007; Lahsen, 2005; McCright & Dunlap, 2003).

Science, which in ideal form mandates an open epistemology and sets forth conclusions that are always viewed as tentative, is self-reflective in the sense that most scientists viewed as credible will speak to the uncertainty of their models and findings. This presents fertile ground for media outlets (or any critic for that matter) to plant seeds of conflict, even if little exists. Where such discussions of uncertainty are necessary in science, these same discussions, when amplified by media outlets, undermine the perceived authority and legitimacy of science in the eyes of the public (Shackley & Wynne, 1996). Taken a step further, the conflict focus of media reporting, rooted as it is in scientific uncertainties, usually takes on a partisan flavor (Lahsen, 2005; McCright & Dunlap, 2003). That is, coverage has historically moved from a focus on scientific findings to controversial policy questions related to costs, values, and outcomes (Trumbo, 1996). In moving to policy questions and outcomes, the uncertainty presented by scientists has collapsed along partisan dimensions. For example, it is commonplace for the frequently conservative and Republican opposition to climate change regulation to assert that the science provided by the IPCC is little more than conjecture (McCright & Dunlap, 2003). Importantly and perhaps unsurprisingly, media coverage of scientific knowledge is found to have substantial influence over public opinion (Antilla, 2008; Boycoff & Boycoff, 2007).

**Figure 1.8:** Public Perceptions of the Medias Treatment of Climate change. *Source:* Nisbet and Myers, 2007.



*Thinking about what is said in the news, in your view is the seriousness of climate change—generally exaggerated, generally correct, or is it generally underestimated?*

Figure 1.8 illustrates recent polling data from 1997 to 2007 presented in a summary article on the public’s assessment of the media’s treatment of the seriousness of climate change (Nisbet & Myers, 2007). Generally speaking, at any point in time over the ten years captured in these polling data, roughly 1/3<sup>rd</sup> of those polled fall into one of the three categories regarding their perceptions of the media’s portrayal of the seriousness of climate change: generally exaggerated, generally correct, or generally underestimated. Of course there are spikes or dips in one category or another, particularly in 2004 and 2006, yet by 2007 the three categories converge. Figure 1.8 shows that only a third generally trust that the media’s portrayal is correct, while the

remainder believe that the media's portrayal of climate change is either underestimated or overestimated—in roughly equal proportions nonetheless.

Many conclusions have been drawn as to why media outlets focus on the sensationalistic dimensions of relevant issues. One explanation is that special interests such as the fossil fuel industry (e.g., Dispensia, 2003) have co-opted media outlets and used the acquired platform to promote their specialized interests. Potential conspiracy theories aside, Boycoff and Boycoff (2007) contend that the reasons for media behavior are more likely derived from considerations endogenous to media organizations. The authors argue that the motive behind media coverage is inextricably tied to journalistic norms.

Boycoff and Boykoff (2007, pp. 1192-1193) supply a model of the internal workings of media organizations by categorizing norms governing media behavior into first and second orders. The first-order refers to “baseline influences on the selection of what is news and the content of news stories” (p. 1192). These norms are personalization, dramatization and novelty, all of which help determine what news to cover and what the content should look and sound like. *Personalization* downplays large systemic or thematic coverage in favor of a personal focus on human elements; *dramatization* emphasizes crisis over *continuity*—static states do not make for good news; and, novelty which establishes that something new is better than something old. These three first-order norms inform and direct second-order norms. Second-order journalistic norms include authority-order and balance. The *authority-order* norm dictates that journalists primarily focus on “authority figures—government officials,



business leaders, and others” (p. 1193). *Balance* is a norm, the authors argue, that works as a proxy for objectivity. That is, there is a cultural norm in journalism to present both sides of a debate on any given issue in a proclaimed interest in fairness and an objective treatment of the issue.

Performing a content analysis of television and newspaper coverage of climate change in the U.S. from 1988 to 2004, the authors find that “adherence to first-order norms significantly influence the employment of second-order norms” (p.1190). They further interpret their findings as an explanation as to why media have produced an informationally deficient and partisan-charged discourse environment related to climate change. That is, normalized institutional behaviors on the part of the media play an important contributing role in the proliferation of the notion that climate change science is uncertain and contested. The popularization of this notion has occurred primarily through the vehicle of giving the authorities on the dissenting side of the debate an equal, yet undeserved, standing.

The sensational media model can be summarized as a model that focuses the researcher’s attention on the structure and delivery system of communications about climate change. This model has found that media do in fact influence public opinion. However, this influence is also found to be detrimental. Second-order journalist norms, guided by first-order norms, are found to steer coverage in a direction that centers on the need of news organizations to generate interest. Much like the previously discussed knowledge-deficit model, the presumption here is that media should reflect scientific

opinion on the issue of climate change in a way that mirrors the debate within the scientific community.

### **1.6.3 Assessing the Models**

The knowledge-deficit and the sensational media models are two of the dominant explanations of why public opinion diverges from scientific opinion on climate change. It is not uncommon to present them as alternative explanations. For example, Kellstadt et al. (2008), presents the models as competing explanations, finding the knowledge deficit model lacking in that “the more information a person has the less responsible he/she will feel for it; and, indirectly, the more information a person has about global warming, the less concerned he or she is for it” (p. 122). Certainly, the two models have differences, but both have provided some traction in explaining why individuals hold the opinions they do about climate change. While the knowledge-deficit model draws our attention to the content of messages, the sensationalistic media model draws our attention to how that information is conveyed—or, the structure of communication messages. Both models also have similarities in the sense that they also focus our attention on the information offered by the scientific community and how best to get the general public to understand and retain that information. However, in drawing our attention to these important elements of communication structure, these approaches have, in general, neglected a potentially necessary synergy between the attributes brought to the table by each individual when processing information and both the structure and content of communications.

Individuals do not process information in a vacuum; rather, individuals bring their life experiences and their understanding of the world to bear when determining what information to accept, what information to reject, and, most importantly, what that information means. These experiences and understandings are typically accounted for in social scientific models using an array of variables including such categories as race, gender, ideology, culture, and religion, among others. These variables, referred heretofore as priors, attempt to capture those common life experiences that might help individuals process information. To be clear, the argument made here is not that previous analyses knowledge-deficit and media have neglected prior attributes when operationalizing their models. Both models, when assessing public opinion, have usually accounted for priors, typically in the form of controls. The thrust of the argument presented here is that there is a potential synergy between message structure and content and the prior attributes of individuals that influence the processing and retention of information.

Several studies have offered findings providing valuable insights as to how and why priors influence information processing. In many cases, albeit indirectly, these findings call into question the previously discussed models. For example, Steel et al. (2004) find that the level of trust an individual has in science is heavily influenced by their ideological orientation. Whereas liberals are more likely to trust scientists, conservatives are more likely to view scientists as biased, or having some hidden agenda (Steel et al., 2004). Indicating that the scientific community at least implicitly understands this point, Carolan (2006) finds that scientists in disciplines such as

sociology, policy, biology, and ecology employ the use of value-laden metaphor, suggesting these metaphors provide valuable cues to readers related to their priors. Linking metaphor to individual interpretation of scientific information, Unger (2000) observes that the ozone layer was readily understood and processed easily by the lay public precisely because it was frequently structured by information providers bound in cultural metaphor. Carvalho, in a recent 2007 study, finds a similar relationship with media representations of scientific information. The author finds that "...scientific claims in the media are strongly entangled with ideological standpoints [and] ideology works as a powerful selection device in deciding what is scientific news" (Carvalho, 2007 p. 223).

Findings questioning the efficacy of the knowledge-deficit model also draw forth how important it may be to consider priors as scientific knowledge is often not enough to change or even significantly guide opinions or perceptions of risk (e.g., Durant & Legge, 2005, McLennan, 2000). For example, Durant & Legge (2005) find that support for genetically modified foods is also heavily influenced by a respondent's trust in government. McLennan (2000), examining motherly tendencies to purify water for infants in developing countries, finds that social support networks are more important than increased knowledge in determining whether or not mothers will engage in the practice of boiling water to purify infant drinking water. Specifically related to climate change, Doble (1995), as noted earlier, found that educating the public does make their views resemble that of scientists; however, Doble also found that differences in opinion remained and those differences were largely rooted in values (Doble, 1995). These

findings and the discussion of priors indicate that information can be made more or less accessible by packaging said information in a way that aligns with the individual's prior attributes. A recently theorized but not yet empirically verified relationship between narrative communication structures and prior cultural orientations may provide avenues to better understand why the public holds the opinions it does about climate change.

### **1.7 Cultural Stories**

A merger of several theoretical literatures has generated a promising structural discourse-analytic framework that may help explain the differences between scientific and public opinion. Stephen Ney (2006) relies on narratively structured policy stories to integrate the Advocacy Coalition Framework (Sabatier & Jenkins-Smith, 1993), Cultural Theory (Thompson et al., 1990) and the broad theoretical foundations of the argumentative turn (e.g., Fischer & Forrester, 1993) to identify distinct narrative structures: setting (basic assumptions), villains (policy problem), and heroes (policy solution) (Ney, 2006, p.26). Using these narrative components, researchers are able to map areas of policy agreement and disagreement thereby generating solutions to policy problems.

Promising findings have been produced using this method. Research utilizing this framework has examined climate change, detailed the relevant cultural stories in terms of their narrative structural components, and proposed cross-cutting cultural solutions (Ney & Thompson, 2000; Verweij & Thompson, 2006; Verweij et al. 2006). The

following section focuses on the policy stories techniques as they have been applied to the study of climate change.

The policy stories approach relies on two theoretical components to map issues: Cultural Theory (CT) and narrative (both theories are discussed in greater detail in Chapter 2). CT measures belief systems along two dimensions of grid and group. Grid measures preferred levels of group interaction, while the dimension of group captures the degree that these groups are expected to constrain the individual's beliefs and behavior (Thompson et al., 1990). The two dimensions of grid and group create four categories of cultural orientation: individualist, egalitarian, hierarch and fatalist. Each category produces differing and mutually exclusive orientations towards nature, making it an especially useful theory to examine climate change.

Fatalists believe that nature is capricious, or random, and that there is little individuals can do to control their lives. Hierarchs believe that nature can be controlled, but in doing so individuals must be bound by tight societal prescriptions where experts and specialists manage their particular sphere. Individualists, much like the position of classical economics, believe nature is resilient. Whatever the individual does, nature will return to equilibrium. Egalitarians view nature as dangerously fragile. For the egalitarian, human activity always runs the risk of going too far, where little can be done to correct for previous mistakes.

There are numerous studies validating CT measures in survey research, as well as other applications (see Mamadouh, 1999, for a concise summary of CT literature). Additionally, CT measures regularly outperform demographics, partisanship, ideology,

and knowledge in explaining policy preferences and opinion when applied in survey research (Wildavsky & Dake, 1990; Kahan & Braman, 2007).<sup>11</sup> These value orientations are always present and influence how incoming information is processed (Wildavsky, 1987; Thompson et al., 1990).

Narratives are a central feature of the policy stories approach. Narratives are a perhaps understudied communication structure in the social sciences as narratives are a ubiquitous means by which individuals communicate, process, and organize information (see Herman 2002). In identifying key narrative components researchers have been able to isolate the dominant cultural stories for each relevant cultural type in the dominant form through which information is conveyed.

Recent CT scholarship just surveyed has demonstrated a natural synergy between CT and narrative. Performing an extensive analysis of climate change discourses, a series of studies describe three cultural stories about climate change that have dominated public and elite communications (Raynor & Malone, 1998; Ney & Thompson 2000; Verweij et al., 2006):<sup>12</sup>

### **1.7.1 Profligacy: An Egalitarian Story**

In this story the cause of global warming is over-consumption. For the egalitarians, global warming is a moral issue, where selfishness has driven the environment to the brink of destruction. The villains of this story are profit driven

---

<sup>11</sup> It is worth noting that most of these studies have been performed by scholars sympathetic to CT.

<sup>12</sup> It is common in CT scholarship to exclude fatalists from analysis. See Mamadoah (1999) for a concise historical overview of CT applications.

corporations, governments that facilitate these corporations, and any group that supports the status quo. The heroes of the profligacy story are groups like Eco-defense and Earth First that seek the elimination of greenhouse gasses and advocate for fundamental changes in the human relationship with nature. The setting of this story is a fragile world where humans have overstepped their bounds, while the moral of the story is that humankind is doomed if it does not correct for past mistakes. The profligacy story favors renewable resources to deal with GHG's.

### **1.7.2 Lack of Global Planning: A Hierarchical Story**

The hierarchical story narrates the cause of climate change as runaway markets that have led to excessive economic and population growth. The setting is a world where humans have not properly managed economic and societal systems to allow for growth at a responsible pace that the climate can tolerate. The heroes in this story are groups like the Club of Rome, impartial scientists, and the governments that employ them. Hierarchs advocate for increased scientific management and governmental intervention to curtail climate change. The hierarchical story favors expert driven solutions like nuclear energy to solve the problem of GHG's.

### **1.7.3 Business as Usual: An Individualistic Story**

The individualistic story's heroes are groups such as the Cato Institute and organizations like the *Wall Street Journal*. The cause of global climate change for these groups is generally naïve but dangerous idealists (egalitarians) and self-interested government



representatives (hierarchs) that have fabricated the story (it is a hoax). Should they admit climate change is reality, they will argue the cause is irrelevant. The only solution for climate change is to allow market forces to move naturally as individuals compete and innovate to create new technologies that reduce carbon emissions and allow adaptation. The moral of the story is that markets must operate with minimal interference. Thus, Individualists are likely to be more sympathetic to market solutions such as a cap-and-trade on GHG's.

## **1.8 Conclusion**

Although the three stories mentioned have been painstakingly chronicled and detailed by previous scholars, their persuasiveness or actual effectiveness has yet to be empirically verified. Wildavsky (1987) observed that one's culture is always at hand, providing valuable information shortcuts that facilitate decision-making and information processing; Hayden White (1987), a prominent narrative scholar, makes a similar observation about narrative, noting that narratives are ubiquitous if not omnipresent. It would seem, then, that CT and narrative have a natural synergy, which previous scholarship has confirmed (e.g., Verweij et al. 2006). If White and Wildavsky's daring assertions are correct, then these two theories merged should explain considerable variation in public opinion related to climate change. Importantly, the policy stories research may shed light on previous gaps in our knowledge produced by the knowledge deficit and media models, by focusing our attention on the interactions between established priors and communication structures. Working from the policy stories work

and integrating several strands of social scientific literature and research, chapter two lays out a Cultural Narrative Model designed to assess how individuals process information and form opinions on climate change.

## CHAPTER 2: THE CULTURAL NARRATIVE MODEL, DATA, AND RESEARCH DESIGN

The previous chapter has demonstrated that global climate change is easily identified as one of the most complex and contentious policy problems facing not only the United States, but the human race. In a democratic society such as our own, understanding the public's capacities and tendencies in processing information and forming opinions about climate change has serious and far-reaching policy implications. Historically quite low, public knowledge about climate change is now on the rise, as is the importance of the issue on the public agenda (Leiserowitz, 2006). Consequently, it is not unreasonable to expect the public, for better or worse, to play a larger role in future climate policy melees (Burstein, 2003; 2006).

In light of the prospect of an increasingly important public role in shaping policy contours, this research seeks to explain how individuals form opinions about climate change and how those opinions vary. Importantly, the previous chapter demonstrates that while scientists largely converge on their opinions about the reality and causes of climate change, the public does not follow the same pattern. Dominant explanations for this divergence in opinion between the public and the scientific community in the social sciences can be characterized by two general models. The knowledge-deficit model finds that if people were better informed about climate change, their opinions would shift towards the scientific consensus (e.g., Kellstedt et al., 2008); the sensational media model finds that it is the coverage of climate change by primary media outlets, focusing on conflict and the exciting dimensions of news worthy events, that misinforms the

public—manufacturing a sense of conflict about climate change science, when little exists (e.g., Boycoff & Boycoff, 2007). However, both models were identified to not pay adequate attention to potential interactions between message structures and the prior beliefs and experiences individuals use to filter incoming information. In order to address these questions, two theories that account for both individual internal factors and external stimuli in opinion formation and change are merged to create the Cultural Narrative Model (CNM).

The first, Cultural Theory (CT), argues that there are four exclusive value orientations to which individuals subscribe based upon valued levels of group interaction and the degree that these groups are expected to constrain the individual's beliefs and behavior. These value orientations are always present and influence how incoming information is processed (Wildavsky, 1987; Thompson et al., 1990). Cultural Theory has a proven history of explaining variation in opinion (Wildavsky & Dake, 1990; Kahan & Braman, 2003); however, the influence of message structures in CT scholarship is lacking. Relying upon the previously detailed policy stories literature of chapter one (e.g., Verweij et al., 2006) this research operationalizes narrative theory to address this gap. Seeking to determine if cultural narratives help explain variations in opinions related to climate change, two research questions are addressed:

**RQ1:** Does cultural *narrative structure* influence opinions related to climate change?

**RQ2:** Does cultural *narrative content* explain variation in opinions related to climate change?

In order to develop hypotheses for these broad research questions, a model of how the individual processes information must be specified. To that end, in what follows the extant literature and research relevant to information processing is synthesized to produce the Cultural Narrative Model (CNM). Specific hypotheses derived from the discussion of CNM are detailed in subsequent sections on research design and methodology.

## 2.1 The Cultural Narrative Model (CNM)

Figure 2.1 illustrates the theorized relationships between exogenous cultural narratives and key endogenous variables of the Cultural Narrative Model. As illustrated, affect plays a central role. Several postulates derived from the extant literature generally guide the posited relationships within the model:<sup>13</sup>

1. **Hot Cognition:** All socio-political concepts are affect laden (Lodge & Taber, 2005; Morris, Squires, Taber & Lodge, 2003) and when these concepts are activated, affective attachments to said concept are activated as well (Redlawsk, 2002, p. 1023).
2. **Selective Exposure:** Individuals select sources and information that are congruent with what they already believe (Kunda, 1990, p. 495; Taber & Lodge, 2006).
3. **Confirmation Bias:** Individuals have a predisposition to treat congruent evidence that agrees with their priors as stronger than incongruent evidence (Taber & Lodge,

---

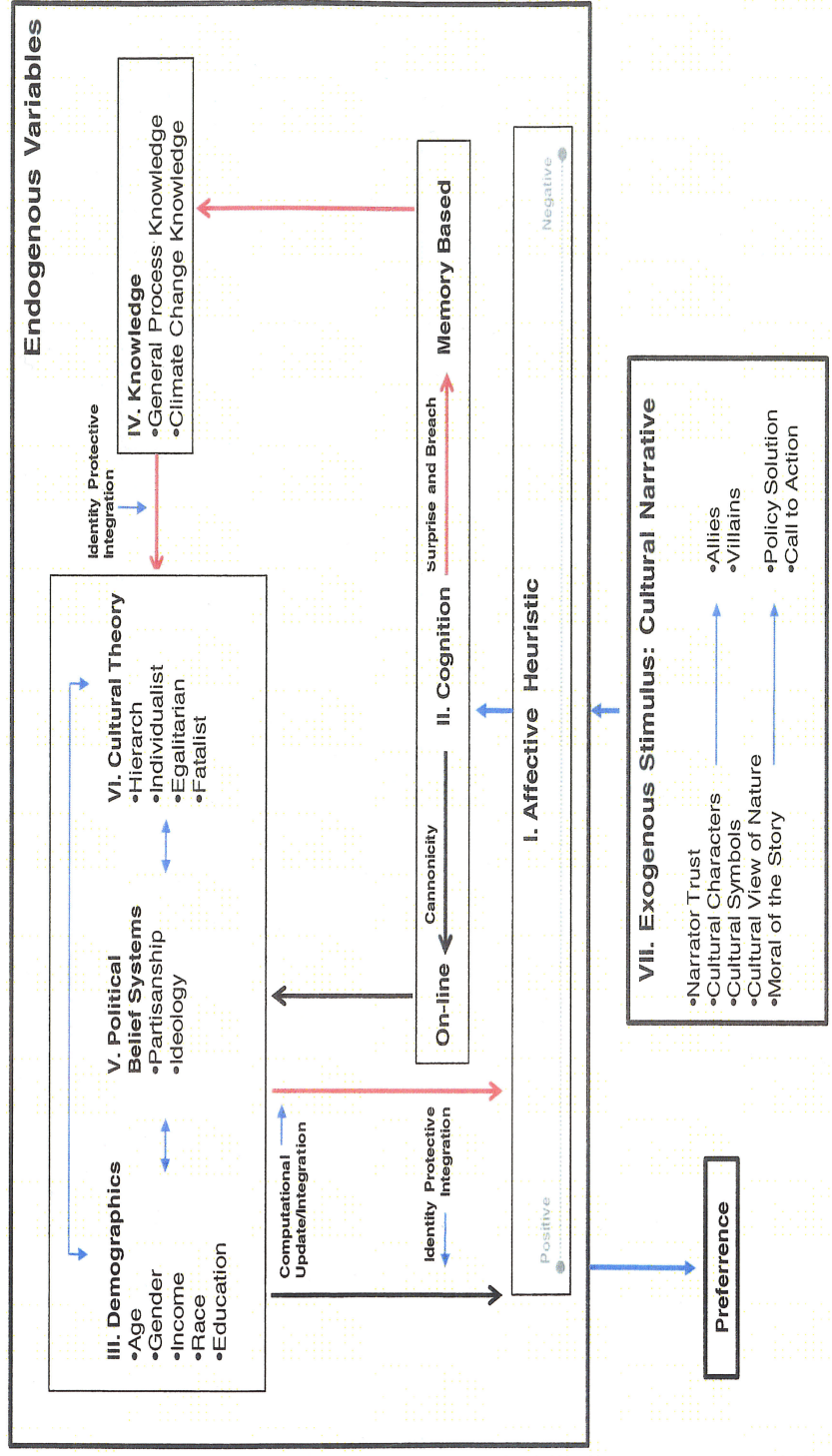
<sup>13</sup> These postulates are slightly modified summaries of recent work by Taber & Lodge (2007).

- 2006), and process congruent stimuli quicker than incongruent stimuli (Lodge & Taber, 2005).
4. **Disconfirmation Bias:** Evidence that is incongruent to an individual's priors is counter argued (Taber & Lodge, 2006) and takes longer to process than evidence that is congruent (Lodge & Taber, 2005).
  5. **Knowledge and Prior Beliefs:** Selective exposure, confirmation bias, and disconfirmation bias are conditioned by knowledge and prior beliefs. Those with the strongest prior attitudes employ what they know to protect their priors (Taber & Lodge, 2006), especially those with higher levels of knowledge and political sophistication (Taber & Lodge, 2006).

### 2.1.1 I. Affect

Affect is defined as positive or negative emotional response to stimuli (Leiserowitz, 2005, p. 1436; Lodge & Taber, 2005). In line with previous scholarship observing that affect precedes all cognitions (Lodge & Taber, 2005; Lodge & Taber, 2007 p. 6-7), CNM assumes the primacy of affect in human cognitive processes. The mechanism of affect's effect occurs by individuals positively or negatively "*charging*" socio-political concepts (e.g., I "hate" or "love" Obama) when either first encountered or through a process of updating (Leiserowitz, 2005, p. 1436; Redlawsk 2002, p.1021). These affective assessments occur spontaneously within 100-250 milliseconds before cognition (Lodge & Taber, 2007 p.16; Lodge & Taber 2005; Morris, Squires, Taber & Lodge, 2003) and are later integrated with conceptual knowledge (Duncan & Barrett, 2007). Found to be

Figure 2.1. The Cultural Narrative Model (CNM)



critical to such essential human functions as language fluency and memory (Duncan & Barrett, 2007), affective ascription allows individuals to engage in the very activity of choosing amongst various and often conflicting preferences (Taber & Lodge, 2007, p.18). That is, the act of choosing would be near impossible if human beings were incapable of assigning positive and negative value. Indeed, many individuals that are deficient in the ability to assign affect have been categorized as sociopaths and psychopaths, or are known to have suffered traumatic brain injuries (Damasio, 1994). In CNM, affect is posited as operating as an essential heuristic (Slovic et al. 2007), allowing individuals to form on-line opinions quickly, even when these individuals may not be able to articulate why they hold a given opinion. Affect is also theorized to serve an important role in the memory-based computational updating of preferences, as one “systematically weighs the pros and cons” (Lodge & Taber, 2007, p. 8).

Affect research has demonstrated importance in preferences for candidates (Granberg & Brown, 1989), issues (Lodge & Taber, 2005), groups (Lodge & Taber, 2005) and political parties (Granberg & Brown, 1989), among many other important socio-political concepts. Specifically related to the cultural narrative content of the model, marketing research demonstrates that narratives elicit stronger affective responses in consumers than do alternatives such as lists (Matilla, 2000; 2002), while cultural worldviews and affect are found to drive preferences about nuclear energy (Peters & Slovic, 1996).



### 2.1.2 II. Cognition: Online and Memory Based Processing

Given that affect is empirically found to come prior to cognition, all stimuli in CNM are theorized to move through an affective filter. Conditioned by the affective response, CNM posits that the incoming information is processed in one of two ways: on-line or through memory-based cognitions.<sup>14</sup> Memory-based cognition posits an individual that accesses current and individually salient considerations from memory to structure incoming information (e.g., Zaller, 1992). On-line cognition posits an individual that develops a running-tally of general phenomenon, updating various heuristics using affect-laden considerations and then discarding most information, but retaining the emotional attachment (e.g., Sniderman et al., 1991).

Stimuli that are attitudinally congruent with the respondent (Kunda, 1990), that support their priors (Taber & Lodge, 2007, p. 33), and/or is affectively congruent is processed faster than stimuli that does not meet these conditions (Lodge & Taber, 2005), indicating an on-line cognition process. Thus, stimuli that are attitudinally and/or affectively incongruent (Taber & Lodge, 2007, p. 33) and challenge a respondent's priors (Taber & Lodge, 2007, p. 9) take longer for a respondent to process (Lodge & Taber, 2005). These incongruent stimuli are demonstrated to provoke active counterargument on the part of the respondent

---

<sup>14</sup> There is considerable debate as to whether cognition modelers should embrace on-line or memory-based models. Following, Druckman and Lupia (2000), the position in this research does not view the two positions as dichotomous. Rather, CNM embraces both cognition models as accessible, viable, and beneficial processes human beings engage in to make sense of the world.

(Taber & Lodge, 2007, p. 9) and intended to protect the respondent's previously held beliefs and preferences (Kahan et al., 2007). Thus, incongruent stimuli are posited to be processed using a memory-based cognitive process. Memory-based processing is the less frequent of the two cognitive processes (Druckman & Lupia, 2000).

### **2.1.3 Endogenous Priors**

In line with previous research on public opinion, CNM distinguishes between two categories of variables in models of opinion formation: endogenous and exogenous (Kuklinski & Segura, 1995). Frequently referred to as priors, endogenous variables are characteristics intrinsic to the individual.

#### **2.1.3.1 III. Demographics**

The most widely cited and studied endogenous variables are standard demographic characteristics. For example, race has been found to be a strong predictor of attitudes about welfare (Kinder & Sanders, 1997) and risk (Finucane et al., 2000), while gender has a proven record with helping explain risk (Finucane et al., 2000) and opinions on foreign policy (Holsti, 2004, pp. 219-221). Other common demographic variables in explaining opinion include age, education, and income, all of which demonstrate predictive power, dependent upon the issue considered.

### **2.1.3.2 IV. Knowledge**

Respondent knowledge is a well-studied concept in preference formation and change research (e.g., Sniderman et al., 1991; Zaller, 1992; Delli Caprini & Keeter, 1996). In CNM, knowledge serves the primary function of filtering stimuli moving through the memory-based cognition path. Individuals with little process or domain specific knowledge are likely to rely on heuristics such as culture (Gastil et al., 2005; Wildavsky, 1987) and partisanship (Goren, 2005), and thus track the information through on-line processing. Individuals with high levels of knowledge will use this knowledge to help process the stimuli; however, they will do so for the primary purpose of defending their preexisting beliefs and preferences (Kahan et al., 2007; Sniderman et al., 1991). In generating internal counterarguments, individuals with high levels of knowledge “...limit the extent to which new information surprises them” (Druckman & Lupia, 2000).

Therefore, individuals with the lowest and highest levels of knowledge are least likely to shift opinion (Druckman & Lupia, 2000 p. 15). Respondents with moderate levels of knowledge are therefore posited as being most susceptible to new arguments and information (Zaller, 1992, p. 124).

Recently, Gilens (2001) finds that new policy specific information frequently changes opinions across many policy domains, including crime, foreign aid, and taxes. Knowledge has been measured as educational level, knowledge about the policy domain, and knowledge of the political process (Gilens, 2001; Wildavsky & Dake, 1990, p. 47). Given the critical role knowledge

plays in preference formation and change, *policy specific knowledge* (Gilens, 2001) related to climate change (Herron & Jenkins-Smith, 2008) is included as a control variable in CNM.

#### **2.1.3.3 V. Belief Systems: Partisanship and Ideology**

Partisanship and ideology demonstrate substantial explanatory power over an array of preferences. Measured as the strength of an individual's affiliation with a political party, scholars find that partisanship filters incoming political information (Bartels, 2002), explains issue positions (Markus & Converse, 1979), and drives core values (Goren, 2005). Partisanship is also demonstrated to be stable and resistant to change (Goren, 2005). Typically measured as a liberal/conservative continuum, tests of ideology have found that most Americans do not organize political information ideologically, save for a small percentage of political sophisticates (e.g., Converse, 1964; Zaller, 1992). As potentially powerful explanatory priors, partisanship and ideology are included as controls in CNM.

#### **2.1.3.4 VI. Cultural Theory**

The use of partisanship and ideology as endogenous measures in opinion models has become orthodoxy in political science. Despite the proliferation of these measures, both have suffered validity criticisms concerning their unidimensionality. The most notable of the critics in this vein, the late Aaron

Wildavsky, argued that both measures, particularly ideology, collapse issues into categories that have little theoretical coherence (1987).<sup>15</sup> Wildavsky (1987) observed that along the liberal/conservative continuum, libertarians that oppose government regulation in private matters and moralists who ardently support such policies are strangely lumped together as conservatives. Although not the majority position in the literature, scholars have detailed yet more inconsistencies, thus illuminating potential deficiencies (see, for example, Klingeman, 1979; Luttbeg & Grant, 1985). In sum, the thrust of these criticisms is that although ideology and partisanship do serve as organizing devices, they are not necessarily the most frequent devices employed by most individuals most of the time when processing political information and forming political preferences.

Although not nearly as prominent as partisanship and ideology, Cultural Theory (CT) is modeled in CNM as a third belief system construct. CT attempts to specify and explain how people sustain a particular way of life (Thompson, Ellis, & Wildavsky 1990, p. 1). In doing so, the original architects of CT (Douglas, 1982; Thompson, Ellis, & Wildavsky, 1990) merge two historically competitive definitions of culture: the first is embedded in cultural bias and derived from

---

<sup>15</sup> That is not to say that ideology and partisanship are ineffective metrics for assessing a wide array of opinion related dependent variables. They most certainly are. However, seen as coherent belief systems, partisanship and ideology are rife with inconsistencies. Although tangential to the research conducted here, the reason for both the effectiveness and the inconsistencies is likely institutional as issues and positions are captured by the two dominant political parties and forced to collapse along a single dimension (see Downs, 1957).

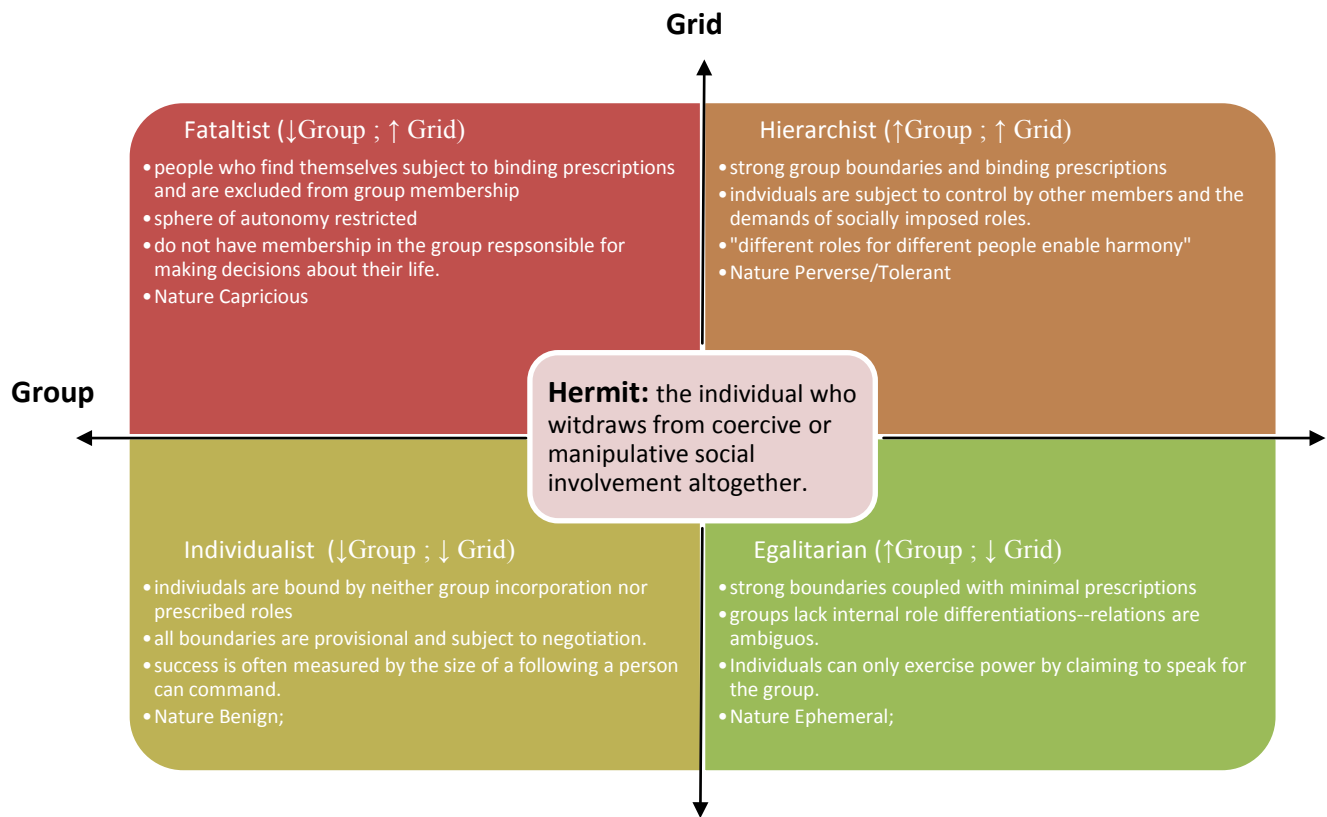
political science (e.g., Almond & Verba, 1963; Elazar, 1966); the second is embedded in social relations (e.g., Benedict, 1934) and largely the product of anthropology (e.g., Douglas, 1982). These two concepts represent the two defining dimensions of CT, where cultural bias is defined as “shared values and beliefs” and social relations are defined as “patterns of interpersonal relations” (Thompson, Ellis, & Wildavsky, 1990, p. 1).

The two dimensions produce two conditions and one theorem that theoretically anchor CT. The *compatibility condition* states that the viability of a particular form of life is conditioned by “a mutually supportive relationship between a particular cultural bias and a particular pattern of relations” whereby these biases and relations cannot be randomly or indiscriminately mixed (Thompson, Ellis, & Wildavsky, 1990, p. 2). That is to say, “a change in the way an individual perceives physical or human nature, for instance, changes the range of behavior an individual can justify engaging in and hence the type of social relations an individual can justify living in” (Thompson, Ellis, & Wildavsky 1990, p. 2). The *impossibility theorem* states that given the compatibility condition, “five and only five ways of life—hierarchy, egalitarianism, fatalism, individualism, and autonomy (also referred to as the hermit)<sup>16</sup> meet these

---

<sup>16</sup> Please note that the hermit classification is discussed only briefly, and not operationalized as a CT component of CNM. Three reasons guide this decision: first, the hermit, when perfectly identified, is the zero point of the two dimensions—hence, the likelihood of a pure hermit emerging is slight; second, hermits, defined by their social isolation and prescription rejection are unlikely to participate in surveys; third, it is common in the literature to exclude this category (see Mamadouh, 1999).

**Figure 2.2.** Cultural Theory Grid and Group Typology. *Source:* Thompson, Ellis, and Wildavsky, 1990.



conditions of viability” (Thompson, Ellis, & Wildavsky, 1990, p. 3). There are five *viable* combinations of cultural bias and patterns of social relations. These ways of life compete with each other, but are interdependent in the sense that the individual ways of life cannot exist without the others. As a consequence, the *requisite variety condition* states that “there may be more than five ways of life, but never fewer” (Thompson, Ellis, & Wildavsky 1990, p. 4). Each way of life will be represented in a culture, but not necessarily in equal proportions and is

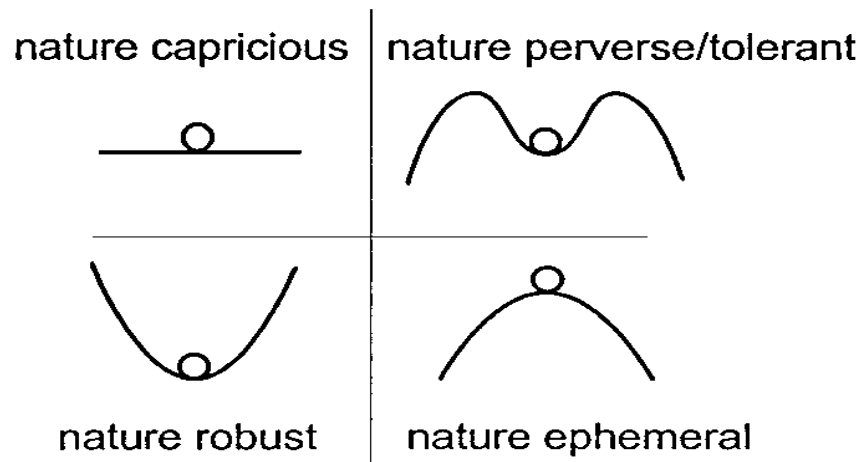
dependent on the other ways of life for the defining characteristics that make that way of life possible.

Operationalizing the previously mentioned dimensions, CT measures belief systems along two dimensions of grid and group. Grid measures valued levels of group interaction, while the dimension of group captures the degree that these groups are expected to constrain the individual's beliefs and behavior (Thompson, Ellis, & Wildavsky, 1990). By surveying respondents, individuals can be placed in a two-dimensional space and classified as most closely approximating one of four types: fatalist, hierarch, individualist, and egalitarian.

In addition to information about an individual's grid and group, CT argues that each quadrant produced by the two dimensions provides an exclusive view of nature, thereby making CT an appropriate tool for the study of climate change. Figure 2.3 illustrates this understanding of nature in terms of a ball representing human choice and agency atop a line representing nature's reaction to that agency. Fatalists believe that nature is capricious, or random, and that there is little individuals can do to control their lives—the ball rolls about randomly. Hierarchs believe that nature can be controlled, but in doing so individuals must be bound by tight societal prescriptions where experts and specialists manage their particular sphere. Individualists, much like the position of classical economics, believe nature is resilient. Whatever the individual does, nature will return to equilibrium, just like markets. Egalitarians view nature as



**Figure 2.3.** Cultural Theory Myths of Nature. *Source:* Mamadouh, 1999; Thompson et al. 1990, p.27.



dangerously fragile. For the egalitarian, human activity always runs the risk of going too far, where little can be done to correct for previous mistakes.

There are at least three reasons to embrace CT theory and measures as the endogenous belief system of interest. First, CT measures regularly outperform demographics, partisanship, ideology, and knowledge in explaining policy preferences and opinion (Wildavsky & Dake, 1990; Kahan & Braman, 2007).<sup>17</sup> Second and as discussed in chapter one, CT has already been applied to the study of climate change in terms of stories. Finally, there is an intuitive linkage between CT's views of nature and how these views might relate to climate change policy. CT measures are the endogenous priors of interest in CNM.

<sup>17</sup> It is worth noting that most of these studies have been performed by scholars sympathetic to CT.

#### **2.1.4 VII. Exogenous Stimulus: Cultural Narrative**

The most compelling reasons to embrace narrative as a model for exogenous influence on preference formation are straightforward: there is considerable evidence that humans use narrative to organize, process, and convey information (see for example, Berinsky & Kinder, 2006; Gerrig & Egidi, 2003; Klein, 2003). Indeed, there is persuasive evidence that narrative cognition is fundamental to human existence. Neuroscience research has located the neural network responsible for narration (Troiani et al., 2006; Young & Saver, 2001), and determined that brain injuries or degeneration such as that caused by Alzheimer's disease (Ash et al., 2007) can result in the loss of the ability to narrate (Young & Saver, 2001). Once this loss occurs, neuroscience research finds that the loss of narration is more problematic than losses of other functions such as kinesthetic, mathematic, or linguistic (Young & Saver, 2001). The loss of the ability to narrate results in the patient's inability to perceive the self (Young & Saver, 2001, p. 77).

The study of narrative unsurprisingly finds its genesis in literary theory, where two general approaches materialized: structuralism and poststructuralism. Applications of narrative in public policy are predominantly poststructural (Jones & McBeth, 2010). Poststructuralist scholarship asserts that each instance of narrative, caused by every conceivable act of interpretation, is unique (e.g., Derrida, 1981) and generalization is impossible (Fischer, 2003, p.vii). For the poststructuralist, each narrative and the interpretations that constitute

said narrative, is the unit of analysis (Huisman, 2005, p. 39). On the other hand, structuralists assert that each story has general identifiable components from which generalizations can be formed (e.g., Genette, 1980). Structural applications of narrative seek generalizable components that can be applied in different contexts (Herman, 2009; McQuillan, 2000). Jones & McBeth (2010) in their synthetic review of narrative applications in public policy find that to avoid the relativistic claims of poststructural research, empirically oriented studies of narrative should define both general narrative structures and anchor those structures to generalizable content. Therefore, a structural treatment of narrative is essential to empirical investigation.

Structural approaches have found some success in policy studies (see Jones & McBeth, 2010 for an overview of this literature). For example, McBeth et al. (2005) use narrative structure to quantitatively identify core policy beliefs, while Ricketts (2007) finds that narratively structured communications are 20% more likely to get individuals to comply with safety instructions than traditional abstract safety warnings. Drawing on the structural tradition in narrative policy research, CNM rejects the poststructural position of relativity and posits that all narratives have general structural components that compose the skeletal frame of stories—regardless of context.

CNM invokes the baseline structural definition of narratives provided by Jones & McBeth (2010) in their overview of narrative research in public policy. Narrative is defined as a story with distinct components consisting of a

beginning, middle, and end (McBeth et al., 2005) that takes place in a particular setting (Stone, 2002), contains a plot (Abell, 2004; Stone 2002), is composed of characters (McBeth et al., 2005; Verweij et al., 2006), and offers a moral to the story (Verweij et al., 2006).

Jones & McBeth (2010) also argue that if the position of relativity asserted by postpositivists is to be avoided, narrative must also be shown to have generalizable content. In order to avoid charges of narrative relativity, narrative content must be anchored in generalizable content that limits variability. That is, narratives must also be about something that transcends specific contexts. Admittedly, this is a more difficult task than identifying generic narrative structures. Jones and McBeth (2010) suggest that one effective strategy for identifying generic narrative content is to employ previously proven belief system measures in the social sciences to identify this content, such as ideology and Cultural Theory. These belief system measures will allow for the identification of the previously mentioned narrative structural components such as characters and plots within a range that is wide, but nonetheless limited. For example, a narrative designed to persuade conservative voters that characterized Nancy Pelosi as a hero is likely to be rejected, as Speaker Pelosi is viewed by many of these voters as the archetype of liberal philosophy. Cultural Theory provides the necessary content anchor for CNM.

The policy stories research summarized in chapter one provides the necessary content for the stories presented as exogenous message structures in

CNM, while the previously identified narrative structures inform what components must be in a narrative. The policy stories approach tells how those components should be populated with cultural theory content.

### **2.1.5 Mechanisms of Persuasion**

Two mechanisms of persuasion are theorized in CNM. The first, congruence and incongruence, suggests that individuals are more likely to be persuaded by cultural stories that fit their world view. The second, narrator trust, suggests that the more an individual trusts a narrator, the more likely a persuasion effect is to occur.

#### **2.1.5.1 Congruence and Incongruence**

New information in narrative form is generally easy for individuals to process as it is structured similarly to life experience (Matilla, 2000; 2002). Narratives persuade to the extent they comport with that individual's understanding of the world or life experience (Schank et al., 1995). Concerning CNM, narrative is posited to comport to an individual's reality to the extent that it is congruent with their cultural worldview. Through cultural symbols (e.g., characters), plots, causal connections, and language, certain facets of the story are sharpened and more apparent, while others become leveled and obscure (Gilovich, 1991). These cultural identifiers allow an individual to quickly gauge congruence or incongruence. Congruence is preferred by the individual as he/she protects their

existing understanding of the world (Kunda, 1990, p. 495; Taber & Lodge, 2006); incongruence is actively rejected (Lodge & Taber, 2005; Taber & Lodge, 2006) as individuals engage in cultural identity protection (Kahan et al., 2007). Cultural identity protection makes it difficult to persuade an individual to accept an alternate cultural view. Congruence and incongruence are critical conceptual components of CNM. Cultural Theory metrics determine a respondent's cultural type and the extent to which the cultural narrative stimulus they encounter is congruent or incongruent is likely to influence that individual's processing of the information within that narrative.

#### **2.1.5.2 Narrator Trust**

The importance of source effects is well documented as an important exogenous component of message persuasion (Page et al., 1987; Mondak, 1993). A source's trustworthiness (Popkin, 1994, p.47), accuracy and objectivity (Iyengar & Kinder, 1985), expert status (Page et al., 1987), likeability (Sniderman, Brody, & Tetlock, 1991), and ideology (Zaller, 1992, p. 47) have all been identified as affecting a recipient's willingness to accept a message. Thus, a recipient of a given message is likely to be persuaded by an argument if the respondent and the message source share interests and the speaker is believed to be knowledgeable (Druckman & Lupia, 2000, p. 17). Related specifically to the narrative stimulus, the plausibility of a story is conditioned by both the

recipient's knowledge and the extent to which they trust the narrator or the source (Hovland & Weiss, 1951; Olson, 2003).

## **2.2 Research Design, Data, and Methodology**

The previous discussion has specified the *Cultural Narrative* model's key endogenous and exogenous categorizations and expected relationships. To reiterate, CT measures constitute the primary belief system measures, while narrative theory provides the primary exogenous structuring theory. The following sections detail the research design, data, methodology, as well as discussing some of the inherent tradeoffs in operationalizing cultural narratives. Moving forward from CNM's theoretical specification, recall that CNM addresses two general research questions:

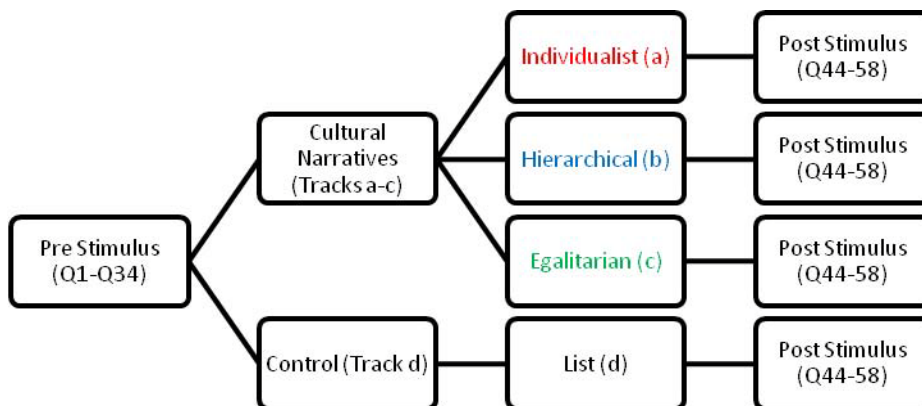
**RQ1:** *Cultural Narrative Structure:* Does cultural narrative structure influence opinions related to climate change?

**RQ2:** *Cultural Narrative Content:* Does cultural narrative content explain variation in opinions related to climate change?

The above research questions guide the research design, data collection strategy, and applications of method. Relevant hypotheses are tested for each research question. Briefly summarizing this research, the data consist of a nationally representative sample of 1586 respondents. Each respondent takes an online internet survey, consisting of fifty-eight questions (See Appendix A for the full survey). Built into the survey, is an experimental design testing the

influence of cultural narrative structure (RQ1) and the influence of cultural narrative content (RQ2). Each respondent is randomly assigned to one of four experimental tracks. The experimental progression, by track, is illustrated in Figure 2.4. Three of the tracks (a-c) provide the cultural narrative treatment while a fourth provides a control list (d).

**Figure 2.4.** Experimental Progression, by Track



This experimental design sets up a comparison between respondent responses to key climate change opinion related dependent variables across experimental tracks, addressing RQ1 and RQ2. Based on the three stories identified by previous research detailed in chapter one (e.g., Verweij et al., 2006), each cultural narrative is constructed to stay true to the experimental design by alternatively varying structure or content. RQ1 (narrative structure) is assessed by comparing the control list (track d) to each of the three cultural narrative tracks (a-c). Holding narrative structure constant, RQ2 (narrative content) is addressed by varying the cultural content in terms of characters,



cultural symbols, and policy solutions of the narratives and comparing responses across cultural narrative tracks (a-c). The content of each exogenous narrative experimental treatment is culturally specific to the egalitarian, hierarch, and individualist stories identified in previous scholarship (e.g., Verweij et al., 2006).

### **2.2.1 Sampling and Data Collection**

Survey responses for this research consist of 1,586 individuals drawn from Survey Sampling Inc.'s (SSI) pool of internet survey volunteers. The data were collected between April 24<sup>th</sup> and April 27<sup>th</sup>, 2009. Although not a true random probability sample, SSI's pool of respondents is screened as the sample is drawn to form the sample population to be representative of the U.S. national population more generally. A true probability sample, such as that gathered using random digit dialing techniques (RDD), is not usually necessary "...when the most important variables of interest are based on experimental treatments" (Berrens et al., 2003, p. 2). Additionally, on the substantive issue of climate change, internet samples and traditional RDD phone samples are found to be quite similar (Berrens et al., 2003, p. 21). As the survey employed in this research is an experimental design and substantively related to climate change, obtaining a true probability sample is deemed unnecessary.

Table 2.1 summarizes the demographic characteristics of the overall survey sample. For comparative purposes, the corresponding demographic percentage of the U.S. national population is included in Table 2.1. For the most

**Table 2.1.** General Survey Population Demographics. *Source:* U.S. National Population Figures, Herron and Jenkins-Smith, 2006, p. 180.

| <b>Demographic</b>         | <b>Frequency</b> | <b>Respondent (%)</b> | <b>US National Population (%)</b> |
|----------------------------|------------------|-----------------------|-----------------------------------|
| <i>Gender</i>              |                  |                       |                                   |
| Male                       | 688              | 43.4                  | 48.1                              |
| Female                     | 893              | 56.3                  | 51.9                              |
| <i>Age</i>                 |                  |                       |                                   |
| 18-24                      | 150              | 9.5                   | 13.2                              |
| 25-54                      | 948              | 59.6                  | 57.0                              |
| >54                        | 488              | 30.8                  | 28.8                              |
| <i>Education</i>           |                  |                       |                                   |
| High School Grad or Higher | 1538             | 97.3                  | 83.1                              |
| College Grad or Higher     | 603              | 38.2                  | 24.3                              |
| <i>Race/Ethnicity</i>      |                  |                       |                                   |
| White, non-Hispanic        | 1075             | 67.8                  | 72.7                              |
| Black                      | 256              | 16.1                  | 11.5                              |
| Hispanic                   | 176              | 11.1                  | 11.0                              |
| Other                      | 72               | 5                     | 4.7                               |
| <i>Household Income</i>    |                  |                       |                                   |
| \$0-49,999                 | 917              | 57.8                  | 57.3                              |
| \$50,000-99,999            | 509              | 32.1                  | 29.3                              |
| \$100,000 and above        | 124              | 7.8                   | 13.4                              |

part, the survey sample supplied by SSI conforms to national standards, with significant over representation of educated respondents, which is a common feature of internet surveys (Berrens et al. 2003), but presents no validity threats to this research.

The survey is taken online after a potential participant receives an e-mail invitation from Survey Sampling, Incorporated (SSI) and accepts the invitation. Response rates for initial acceptance are unknown and not provided by SSI. Each respondent that finished the survey received three dollars in compensation. A sample size of 1,586 respondents allows for >250 respondents in each experimental track, providing a sample error within each treatment group of +/- 5%.

### **2.2.3 RQ2: Narrative Structure**

Constructing exogenous cultural narrative treatments on climate change for this dissertation's nested experimental internet survey presents a tension between at least two competing objectives. On the one hand, narratives have largely been treated as context dependent by dominant postpositivist applications of narrative (Fischer, 2003; Hajer, 1993; 1995; Stone, 2002); thus, by this definition narratives are highly variable and situation specific—in fact many assert this is their primary virtue (e.g., Dodge et al. 2005); on the other hand, the demands of experimental design require that all but the stimulus be held constant (McDermott, 2002). This presents an interesting problem. How does

one create a general narrative structure when that structure's effectiveness is largely argued to be contingent upon the degree to which *the content* matches the unique context it is applied to or attempting to explain? Or, stated differently, narratives are typically argued to illuminate the contexts to which they are applied and must necessarily do so to be considered "good stories;" experimental designs, on the other hand, require stripping away much of this context to test generalizable knowledge. In what follows, how this tension has been navigated in the construction of the cultural narrative and the control treatments are addressed.

#### **2.2.4 The Control List**

What can and should be classified as a narrative is a highly contentious point in narrative scholarship. While some argue that everything is implicitly narrative (e.g., Derrida, 1981), others argue that narratives must be tightly bound by stringent qualifications (e.g., Abell 2004; Jones & McBeth, 2010). It is not the purpose of this research to resolve this debate. Rather, it is asserted, along with other scholarship (e.g., Herman, 2002; White 1980), that certain texts (broadly understood) possess more "narrativity" than others. As has been done in other experimental designs testing the influence of narrative, a list stimulus is employed as a control to determine the influence of narrative structures (e.g., Mattilla, 2000). While there is substantial disagreement on what a narrative is, most would agree that either a list is not a narrative or, at the very least, possesses less narrativity than the cultural narrative stimuli. The control list

**Table 2.2. Control and Cultural Narrative Setting Text Comparison**

| Control List: Standardized Facts   | Cultural Narrative Standardized Facts   |
|--|---|
| <p><i>Lead in:</i> The issue of global climate change has been the subject of debate over the last few decades. Recently, a large group of scientists analyzed all of the existing studies on climate change and summarized these findings:</p> <ul style="list-style-type: none"> <li>• Most agree that the Earth is warming and that over the past one hundred years the average temperature has increased by one to two degrees.</li> <li>• During this same time period, human beings have increased the amount of greenhouse gasses in the atmosphere.</li> <li>• The release of carbon dioxide from the burning of fossil fuels like coal and oil are the main contributors to these increased greenhouse gasses.</li> <li>• The summary of findings also confirmed that increases in greenhouse gasses tend to warm the planet.</li> </ul>  | <p>The issue of global climate change has been the subject of debate over the last few decades. Recently, a large group of scientists analyzed all of the existing studies on climate change and summarized these findings <i>in a way that most involved in the debate agree with.</i></p> <p>Most agree that the Earth is warming and that over the past one hundred years the average temperature has increased by one to two degrees. During this same time period, human beings have increased the amount of greenhouse gasses in the atmosphere. The release of carbon dioxide from the burning of fossil fuels like coal and oil are the main contributors to these increased greenhouse gasses. The summary of findings also confirmed that increases in greenhouse gasses tend to warm the planet. Few contest these findings.</p>   |
| <p><i>Lead in:</i> The summary report by the scientists also made several predictions about what could happen in the United States:</p> <ul style="list-style-type: none"> <li>• In the Northeast, there is 90% likelihood that coastlines will be exposed to coastal erosion.</li> <li>• In Polar Regions such as Alaska, infrastructure (roads, bridges, etc.) and native ways of life are 80% likely to suffer significant harm from the effects of climate change. There is an 80% certainty that migratory birds, mammals and higher predators will suffer significant harm from reductions in glaciers, ice sheets, and sea ice.</li> <li>• It is 80% likely that heat waves in cities like Chicago will increase in number, intensity, and duration during the course of the century.</li> <li>• It is 66% likely that the Great Plains area will experience more severe summer droughts and a 90% likelihood that increased springtime flooding will damage crop yields.</li> <li>• There is 80% certainty that warming in western mountains will lead to decreased snowpack, more winter flooding and reduced summer flows, which would increase competition for water in many western states.</li> </ul> | <p><b>Cultural Narrative: US Scenario</b></p> <p>The summary report by the scientists also made several predictions about what could happen in the United States. <i>Although a bit technical, it is worth looking at some of these predictions:</i></p> <ul style="list-style-type: none"> <li>• In the Northeast, there is 90% likelihood that coastlines will be exposed to coastal erosion.</li> <li>• In Polar Regions such as Alaska, infrastructure (roads, bridges, etc.) and native ways of life are 80% likely to suffer significant harm from the effects of climate change. There is an 80% certainty that migratory birds, mammals and higher predators will suffer significant harm from reductions in glaciers, ice sheets, and sea ice.</li> <li>• It is 80% likely that heat waves in cities like Chicago will increase in number, intensity, and duration during the course of the century.</li> <li>• It is 66% likely that the Great Plains area will experience more severe summer droughts and a 90% likelihood that increased springtime flooding will damage crop yields.</li> <li>• There is 80% certainty that warming in western mountains will lead to decreased snowpack, more winter flooding and reduced summer flows, which would increase competition for water in many western states.</li> </ul> |

contains identical information and nearly identical wording to that detailed in both the cultural narrative standardized facts and the cultural narrative US scenario (see Table 2.2). The gray-scale columns identify the cultural narrative treatment of the same information contained in the control, while the italicized words in the same columns indicate textual changes between all cultural narrative tracks and the control list. Comparing the cultural narrative responses to responses to the control should help illuminate the broader importance (or lack of) of narrative structure.

### **2.2.5 Cultural Narrative Structure**

The influence of narrative structure (tracks a-c) on key climate change opinion dependent variables is ascertained in relation to the control list (track d). Table 2.3 specifies the question and progression for each experimental track. The far left hand column identifies the pre-treatment question progressions, the middle column the cultural narrative question progressions, and the right hand column details the control list question progressions.<sup>18</sup>

Following pre-stimulus questions including measures of CT, demographics, ideology, and partisanship, all respondents receive the same factual information, derived from the Intergovernmental Panel Climate Change (IPCC) Report, 2007. In the control list, the information is presented as two separate lists. One list provides general facts about climate change, while the

---

<sup>18</sup> Please note that Table 2.3 lists all of the progressions for this survey. However, not all of the questions are empirically tested in this dissertation project.

**Table 2.3.** Survey Question Progression Coding

| <b>Pre-Test Questions</b>   | <b>Cultural Narrative</b><br>(Tracks a-c)   | <b>Control Group</b><br>(Track d) |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
|---|---|-----------------------------------|----------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|------------|--|--|------------|------------|------------|-----------|-----------|
| <p><b>Demographics</b></p> <ol style="list-style-type: none"> <li>1. Age Screening</li> <li>2. Age (verbatim)</li> <li>3. Education</li> <li>4. Gender</li> </ol> <p><b>Party and Ideology</b></p> <ol style="list-style-type: none"> <li>5. Political Party</li> <li>6. Strength of Party identification</li> <li>7. Ideology</li> </ol> <p><b>General Political Knowledge</b></p> <ol style="list-style-type: none"> <li>8. House of Rep.</li> <li>9. Veto Override</li> <li>10. Federal Judges</li> <li>11. Senator</li> </ol> <p><b>General CC Knowledge</b></p> <ol style="list-style-type: none"> <li>12. Temperature Rise</li> <li>13. Ocean Levels</li> <li>14. Droughts</li> <li>15. Floods</li> <li>16. Severe Weather</li> </ol> <p><b>CC Causes</b></p> <ol style="list-style-type: none"> <li>17. Auto Exhausts</li> <li>18. Nuclear Power</li> <li>19. Toxic Chemicals</li> <li>20. Coal Power</li> <li>21. Deforestation</li> <li>22. Avg Temp. Increase</li> </ol> <p><b>Cultural Theory Measures</b></p> <ol style="list-style-type: none"> <li>23. Hierarchy: ahead</li> <li>24. Hierarchy: authority</li> <li>25. Hierarchy: rules</li> <li>26. Individualist: fail</li> <li>27. Individualist: disadvantaged</li> <li>28. Individualist: individual</li> <li>29. Egalitarian: Fair</li> <li>30. Egalitarian: Power</li> <li>31. Egalitarian: Income</li> <li>32. Fatalist: Random</li> <li>33. Fatalist: Fate</li> <li>34. Fatalist: Plans</li> </ol> | <p><b>Standardized Facts</b></p> <ol style="list-style-type: none"> <li>35. Surprise</li> </ol> <p><b>US Scenario</b></p> <ol style="list-style-type: none"> <li>36. Surprise</li> </ol> <p><b>The Villain</b></p> <table border="1"> <thead> <tr> <th>Ind.</th> <th>Hierarch</th> <th>Egal.</th> </tr> </thead> <tbody> <tr> <td>37a. Egal1</td> <td>37b. Egal1</td> <td>39c. Hier1</td> </tr> <tr> <td>38a. Egal2</td> <td>38b. Egal2</td> <td>40c. Ind.1</td> </tr> <tr> <td>39a. Hier1</td> <td>40b. Ind.1</td> <td>41c. Ind.2</td> </tr> <tr> <td></td> <td>41b. Ind.2</td> <td></td> </tr> </tbody> </table> <p><b>Policy Solution</b></p> <ol style="list-style-type: none"> <li>42. Argument Surprise</li> <li>43. Hero Response</li> </ol> <p><b>Post Stimulus</b></p> <ol style="list-style-type: none"> <li>44. Narrator Risk</li> <li>45. Narrator Trust</li> <li>46. Affective Response</li> <li>47. Respondent Risk</li> <li>48. Climate Change Action</li> </ol> <p><b>Fact Agreement</b></p> <ol style="list-style-type: none"> <li>49. Climate Change Belief</li> <li>50. GHG Cause</li> <li>51. US Scenario</li> </ol> <p><b>Climate Change Policy Preference</b></p> <ol style="list-style-type: none"> <li>52. Hierarchical</li> <li>53. Individualist</li> <li>54. Egalitarian</li> </ol> <p><b>More Demographics</b></p> <ol style="list-style-type: none"> <li>55. Race</li> <li>56. Income</li> <li>57. Zip code</li> </ol> <p><b>Narrative Organization</b></p> <ol style="list-style-type: none"> <li>58. Sorting Exercise</li> </ol> | Ind.                              | Hierarch | Egal. | 37a. Egal1 | 37b. Egal1 | 39c. Hier1 | 38a. Egal2 | 38b. Egal2 | 40c. Ind.1 | 39a. Hier1 | 40b. Ind.1 | 41c. Ind.2 |  | 41b. Ind.2 |  | <p><b>Standardized Facts</b></p> <ol style="list-style-type: none"> <li>35. Surprise</li> </ol> <p><b>US Scenario</b></p> <ol style="list-style-type: none"> <li>36. Surprise</li> </ol> <p><b>Group Responses</b></p> <table border="1"> <tbody> <tr> <td>37d. Egal1</td> </tr> <tr> <td>38d. Egal2</td> </tr> <tr> <td>39d. Hier1</td> </tr> <tr> <td>40d. Ind1</td> </tr> <tr> <td>41d. Ind2</td> </tr> </tbody> </table> <p><b>Post Stimulus</b></p> <ol style="list-style-type: none"> <li>44. Narrator Risk</li> <li>45. Narrator Trust</li> <li>46. Affective Response</li> <li>47. Respondent Risk</li> <li>48. Climate Change Action</li> </ol> <p><b>Fact Agreement</b></p> <ol style="list-style-type: none"> <li>49. Climate Change Belief</li> <li>50. GHG Cause</li> <li>51. US Scenario</li> </ol> <p><b>Climate Change Policy Preference</b></p> <ol style="list-style-type: none"> <li>52. Hierarchical</li> <li>53. Individualist</li> <li>54. Egalitarian</li> </ol> <p><b>More Demographics</b></p> <ol style="list-style-type: none"> <li>55. Race</li> <li>56. Income</li> <li>57. Zip code</li> </ol> <p><b>Narrative Organization</b></p> <ol style="list-style-type: none"> <li>58. Sorting Exercise</li> </ol> | 37d. Egal1 | 38d. Egal2 | 39d. Hier1 | 40d. Ind1 | 41d. Ind2 |
| Ind.  | Hierarch  | Egal.                             |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
| 37a. Egal1  | 37b. Egal1  | 39c. Hier1                        |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
| 38a. Egal2  | 38b. Egal2  | 40c. Ind.1                        |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
| 39a. Hier1  | 40b. Ind.1  | 41c. Ind.2                        |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
|   | 41b. Ind.2  |                                   |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
| 37d. Egal1  |   |                                   |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
| 38d. Egal2  |   |                                   |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
| 39d. Hier1  |   |                                   |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
| 40d. Ind1   |   |                                   |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |
| 41d. Ind2   |   |                                   |          |       |            |            |            |            |            |            |            |            |            |  |            |  |  |            |            |            |           |           |

second provides a list of potential consequences of climate change for the United States. In narrative form (as opposed to a list), the same information is presented in each cultural narrative as the setting. The setting does not vary across cultural narratives and is exactly the same for each of the three cultural narratives.

Following the general facts and the predictions for the US, respondents in the control track move directly to post-stimulus questions; respondents exposed to a cultural narrative setting move to the next cultural narrative section in their assigned track. Five narrative structural components are consistent across all cultural narrative tracks:

1. **Setting:** Each cultural narrative begins with a setting (Stone, 2002) detailing the specific context of the story. The findings of the IPCC report (2007) are used to establish this setting. The report serves the purpose of legitimizing climate change as a reality, which is supported by a general level of acceptance in public opinion polls in the United States (Leiserowitz, 2005).<sup>19</sup> All three cultural narratives and the control list use the same fact base to set the stage.
2. **Plot:** Plots are fundamental components of narrative (Somers 1992; Abell 2004), providing relationality of component parts (e.g., characters and the setting), and structuring causal explanations

---

<sup>19</sup> IPCC reports have been identified as hierarchical sources (Raynor & Malone, 1998) and likely to bias survey responses. Therefore, the setting descriptions and lists do not credit the IPCC directly.



(Somers 1992; Stone, 2002) that determine the plausibility of the narrative. The plot used in all cultural narratives is the “stymied-progress” plotline (Stone, 2002). The “stymied-progress” plotline details an obstruction of progress in dealing with climate change caused by the “dangerous” interests of the enemy (other cultural types). The causal explanation (Stone, 2002) details the hero’s actions as intentionally obstructed by the villains.

3. **Characters:** Characters are an integral part of narrative structure. Consistent with previous operationalizations in the policy literature (McBeth et al. 2005; Verweij et al. 2006), each narrative contains tangible and culturally specific heroes, villains, and victims.
4. **Moral of the Story:** The moral of the story in narrative is often portrayed to prompt action (Stone, 2002) and is frequently presented as a policy solution (Ney & Thompson, 2000; Verweij et al. 2006). Consistent with these past treatments of “the moral of the story,” this component of each cultural narrative is operationalized as a culturally specific policy solution.

Methods of analysis include t-tests and analysis of variance (ANOVA) and (where appropriate) linear regression models. Discussed in more detail in chapter four, the following hypotheses are tested for narrative structure:

- H<sub>01</sub>:** There is no relationship between a respondent's perceptions of the narrator's assessment of the risk climate change poses and narrative structure.
- H<sub>02</sub>:** There is no relationship between levels of trust a respondent ascribes to an author and narrative structure.
- H<sub>03</sub>:** There is no relationship between the level of affect a respondent assigns to the experimental stimulus and narrative structure.
- H<sub>1</sub>:** **Personal Risk:** Narratively structured climate change messages will increase the respondent's sense of threat that climate change poses to them personally relative to the control group.
- H<sub>2</sub>:** **Sociotropic Risk:** Narratively structured climate change messages will increase the respondent's sense of threat that climate change poses to the United States in general relative to the control group.
- H<sub>3</sub>:** **Climate Change Belief:** Narratively structured messages will increase the respondent's willingness to accept that climate change is a reality relative to the control group.
- H<sub>4</sub>:** **Anthropogenic Cause:** Narratively structured messages will increase the respondent's willingness to accept that human beings are a critical cause of climate change through increased GHG emissions relative to the control group.

- H<sub>5</sub>: **GHG Regulation:** Narratively structured messages will increase the respondent's willingness to regulate GHG's relative to the control group.
- H<sub>6</sub>: **Hero Affect:** Characters (groups) treated as heroes in the cultural narratives will facilitate more positive affective responses than groups in the control.
- H<sub>7</sub>: **Villain Affect:** Characters (groups) treated as villains in the cultural narratives will facilitate more negative affective responses than groups in the control.
- H<sub>8</sub>: **Moral of the Story:** Policy preferences advocated by a cultural narrative will be preferred by respondents exposed to that narrative.
- H<sub>9</sub>: **Culturally Antithetical Moral of the Story:** Policy preferences admonished by the cultural narrative will find less support from respondents exposed to that narrative.
- H<sub>10a</sub>: Respondents with congruent cultural type to the cultural narrative stimulus **will be more trusting of the narrator than their cultural counterparts in the control.**
- H<sub>10b</sub>: Respondents with incongruent cultural type to the cultural narrative stimulus **will be less trusting of the narrator than their cultural counterparts in the control.**

- H<sub>11a</sub>: Respondents with congruent cultural type to the cultural narrative stimulus ***will have higher perceptions of risk in relation to climate change, relative to their cultural counterparts in the control.***
- H<sub>11b</sub>: Respondents with incongruent cultural type to the cultural narrative stimulus ***will have lower perceptions of risk in relation to climate change, relative to their cultural counterparts in the control.***
- H<sub>12a</sub>: Respondents with congruent cultural type to the cultural narrative stimulus ***will have more positive affect for culturally identified heroes than their cultural counterparts in the control.***
- H<sub>12b</sub>: Respondents with congruent cultural type to the cultural narrative stimulus ***will have more negative affect for culturally identified villains than their cultural counterparts in the control.***
- H<sub>12c</sub>: Respondents with incongruent cultural type to the cultural narrative stimulus ***will have more positive affect for culturally identified heroes than their cultural counterparts in the control.***
- H<sub>12d</sub>: Respondents with incongruent cultural type to the cultural narrative stimulus ***will have more negative affect for culturally identified enemies than their cultural counterparts in the control.***

**H<sub>13a</sub>**: Relative to the control group, respondents *will have higher levels of support for culturally identified policy solutions, regardless of which narrative treatment they are exposed to.*

**H<sub>13b</sub>**: Relative to the control group, respondents *will have lower levels of support for culturally identified incongruent policy solutions, regardless of which narrative treatment they are exposed to.*

### 2.2.6 RQ2: Narrative Content

In order to determine the influence of cultural narrative content on key climate change opinion related dependent variables, the following narrative structural components are held constant: *setting, plotline, the spatial location of characters and policy solutions within the text.* Where possible, only the cultural content within the narrative structures vary from cultural narrative to cultural narrative.<sup>20</sup> Holding narrative structure constant the following content is varied:

---

<sup>20</sup>All of the stories begin from the same setting of constituent facts and predictions for the United States derived from the IPCC Report (2007). The IPCC (2007) findings are judged to be the safe ground to leverage all three stories from in that it is common for most of the public in the United States to accept climate change as a problem (See chapter one). However, it is not universal to do so. Several preliminary stories were constructed that set forth an individualist cultural narrative that began from the premise that climate change was a concoction of hierarchs and egalitarians built on faulty science. Indeed, this cultural narrative seemed to intuitively adhere itself better to the individualist worldview. However, beginning from the premise that climate change is not real (which must be done to satisfy the requirements of the experimental design) is a much more difficult task for the hierarchal cultural narrative, and a simple nonstarter for the egalitarian cultural narrative. This

1. **Characters:** The same characters are used across cultural narratives, but their treatment in each is different. Characters are either heroes or villains in each cultural narrative. Each group used as a character has been linked as a hero or villain to a cultural type in previous research (Verweij et al. 2006). Hierarchs ally with the Club of Rome and government; Egalitarians ally with Earthfirst and Ecodefense; Individualists ally with the *Wall Street Journal* and the Cato Institute. A hero for one cultural type is treated as an villain for the other two; each hero or villain is situated in exactly the same place (relative to the other two cultural narratives) in the text and nested in nearly identical wording.
2. **Moral of the Story (Policy Solution):** Each cultural story is identified to promote a policy solution specific to their worldview (Verweij et al., 2006). In each of the cultural narratives, a policy solution is offered, while the two solutions offered in the alternative cultural narratives are rebuked. The egalitarians promote renewable and community owned energy; the hierarchs promote nuclear energy; the individualists promote a cap-and-trade system for carbon emissions.

Table 2.4 illustrates which content components are manipulated in each experimental track.

---

storyline had to be abandoned in the interest of holding the structures constant across cultural narratives.

**Table 2.4:** Cultural Narrative Content Variation, by Experimental Track

| <b>Narrative Structure</b>       | <b>Control Treatment</b> | <b>Individualist Narrative</b> | <b>Hierarchical Narrative</b> | <b>Egalitarian Narrative</b> |
|----------------------------------|--------------------------|--------------------------------|-------------------------------|------------------------------|
| <b><i>Plot</i></b>               |                          |                                |                               |                              |
|                                  | List                     | Stymied Progress               | Stymied Progress              | Stymied Progress             |
| <b><i>Setting</i></b>            |                          |                                |                               |                              |
| Facts                            | List                     | Narrative form                 | Narrative form                | Narrative form               |
| US                               | List                     | Narrative form                 | Narrative form                | Narrative form               |
| <b><i>Characters</i></b>         |                          |                                |                               |                              |
| Heroes                           | NA                       | Cato Institute                 | Club of Rome                  | Ecodefesnse                  |
| Villains                         | NA                       | Club of Rome                   | Cato Institute                | Cato Institute               |
|                                  |                          | Ecodefense                     | Wall Street Journal           | Wall Street Journal          |
|                                  |                          | Earthfirst                     | Ecodefense                    | Club of Rome                 |
|                                  |                          |                                | Earthfirst                    |                              |
| <b><i>Moral of the Story</i></b> |                          |                                |                               |                              |
| Policy Solution                  | NA                       | Cap-and-Trade                  | Nuclear Energy                | Renewable Energy             |

Table 2.5 summarizes a word-by-word comparison broken down by narrative structural categories of the three cultural narratives.<sup>21</sup> The cultural narratives are

<sup>21</sup> The same language was used where possible to operationalize each cultural narrative, but changes were often necessary to avoid undue repetition and the consequent decrease of narrativity across stories. In many cases, changes made

**Table 2.5.** Cultural Narrative Content Comparison, by Structural Category

|                              | Total Words | Egalitarian                   | Individualist                 | Hierarchical                  | Control <sup>a</sup>          |
|------------------------------|-------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <b>Standardized Facts</b>    | 133         | 133 (100%)                    | 133 (100%)                    | 133 (100%)                    | 121 (90.9%)                   |
| <b>US Scenario</b>           | 239         | 239 (100%)                    | 239 (100%)                    | 239 (100%)                    | 226 (94.6%)                   |
| <b>Enemy Transition</b>      | 55          | 52 (94.5%)                    | 52 (94.5%)                    | 52 (94.5%)                    |                               |
| <b>Enemy 1: Egalitarian</b>  | 83          |                               | 63 (75.9%)                    | 48 (57.8%)                    |                               |
| <b>Enemy1: Individualist</b> | 83          | 63 (75.9%)                    |                               | 48 (57.8%)                    |                               |
| <b>Enemy1: Hierarch</b>      | 83          | 48 (57.8%)                    | 48 (57.8%)                    |                               |                               |
| <b>Enemy 2: Egalitarian</b>  | 83          |                               | 47 (56.6%)                    | 64 (77.1%)                    |                               |
| <b>Enemy2: Individualist</b> | 83          | 47 (56.6%)                    |                               | 46 (55.4%)                    |                               |
| <b>Enemy2: Hierarch</b>      | 83          | 64 (77.1%)                    | 46 (55.4%)                    |                               |                               |
| <b>Hero Transition</b>       | 90          | 77 (85.5%)                    | 77 (85.5%)                    | 77 (85.5%)                    |                               |
| <b>Cultural Solution</b>     | 109         | 15 (13.7%)                    | 15 (13.7%)                    | 15 (13.7%)                    |                               |
| <b>Moral of the Story</b>    | 64          | 33 (51.6%)                    | 33 (51.6%)                    | 33 (51.6%)                    |                               |
| <b>Total:</b>                | <b>1188</b> | <b>771</b><br><b>(75.44%)</b> | <b>753</b><br><b>(73.67%)</b> | <b>755</b><br><b>(73.87%)</b> | <b>347</b><br><b>(93.28%)</b> |

roughly 7/10ths similar: the egalitarian narrative is 75.44%, the individualist narrative is 73.67%, and the hierarchical narrative is 73.87% similar to the other two.<sup>22</sup> Each of the three cultural narratives is one-thousand and twenty-two

---

may seem trivial but where necessary for pure readability. For example, repeatedly using the word “groups” in reference to the groups identified in the story makes for a very boring read. In this case, the word “organization” was substituted when discussing the second enemy. See Appendix C for a sentency-by-sentence comparison of the cultural narrative treatments.

<sup>22</sup> The cultural narratives are described as roughly similar because similarity largely depends on how one chooses to compare the texts. For example, given that there are three narratives in which each possess an admonishment of the



words long. In short, roughly 25-30% of the text changes in each cultural narrative.

Methods of analysis include analysis of variance and linear regression models. Discussed in more detail in chapter four, the following hypotheses are tested for narrative content:

**H<sub>15</sub>: Narrator Trust:** Respondents with congruent cultural type to their cultural narrative treatment will be more trusting of the narrator than respondents of the same cultural type in incongruent cultural narratives.

**H<sub>16</sub>: Affect:** Respondents with congruent cultural type to their cultural narrative treatment will show more positive affect for the cultural narrative than respondents of the same cultural type in incongruent cultural narratives.

**H<sub>17</sub>: Personal Risk:** Respondents with congruent cultural type to their cultural narrative treatment will view climate change as more of a personal threat than respondents of the same cultural type in incongruent cultural narratives.

---

other cultural narrative allies (i.e., the enemy) the ordering of these characters is different across Cultural Narrative conditions. Whereas the hierarch narrative chronologically discusses the egalitarian enemy first, the individualist discusses the egalitarian enemy second. Cross-comparing these texts (as opposed to the comparison of the enemies chronologically in the text) produces a more favorable similarity percentage than the one reported in the above text. The percentages reported above are a conservative estimate of cultural narrative track similarity.

- H<sub>18</sub>: Sociotropic Risk:** Respondents with congruent cultural type to their cultural narrative treatment will view climate change as more of a threat to American society than respondents of the same cultural type in incongruent cultural narratives.
- H<sub>19</sub>: Climate Change Belief:** Respondents with congruent cultural type to their cultural narrative treatment will be more willing to believe that climate change is real than respondents of the same cultural type in incongruent cultural narratives
- H<sub>20</sub>: Anthropogenic Cause:** Respondents with congruent cultural type to their cultural narrative treatment will be more willing to accept that human beings are a principal cause of climate change than respondents of the same cultural type in incongruent cultural narratives
- H<sub>21</sub>: GHG Regulation:** Respondents with congruent cultural type to their cultural narrative treatment will be more willing to regulate GHG's than respondents of the same cultural type in incongruent cultural narratives.
- H<sub>22</sub>: Cultural Heroes:** Respondents with incongruent cultural type to the cultural narrative treatment will have more positive affect for culturally identified heroes than their cultural counterparts in incongruent cultural narratives.

**H<sub>23</sub>: Cultural Villains:** Respondents with incongruent cultural type to the cultural narrative treatment will have more positive affect for culturally identified villains than their cultural counterparts in incongruent narratives.

**H<sub>24</sub>: Cultural Policy Solutions:** Respondents with incongruent cultural type to the cultural narrative treatment will have more positive affect for culturally identified policy solution than their cultural counterparts in incongruent narratives.

### **2.3 CT Measures and Construct Validity**

Chapter three addresses narrative structure and hypotheses one through twelve; chapter four addresses narrative content and hypotheses thirteen through twenty. The analyses of chapters three and four consist primarily of analysis of variance (ANOVA) and ordinary least squares regressions. However, before conducting these analysis clarity on the validity of the several of the variables theorized is necessary as well as clarity specific variable operationalizaitons. In what follows, relevant CT indices, manipulations, and construct validity are addressed. These variables will be used throughout the various analyses performed in subsequent chapters.

### 2.3.1 Cultural Theory Metrics

In order to assess a survey respondent’s cultural type, twelve cultural theory questions are asked—three questions for each type: individualist, hierarchy, egalitarian, and fatalist. Table 2.6 lists these questions by cultural type.

**Table 2.6.** Cultural Theory Survey Questions

| <b>Hierarchy</b>  | <b>Individualist</b>   | <b>Egalitarian</b>  | <b>Fatalist</b>  |
|---|--|---|--|
| <b>Q23 Ahead:</b> The best way to get ahead in life is to do what you are told to do.                                       | <b>Q26 Fail:</b> Even if some people are at a disadvantage, it is best for society to let people succeed or fail on their own. | <b>Q29 Fair:</b> What our society needs is a fairness revolution to make the distribution of goods more equal.  | <b>Q32 Random:</b> Most of the important things that take place in life happen by random chance.                         |
| <b>Q24 Authority:</b> Our society is in trouble, because we don’t obey those in authority.                                  | <b>Q27 Disadvantaged:</b> Even the disadvantaged should have to make their own way in the world.                               | <b>Q30 Power:</b> Society works best if power is shared equally.  | <b>Q33 Fate:</b> No matter how hard we try, the course of our lives is largely determined by forces outside our control. |
| <b>Q25 Rules:</b> Society would be much better off if we imposed strict and swift punishment on those that break the rules. | <b>Q28_ind3_indv:</b> We are all better off when we compete as individuals.  | <b>Q31: Income:</b> It is our responsibility to reduce the differences in income between the rich and the poor. | <b>Q34 Plans:</b> It would be pointless to make serious plans in such an uncertain world.                                |

CT questions are presented to the respondent pre-treatment in random order. Respondent’s are then asked to place themselves on a scale from one to seven for each question, where one is strongly disagree and seven is strongly

agree. The scores are then typically aggregated to produce a strength of cultural type score. These same questions have been utilized in previous research and been shown to produce reliable indices and factor scores (Herron & Jenkins-Smith, 2006; Mamadouh, 1999; Wildavsky & Dake, 1990). Table 2.7 provides descriptive data for these aggregations as well as Cronbach's Alpha scores which indicate the reliability of the each index.

**Table 2.7.** Strength of Cultural Type

|                | <b>Minimum</b> | <b>Maximum</b> | <b>Mean</b> | <i>alpha</i> | <b>N</b> |
|----------------|----------------|----------------|-------------|--------------|----------|
| Individualism  | 3              | 21             | 12.333      | .673         | 1557     |
| Hierarchism    | 3              | 21             | 11.6100     | .576         | 1559     |
| Egalitarianism | 3              | 21             | 12.3201     | .723         | 1559     |
| Fatalism       | 3              | 21             | 9.8544      | .643         | 1566     |

Typically, from these aggregate scores a researcher might derive factor scores or use the raw numbers themselves as indicators of strength of cultural type. These approaches are sufficient for providing interval data indicating the intensity of a respondent's cultural orientation. However, such an approach does not account for central theoretical CT propositions identified earlier in this chapter. Summarizing the previous discussion of these propositions, the *compatibility condition*, the *impossibility theorem*, and the *requisite variety condition* come together to assert that one cannot occupy multiple quadrants of the gird-group typology simultaneously and that the existence of the other three types makes the existence of any given cultural type possible. As the simple

aggregation procedures used to produce Table 16 violate these conditions, a different approach is necessary when categorizing individuals in each quadrant. This procedure removes the possibility of a respondent occupying multiple quadrants simultaneously. The following formula is used to categorize survey respondents in a single Cultural Theory category:

$$\text{If } T > A \ \& \ B \ \& \ C, \text{ then } T = \sum \{(T - A) + (T - B) + (T - C)\}$$

Where:

T= the highest *Strength of Cultural Type Score*

A, B, C= the remaining three *Strength of Cultural Type scores*

For the purposes of categorization, any score higher than one places that survey respondent in the appropriate category, as a score higher than one indicates a comparatively higher tendency by a respondent to value that particular cultural orientation. This categorization produces the following number of cultural type respondents in each experimental track detailed in Table 2.8:

**Table 2.8:** Strong Cultural Type, by Experimental Track

| <b>Strong Cultural Type</b> | <b>Control Treatment</b> | <b>Individualist Narrative</b> | <b>Hierarch Narrative</b> | <b>Egalitarian Narrative</b> |
|-----------------------------|--------------------------|--------------------------------|---------------------------|------------------------------|
| Strong Individualist        | 104                      | 107                            | 86                        | 101                          |
| Strong Hierarch             | 72                       | 63                             | 57                        | 66                           |
| Strong Egalitarian          | 155                      | 140                            | 147                       | 136                          |
| Strong Fatalist             | 45                       | 57                             | 41                        | 44                           |

### **2.3.2 Cultural Narrative Construct Validity**

In constructing the cultural narrative treatments used in this survey research several narrative components were identified by previous research to be associated with specific cultural orientations, particularly characters (e.g, Verwiej et al. 2006). The following sections tests the validity of the cultural characters operationalized in each cultural narrative track. T-tests are used to determine if there is a significant difference in means between affective assessments of groups (i.e., characters) by strong cultural types within the control group. Table 2.9 reports the results.

The left hand column of Table 18 lists the groups identified as cultural narrative heroes for each strong cultural type for which cultural narratives were operationalized: individualist, hierarch, and egalitarian. The Group 2 column represents all other groups used in the cultural narratives. On a scale ranging from zero to ten, where zero means completely negative and ten means completely positive, respondents assessed their affective reaction to all of these groups free of a cultural narrative treatment. The groups operationalized as heroes work quite well for strong individualists and strong egalitarians, with mean differences moving in the expected direction (positive) and the majority of the differences significant. However, the single hierarch hero, the Club of Rome, does not perform as expected with all of the mean differences moving in the wrong direction (negative) and 3/4ths of those differences significant. The groups identified by previous scholarship for the individualists and egalitarians

**Table 2.9.** Strong Cultural Type Group Affective Evaluations Paired Comparisons

| <b>Individualist Group</b> | <b>Mean (n)</b> | <b>Group 2</b>      | <b>Mean (n)</b> | <b>Mean Difference</b> | <b>T-stat.</b> | <b>p</b> |
|----------------------------|-----------------|---------------------|-----------------|------------------------|----------------|----------|
| The Cato Institute         | 4.8596 (57)     | Earth First         | 4.0351 (57)     | +0.8245                | -2.200         | .032     |
| The Cato Institute         | 4.8333 (54)     | Ecodefense          | 3.9630 (54)     | +.8703                 | -3.018         | .004     |
| The Cato Institute         | 4.6522 (46)     | The Club of Rome    | 3.8043 (46)     | +.8479                 | -3.150         | .003     |
| Wall Street Journal        | 5.1389 (72)     | Earth First         | 4.5139 (72)     | +.0625                 | -1.715         | .091     |
| Wall Street Journal        | 5.2951 (61)     | Ecodefense          | 4.3607 (61)     | +.9344                 | -2.608         | .011     |
| Wall Street Journal        | 4.9787 (47)     | The Club of Rome    | 3.9362 (47)     | +1.0425                | -2.908         | .006     |
| <b>Hierarch Group</b>      | <b>Mean (n)</b> | <b>Group 2</b>      | <b>Mean (n)</b> | <b>Mean Difference</b> | <b>T-stat.</b> | <b>p</b> |
| The Club of Rome           | 4.3514 (37)     | Earth First         | 5.6486 (37)     | -1.2972                | 3.151          | .003     |
| The Club of Rome           | 4.3514 (37)     | Ecodefense          | 5.1622 (37)     | -.8108                 | 1.693          | .099     |
| The Club of Rome           | 4.3514 (37)     | Cato Institute      | 4.6216 (37)     | -.2702                 | -.911          | .368     |
| The Club of Rome           | 4.3889 (36)     | Wall Street Journal | 5.0833 (36)     | -.6944                 | -2.071         | .046     |
| <b>Egalitarian Group</b>   | <b>Mean (n)</b> | <b>Group 2</b>      | <b>Mean (n)</b> | <b>Mean Difference</b> | <b>T-stat.</b> | <b>p</b> |
| Earth First                | 6.1972 (71)     | Club of Rome        | 4.9296 (71)     | 1.2676                 | 4.965          | .000     |
| Earth First                | 6.0789 (76)     | Cato Institute      | 5.1579 (76)     | .921                   | 3.265          | .002     |
| Earth First                | 6.5437 (103)    | Wall Street Journal | 5.5728 (103)    | 0.9709                 | 3.279          | .001     |
| Ecodefense                 | 5.8028 (71)     | Club of Rome        | 4.9296 (71)     | 0.8732                 | 3.895          | .000     |
| Ecodefense                 | 5.5946 (74)     | Cato Institute      | 5.2838 (74)     | 0.3108                 | 1.306          | .196     |
| Ecodefense                 | 5.9070 (86)     | Wall Street Journal | 5.4186 (86)     | 0.4884                 | 1.646          | .103     |

appear suitable hero characters, while the Club of Rome may be a bad choice for a hierarchical hero.



## **2.4 Conclusion**

Chapter two has set forth two general research questions intended to offer an explanation for why the public diverges from scientific opinion on climate change. Attempting to better articulate the potential interactions between individual priors and exogenous communication structures, a theoretical model of the individual is specified. This model, CNM, emphasizes cultural theoretic belief systems and their potential congruence or incongruence with incoming information, among other control variables deemed relevant by previous research and scholarship. Importantly, however, the structures of the communication messages are operationalized in terms of the most common organizing and communication structures invoked by human beings: narratives.

Emanating from the review of previous research on climate change and public opinion presented in chapter one and CNM's theoretical specifications, two general research questions manifest along with testable hypotheses related to these questions. An online experimental survey is employed to test these hypotheses. The next two chapters address each of the two research questions in sequence. Chapter three examines the relationship between narrative structure and opinions on climate change, while chapter four addresses cultural narrative content and opinions related to climate change.

## **CHAPTER 3: NARRATIVE STRUCTURE AND MASS OPINIONS ON CLIMATE CHANGE**

With a focus on when and where public opinion influences public policy, chapter one summarized the relationship between these two concepts as they relate to climate change. A case was made that climate change is a high salience issue and that the American public is steadily showing more awareness of the issue and increasing knowledge of climate change processes and potential consequences. These conditions have been identified by previous scholarship as likely indicators that public opinion will influence public policy in the United States (Burstein, 2003; 2006). It is the influence that public opinion is likely to exhibit over climate change policy that provides both the practical and theoretical impetus to study the proclivities of mass opinion on this scientifically complex and contentious issue.

Following the discussion of public opinion and public policy, a brief history of the development of climate change policy and the science that accompanies it was summarized. Special attention was given to trends and developments in public opinion during periods of scientific advancement and the politicizing of the climate change debate. Emerging from this discussion is a clear line of demarcation between the scientific community, which exhibits high levels of agreement about climate change temperature increases and

greenhouse gas causes, and a non-trivial component of the public that has been historically resistant to the findings of the scientific community.

Chapter one continues by describing two general research models that have been offered to explain differences between scientific and public opinion about climate change: 1) the knowledge deficit model and 2) the sensational media model. Each model is argued to have critical strengths and weaknesses. Arguing that there is room for improvement in accounting for interactions between individual priors and message structure form and content when considering the opinions of the mass public, a recent summary of a policy stories approach (e.g., Verweij et al., 2006) to climate change is summarized as a potential way to address these interactions.

Based upon the discussions in chapter one, chapter two offers a Cultural Narrative Model (CNM) as a potential candidate to explain mass opinions about climate change. Integrating several distinct literatures, CNM models key variables considered intrinsic (endogenous) to the individual such as Cultural Theory (CT), partisanship, ideology, knowledge, and affect with external (exogenous) message structures. Exogenous message structures are modeled using narrative theory, providing key experimental structuring components such as plot, characters, and a moral to the story. However, modeling narrative in such a way comes with specific issues relevant to the theory's dominant treatment in the social sciences. Within the content of CNM, chapter two addresses these issues.

Summarizing chapter two's discussion, narrative is often viewed as synonymous with poststructural approaches in the public policy literature (e.g., Dodge & Ospina, 2005) and its migration to the social sciences has been almost exclusively under the umbrella of post-positivist approaches (Jones & McBeth, 2010). Indicative of the post-positivist approach is an orientation toward epistemologies that emphasize individual interpretation that militate against generalization, falsification, quantification, and the scientific approach more generally (e.g., Fischer, 2003). As a rebuttal of this dominant understanding of narrative theory in public policy, CNM argues that narrative can be studied using traditional scientific methods and techniques, provided one embraces a structural model of narrative. However, in offering a structural account of narrative, both general narrative structures and generalizable content must be specified to limit variability. CNM models commonly identified exogenous narrative structures in the study of public policy and relies on CT as a familiar and well regarded content anchor to accomplish these two tasks.

Following a discussion of key causal drivers specific to CT and narrative theory, including narrator trust and cultural congruence and incongruence, specific cultural narratives relevant to climate change are operationalized. Relying on previous research (Verweij, et al. 2006), specific value orientations, characters (heroes, villains, and victims), plots, and morals of the story (policy solutions) are specified for three CT narratives: egalitarian, hierarch, and individualist. These three stories provide the basis for the message structure

(i.e., narrative) experimental manipulations specified in chapter two's elaboration of the research design employed in this research.

Chapter two details how CNM is operationalized to determine if cultural narratives help explain variation in key dependent variables identified to be theoretically and practically important to the issue area of climate change. Two general research questions are addressed:

**RQ1: *Cultural Narrative Structure:*** does cultural narrative structure influence opinions related to climate change?

**RQ2: *Cultural Narrative Content:*** Does cultural narrative content explain variation in opinions related to climate change?

Relevant hypotheses are specified for each research question. Data are acquired using an online internet survey with a built in experimental design. This chapter, chapter three, addresses hypotheses relevant to RQ1. Specifically, *comparisons between narrative treatments and the control treatment guide both the analysis and discussion.*

Table 3.1 lists hypotheses, corresponding survey questions, and measurement information for each dependent variable addressed in this chapter (See Appendix D for dependent variable descriptive statistics). Where significance is found or interesting findings emerge, measurement issues are discussed more thoroughly in the analysis presented in this chapter. Where significance is not found, please refer to Table 3.1 for measurement information and the corresponding appendices for relevant frequency and descriptive data.

**Table 3.1.** Narrative Structure Hypotheses, Survey Questions, and Measurement

| Dependent Variable |  | Measurement Range |                       |                     |
|--------------------|--|-------------------|-----------------------|---------------------|
| Description        | Q#'s                                       | 0                 | → 10                  |                     |
| H <sub>01</sub>    | Narrator Threat                            | 44                | No threat at all      | Extreme threat      |
| H <sub>02</sub>    | Narrator Trust                             | 45                | No trust              | Complete trust      |
| H <sub>03</sub>    | Affect                                     | 46                | Extremely negative    | Extremely positive  |
| H <sub>1</sub>     | Personal Risk                              | 47                | No threat at all      | Extreme threat      |
| H <sub>2</sub>     | Sociotropic Risk                           | 51                | No problem whatsoever | Devastating         |
| H <sub>3</sub>     | Climate Change Belief                      | 49                | Completely disagree   | Completely agree    |
| H <sub>4</sub>     | Antropogenic Cause                         | 50                | Completely disagree   | Completely agree    |
| H <sub>5</sub>     | GHG Regulation                             | 48                | Not at all important  | Extremely important |
| H <sub>6</sub>     | Hero Affect                                | 43a-43d           | Completely negative   | Completely positive |
| H <sub>7</sub>     | Villain Affect                             | 37a-41d           | Completely negative   | Completely positive |
| H <sub>8</sub>     | Moral of the Story                         | 52-54             | Completely disagree   | Completely agree    |
| H <sub>9</sub>     | Culturally Antithetical Moral of the Story | 52-54             | Completely disagree   | Completely agree    |
| H <sub>10a</sub>   | Congruent Narrator Trust                   | 45                | No trust              | Complete trust      |
| H <sub>10b</sub>   | Incongruent Narrator Trust                 | 45                | No trust              | Complete trust      |
| H <sub>11a</sub>   | Congruent Risk                             | 47                | No threat at all      | Extreme threat      |
|                    |  | 51                | No problem whatsoever | Devastating         |
| H <sub>11b</sub>   | Incongruent Risk                           | 47                | No threat at all      | Extreme threat      |
|                    |  | 51                | No problem whatsoever | Devastating         |
| H <sub>12a</sub>   | Congruent Cultural Heroes                  | 43a-43d           | Completely negative   | Completely positive |
| H <sub>12b</sub>   | Congruent Cultural Villains                | 37a-41d           | Completely negative   | Completely positive |
| H <sub>12c</sub>   | Incongruent Cultural Heroes                | 43a-43d           | Completely negative   | Completely positive |
| H <sub>12d</sub>   | Incongruent Cultural Villains              | 37a-41d           | Completely negative   | Completely positive |
| H <sub>13a</sub>   | Congruent Policy Solutions                 | 52-54             | Completely disagree   | Completely agree    |
| H <sub>13b</sub>   | Incongruent Policy Solutions               | 52-54             | Completely disagree   | Completely agree    |

### 3.1 Narrative Structure and Non-Directionally Specified Relationships

Much of the narrative literature is silent on the matter of what relationships we might expect with several dependent variables addressed in this research. Previous scholarship does not suggest a relationship between *narrative structure* and a respondent's perception of the narrator's sense of threat (Narrator Threat), the level of trust a respondent will have for the narrator (Author Trust), or the emotional response a respondent will have to the cultural narrative treatment (Affect); therefore, the null is hypothesized for these variables. The following null hypotheses are tested for these select dependent variables:

- H<sub>01</sub>:** There is no relationship between a respondent's perceptions of the narrator's assessment of the risk climate change poses and narrative structure.
- H<sub>02</sub>:** There is no relationship between levels of trust a respondent ascribes to an author and narrative structure.
- H<sub>03</sub>:** There is no relationship between the level of affect a respondent assigns to the experimental stimulus and narrative structure.

Table 3.2 summarizes OLS estimates for key dependent variables where the null is hypothesized for RQ1. Each row in Table 3.2 represents an independent OLS regression, controlling for age, education, gender, income,

race, ideology,<sup>23</sup> climate change knowledge, and CT. All respondents are eighteen years or older. Ages range from eighteen to eighty-eight. Education is coded on a scale ranging from one to seven, where one represents *elementary or some high school education* and seven represents a *doctorate of any type*. Gender is coded one for male and zero for female. Race is coded one for white/Asian and zero for other racial categories. Ideology is coded on a scale from one to seven, where one is strongly liberal and seven is strongly conservative. Climate change knowledge is a composite measure derived from a series of questions on climate change causes and scientific expectations. In total there are eleven of these questions. The scale on climate change knowledge ranges from one to eleven, where each cumulative point represents a correct answer on one of the climate change knowledge questions. CT measures are aggregations of three agree/disagree questions for each cultural type (discussed in chapter 2; see appendix C for control variable descriptive statistics). Each narrative column in table 3.2 represents a dummy variable where zero indicates a lack of the narrative treatment identified in the heading of the column and a one represents that a respondent was randomly assigned to that narrative track. The control list experimental treatment is the baseline and is necessarily omitted from the OLS regressions. The three dependent variables in Table 2.2 are all assessed in the online survey post-treatment.

---

<sup>23</sup> Partisanship was initially included in all models. However, the collinearity between partisanship and ideology proved problematic to the analysis. Partisanship was removed as ideology proved the more powerful explanatory variable of the two.



**Table 3.2.** Narrative Structure and Key Non-Directional Dependent Variable Summary (OLS Estimates)

| Dependent Variable     | Individualist Narrative  | Hierarch Narrative      | Egalitarian Narrative | Adj. R2 | F-Statistic | n    |
|------------------------|--------------------------|-------------------------|-----------------------|---------|-------------|------|
| <b>Narrator Threat</b> | <b>-.562**</b><br>(.184) | <b>-.376*</b><br>(.189) | .117<br>(.187)        | .081    | 9.665       | 1382 |
| <b>Author Trust</b>    | <b>-.456*</b><br>(.182)  | <b>-.474*</b><br>(.187) | -.303<br>(.185)       | .106    | 12.725      | 1384 |
| <b>Affect</b>          | .032<br>(.173)           | .138<br>(.177)          | .247<br>(.175)        | .063    | 7.645       | 1380 |

The OLS regression coefficients in Table 3.2 show no significance for the relationship between narrative structure and the respondent’s affective assessment of the narrative track (Affect).  $H_{03}$  is accepted. However, both narrator threat and author trust have statistically significant relationships with narrative structure.

Narrator threat is measured on a scale of one to ten, where one means no threat at all and ten means extreme threat, and is intended to gauge how much of a threat the respondent feels the author of the cultural narrative believes climate change to pose. Or, stated as a question, does the respondent feel that the author of the cultural narrative treatment believes climate change is no threat at all (0) or does the respondent believe that the narrator views climate change as an extreme threat (10)? Respondents randomly assigned to the individualist cultural narrative experimental track see their perceptions of the narrator’s sense of threat climate change presents decrease by a little over half a point (-.562). Similarly, those assigned to the hierarchal narrative

treatment show significant decreases in their perceptions of narrator threat (-.376). Respondents assigned to the egalitarian narrative track show no statistically significant relationship with narrator threat. Given that two of the tracks actually lower perceptions of narrator threat for respondents assigned to these tracks,  $H_{01}$  is rejected. Although wording is very similar in all three experimental tracks (roughly 75%), respondents in both the hierarch and individualist narrative tracks perceive the narrator as viewing climate change as less of a threat than respondents in the control group.

Measured on a scale from zero to ten, where zero means no trust and ten means complete trust, author trust is a measure intended to gauge how much the respondent believes that the information presented in the cultural narrative is truthful. Both the hierarch and individualist narrative stimuli have a significant influence on author trust, while the egalitarian cultural narrative comes very close to statistical significance ( $p$  value = .101). In both cases where the relationship between narrative structure and author trust are significant, that relationship is negative. In both the individualist and hierarch narratives, respondent trust drops by roughly half a point relative to the control group. Nominally, the egalitarian narrative treatment has a similar negative influence over respondent levels of trust for the narrator of the experimental treatments.  $H_{02}$  is rejected. Table 3.2 demonstrates that respondents assigned to the narrative treatments are less trusting of the narrated information than are

respondents presented with only a list of facts in the control group. (See Appendix E1 for full regression tables related to Table 3.2).

### **3.2 Narrative Structure and Directionally Specified Relationships**

Table 3.3 summarizes OLS estimates for key dependent variables related to RQ1 where a directional relationship with narrative structure is hypothesized. Directionality is determined based on theoretical assumptions modeled in CNM and relevant empirical findings. All cultural narratives offer a story that assumes the reality of climate change, that greenhouse gasses (GHG's) are the cause, and makes a case for GHG reduction via one of three policy solutions: cap-and-trade (individualist), nuclear energy (hierarchy), and renewable energy (egalitarian). As narrative research finds narratives to be more persuasive than non-narrative stimuli (Ricketts, 2007), in the cases of respondent risk, sociotropic risk, climate change belief, anthropogenic cause, and GHG regulation, a positive relationship between narrative structure and these dependent variables is expected, given the assumptions and arguments built into each cultural narrative.

Each narrative invokes culturally linked groups or organizations as heroes and villains. In cases where narratives deploy a group as a hero, the affective assessment of that group should be positive; conversely, groups deployed as a villain should elicit negative affective reactions from the respondent. Each narrative also invokes a culturally specific policy solution (moral of the story) for climate change while admonishing the solutions offered in the other two

narratives, thus it is expected that narrative experimental tracks will have influence over policy preferences in directions specified by the narrative: positive when argued for and negative when argued against.

Similarly to Table 3.2, each row in Table 3.3 represents an independent OLS regression where the independent variable of interest is the respondent's random assignment to a narrative track (zero not present, one present). The control list serves as the baseline. Each regression controls for age, education, gender, income, race, ideology, climate change knowledge, individualism, hierarchy, egalitarianism, and fatalism (see Appendices E2-E5 for full regression tables). The control variables in Table 3.3 are operationalized in the same manner as the controls presented in Table 3.2. The following hypotheses are addressed in Table 3.3:

- H<sub>1</sub>: Personal Risk:** Narratively structured climate change messages will increase the respondent's sense of threat that climate change poses to them personally relative to the control group.
- H<sub>2</sub>: Sociotropic Risk:** Narratively structured climate change messages will increase the respondent's sense of threat that climate change poses to the United States in general relative to the control group.
- H<sub>3</sub>: Climate Change Belief:** Narratively structured messages will increase the respondent's willingness to accept that climate change is a reality relative to the control group.

- H<sub>4</sub>: *Anthropogenic Cause*:** Narratively structured messages will increase the respondent's willingness to accept that human beings are a critical cause of climate change through increased GHG emissions relative to the control group.
- H<sub>5</sub>: *GHG Regulation*:** Narratively structured messages will increase the respondent's willingness to regulate GHG's relative to the control group.
- H<sub>6</sub>: *Hero Affect*:** Characters (groups) treated as heroes in the cultural narratives will facilitate more positive affective responses than groups in the control.
- H<sub>7</sub>: *Villain Affect*:** Characters (groups) treated as villains in the cultural narratives will facilitate more negative affective responses than groups in the control.
- H<sub>8</sub>: *Moral of the Story*:** Policy preferences advocated by a cultural narrative will be preferred by respondents exposed to that narrative.
- H<sub>9</sub>: *Culturally Antithetical Moral of the Story*:** Policy preferences admonished by the cultural narrative will find less support from respondents exposed to that narrative.

Statistically significant relationships are not found between narrative structure and sociotropic risk (H<sub>2</sub>), climate change belief (H<sub>3</sub>), anthropogenic cause (H<sub>4</sub>), and GHG regulation (H<sub>5</sub>). H<sub>2</sub> through H<sub>5</sub> are rejected. However,

**TABLE 3.3.** Narrative Structure and Key Directional Dependent Variable Summary (OLS Regression Estimates)

| Dependent Variable                                 | Individualist Narrative    | Hierarch Narrative         | Egalitarian Narrative      | Adj. R2 | F-Statistic | n    |
|--|----------------------------|----------------------------|----------------------------|---------|-------------|------|
| <b>Personal Risk</b>                               | .005<br>(.192)             | .243<br>(.197)             | <b>.322*</b><br>(.195)     | .197    | 25.161      | 1382 |
| <b>Sociotropic Risk</b>                            | .157<br>(.165)             | .262<br>(.169)             | -.015<br>(.168)            | .265    | 36.461      | 1380 |
| <b>Climate Change Belief</b>                       | -.105<br>(.183)            | .063<br>(.188)             | -.165<br>(.186)            | .171    | 21.366      | 1382 |
| <b>Anthropogenic Cause</b>                         | -.196<br>(.185)            | .177<br>(.189)             | -.102<br>(.187)            | .251    | 34.088      | 1382 |
| <b>GHG Regulation</b>                              | -.120<br>(.185)            | .241<br>(.189)             | -.063<br>(.187)            | .220    | 28.728      | 1380 |
| <b>Character Affect</b>                            |                            |                            |                            |         |             |      |
| <b>Ecodefense</b>                                  | <b>-1.614***</b><br>(.214) | <b>-1.509***</b><br>(.220) | <b>.641**</b><br>(.218)    | .258    | 29.181      | 1135 |
| <b>Club of Rome</b>                                | <b>-1.281***</b><br>(.222) | <b>1.214***</b><br>(.230)  | <b>-1.553***</b><br>(.226) | .231    | 23.483      | 1045 |
| <b>The Cato Institute</b>                          | <b>.718***</b><br>(.220)   | <b>-1.530***</b><br>(.223) | <b>-1.754***</b><br>(.222) | .182    | 18.413      | 1092 |
| <b>The Moral of the Story (Policy Preferences)</b> |                            |                            |                            |         |             |      |
| <b>Cap and Trade</b>                               | <b>.776***</b><br>(.229)   | -.124<br>(.234)            | <b>-.535*</b><br>(.235)    | .128    | 14.119      | 1248 |
| <b>Nuclear Energy</b>                              | -.355<br>(.227)            | -.211<br>(.232)            | <b>-.539***</b><br>(.233)  | .090    | 10.026      | 1273 |
| <b>Renewable Energy</b>                            | -.056<br>(.211)            | <b>-.546*</b><br>(.216)    | <b>.366*</b><br>(.215)     | .057    | 6.465       | 1275 |

\* p < .05, \*\*p<.01, \*\*\* p <.001 one-tailed test

*Controls: Age, Education, Gender, Income, Race, Ideology, Climate Change Knowledge, Individualism, Hierarchy, Egalitarianism, Fatalism*

several key dependent variables yield statistically meaningful relationships with narrative structure, including personal risk, the broad categories of character affect (i.e., heroes and villains) and policy preferences (i.e., the moral of the story).

Personal risk is designed to assess a respondent's sense of personal threat that climate change presents to them directly. The question appears post-treatment in the online survey as follows:

**Personal Risk:** Using a scale from zero to ten, *where zero is no threat at all and ten is extreme threat*, in your considered assessment, how much of a threat do you believe climate change poses to you personally in the next 50 years?

Respondents randomly assigned to the egalitarian narrative track see their sense of personal risk increase by slightly less than a third of a point (.322); however, the remaining two narrative treatments show no statistical significance.  $H_1$  is rejected.

Discussed in detail in chapter two, characters are a structurally essential component of narrative, both driving plotlines and helping to solidify causal relationships. Narrative theory expects and relies upon the treatment of characters within a story to influence perceptions of those characters and, as a consequence, influence the overall persuasiveness of the story. In the cultural narrative experimental treatments, affective responses to the cast of characters are measured using the following survey question:

**Character Affect:** The author mentioned several groups in the above text. Using a scale from zero to ten, *where zero means completely negative*

*and ten means completely positive*, please indicate your reaction to these groups.<sup>24</sup>

In the control list treatment groups receive no textual help. The list treatment in the control presents no culturally specific interpretation and relies upon what the respondent already feels about the group by simply prompting the respondent for an affective assessment of each group. In the control, character affective responses are measured as follows:

**Group Affect (Control):** Now I would like to ask your opinion about a few groups commonly associated with debates about climate change. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to these groups.

Table 3.3 indicates that narrative structure plays a powerful role in shaping respondent affective assessments of the characters within each cultural narrative. Relative to the control group, in every case a group identified as a hero elicits a more positive affective response from respondents while those characters treated as villains find a more negative affective assessment—even when controlling for priors.

Affective assessments of characters are measured on a scale of zero to ten. Given the measurement range, the statistical effects facilitated by the narrative treatments on character affective assessments are not trivial. The

---

<sup>24</sup> Only three characters are included in Table 3.3: Ecodefense, The Club of Rome, and The Cato Institute. The reason for this is that only these three characters occur in all three narratives, while the *Wall Street Journal* and Earth First do not. See chapter two for more detail.



presence of the individualist narrative experimental track results in a +.718 increase in affective assessments of the Cato Institute (the hero), and decreases of over a full point in assessments of both Ecodefense (-1.614) and the Club of Rome (-1.218) (both villains). Similar relationships exist for both the hierarchical and egalitarian tracks. In the hierarchical track, the Club of Rome (the hero) is assigned positive affect by respondents (+1.214), while both Ecodefense (-1.509) and the Cato Institute (-1.530) are reacted to negatively by respondents (again, both are villains). In the egalitarian narrative track, Ecodefense (the hero) is responded to positively (+.641), while the villain characters, the Cato Institute (-1.754) and the Club of Rome (-1.553), are assigned more negative affect by respondents. These effects are large and distinct even while controlling for both demographic and belief system variables. Therefore H<sub>6</sub> and H<sub>7</sub>, hypothesizing that narrative structure influences character affective ascriptions in directions specified by the narrative, are accepted.

Each cultural narrative presents a culturally specific policy solution presented as the moral of each story. The individualist narrative, reliant as it is on competition and markets, offers cap-and-trade. Rooted in cultural prescriptions that rely on societal stratification such as that offered by scientific expertise, the hierarch narrative offers nuclear energy as a solution to rising GHG levels. Guided by the premise that all should be treated equally, the egalitarian narrative prescribes community owned renewable energy as a solution to increasing levels of GHGs. Table 3.3 summarizes statistical significance for the

respondent's preferences for the moral offered in each narrative track.

Although there are significant findings in each track, the findings do not demonstrate the same level of consistency as findings related to character affect. However, significant coefficients do move in expected directions.

Each narrative argues for one policy solution while arguing against the two policy solutions offered in the other narratives. The individualist cultural narrative track argues for and statistically increases respondent preferences for cap-and-trade (+.766). Argued against, the hierarchical track facilitates statistically significant and negative influence on a respondent's preference for renewable energy (-.546). Finally, the egalitarian track finds significant decreases in preferences for cap-and-trade (-.535) and nuclear energy (-.539), both of which were argued against in the cultural narrative. The egalitarian narrative also finds increasing support for the favored policy solution of renewable energy (.366). Overall, these findings suggest that narrative structure does influence preferences for climate change policy solutions in hypothesized directions, but the effect is not universal for all policy solutions across all experimental tracks. However, since over half of the possible coefficients for the policy preferences are significant in hypothesized directions (five of nine and at least once in each experimental track),  $H_8$  and  $H_9$  are accepted.

### **3.3 Narrative Structure and Cultural (In)Congruence**

The analysis presented so far in this chapter has looked primarily at the influence of narrative structure on key dependent variables while controlling for several variables, including CT belief system measures. While finding that there are many significant relationships between key dependent variables and narrative structure, the models presented so far have not adequately addressed potential interactions between the exogenous cultural narrative structures and Cultural Theory. The following sections address these potential interactions as modeled in the CNM.

In chapter two several theoretical narrative causal mechanisms were posited, including congruence and incongruence. Briefly summarizing that discussion, narratives are theorized to persuade to the extent that they are congruent or “fit” with an individual’s view of the world (Shank, 1995). The experimental manipulation employed in this dissertation research operationalizes congruence and incongruence in terms of Cultural Theory (CT). Narratives are constructed specifically to mirror previous scholarship’s (e.g., Verweij, 2006) assessment of one of three cultural stories about climate change that are found to dominate climate change discourse: individualist, hierarch, and egalitarian. Previous research indicates that cultural congruence should be preferred by the individual (Kunda, 1990, p. 495; Taber & Lodge, 2006) while incongruence should be actively rejected (Lodge & Taber, 2005; Taber & Lodge, 2006). Or stated in terms of how congruence and incongruence are modeled in

this research, respondents previously identified as a strong cultural type should prefer cultural narratives of the same cultural type (congruence) and reject information, arguments, and assumptions provided in cultural narratives of opposing types (incongruence). Several hypotheses related to congruence and incongruence are tested using one-way ANOVA to ascertain if there is a significant difference between strong cultural type means in congruent or incongruent cultural narrative experimental treatments and the control group. As detailed in chapter two (see pp. xx-xx), strong cultural type is calculated by summing the battery of CT survey questions and categorizing respondents based upon their highest CT type score (individualist, hierarch, or egalitarian).

### **3.4 Narrative Structure, Narrator Trust, and Cultural (In) Congruence**

Research on narrator trust, commonly operationalized in social scientific research as source credibility (see, for example, Page et al., 1987 & Mondak, 1993), supports the theorized importance of congruence and incongruence. Research on source credibility has demonstrated a source's trustworthiness (Popkin, 1994, p.47), accuracy and objectivity (Iyengar & Kinder, 1985), expert status (Page et al, 1987), likeability (Sniderman et al., 1991), and ideology (Zaller, 1992, p. 47) influence a recipient's willingness to accept a message. Thus, message recipients are likely to be persuaded if the respondent and the message source share interests and the speaker is believed to be knowledgeable (Druckman & Lupia, 2000, p. 17). Therefore the following is hypothesized:

**H<sub>10a</sub>**: Respondents with congruent cultural type to the cultural narrative stimulus *will be more trusting of the narrator than their cultural counterparts in the control.*

**H<sub>10b</sub>**: Respondents with incongruent cultural type to the cultural narrative stimulus *will be less trusting of the narrator than their cultural counterparts in the control.*

To test H<sub>10a</sub> and H<sub>10b</sub>, mean responses to the narrator trust question, categorized by strong cultural type and experimental narrative treatment, are compared to the control group. Narrator trust is measured using a single post-experimental treatment survey question:

**Narrator Trust:** Using a scale from zero to ten, *where zero means no trust and ten means complete trust*, how much do you trust that the facts and arguments presented in the previous article are accurate?

Table 3.4 summarizes mean scores for the control group and each of the three strong cultural types in congruent and incongruent narrative experimental tracks.<sup>25</sup> Congruent results in Table 3.4 are both italicized and set off from the rest of the table by grayed table cells. Bonferroni post-hoc one-tailed tests of mean difference significance are reported.

The only strong cultural type to register statistical significance is the Strong Egalitarian. In the control, the Strong Egalitarian has a mean narrator trust score of 6.5742. When Strong Egalitarian respondents are randomly

---

<sup>25</sup> Strong Fatalists are excluded from the analysis do to small sample size.

**Table 3.4.** Narrative Structure, Author Trust, and Cultural (In)Congruence

|                             | Control |     | Individualist |     |                 | Hierarch |     |                 | Egalitarian |     |                |
|-----------------------------|---------|-----|---------------|-----|-----------------|----------|-----|-----------------|-------------|-----|----------------|
|                             | Mean    | N   | Mean          | N   | Dif.            | Mean     | N   | Dif.            | Mean        | N   | Dif.           |
| <b>Strong Individualist</b> | 4.7692  | 107 | 4.5327        | 104 | -.2365          | 4.4186   | 86  | -.3506          | 4.4500      | 100 | -.3192         |
| <b>Strong Hierarch</b>      | 4.9296  | 71  | 5.1746        | 63  | .2450           | 5.0351   | 57  | .1055           | 5.5758      | 66  | .6462          |
| <b>Strong Egalitarian</b>   | 6.5742  | 155 | 5.5290        | 138 | <b>-1.0452*</b> | 5.1301   | 136 | <b>-1.4441*</b> | 5.7794      | 136 | <b>-.7948*</b> |

One-way ANOVA, one-tailed test, Bonferroni post-hoc test

\*P <.05

assigned to the congruent egalitarian narrative, mean narrator trust falls to 5.779. When Strong Egalitarians are assigned to the incongruent individualist narratives the mean falls to 5.529, while also falling to 5.130 when assigned to the incongruent hierarchical narrative. Related to H<sub>10a</sub>, which hypothesizes that cultural types assigned to congruent narratives will be more trusting, Strong Egalitarians move in the opposite direction hypothesized, while the remaining cultural types fail to produce statistically significant differences of means. Therefore, H<sub>10a</sub> is rejected.

Regarding incongruent narrative treatments, Table 3.4 demonstrates that Strong Egalitarians see their mean score significantly reduced in both incongruent narrative tracks suggesting there is some evidence to accept H<sub>10b</sub>. However, the remaining strong cultural types show no significant differences in mean trust levels between the control group and incongruent narrative assignments. H<sub>10b</sub> is rejected as well.

### 3.5 Narrative Structure, Risk, and Cultural (In)Congruence

Each of the three cultural narrative stimuli provide a setting where climate change is real, human beings are a central contributing cause to climate change in the form of increased greenhouse gasses, and offers potential climate change induced consequences in the United States. Since the notion that climate change is a threat is a central plot element of all of the cultural narratives and narratives are found more persuasive than lists, then this sense of threat should be passed along to respondents. However, since CNM models a biased assimilator as the individual, one would expect that individuals with congruent belief system orientations to the communicated narrative should be even more susceptible to narrative persuasion, while actively rejecting information communicated in an incongruent cultural narrative. Therefore, the following is hypothesized:

**H<sub>11a</sub>**: Respondents with congruent cultural type to the cultural narrative stimulus *will have higher perceptions of risk in relation to climate change, relative to their cultural counterparts in the control.*

**H<sub>11b</sub>**: Respondents with incongruent cultural type to the cultural narrative stimulus *will have lower perceptions of risk in relation to climate change, relative to their cultural counterparts in the control.*

Summary findings in Table 3.5 illustrate the mean responses of strong cultural types in the control treatment and both the congruent and incongruent narrative treatments. Experimental tracks are represented by columns, while rows represent the two risk variables for each strong cultural type. Grayed cells

**Table 3.5.** Narrative Structure, Risk, and Cultural (In)Congruence

| <b>Strong Individualist</b> |      |                |     |  |                                  |     |            |                             |     |            |                                |     |            |
|-----------------------------|------|----------------|-----|--|----------------------------------|-----|------------|-----------------------------|-----|------------|--------------------------------|-----|------------|
|                             |      | <b>Control</b> |     |  | <b>Individualist (congruent)</b> |     |            | <b>Hierarch</b>             |     |            | <b>Egalitarian</b>             |     |            |
|                             |      | Mean           | N   |  | Mean                             | N   | Difference | Mean                        | N   | Difference | Mean                           | N   | Difference |
| Personal                    | Risk | 4.6058         | 107 |  | 4.4579                           | 107 | -.1478     | 4.7294                      | 107 | .1236      | 4.6300                         | 100 | .0242      |
| Sociotropic                 | Risk | 5.1068         | 103 |  | 5.0841                           | 107 | -.0227     | 5.3488                      | 107 | .2420      | 4.5800                         | 100 | -.5268     |
| <b>Strong Hierarch</b>      |      |                |     |  |                                  |     |            |                             |     |            |                                |     |            |
|                             |      | <b>Control</b> |     |  | <b>Individualist</b>             |     |            | <b>Hierarch (congruent)</b> |     |            | <b>Egalitarian</b>             |     |            |
|                             |      | Mean           | N   |  | Mean                             | N   | Difference | Mean                        | N   | Difference | Mean                           | N   | Difference |
| Personal                    | Risk | 5.0972         | 72  |  | 5.8413                           | 63  | .7441      | 5.5263                      | 57  | .4291      | 6.2879                         | 66  | 1.1907*    |
| Sociotropic                 | Risk | 5.8333         | 72  |  | 6.0952                           | 63  | .0439      | 5.8772                      | 57  | .0439      | 6.5781                         | 64  | .7448      |
| <b>Strong Egalitarian</b>   |      |                |     |  |                                  |     |            |                             |     |            |                                |     |            |
|                             |      | <b>Control</b> |     |  | <b>Individualist</b>             |     |            | <b>Hierarch</b>             |     |            | <b>Egalitarian (congruent)</b> |     |            |
|                             |      | Mean           | N   |  | Mean                             | N   | Difference | Mean                        | N   | Difference | Mean                           | N   | Difference |
| Personal                    | Risk | 6.7987         | 154 |  | 6.3453                           | 139 | -.4534     | 6.8699                      | 146 | .0717      | 6.9037                         | 135 | .1050      |
| Sociotropic                 | Risk | 7.3947         | 152 |  | 7.2374                           | 139 | -.1573     | 7.2877                      | 146 | -.1071     | 7.3481                         | 135 | -.0466     |

One-way ANOVA, one-tailed test, bonferroni post-hoc test, \*P <.05



represent congruent cultural narratives, while white cells represent incongruent narrative assignments and the control treatment. Means and mean differences from the narrative track and the control treatment are provided for two variables: personal risk and sociotropic risk. The following two survey questions are used to measure these two variables:

**Personal Risk:** Using a scale from zero to ten, *where zero is no threat at all and ten is extreme threat*, in your considered assessment, how much of a threat do you believe climate change poses to you personally in the next 50 years?

**Sociotropic Risk:** Using a scale from zero to ten, *where zero means no problem whatsoever and ten means devastating*, how much of a problem do you believe climate change will be for the United States as a whole in the next 50 years?

Table 3.5 reports post-hoc bonferroni one-tailed tests of significance between means in the control and culturally congruent and incongruent means. There is no significant difference in means between respondents categorized by strong cultural type assigned to the narrative treatments and the control.  $H_{11a}$  and  $H_{11b}$  are rejected.

### **3.6 Cultural Congruence, Cultural Type, and Character Affect**

The OLS regression estimates produced and analyzed in the first part of this chapter demonstrate that narrative structure, even when controlling for

demographics and belief system variables such as Cultural Theory, play an important and statistically significant role in shaping respondent's affective assessments of characters (groups) within the narrative. These earlier OLS regressions show that the influence of narrative structure on character affect is such that the treatment of characters within each cultural narrative directs the affective response: villains are disliked, while heroes are viewed positively. Does this relationship hold when one considers motivated reasoning, biased assimilation, (e.g., Taber & Lodge, 2005), and identity protective cognition (Kahan et al., 2007) processes incorporated into the Cultural Narrative Model detailed in chapter two?

Modeling a biased assimilating individual, CNM posits that individuals will reject the influence of exogenous sources that are not congruent with their endogenous belief structures, while also being much more willing to accept information and arguments from sources that are congruent. Therefore one might expect that the findings presented in the earlier part of this chapter would be conditioned by cultural congruence and incongruence. The research design presented in chapter two operationalizes congruence and incongruence in terms of CT and it is expected that individuals of strong cultural type will be accepting of character ascriptions in congruent narratives and resistant to character ascriptions in incongruent narratives. In fact, CNM suggests that incongruent information and sources are likely to prompt a more visceral response than congruent sources as individuals actively counter argue the incongruent

information (see postulates 3-5, chapter two). In each hypothesis listed below the term *culturally identified* refers to the groups identified as being culturally congruent or incongruent to each cultural type by the policy stories literature reviewed in chapter one (i.e., Ecodfense is congruent to the egalitarian; the Club of Rome is congruent to the hierarchy). The following has been hypothesized:

**H<sub>12a</sub>**: Respondents with congruent cultural type to the cultural narrative stimulus ***will have more positive affect for culturally identified heroes than their cultural counterparts in the control.***

**H<sub>12b</sub>**: Respondents with congruent cultural type to the cultural narrative stimulus ***will have more negative affect for culturally identified villains than their cultural counterparts in the control.***

**H<sub>12c</sub>**: Respondents with incongruent cultural type to the cultural narrative stimulus ***will have more positive affect for culturally identified heroes than their cultural counterparts in the control.***

**H<sub>12d</sub>**: Respondents with incongruent cultural type to the cultural narrative stimulus ***will have more negative affect for culturally identified enemies than their cultural counterparts in the control.***

In short, H<sub>12a</sub>-H<sub>12d</sub> hypothesize that respondents engaging in cultural identity protection will prefer the groups identified by the previous policy stories research (Verweij et al., 2006) as cultural heroes and react negatively to groups identified by previous research as cultural villains (e.g., Verweij et al. 2006), regardless of narrative structure. These hypotheses should help illuminate to

what extent the OLS findings presented in Table 3.3 earlier in this chapter are conditioned by interactions between strong cultural types and congruent or incongruent exogenous cultural narratives.

Table 3.6 summarizes one-way ANOVA bonferroni post-hoc one-tailed tests of significance between the mean of strong cultural types in the control and the mean affective assessment of cultural narrative characters in congruent and incongruent cultural narratives. Grayed table cells indicate strong cultural types assigned to congruent cultural narratives, while white cells represent strong cultural types assigned to incongruent cultural narratives. Congruent hypotheses are addressed first ( $H_{12a}$  and  $H_{12b}$ ), followed by a discussion of incongruent findings ( $H_{12c}$  and  $H_{12d}$ ).

Two points stand out when examining the congruent narrative (gray-italicized) summary findings in Table 3.6. First, in all cases except for the strong hierarch's affective assessment of the Cato Institute in the hierarch narrative, the mean between strong cultural types in congruent narratives (grayed cells) and means in the control (left hand column) are significantly lower in congruent tracks for characters identified as villains. These findings are as hypothesized. The decrease in mean ranges from just under a point and a half (-1.3964: *The Wall Street Journal* in the Hierarch narrative) to nearly three full points (-2.7750: *The Club of Rome* in the Egalitarian narrative). It is also worth noting that the single non-significant affective assessment of a villain in a congruent cultural treatment moves nominally in the expected negative direction and is large. In

**Table 3.6.** Narrative Structure, the Cast of Characters, and Cultural (In)Congruence

| Strong Individualist        |                            |     |            |                        |     |            |                          |     |            |      |   |            |
|-----------------------------|----------------------------|-----|------------|------------------------|-----|------------|--------------------------|-----|------------|------|---|------------|
| Control                     | Individualist (Congruence) |     |            | Hierarchy              |     |            | Egalitarian              |     |            |      |   |            |
|                             | Mean                       | N   | Difference | Mean                   | N   | Difference | Mean                     | N   | Difference | Mean | N | Difference |
| Earth First (v)             | 4.6316                     | 76  | -2.3597*   | 3.2405                 | 79  | -1.3911*   | 4.9773                   | 88  | .5963      |      |   |            |
| Ecodefense (v)              | 4.3810                     | 63  | -2.4888*   | 3.0260                 | 77  | -1.3550*   | 2.8250                   | 80  | -1.0708    |      |   |            |
| The Club of Rome (v)        | 3.8958                     | 48  | -1.8333*   | 5.7429                 | 70  | 1.8470*    | 3.4706                   | 85  | -1.4616*   |      |   |            |
| The Cato Institute. (h)     | 4.9322                     | 59  | .24557     | 3.1418                 | 81  | -1.7841*   | 4.5895                   | 95  | -.6378     |      |   |            |
| The Wall Street Journal (h) | 4.5414                     | 88  |            | 3.7590                 | 83  | -1.4682*   |                          |     |            |      |   |            |
| Strong Hierarchy            |                            |     |            |                        |     |            |                          |     |            |      |   |            |
| Control                     | Individualist              |     |            | Hierarchy (Congruence) |     |            | Egalitarian              |     |            |      |   |            |
|                             | Mean                       | N   | Difference | Mean                   | N   | Difference | Mean                     | N   | Difference | Mean | N | Difference |
| Earth First (v)             | 6.1304                     | 46  | -2.0954*   | 4.0351                 | 46  | -2.1100*   | 6.1071                   | 56  | .7208      |      |   |            |
| Ecodefense (v)              | 5.3864                     | 44  | -1.1408    | 3.3261                 | 46  | -2.0628*   | 3.2407                   | 54  | -1.1106    |      |   |            |
| The Club of Rome (h)        | 5.5000                     | 37  | -1.0531    | 5.5000                 | 42  | 1.1487     | 3.3571                   | 56  | -1.4801*   |      |   |            |
| The Cato Institute (v)      | 4.8372                     | 43  | .8428      | 3.6667                 | 45  | -1.1705    | 3.8305                   | 59  | -1.5266*   |      |   |            |
| The Wall Street Journal (h) | 5.3571                     | 56  |            | 3.9608                 | 51  | -1.3964*   |                          |     |            |      |   |            |
| Strong Egalitarian          |                            |     |            |                        |     |            |                          |     |            |      |   |            |
| Control                     | Individualist              |     |            | Hierarchy              |     |            | Egalitarian (Congruence) |     |            |      |   |            |
|                             | Mean                       | N   | Difference | Mean                   | N   | Difference | Mean                     | N   | Difference | Mean | N | Difference |
| Earth First (h)             | 6.6204                     | 108 | -2.3426*   | 4.1439                 | 132 | -2.4764*   | 6.7250                   | 120 | .6810      |      |   |            |
| Ecodefense (h)              | 6.0440                     | 91  | -2.0765*   | 3.7442                 | 129 | -2.2997*   | 2.1565                   | 115 | -2.7750*   |      |   |            |
| The Club of Rome (v)        | 4.9315                     | 73  | -1.6434*   | 5.7544                 | 114 | .8229      | 2.4034                   | 119 | -2.6091*   |      |   |            |
| The Cato Institute (v)      | 5.0125                     | 80  | 1.0892*    | 2.8661                 | 127 | -2.1464*   | 2.9919                   | 124 | -2.4456*   |      |   |            |
| The Wall Street Journal (v) | 5.4375                     | 128 |            | 3.0074                 | 135 | -2.4301*   |                          |     |            |      |   |            |

h: hero v: villain One-way ANOVA, one-tailed test, bonferroni post-hoc test, \*P < .05

the hierarch cultural narrative, the strong hierarch mean affective response for the Cato Institute is a just over a point less (-1.1705) than the strong hierarch affective mean for the Cato Institute in the control treatment. The second trend that stands out in Table 3.6 is that every hero identified in the congruent cultural track is nominally positive, but in all cases fails to achieve statistical significance.

In congruent tracks heroes fail to meet thresholds of significance, while nominally positive; villains, on the other hand, overwhelmingly achieve negative and statistically meaningful results. Culturally congruent respondents clearly do not like the villains identified by the cultural narratives offered to them.  $H_{12a}$  is rejected, while  $H_{12b}$  is accepted.

Culturally incongruent findings summarized in Table 3.6 show that all mean differences between culturally identified heroes in each incongruent cultural narrative for each strong cultural type nominally move in the opposite direction hypothesized by CNM. Recall that CNM relies upon biased assimilation processes where strong cultural types will have more positive affect for their culturally specific groups and less affect for the culturally specific groups of the other cultural types. The culturally identified heroes for each cultural type (individualist: the Cato institute and the *Wall Street Journal*; Hierarch: the Club of Rome; and, the egalitarian: Earthfirst and Ecodefense) all show nominally lower mean responses in incongruent cultural narratives for all strong cultural types. Many of these differences are statistically significant. For the strong individualist, when the hero groups of the Cato Institute and the Wall Street

Journal are presented in incongruent tracks, the mean affective response for these groups by strong individualists is negative and significantly different from the mean in the control three of four times. Four out of four times, the egalitarian's culturally identified heroes of Ecodefense and Earth First, when presented in incongruent cultural narrative treatments, show mean differences from the control group that are negative and significant. The strong hierarch's hero, the Club of Rome, while nominally moving in the opposite direction hypothesized is not significant in any of the incongruent treatments. Coded on a scale from one to ten, these mean differences for character affect are not slight. Significant mean differences range from -1.4682 for the strong individualist' affective response to the *Wall Street Journal* in the incongruent hierarch narrative to -2.4764 for the strong egalitarian's affective response to Earth First in the incongruent hierarch narrative.  $H_{12c}$  is rejected. Culturally identified heroes are not received more positively in culturally incongruent narratives. Rather, the opposite is occurring as strong cultural types overwhelmingly ascribe affect to characters in the directions specified by that characters treatment in the cultural narrative.

Table 3.6 shows many mean differences that might support hypothesis  $H_{12d}$ , which hypothesizes that strong cultural types will have more negative affect for culturally identified villains than their counterparts in the control. For all strong cultural types, groups identified by previous research as cultural villains show statistically significant and negative differences in means between their

treatment in culturally incongruent narratives and the control group in nine different cells. For example and as hypothesized, in the hierarchical narrative, strong egalitarian mean differences from strong egalitarians in the control group for both the Cato Institute (-2.1464) and the *Wall Street Journal* (-2.4301) are negative, significant and large. Similar findings appear in all incongruent narrative treatments. Strong individualists dislike Earth First and Ecodefense in the hierarch narrative; strong hierarchs dislike the Cato Institute and the *Wall Street Journal* in the egalitarian cultural narrative. However and along with offering some confirmatory evidence to accept previous hypotheses, these mean differences also move in the directions of how these groups are treated in each cultural narrative. That is, in general and regardless of which cultural narrative a strong cultural type is randomly assigned to, villains are disliked.

Dictated by the treatment of a group in the narrative, several culturally specific villains yield mean differences that do not readily support the biased assimilating individual modeled in CNM. Rather, significant mean differences appear to be dictated by the treatment of each group in the cultural narrative rather than guided by strong preexisting affective responses to these groups theorized to be guided by cultural orientation in the CNM. For example, whereas previous scholarship suggests that strong individualists would have a negative affective response to the Club of Rome, strong individualists have a positive and significant reaction to this group when treated as a hero in the hierarch narrative. Similarly, strong egalitarians are hypothesized to react



negatively to the Cato Institute, but when this group is treated as a hero in the individualist narrative, strong egalitarians mean scores significantly increase by just over a point (1.0892) relative to the control group. Even where statistical significance is not found, all cultural villain means move in a direction that would indicate a strong influence of narrative structure and a weak form of resistance on the part of the respondent's strong cultural orientation, when compared to mean affective responses in the control treatment. Given the uniform negative movement of mean differences between incongruent character treatments and the control treatment of villains,  $H_{12d}$  is rejected.

Summarizing the findings presented in Table 3.6, strong cultural types appear to take narrative cues on villains as affective responses in congruent cultural narratives are meaningfully less than those in the control; however, that same relationship, while nominally positive for heroes, is not significant for respondents of strong cultural type in congruent narratives. The mean differences between respondents in culturally incongruent narratives and the control treatment present a less straightforward set of results. While some mean differences related to villains would support posited hypotheses, many mean differences do not. For example, mean differences for culturally identified heroes in incongruent cultural narratives are always negative in incongruent narratives when compared to the control group. Importantly and when compared to affective assessments of groups for each strong cultural type in the control treatment, the movement of each mean for all characters in all tracks is

consistent with the cultural narrative's treatment of the group. This is in all cases nominally true; in many the difference in means between incongruent cultural narrative and the control group for strong cultural types is also statistically significant. Mean difference significance in incongruent treatments mirror congruent narrative mean differences in this regard. In sum, Table 3.6 provides strong evidence that narrative structure influences individual affective assessments of characters in the directions specified by the narrative.

### **3.7 Narrative Structure, Cultural (In)congruence, and Policy Solutions**

As narratives are more persuasive than non-narrative communication messages (Ricketts, 2007), including lists (Matilla, 2002), we would expect that a narrative account of climate change that is offering a solution to the problem of increasing GHG's as a moral of the story, would be more effective in persuading than the control list. Indeed, the OLS regression analysis conducted earlier in this chapter suggest this to be true. Contra what these earlier findings would suggest, however, CNM models individuals that selectively process information that is congruent more easily and actively reject and counter argue incongruent information. Given that the policy solutions were selected and framed in such a manner that would make them congruent to one of the three cultural types operationalized in the cultural narrative treatments, we would expect the individual modeled in CNM to prefer their culturally specific solution regardless of which narrative track it appears in: individualists should prefer cap-and-trade;

hierarchs should prefer nuclear energy; and, egalitarians should prefer renewable energy. As each policy solution is embedded in culturally specific language and adorned with culturally specific symbolism when both argued for and against, CNM also expects strong cultural types to dislike solutions operationalized as congruent to the other cultural types. Table 3.7 addresses the following hypotheses:

**H<sub>13a</sub>**: Relative to the control group, respondents ***will have higher levels of support for culturally identified policy solutions, regardless of which narrative treatment they are exposed to.***

**H<sub>13b</sub>**: Relative to the control group, respondents ***will have lower levels of support for culturally identified incongruent policy solutions, regardless of which narrative treatment they are exposed to.***

In the above stated hypotheses, the phrase *culturally identified* refers to policy solutions that are specifically linked to each strong cultural type. Each policy preference is measured on a scale of zero to ten, where zero means completely disagree and ten means completely agree. All preferences are measured post experimental treatment. Like Table 3.7, grayed cells indicate a congruent cultural narrative, while white cells indicate an incongruent cultural narrative. The preferred policy for each strong cultural type is set off from the rest of the table by both outlining the cell and italicizing the policy name in the left-hand column of the table. Table 3.7 shows that much like the OLS regressions presented earlier in the chapter, narrative structural influences on

**Table 3.7.** Narrative Structure, the Moral of the Story, and Cultural Incongruence

| Strong Individualist      |     |  |               |     |                  |           |     |                  |             |     |                  |
|---------------------------|-----|--|---------------|-----|------------------|-----------|-----|------------------|-------------|-----|------------------|
| Control                   |     |  | Individualist |     |                  | Hierarchy |     |                  | Egalitarian |     |                  |
| Mean                      | N   |  | Mean          | N   | Difference       | Mean      | N   | Difference       | Mean        | N   | Difference       |
| 3.4043                    | 94  |  | 5.1373        | 94  | <b>1.7330*</b>   | 3.4762    | 84  | .07194           | 3.1034      | 87  | -.30081          |
| 5.7526                    | 97  |  | 5.9320        | 103 | .17946           | 5.8118    | 85  | .05919           | 5.5914      | 93  | -.16118          |
| 6.0729                    | 96  |  | 5.6667        | 102 | -.4063           | 4.5000    | 82  | <b>-1.57292*</b> | 5.6170      | 96  | -.45590          |
| <b>Strong Hierarchy</b>   |     |  |               |     |                  |           |     |                  |             |     |                  |
| Control                   |     |  | Individualist |     |                  | Hierarchy |     |                  | Egalitarian |     |                  |
| Mean                      | N   |  | Mean          | N   | Difference       | Mean      | N   | Difference       | Mean        | N   | Difference       |
| 5.0000                    | 68  |  | 5.4231        | 52  | .42308           | 4.6327    | 49  | -.3674           | 4.2295      | 61  | -.77049          |
| 5.6418                    | 50  |  | 5.2963        | 54  | -.34549          | 5.4600    | 67  | -.19179          | 5.5167      | 60  | -.12512          |
| 5.5000                    | 68  |  | 6.0364        | 55  | .5364            | 5.9592    | 49  | .4592            | 6.6500      | 60  | <b>1.15000*</b>  |
| <b>Strong Egalitarian</b> |     |  |               |     |                  |           |     |                  |             |     |                  |
| Control                   |     |  | Individualist |     |                  | Hierarchy |     |                  | Egalitarian |     |                  |
| Mean                      | N   |  | Mean          | N   | Difference       | Mean      | N   | Difference       | Mean        | N   | Difference       |
| 5.6154                    | 143 |  | 5.7302        | 126 | .11477           | 4.8797    | 133 | -.73569          | 4.6303      | 119 | <b>-.98513*</b>  |
| 5.6383                    | 141 |  | 4.5118        | 127 | <b>-1.11265*</b> | 4.9291    | 141 | -.70922          | 4.3644      | 118 | <b>-1.27389*</b> |
| 6.4626                    | 124 |  | 6.0465        | 129 | -.41607          | 5.7101    | 138 | -.75244          | 6.7339      | 124 | .27129           |

One-way ANOVA, one-tailed test, bonferroni post-hoc test

\*P < .05

policy preferences are intermittently significant. All three strong cultural types show statistically significant differences in means between cultural narrative treatments and the control group in at least one cell. Hypotheses H<sub>13a</sub> and H<sub>13b</sub> are addressed in sequence.

The culturally identified congruent policy solution for the individualist is cap-and-trade. In the control treatment, Strong Individualists clearly do not prefer this solution with a mean response of 3.4043. When exposed to the congruent individualist narrative treatment, the mean response increases by a statistically significant 1.7330 points. This finding is as hypothesized by H<sub>13a</sub>; however, there should also be statistically significant mean increases in the two incongruent cultural narratives treatments for the Strong Individualist's preference for cap-and-trade. For the Strong Individualist, mean preferences for the cap-and-trade policy solution in incongruent tracks remains very similar to preferences in the control treatment, yielding no statistically significant difference of means. Both the Strong Hierarchs and the Strong Egalitarians show no significant differences of means for their respective culturally identified policy solutions of nuclear energy and renewable resources between the control group and any cultural narrative treatment. While there is evidence that Strong Individualists are heavily influenced by their congruent individualist narrative to prefer cap-and-trade as a policy solution, none of the other treatments suggest that CNM is correct in theorizing that strong cultural types will prefer their

culturally identified solutions, regardless of the exogenous source.  $H_{13a}$  is rejected.

Hypotheses  $H_{13b}$  expects that because the policy solutions of “other” cultural types are framed in culturally specific language and symbolism that strong cultural types not culturally associated with a policy solution will provoke a negative reaction from respondents relative to the control group. Table 3.7 offers some evidence to support this hypothesis. Two of the strong cultural types demonstrate a negative difference in means between the control and at least one cultural narrative treatment. As  $H_{13b}$  would predict, the Strong Egalitarian has a negative mean difference in preferences for nuclear energy in the hierarch cultural narrative (-1.11265) and in the egalitarian cultural narrative (-1.27389), as well as a negative mean difference for preferences for cap-and-trade in the individualist cultural narrative (-.98513). The Strong Individualist shows a negative reaction to renewable energy in the hierarch narrative (-1.57292) relative to Strong Individualists in the control. All of these mean differences offer support for  $H_{13b}$ . However, there are also several reasons illuminated by the data in Table 3.7 to reject this hypothesis.

First, the vast majority of the cells listing mean differences within each cultural narrative treatment in Table 3.7 do not demonstrate statistically significant differences from the control treatment. Of the twenty-seven mean differences reported for cultural narrative treatment mean responses, six differences are significant. Second, of those six reported significant mean

differences, one moves in the opposite direction hypothesized. The Strong Hierarchy has a significantly positive mean preference for renewable energy in the egalitarian cultural narrative. There is simply insufficient evidence to accept  $H_{13b}$ .

### **3.8 Discussion and Conclusion**

The analysis presented in this chapter has attempted to illuminate the relationship between narrative structure and key dependent variables related to climate change. In the earlier sections of the chapter examining hypotheses  $H_{01}$  through  $H_{09}$ , the relationship between narrative structure and climate change opinion related variables was examined using OLS regressions. In these analyses the cultural narrative experimental treatments were the independent variables of interest, while key endogenous variables were included as controls. Although many of the OLS regressions did not reveal a statistically significant relationship between narrative structure and the dependent variable in question, there were several meaningful findings reported. Table 26 provides a summary of which hypotheses were accepted and which were rejected.

The first set of OLS regressions found a significant relationship between narrative structure and both *narrator threat* and *author trust*. The analyses showed that in the individualist and hierarch narratives, respondents believed the author of the cultural narrative to view climate change as less of a threat than the author of the control list. The analysis also showed that in two of the

**Table 2.8.** Hypotheses Tests

|                  | <b>Hypotheses</b>  | <b>Status</b> | <b>Method</b> |
|------------------|--|---------------|---------------|
| H <sub>01</sub>  | There is no relationship between a respondent's perceptions of the narrator's assessment of the risk climate change poses and narrative structure.   | Reject        | OLS           |
| H <sub>02</sub>  | There is no relationship between levels of trust a respondent ascribes to an author and narrative structure.   | Reject        | OLS           |
| H <sub>03</sub>  | There is no relationship between the level of affect a respondent assigns to the experimental stimulus and narrative structure.  | Accept        | OLS           |
| H <sub>1</sub>   | <b>Personal Risk:</b> Narratively structured climate change messages will increase the respondent's sense of threat that climate change poses to them personally relative to the control group.  | Reject        | OLS           |
| H <sub>2</sub>   | <b>Sociotropic Risk:</b> Narratively structured climate change messages will increase the respondent's sense of threat that climate change poses to the United States in general relative to the control group.                          | Reject        | OLS           |
| H <sub>3</sub>   | <b>Climate Change Belief:</b> Narratively structured messages will increase the respondent's willingness to accept that climate change is a reality relative to the control group.   | Reject        | OLS           |
| H <sub>4</sub>   | <b>Anthropogenic Cause:</b> Narratively structured messages will increase the respondent's willingness to accept that human beings are a critical cause of climate change through increased GHG emissions relative to the control group. | Reject        | OLS           |
| H <sub>5</sub>   | <b>GHG Regulation:</b> Narratively structured messages will increase the respondent's willingness to regulate GHG's relative to the control group.   | Reject        | OLS           |
| H <sub>6</sub>   | <b>Hero Affect:</b> Characters (groups) treated as heroes in the cultural narratives will facilitate more positive affective responses than groups in the control.   | Accept        | OLS           |
| H <sub>7</sub>   | <b>Villain Affect:</b> Characters (groups) treated as villains in the cultural narratives will facilitate more negative affective responses than groups in the control.  | Accept        | OLS           |
| H <sub>8</sub>   | <b>Moral of the Story:</b> Policy preferences advocated by a cultural narrative will be preferred by respondents exposed to that narrative.  | Accept        | OLS           |
| H <sub>9</sub>   | <b>Culturally Antithetical Moral of the Story:</b> Policy preferences admonished by the cultural narrative will find less support from respondents exposed to that narrative.  | Accept        | OLS           |
| H <sub>10a</sub> | Respondents with congruent cultural type to the cultural narrative stimulus <b>will be more trusting of the narrator than their cultural counterparts in the control.</b>  | Reject        | ANOVA         |
| H <sub>10b</sub> | Respondents with incongruent cultural type to the cultural narrative stimulus <b>will be less trusting of the narrator than their cultural counterparts in the control.</b>  | Reject        | ANOVA         |
| H <sub>11a</sub> | Respondents with congruent cultural type to the cultural narrative stimulus <b>will have higher perceptions of risk in relation to climate change.</b>   | Reject        | ANOVA         |
| H <sub>11b</sub> | Respondents with incongruent cultural type to the cultural narrative stimulus <b>will have lower perceptions of risk in relation to climate change.</b>  | Reject        | ANOVA         |
| H <sub>12a</sub> | Respondents with congruent cultural type to the cultural narrative stimulus <b>will have more positive affect for <u>culturally identified</u> heroes than their cultural counterparts in the control.</b>                               | Accept        | ANOVA         |
| H <sub>12b</sub> | Respondents with congruent cultural type to the cultural narrative stimulus <b>will have more negative affect for <u>culturally identified</u> villains than their cultural counterparts in the control.</b>                             | Reject        | ANOVA         |
| H <sub>12c</sub> | Respondents with incongruent cultural type to the cultural narrative stimulus <b>will have more positive affect for <u>culturally identified</u> heroes than their cultural counterparts in the control.</b>                             | Reject        | ANOVA         |
| H <sub>12d</sub> | Respondents with incongruent cultural type to the cultural narrative stimulus <b>will have more negative affect for <u>culturally identified</u> enemies than their cultural counterparts in the control.</b>                            | Reject        | ANOVA         |
| H <sub>13a</sub> | Relative to the control group, respondents <b>will have higher levels of support for <u>culturally identified</u> policy solutions, regardless of which narrative treatment they are exposed to.</b>                                     | Reject        | ANOVA         |
| H <sub>13b</sub> | Relative to the control group, respondents <b>will have lower levels of support for <u>culturally identified</u> incongruent policy solutions, regardless of which narrative treatment they are exposed to.</b>                          | Reject        | ANOVA         |



three cultural narrative tracks, respondents exhibited significantly lower levels of trust for the author of the cultural narrative treatment than the author of the list of facts presented in the control. It would seem that respondents have more faith that information presented without narration is more accurate and trustworthy than information presented in narrative form. Keep in mind that the information presented in the lists for both the control and the narrative treatments is exactly the same.

Other relationships between key climate change opinion variables and narrative structure were also found by the OLS regression analysis presented at the beginning of the chapter. Groups identified as relevant to the climate change debate were found to have their affective assessments by respondents heavily influenced by their treatment in the cultural narratives. Groups portrayed as villains were disliked, while groups portrayed as heroes were liked. A similar, but less convincing set of findings was found for policy preferences in the cultural narrative treatments.

By linguistic and symbolic linkages to specific cultural types, policy preferences are presented as a moral conclusion for each cultural narrative treatment. The solutions offered in the other two cultural narratives, couched in the same symbolic and culturally specific language used in the policy preferences home narrative, are admonished. If narrative structure matters for these policy preferences, then, compared to the control group, each preference argued for should be preferred. Each policy preference argued against should also receive a

more negative reaction from respondents. OLS analysis confirmed these hypotheses, finding that five of nine relationships were significant with coefficients moving in the expected direction.

While the OLS regressions applied in the beginning of the chapter tested for the influence of narrative structure on key dependent variables while controlling for variables modeled in CNM, potential interactions between strong cultural type and the cultural narrative stimuli in the OLS models were insufficient to gauge the effects of narrative congruence and incongruence. To account for this deficiency and better apply the CNM model developed in chapter two, differences of means tests were performed on sample sub-populations of strong cultural type. The idea of performing these difference of means tests is to determine if the relationship between narrative structure and dependent variables of interest are conditioned by cultural type.

The ANOVA analysis confirmed only one hypothesis ( $H_{12a}$ ). Respondents of strong cultural type in congruent narrative tracks did in fact show higher affect for heroes in the congruent narrative treatment. However, none of the remaining conditional hypotheses were confirmed. If one considers the single confirmed hypothesis in light of the remaining rejected hypotheses, it is apparent that the confirmation is likely the result of the narrative treatment of the hero and not the cultural type of the respondent. That is, in all tracks significant differences of means move in the directions specified by the cultural narratives. Both the OLS and ANOVA analyses leave a strong impression that

narrative structure is an important element of driving respondent opinions about narrator threat, author trust, affect for characters, and policy preferences.

However, the lack of findings from the analysis of mean differences is not viewed as a solid rebuttal of the CNM model.

It may still be the case that interactions between cultural type and the cultural orientation of the narrative treatments are both occurring and meaningful. Chapter four addresses further interactions by comparing respondent preferences for key climate change opinion dependent variables across cultural narrative tracks. In chapter four narrative structure is held constant while the content of the narratives varies. The final chapter, chapter six, summarizes significant findings and offers an empirical model relying on the different components of narrative to try and illuminate how narrative structures might influence opinion formation and change related to climate change. Importantly, chapter six demonstrates that character affect is a central narrative input, driving both perceptions of risk and the respondent's willingness to regulate GHG's.

## **CHAPTER 4: NARRATIVE CONTENT AND MASS OPINIONS ON CLIMATE CHANGE**

While the previous chapter examined hypotheses related to narrative structure, chapter four addresses RQ2 and narrative content. Does cultural narrative content influence preferences for opinion related dependent variables relevant to climate change? To assess this second research question, responses to survey questions associated to key dependent variables categorized by strong cultural type are compared across cultural narrative experimental treatments (e.g., individualist cultural narrative vs. egalitarian cultural narrative) in the context of congruence and incongruence. However, before examining specific congruence and incongruence hypotheses, it is worthwhile to examine the relationship between Cultural Theory (CT) metrics and the dependent variables operationalized in this research. The benefit of doing so is that understanding the underlying CT relationships with these theoretically and practically important dependent variables will provide additional insight into any congruence and incongruence findings (or lack thereof). Specifically, the aim is to identify underlying relationships between CT and the analyzed dependent variables to better understand the variation of cultural biases in congruent and incongruent cultural narrative treatments examined later in the chapter.

### **4.1 Cultural Theory and Opinions on Climate Change**

Table 4.1 summarizes OLS partial regression coefficients for CT metrics for climate change opinion related dependent variables. Each column represents

an independent OLS regression, controlling for age, education, gender, income, race, ideology, and climate change knowledge, where the three CT measures of interest are individualism, hierarchy, and egalitarianism (see appendix F1-F3 for complete OLS findings).<sup>26</sup>

All respondents are eighteen years or older. Ages range from eighteen to eighty-eight. Education is coded on a scale ranging from one to seven, where one represents *elementary or some high school education* and seven represents *a doctorate of any type*. Gender is coded one for male and zero for female. Race is coded one for white/Asian and zero for all other racial categories. Ideology is coded on a scale from one to seven, where one is *strongly liberal* and seven is *strongly conservative*. Climate change knowledge is a composite measure derived from a series of questions on climate change causes and scientific expectations. The scale on climate change knowledge ranges from one to eleven, where each cumulative point represents a correct answer on one of the climate change knowledge questions. CT measurements are aggregations of three agree/disagree questions for each cultural type (see appendix C for variable descriptive statistics).

Previous CT research expects that several of the dependent variables listed in Table 4.1 will have significant relationships with CT metrics. Past research predicts that individualism will have a negative relationship with climate change risk (e.g., Kahan & Braman, 2006) and a positive relationship with

---

<sup>26</sup> Fatalism is included as a control.

**Table 4.1: Cultural Theory and Opinion Related Dependent Variables, OLS Regression estimates**

| Individualist Narrative | Narrator Threat     | Narrator Trust      | Affect              | Personal Risk <sup>a</sup> | Sociotropic Risk <sup>a</sup> | CC Belief           | Anthropogenic Cause | GHG Regulation      | Cap-and Trade       | Nuclear Energy <sup>ab</sup> | Renewable Energy    |
|-------------------------|---------------------|---------------------|---------------------|----------------------------|-------------------------------|---------------------|---------------------|---------------------|---------------------|------------------------------|---------------------|
| Constant                | 3.163***<br>(.978)  | 3.846***<br>(.957)  | 3.371***<br>(.902)  | 4.341***<br>(1.072)        | 3.728***<br>(.873)            | 3.488***<br>(1.005) | 4.454***<br>(1.007) | 4.454***<br>(1.038) | 3.543***<br>(1.219) | -0.435<br>(1.271)            | 3.483***<br>(1.158) |
| Individualism           | .060<br>(.036)      | -.054<br>(.035)     | .006<br>(.033)      | -.136***<br>(.039)         | -.109***<br>(.032)            | -.095**<br>(.036)   | -.119***<br>(.036)  | -.111**<br>(.037)   | .038<br>(.044)      | .124**<br>(.046)             | .063<br>(.042)      |
| Hierarchy               | .048<br>(.039)      | .109**<br>(.037)    | .059*<br>(.035)     | .072<br>(.042)             | .090**<br>(.034)              | .111**<br>(.039)    | .129***<br>(.048)   | .108**<br>(.041)    | .092<br>(.048)      | .107*<br>(.050)              | .054<br>(.045)      |
| Egalitarianism          | .054<br>(.032)      | .085**<br>(.031)    | .061*<br>(.029)     | .149***<br>(.035)          | .170***<br>(.028)             | .076*<br>(.033)     | .162***<br>(.040)   | .136***<br>(.033)   | .089*<br>(.040)     | -.029<br>(.041)              | .091*<br>(.038)     |
| Adjusted R <sup>2</sup> | .143                | .075                | .028                | .173                       | .261                          | .190                | .253                | .184                | .057                | .105                         | .021                |
| F-Statistic             | 5.388               | 3.696               | 1.944               | 7.949                      | 12.785                        | 8.830               | 12.223              | 8.480               | 2.837               | 4.624                        | 1.659               |
| N                       | 366                 | 366                 | 366                 | 366                        | 367                           | 367                 | 365                 | 364                 | 334                 | 341                          | 340                 |
| Hierarch Narrative      | Narrator Threat     | Narrator Trust      | Affect              | Personal Risk <sup>a</sup> | Sociotropic Risk <sup>a</sup> | CC Belief           | Anthropogenic Cause | GHG Regulation      | Cap-and Trade       | Nuclear Energy <sup>ab</sup> | Renewable Energy    |
| Constant                | 5.527***<br>(1.216) | 4.637***<br>(1.164) | 6.581***<br>(1.086) | 5.369***<br>(1.200)        | 7.041***<br>(1.049)           | 4.840***<br>(1.155) | 4.600***<br>(1.144) | 6.120***<br>(1.113) | 3.671*<br>(1.508)   | .902<br>(1.427)              | 5.146***<br>(1.413) |
| Individualism           | -.001<br>(.039)     | .026<br>(.037)      | -.027<br>(.034)     | -.077*<br>(.039)           | -.058*<br>(.034)              | .021<br>(.037)      | -.041<br>(.037)     | -.015<br>(.035)     | -.030<br>(.048)     | .135**<br>(.045)             | -.009<br>(.045)     |
| Hierarchy               | -.031<br>(.042)     | .056<br>(.040)      | .084*<br>(.037)     | -.009<br>(.041)            | -.008<br>(.036)               | -.047<br>(.040)     | .043<br>(.039)      | -.035<br>(.037)     | .112*<br>(.052)     | .083*<br>(.048)              | .024<br>(.047)      |
| Egalitarianism          | .038<br>(.035)      | .006<br>(.034)      | -.047<br>(.031)     | .121***<br>(.035)          | .078**<br>(.030)              | .081*<br>(.033)     | .132***<br>(.033)   | .107***<br>(.032)   | .155***<br>(.043)   | -.005<br>(.041)              | .091*<br>(.041)     |
| Adjusted R <sup>2</sup> | .059                | .015                | .013                | .101                       | .183                          | .109                | .158                | .164                | .108                | .062                         | .007                |
| F-Statistic             | 1.803               | 1.442               | 1.399               | 4.333                      | 7.655                         | 4.630               | 6.543               | 6.763               | 4.297               | 2.836                        | 1.190               |
| N                       | 325                 | 327                 | 326                 | 326                        | 326                           | 326                 | 326                 | 325                 | 298                 | 308                          | 300                 |
| Egalitarian Narrative   | Narrator Threat     | Narrator Trust      | Affect              | Personal Risk <sup>a</sup> | Sociotropic Risk <sup>a</sup> | CC Belief           | Anthropogenic Cause | GHG Regulation      | Cap-and Trade       | Nuclear Energy <sup>ab</sup> | Renewable Energy    |
| Constant                | 6.824***<br>(1.107) | 6.529***<br>(1.113) | 6.936***<br>(1.050) | 5.865***<br>(1.063)        | 6.173***<br>(.934)            | 5.379***<br>(1.055) | 5.956***<br>(1.081) | 6.343***<br>(1.084) | 4.818***<br>(1.430) | .093<br>(1.463)              | 5.358***<br>(1.281) |
| Individualism           | -.021<br>(.037)     | -.126***<br>(.037)  | -.103**<br>(.035)   | -.121***<br>(.035)         | -.155***<br>(.031)            | -.112**<br>(.035)   | -.158***<br>(.036)  | -.169***<br>(.036)  | -.039<br>(.045)     | .130**<br>(.046)             | -.072<br>(.041)     |
| Hierarchy               | .011<br>(.040)      | .111**<br>(.040)    | .055<br>(.037)      | .043<br>(.038)             | .079*<br>(.034)               | .089**<br>(.038)    | .117**<br>(.039)    | .057<br>(.039)      | .051<br>(.049)      | .068<br>(.050)               | .105*<br>(.044)     |
| Egalitarianism          | .028<br>(.037)      | .065<br>(.037)      | .083*<br>(.034)     | .156***<br>(.035)          | .138***<br>(.031)             | .114***<br>(.035)   | .156***<br>(.036)   | .151***<br>(.036)   | .126**<br>(.044)    | -.004<br>(.046)              | .124*<br>(.040)     |
| Adjusted R <sup>2</sup> | .041                | .127                | .149                | .262                       | .348                          | .274                | .328                | .281                | .158                | .087                         | .102                |
| F-Statistic             | 2.311               | 5.493               | 6.413               | 11.964                     | 17.399                        | 12.673              | 16.135              | 13.170              | 6.060               | 3.629                        | 4.176               |
| N                       | 341                 | 341                 | 357                 | 359                        | 338                           | 340                 | 341                 | 342                 | 296                 | 304                          | 308                 |

\*p<.05; \*\*p<.01; \*\*\*p<.001 two-tailed test; <sup>a</sup> one-tailed test for individualism & egalitarianism; <sup>b</sup> one-tailed test for hierarchy

preferences for nuclear energy (Ellen & Slovic, 1996; Jenkins-Smith & Smith, 1994). Hierarchs are also found to have a positive relationship with preferences for nuclear energy (Ellen & Slovic, 1996; Jenkins-Smith & Smith 1994). On the other hand, egalitarianism is found to be positively related to perceptions of climate change risk (Ellen & Slovic, 1996; Kahan & Braman, 2006; Leiserowitz, 2006) and also to be negatively associated with preferences for nuclear energy (Ellen & Slovic, 1996; Jenkins-Smith, 2001, p. 122; Jenkins-Smith & Smith, 1994). For these variables a one-tailed test is used to assess statistical significance. Since past research is silent regarding what relationship we might expect between the remaining dependent variables and CT, the null is hypothesized for these relationships (two-tailed tests of significance).

Generally speaking, the individualist CT measure performs as previous research expects (please refer to Table 4.2 for measurement information for each dependent variable). In every cultural narrative track, as individualism increases for a respondent, there is a statistically significant positive increase in preferences for nuclear energy. This finding is consistent with previous research (Ellen & Slovic, 1996; Jenkins-Smith & Smith, 1994). Across all narrative experimental treatments, individualists have statistically lower perceptions of both personal and sociotropic risk. As the sum of the individualism metric increases we also see significantly lower scores for belief in climate change, a belief that human beings are a primary cause of climate change (Anthropogenic Cause), and a willingness to regulate GHG's in both the individualist and

egalitarian cultural narratives. Given that individualists are found to have significantly lower perceptions of risk in previous research (e.g., Kahan & Braman, 2006) and in this research, it seems intuitive that individualists would have significantly lower responses for these variables. Additionally, individualism is found to be significantly associated with lower affect for the egalitarian narrative as well as significantly lower levels of trust that the facts presented in the egalitarian narrative are accurate and unbiased (narrator trust).

The egalitarian index also performs as expected. In all of the narrative treatments, egalitarianism is positively related to perceptions of personal and sociotropic risk. Similar to the performance of the individualist measurements (but in the opposite direction), egalitarianism has a positive and statistically significant relationship across all cultural narrative treatments with a belief that climate change is real, that human beings are a primary cause, and a willingness to regulate GHG's. Egalitarianism is also positively related to preferences for renewable energy across all experimental manipulations, indicating that the selection of this preference in the egalitarian cultural narrative was an appropriate choice. Several partial regression coefficients exhibit intermittent significance across experimental tracks for the egalitarian index. Interestingly, as egalitarianism increases, respondent affect for both the individualist and egalitarian narratives increase. Egalitarianism is also significantly and positively related to an affirmative emotional assignment of affect to the individualist cultural narrative. Unexpectedly, however, egalitarianism does not exhibit a



statistically significant negative relationship with preferences for nuclear energy in any of the cultural narrative treatments.

The hierarchy CT index presents a set of interesting findings across the experimental treatments. For starters, previous research suggests that hierarchy will be negatively related to perceptions of climate change risk. The findings presented in Table 4.1, at least partially, indicate the opposite. Hierarchy demonstrates a statistically significant and positive relationship with sociotropic risk in both the individualist and egalitarian cultural narrative tracks. Similarly to the performance of egalitarianism, hierarchy is also significantly and positively related to a belief that climate change is real, that humans are a primary cause, and a willingness to regulate GHG's in both the individualist and egalitarian narratives. Where previous research would suggest more symmetry between hierarchism and individualism (Kahan & Braman, 2006), it appears that in the case of climate change, hierarchy and egalitarianism are converging on all of the variables mentioned.<sup>27</sup>

Hierarchy also demonstrates several intermittent relationships with opinion related climate change variables in select narrative treatments.

Hierarchs show significantly higher narrative affect (affect) for the individualist and hierarch narratives. Hierarchy is positively related to trust for the egalitarian

---

<sup>27</sup> Cultural Theory argues that two of the four cultural types will typically ally to produce a societal status quo (Thompson et al., 1990). In American society the status quo is typically conceived of as being produced by individualists and hierarchists. Although beyond the scope of this research, the convergence of hierarchs and egalitarians on the issue of climate change could indicate a shift in this traditional alliance structure on the issue of climate change.

and individualist narrators. The hierarchy index yields statistically significant and positive relationships with preferences for nuclear energy in the individualist and the hierarchical cultural narratives. These findings are as previous research would expect (Ellen & Slovic, 1996; Jenkins-Smith & Smith 1994). Finally, hierarchism demonstrates significant and positive relationships with both cap-and-trade in the hierarchical narrative and renewable energy in the egalitarian narrative.

Taken in total, the findings presented in Table 4.1 provide insight into the underlying influence of cultural theoretic priors. That is, the performance of these measures indicates the strength of the biased assimilation processes modeled in CNM and provide reliable assessments of what cultural biases we can expect individuals to rely on when processing the incoming exogenous cultural narratives. In the cases of the individualist and egalitarian, CT measures perform mostly as the literature would expect. Contra expectations regarding climate change risk (and by extension climate change belief, anthropogenic cause, and GHG regulation), hierarchs seem more aligned with egalitarians than the more typical alliance found with individualists

Most importantly, there is a high degree of consistency across the experimental treatments for each cultural measure. Certainly, for different dependent variables in different experimental tracks, some partial regression coefficients lose significance and fall out of the models. For example, individualism has a negative relationship with climate change belief in both the

individualist and egalitarian narratives. This relationship falls out in the hierarchical narrative. These types of inconsistencies are expected when dealing with so many dependent variables and a number of experimental treatments. What stands out, however, is that all of the relationships that remain significant for each cultural measure, maintain their respective directionality and approximate magnitude within each model. For example, in all cultural narrative treatments, individualism is negatively associated with personal risk, while the inverse is true for egalitarianism. Partial regression coefficients do not switch signs and nor does the magnitude change dramatically for relationships that remain consistent across treatments. Given the relatively consistent behavior of CT measurements across narrative treatments, the OLS analysis presented here suggests that there is not an interaction taking place between cultural theory measurements and the cultural content operationalized in each narrative. The following section addresses this issue in more detail.<sup>28</sup>

#### **4.2 Cultural (In)Congruence, Narrative Content, and Mass Opinion on Climate Change**

Given that each cultural narrative makes specific cultural appeals to individuals of the same cultural type as that narrative, the Cultural Narrative

---

<sup>28</sup> OLS interactive models were ran for each dependent variable. Narrative experimental tracks were dummied as a zero or one and interacted with cultural type. As expected, these models perform quite similarly to the subgroup analysis presented here. The subgroup analysis is presented do to the clarity of the models, which are not rife with the multicollinearity built into interactive models.

Model (CNM) detailed in chapter two would expect strong reactions from both congruent and incongruent cultural types assigned to each treatment. More specifically, postulates two and three modeled in chapter two theorize a confirmation and disconfirmation bias. Confirmation bias states that Individuals exposed to culturally congruent stimuli should be more accepting of the information and arguments (Taber & Lodge, 2006; Lodge & Taber, 2006); disconfirmation bias states that individuals will be less accepting of information and arguments originating from culturally incongruent stimuli (Taber & Lodge, 2006; Lodge & Taber, 2006). The following analysis assesses these CNM postulates by examining the influence of narrative content and comparing strong cultural type survey responses in culturally congruent and incongruent narratives.

Strong cultural types are categorized based on which battery of Cultural Theory survey questions the respondent scored highest. Once categorized by strong cultural type, mean responses are compared for these respondents between congruent and incongruent cultural narrative treatments. Means are assessed using one-way ANOVA with bon ferroni post-hoc tests to determine if the difference in means is significant. In the interest of clarity, Table 4.2 summarizes and describes dependent variable measurement ranges examined in this chapter.

The first set of hypotheses address assumptions built into each narrative that should be influenced by the varied content that produce congruent and

**Table 4.2.** Narrative Structure Hypotheses, Survey Questions, and Measurement

| Dependent Variable |                           | Measurement Range |                       |                     |
|--------------------|---------------------------|-------------------|-----------------------|---------------------|
| Description        | Q#'s                      | 0                 | → 10                  |                     |
| H <sub>14</sub>    | Narrator Threat           | 44                | No threat at all      | Extreme threat      |
| H <sub>15</sub>    | Narrator Trust            | 45                | No trust              | Complete trust      |
| H <sub>16</sub>    | Affect                    | 46                | Extremely negative    | Extremely positive  |
| H <sub>17</sub>    | Personal Risk             | 47                | No threat at all      | Extreme threat      |
| H <sub>18</sub>    | Sociotropic Risk          | 51                | No problem whatsoever | Devastating         |
| H <sub>19</sub>    | Climate Change Belief     | 49                | Completely disagree   | Completely agree    |
| H <sub>20</sub>    | Antropogenic Cause        | 50                | Completely disagree   | Completely agree    |
| H <sub>21</sub>    | GHG Regulation            | 48                | Not at all important  | Extremely important |
| H <sub>22</sub>    | Cultural Heroes           | 43a-43d           | Completely negative   | Completely positive |
| H <sub>23</sub>    | Cultural Villains         | 37a-41d           | Completely negative   | Completely positive |
| H <sub>24</sub>    | Cultural Policy Solutions | 52-54             | Completely disagree   | Completely agree    |

incongruent narrative environments. CNM posits that respondents assigned to congruent narratives should be more responsive to the information, arguments, and assumptions built into each narrative treatment, while those assigned to incongruent information environments (i.e., cultural narratives) should be less so. Therefore, the following hypotheses are tested:

**H<sub>14</sub>: Narrator Threat:** Respondents with congruent cultural type to their cultural narrative treatment will perceive the narrator as viewing climate change as more of a threat than respondents of the same cultural type in incongruent cultural narratives.

- H<sub>15</sub>: Narrator Trust:** Respondents with congruent cultural type to their cultural narrative treatment will be more trusting of the narrator than respondents of the same cultural type in incongruent cultural narratives.
- H<sub>16</sub>: Affect:** Respondents with congruent cultural type to their cultural narrative treatment will show more positive affect for the cultural narrative than respondents of the same cultural type in incongruent cultural narratives.
- H<sub>17</sub>: Personal Risk:** Respondents with congruent cultural type to their cultural narrative treatment will view climate change as more of a personal threat than respondents of the same cultural type in incongruent cultural narratives.
- H<sub>18</sub>: Sociotropic Risk:** Respondents with congruent cultural type to their cultural narrative treatment will view climate change as more of a threat to American society than respondents of the same cultural type in incongruent cultural narratives.
- H<sub>19</sub>: Climate Change Belief:** Respondents with congruent cultural type to their cultural narrative treatment will be more willing to believe that climate change is real than respondents of the same cultural type in incongruent cultural narratives
- H<sub>20</sub>: Anthropogenic Cause:** Respondents with congruent cultural type to their cultural narrative treatment will be more willing to accept

that human beings are a principal cause of climate change than respondents of the same cultural type in incongruent cultural narratives

**H<sub>21</sub>: GHG Regulation:** Respondents with congruent cultural type to their cultural narrative treatment will be more willing to regulate GHG's than respondents of the same cultural type in incongruent cultural narratives.

Table 4.3 illustrates the difference of means between strong cultural types in congruent and incongruent cultural narrative experimental treatments. The left-hand column lists climate change opinion related dependent variables (see Table 4.2 for measurement information). The remaining three columns represent the individualist, hierarchical, and egalitarian narratives. The table is broken up into three sections by strong cultural type, providing three separate sets of results. Congruent cultural narratives are set off from the rest of the table by grayed table cells. Differences of means are determined by comparing congruent means (grayed cells) with means of the same strong cultural type (horizontal comparisons to white celled mean values for the same cultural type) in incongruent cultural narratives.

Table 4.3 demonstrates that the differences between means for strong cultural types in congruent and incongruent narratives are rarely statistically meaningful. Two differences of forty-eight possible tests show significance in

**Table 4.3.** Narrative Content, Cultural (In)Congruence, and Opinions on Climate Change

| Strong Individualist  |                           |  |     |          |            |    |             |            |     |
|-----------------------|---------------------------|--|-----|----------|------------|----|-------------|------------|-----|
|                       | Individualist (congruent) |  |     | Hierarch |            |    | Egalitarian |            |     |
|                       | Mean                      |  | n   | Mean     | Difference | n  | Mean        | Difference | n   |
| Narrator Threat       | 6.9159                    |  | 107 | 6.6471   | -.26883    | 85 | 7.5600      | +.64411    | 100 |
| Narrator Trust        | 4.5327                    |  | 107 | 4.4186   | +.11411    | 86 | 4.4500      | -.08271    | 100 |
| Affect                | 5.0374                    |  | 107 | 5.1412   | +.10379    | 85 | 4.5900      | -.44738    | 100 |
| Personal Risk         | 4.4579                    |  | 107 | 4.7294   | +.27147    | 85 | 4.6300      | +.17206    | 100 |
| Sociotropic Risk      | 5.0841                    |  | 107 | 5.3488   | +.26473    | 86 | 4.5800      | -.50411    | 100 |
| Climate Change Belief | 6.5421                    |  | 107 | 7.1860   | +.64399    | 86 | 6.0900      | -.45206    | 100 |
| Anthropogenic Cause   | 5.1038                    |  | 106 | 6.0581   | +.95437    | 86 | 4.9208      | -.18298    | 101 |
| GHG Regulation        | 6.3491                    |  | 106 | 6.9884   | +.63932    | 86 | 5.9901      | -.35896    | 101 |

| Strong Hierarchy      |               |            |    |                       |  |    |             |            |    |
|-----------------------|---------------|------------|----|-----------------------|--|----|-------------|------------|----|
|                       | Individualist |            |    | Hierarchy (congruent) |  |    | Egalitarian |            |    |
|                       | Mean          | Difference | n  | Mean                  |  | n  | Mean        | Difference | n  |
| Narrator Threat       | 6.9048        | +.27318    | 63 | 5.0351                |  | 57 | 7.3333      | +.70105    | 66 |
| Narrator Trust        | 5.1746        | +.13592    | 63 | 5.6667                |  | 57 | 5.5758      | +.54067    | 66 |
| Affect                | 5.1905        | -.47619    | 63 | 5.5263                |  | 57 | 5.7273      | +.06061    | 66 |
| Personal Risk         | 5.8413        | +.314495   | 63 | 5.8772                |  | 57 | 6.2879      | +.76156    | 66 |
| Sociotropic Risk      | 6.0952        | +.21805    | 63 | 7.1250                |  | 56 | 6.5781      | +.70093    | 64 |
| Climate Change Belief | 7.6032        | +.47817    | 63 | 6.5614                |  | 57 | 7.9091      | +.78409    | 66 |
| Anthropogenic Cause   | 6.6774        | +.11602    | 62 | 7.0536                |  | 56 | 7.1818      | +.62041    | 66 |
| GHG Regulation        | 7.2698        | +.21627    | 63 | 6.6316                |  | 57 | 7.6667      | +.61310    | 66 |

| Strong Egalitarian    |               |                 |     |           |                 |     |                         |     |
|-----------------------|---------------|-----------------|-----|-----------|-----------------|-----|-------------------------|-----|
|                       | Individualist |                 |     | Hierarchy |                 |     | Egalitarian (congruent) |     |
|                       | Mean          | Difference      | n   | Mean      | Difference      | n   | Mean                    | n   |
| Narrator Threat       | 6.8043        | <b>-.96771*</b> | 138 | 7.3288    | -.44329         | 146 | 7.7721                  | 136 |
| Narrator Trust        | 5.5290        | -.25043         | 138 | 5.1301    | -.64927         | 146 | 5.7794                  | 136 |
| Affect                | 5.5108        | -.46682         | 139 | 5.0685    | <b>-.90912*</b> | 146 | 5.9776                  | 134 |
| Personal Risk         | 6.3453        | -.55838         | 139 | 6.8699    | -.03384         | 146 | 6.9037                  | 135 |
| Sociotropic Risk      | 7.2374        | -.11074         | 139 | 7.2877    | -.06048         | 146 | 7.3481                  | 135 |
| Climate Change Belief | 7.8489        | -.35108         | 139 | 8.0759    | -.12414         | 145 | 8.2000                  | 135 |
| Anthropogenic Cause   | 7.3094        | -.43139         | 139 | 7.5241    | -.21660         | 145 | 7.7407                  | 135 |
| GHG Regulation        | 8.0576        | -.39833         | 139 | 8.4315    | -.02438         | 146 | 8.4559                  | 136 |

the directions hypothesized. Strong Egalitarians assigned to the incongruent individualist track show lower perceptions of narrator threat (-.96771). Strong



egalitarians assigned to the incongruent hierarch narrative show significantly less affect for the cultural narrative in general (-.90912). The remaining mean differences are insignificant. Given the paucity of significant findings, there is simply insufficient evidence to accept any of the hypothesized relationships.  $H_{14}$  through  $H_{21}$  are rejected, providing support to the earlier OLS findings suggesting that an interaction between cultural narrative content and prior cultural type is not taking place.

#### **4.3 Narrative Content, Characters, the Moral of the Story and Congruence**

Recall that each cultural narrative is exactly 1022 words long and roughly 75% of the text does not vary across cultural narrative treatments. Thus, the primary benefit of comparing across cultural narrative experimental tracks is that narrative structural components including setting, plotline, the spatial location of characters and policy solutions are all held constant. In holding these structures constant, the influence of the varied content across tracks can be examined.

While narrative structure is held constant, the content of each narrative varies along two dimensions. The first dimension varies characters. Each cultural narrative presents a group or organization as a hero advocating for a culturally specific policy solution. Table 4.4 illustrates the textual treatment of the hero and villain characters in two different cultural narrative treatments. Note that the reference to the hero in each cultural narrative directly follows the

**Table 4.4.** Example of Character Treatments in Opposing Cultural Narratives

|                                 | <b>Individualist<br/>Cultural Narrative</b>  | <b>Egalitarian<br/>Cultural Narrative</b>  |
|---------------------------------|--|--|
| <b>The Hierarchical Villain</b> | Government interests, represented by groups like <i>bureaucratic unions</i> and the infamous <i>Club of Rome</i> , are attempting to use climate change to promote their own agenda. | Government interests, represented by groups like the infamous <i>Club of Rome</i> and <i>selfish politicians</i> , are attempting to use climate change to promote their own agenda. |
|                                 | They push for programs that <i>solidify bureaucratic control</i> and increase the <i>size and cost of government</i> .   | They push for programs that <i>reinforce existing inequalities</i> and increase the <i>wealth and power of politicians</i> .   |
| <b>The Cultural Hero</b>        | Thankfully groups like the <i>Cato Institute</i> have been tirelessly advocating for this solution.  | Thankfully organizations like the <i>Club of Rome</i> have been tirelessly advocating for this solution.   |

policy solution advocated in each cultural narrative (See Appendix B for a sentence by sentence breakdown of the cultural narrative treatments). Those groups that appear as heroes in one cultural narrative also appear as villains in the two remaining cultural narrative experimental treatments. Consequently, each cultural narrative has one hero and at least two villains. The treatment of the characters in each story is made as similar as possible, while also linking those villains to culturally specific language and symbols. Table 4.4

demonstrates the textual similarities and differences in how the characters are treated in the cultural narratives.

Table 4.4 presents the treatment of the hierarchal villain in both the individualist and egalitarian cultural narratives. Differences in wording are bolded and italicized. While both treatments claim that the Club of Rome is promoting a hierarchal agenda, both treatments ground that agenda in value positions that are antithetical to the cultural narrative they are presented in with the intent of provoking a strong cultural reaction from strong cultural types randomly assigned to the narrative—congruent or incongruent. The individualist narrative claims the Club of Rome is trying to solidify bureaucratic control and increase the size and cost of government; the egalitarian narrative asserts that the Club of Rome is reinforcing existing inequalities and giving more wealth and power to politicians. In both cases, if an individual is a strong cultural type congruent to a cultural narrative, that individual should react to these culturally specific appeals. Likewise, incongruent strong cultural types should also recognize that their values are associated with a particular villain and that the cultural beliefs they hold dear are under assault.

The second dimension of content that varies in each cultural narrative is the moral of the story. The moral of the story, defined as a culturally tailored policy solution for each narrative, is designed specifically to appeal to strong cultural respondents of the same type as the cultural narrative. In every case, the policy solution attempts to deal with increasing greenhouse gasses (GHG)

which are argued to be a result of human activity and a primary cause of climate change. The egalitarian narrative appeals to equality by embracing community owned renewable energy resources such as wind and solar power. The hierarchical cultural narrative appeals to the hierarchs value of societal structure and stratification by advocating nuclear energy, which requires significant scientific expertise and governmental oversight to be successful. The individualist narrative appeals to values of competition and the mechanism of markets in advocating the cap-and-trade solution to GHG's.

The analysis presented in the following section looks at the extent to which respondent affect for the varied content is directed by cultural congruence and incongruence. As formulated in chapter two and directed by the CNM, several hypotheses are tested. CNM posits both a confirmation and disconfirmation bias. Confirmation bias finds that individuals are more willing to accept information and arguments from congruent sources (Taber & Lodge, 2006; Lodge & Taber, 2006). Disconfirmation bias finds that individuals actively reject and counter argue information presented in an incongruent information environment (Taber & Lodge, 2006; Lodge & Taber, 2006). However, disconfirmation bias is found to be the more powerful of the two mechanisms in shaping opinion formation.

The narrative portrayals of characters and policy solutions (the varied content of each cultural narrative) are interlaced with culturally specific symbols and language designed specifically to allow respondents to identify if that

character or solution is congruent or incongruent with their cultural type. This is true for both congruent and incongruent narratives. For example, when narrating the Ecodefense hero or the Ecodefense villain, all cultural types should recognize that the group is associated with notions of equality and that the environment is fragile. For the strong egalitarian, respondents should recognize their cultural hero in the egalitarian cultural narrative; similarly, strong egalitarians should also recognize that the values they hold dear are under assault when Ecodefense is presented as a villain in incongruent cultural narratives. It is this incongruent recognition that CNM posits will have the most powerful influence (Taber & Lodge, 2006; Lodge & Taber, 2006).

In each hypothesis listed below the term culturally identified refers to groups and policy solutions identified as being culturally congruent or incongruent to each cultural type. In the case of characters, Ecodefense and Earthfirst are congruent to egalitarians; The Cato Institute and the *Wall Street Journal* are congruent with individualism; the Club of Rome is congruent with hierarchy. All congruent characters identified for one type are considered incongruent for the remaining two. Similarly, cap-and-trade is congruent to individualism; nuclear energy is congruent to hierarchy; and, renewable energy is congruent to egalitarianism. Reliant upon biased assimilation processes modeled in CNM (specifically, the strength of disconfirmation bias), the following has been hypothesized:

- H<sub>22</sub>: Cultural Heroes:** Respondents with incongruent cultural type to the cultural narrative treatment will have more positive affect for culturally identified heroes than their cultural counterparts in incongruent cultural narratives.
- H<sub>23</sub>: Cultural Villains:** Respondents with incongruent cultural type to the cultural narrative treatment will have more positive affect for culturally identified villains than their cultural counterparts in incongruent narratives.
- H<sub>24</sub>: Cultural Policy Solutions:** Respondents with incongruent cultural type to the cultural narrative treatment will have more positive affect for culturally identified policy solution than their cultural counterparts in incongruent narratives.

Each column in Table 4.5 represents one of the three cultural narrative treatments: individualist, hierarchy, and egalitarian. The left-hand column represents affective assessments of culturally specific characters and policy solutions. The variables in the left-hand column are presented for strong individualists, strong hierarchs, and strong egalitarians. Grayed table cells represent a strong cultural type randomly assigned to a congruent cultural narrative, while white table cells indicate an incongruent cultural narrative treatment. One-way ANOVA comparisons of mean responses by strong cultural types are compared horizontally to assess significance for hypothesized

**Table 4.5.** Narrative Content and Cultural (In)Congruence: Characters and Policy Solutions

| Strong Individualist |                           |     |  |          |                  |    |             |                  |    |
|----------------------|---------------------------|-----|--|----------|------------------|----|-------------|------------------|----|
|                      | Individualist (congruent) |     |  | Hierarch |                  |    | Egalitarian |                  |    |
|                      | Mean                      | n   |  | Mean     | Difference       | n  | Mean        | Difference       | N  |
| Ecodefense           | 1.8922                    | 102 |  | 3.0260   | <b>+1.33382*</b> | 77 | 4.9773      | <b>+3.08512*</b> | 88 |
| Earth First          | 2.2718                    | 103 |  | 3.2405   | <b>+.96866*</b>  | 79 |             |                  |    |
| The Club of Rome     | 2.0625                    | 96  |  | 5.7429   | <b>+3.68036*</b> | 70 | 2.8250      | +.7650           | 80 |
| The Cato Institute   | 5.1778                    | 90  |  | 3.1481   | <b>-2.02963*</b> | 81 | 3.4706      | <b>-1.70719*</b> | 85 |
| Cap-and-Trade        | 5.1373                    | 102 |  | 3.4762   | <b>-1.66106*</b> | 84 | 3.1034      | <b>-2.03381*</b> | 87 |
| Nuclear Energy       | 5.9320                    | 103 |  | 5.8118   | -.12027          | 85 | 5.5914      | -.34064          | 93 |
| Renewable Energy     | 5.6667                    | 102 |  | 4.5000   | <b>-1.6667*</b>  | 82 | 5.6170      | -.04965          | 94 |

| Strong Hierarchy        |               |                  |    |                       |    |  |             |                  |    |
|-------------------------|---------------|------------------|----|-----------------------|----|--|-------------|------------------|----|
|                         | Individualist |                  |    | Hierarchy (congruent) |    |  | Egalitarian |                  |    |
|                         | Mean          | Difference       | n  | Mean                  | n  |  | Mean        | Difference       | N  |
| Ecodefense              | 4.2456        | +.913953         | 57 | 3.3261                | 46 |  | 6.1071      | <b>+2.78106*</b> | 56 |
| Earth First             | 4.0351        | -.01468          | 57 | 4.0204                | 49 |  |             |                  |    |
| The Club of Rome        | 3.2982        | <b>-2.20175*</b> | 57 | 5.5000                | 42 |  | 3.2407      | <b>-2.25926*</b> | 54 |
| The Cato Institute      | 5.6800        | <b>+2.01333*</b> | 50 | 3.6667                | 45 |  | 3.3571      | -.30952          | 56 |
| The Wall Street Journal |               |                  |    | 3.9608                | 51 |  | 3.8035      | -.13028          | 59 |
| Cap-and-Trade           | 5.4231        | .79042           | 52 | 4.6327                | 49 |  | 4.2295      | -1.19357         | 61 |
| Nuclear Energy          | 5.2963        | -.16370          | 54 | 5.4600                | 50 |  | 5.5167      | .05667           | 60 |
| Renewable Energy        | 6.0364        | .07718           | 55 | 5.9592                | 49 |  | 6.6500      | .69082           | 60 |

| Strong Egalitarian      |               |                  |     |           |                  |     |                         |   |     |
|-------------------------|---------------|------------------|-----|-----------|------------------|-----|-------------------------|---|-----|
|                         | Individualist |                  |     | Hierarchy |                  |     | Egalitarian (congruent) |   |     |
|                         | Mean          | Difference       | n   | Mean      | Difference       | n   | Mean                    | N |     |
| Ecodefense              | 3.9675        | <b>-2.75752*</b> | 123 | 3.7442    | <b>-2.98081*</b> | 129 | 6.7250                  |   | 120 |
| Earth First             |               |                  |     |           |                  |     |                         |   |     |
| The Club of Rome        | 3.2881        | <b>+1.13161*</b> | 118 | 5.7544    | <b>3.59786*</b>  | 114 | 2.1565                  |   | 115 |
| The Cato Institute      | 6.1017        | <b>+3.69833*</b> | 118 | 2.8661    | .46278           | 127 | 2.4034                  |   | 119 |
| The Wall Street Journal |               |                  |     | 3.0074    | +.001547         | 135 | 2.9919                  |   | 128 |
| Cap-and-Trade           | 5.7302        | <b>+1.09991*</b> | 126 | 4.8797    | .24945           | 133 | 4.6303                  |   | 119 |
| Nuclear Energy          | 4.5118        | .14740           | 127 | 4.9291    | .56467           | 141 | 4.3644                  |   | 118 |
| Renewable Energy        | 6.0465        | -.68736          | 129 | 5.7101    | <b>-1.02373*</b> | 138 | 6.7339                  |   | 124 |

One-way Anova, One-tailed test, bonferroni post-hoc test

mean respondent affective responses to characters, the direction of that difference is in the opposite direction hypothesized. In the case of the cultural hero hypothesis, strong individualists show a lower mean response to the Cato

Institute in both the hierarch (-1.66106) and egalitarian (-2.03381) narratives. Strong hierarchs also demonstrate meaningfully lower affective responses for their culturally identified hero of the Club of Rome. In the individualist narrative the mean response is 2.20175 points lower than the mean in the congruent hierarch narrative. In the egalitarian cultural narrative, the strong hierarch response mean is 2.2596 points lower than the mean response in the hierarch narrative. A similar relationship is found for the strong egalitarians. The mean affective mean response for Ecodefense is significantly lower in both the individualist (-2.75752) and hierarch (-2.9081) narratives. In all cases where significance is found the mean differences move in the opposite directions hypothesized for culturally identified heroes.

Similarly to the findings for culturally identified heroes, respondent affect for culturally identified villains moves in the opposite direction in all cases where the culturally identified villain is treated as a hero in the incongruent narrative. The Club of Rome is a culturally identified villain of the both the individualist and the egalitarian. In the hierarch cultural narrative, where the Club of Rome is a hierarch hero, both strong individualist and strong egalitarian mean responses are significantly higher than mean responses for these strong cultural types in their congruent narratives (+3.59786 for the strong egalitarian; +3.6036 for the strong individualist). This relationship is the same for both the egalitarian hero of Ecodefense and the individualist hero of the Cato Institute. The remaining significant differences of means also continue this trend by moving in the



opposite direction hypothesized. Affective responses to Ecodefense and Earthfirst both see significant mean increases in the hierarch cultural narrative for the strong individualist. The Club of Rome has a significantly higher mean from the strong egalitarians in the individualist narrative.  $H_{22}$  and  $H_{23}$  are definitively rejected; all of the evidence in Table 31 provides strong support for the findings presented in the earlier OLS analysis. There does not appear to be a strong reaction between cultural type and the cultural character content of the narrative experimental treatments.

The moral of each story, operationalized in each cultural narrative as a culturally identified policy solution, also show significant differences in means for strong cultural types between congruent and incongruent narrative treatments. Given that each policy solution is adorned with culturally specific language and symbolism, it is hypothesized that respondents of strong cultural type will be able to identify the link between the solution and their cultural identities providing a more positive response for their culturally specific policy solution. Strong hierarchs show no statistically significant differences in means for their preferences for nuclear energy in either of the incongruent narrative treatments. Strong individualists show significant mean decreases for preferences for their culturally specific policy solution of cap-and-trade in the incongruent hierarch (-1.66106) and egalitarian (-2.03381) narrative treatments. Similarly, strong egalitarian preferences for renewable energy demonstrate a significant mean decrease in the incongruent hierarch narrative (-1.02373). Again, and much like

the character findings just presented, when significant differences in means are identified, the direction of that movement is in the opposite direction hypothesized. Supporting the earlier OLS analysis suggesting that an interaction between cultural type and the cultural content of the narratives is not taking place,  $H_{24}$  is rejected.

#### **4.4 Discussion and Conclusion**

The analysis presented in this chapter has attempted to address how cultural narrative content shapes the variation in respondent opinions about dependent variables relevant to climate change. The first analysis utilized OLS regressions to assess the relationship of CT priors to each of the dependent variables examined in this research. These analyses show that CT priors, to some extent, behave the way the literature would expect.

Individualists and hierarchs prefer nuclear energy, while egalitarians do not. Individualism is associated with lower levels of a belief that climate change is a threat to them personally and to American society more generally. The inverse is true for egalitarianism. Unexpectedly, however, hierarchy was found to be more in line with egalitarianism in respect to risk, as the hierarchy measure is positively related to both personal and societal measures of climate change risk.

Where the literature provided insight into the directional relationship between nuclear energy, climate change risk, and CT, there were several

dependent variables where directionality was uncertain. Where significance was found for these variables, CT measures performed in a way that matched the directional findings. Egalitarians generally are more likely to believe climate change is a threat, by extension significance was also found between egalitarianism and a belief that climate change is real, humans are a cause, and GHG's should be regulated. Hierarchy findings mirrored that of the egalitarian findings. Individualism, on the other, was significantly and negatively associated with these same dependent variables.

Interestingly, the findings from the OLS analysis reveal a telling trend. Each analysis was performed on a subpopulation limited by cultural narrative treatment. All of the findings briefly discussed above perform quite similarly across experimental tracks. That is, if a variable remains significant in more than one track, the coefficients are similar in size and magnitude and the direction of the relationship never changes. In short, these findings indicate that CT has influence over key dependent variables, but that influence does not appear to be interacting with the cultural content of the narratives. This is the exact opposite of what the Cultural Narrative Model expects.

The second set of analyses examined differences of means between strong cultural types randomly assigned to congruent and incongruent cultural narratives. These findings provide confirmatory evidence that the earlier conclusion drawn from the OSL findings is accurate. Table 30 summarized findings for climate change opinion dependent variables. Only two of forty-eight

differences in means between congruent and incongruent narratives were found to be statistically meaningful. A similar analysis was performed in relation to respondent affective reactions to characters within each story and culturally congruent policy preferences.

The biased assimilation processes modeled in CNM suggest that individuals are more likely to accept congruent information and reject incongruent information. Each of the characters and policy solutions offered in each story is operationalized as congruent to one of the three cultural types. In practical terms, for example, this means that when Ecodefense appears as a villain in the hierarch narrative, egalitarians should recognize that their values are under attack. It is hypothesized that respondents in congruent or incongruent narratives will be able to recognize the cultural symbolism defining the characters and policy solutions. Therefore, a respondent assigned to either an incongruent or congruent treatment should recognize their culturally specific characters and solutions and adhere to them. In fact, CNM argues that when an individual's culture is attacked that disconfirmation bias should solicit an even stronger reaction from the individual than the moderately positive reaction drawn forth from a congruent information environment.

The analysis presented in Table 4.5, the final analysis of the chapter, did not confirm the hypotheses. There were many meaningful statistical relationships found, but like the previous analysis, all significant differences in means moved in the opposite direction hypothesized. Culturally identified

heroes demonstrate statistically negative differences in means between congruent and incongruent narratives when treated as a villain. Similarly, culturally identified villains in an incongruent narrative for a given strong cultural type (e.g., a strong egalitarian in the hierarch narrative) demonstrate positive differences in means when treated as a hero. These relationships hold for all strong cultural types in all cultural narrative treatments where significance is found.

Similar to the character findings, preferences for culturally identified policy solutions do not perform as hypothesized. It was hypothesized that strong cultural types would adhere to their culturally specific policy solution, regardless of narrative treatment. For both the individualists and their theorized preference for cap-and-trade and the egalitarian and their theorized preference for renewable energy, mean differences for incongruent narrative tracks were significant and negative. All of the hypotheses offered in this chapter have been rejected.

Does cultural narrative content matter for the formation and change of opinions related to climate change? The short answer is no. All of the significant relationships found in this chapter support this conclusion. More importantly, the findings also support the findings of the previous chapter that narrative structure matters. For example, in almost all cases where significance is found, affective responses for characters and policy preferences move in directions specified by the narrative. Heroes are liked; villains are disliked; policy

preferences are preferred. However, there remains a pressing question: why did the congruence and incongruence processes modeled in CNM fail to perform as expected?

At least three possible explanations exist. First, it may be the case that the cultural narrative content did not properly mirror cultural theoretic values. Perhaps in future research rather than relying on largely qualitative work (i.e., Verweij et al. 2006) preliminary empirical work (such as a survey) can be conducted to more clearly associate groups, solutions, and cultural symbols to cultural type. Second, the poor alpha's for the CT indices (unusual for CT research) discussed in chapter two may indicate that the sample does not offer a truly reliable assessment of CT priors for the population sampled. Third, the "Strong Cultural Type" operationalization, while offering a more theoretically pure mode of modeling CT does sacrifice considerable sample to achieve such purity. In turn, many of the ANOVA tests may achieve significance by increasing the sample size as many of the differences in means are at least nominally large. Fourth, it may be the case that the findings are simply accurate. One explanation could be that narrative information is very successful at overwhelming prior orientations; however, these cross-sectional data do not speak to the longevity of such an effect. It may very well be the case that these effects are quite temporary and would require repeated reinforcement to endure as a part of an individual's beliefs and opinions. In any case, this analysis

proceeds on the basis that, in the case of climate change cultural narratives, cultural narrative content appears to matter little.

The next chapter summarizes the findings presented in chapters three and four. The focus is to situate these findings in the context of the literature presented in chapter one and the Cultural Narrative Model summarized in chapter two. Emerging from this discussion is a final model demonstrating how narratives help shape opinion. Specifically, the consistent findings across chapters three and four point to the importance of characters. These characters are demonstrated to play a central role in shaping the effectiveness of narrative persuasion.

## CHAPTER 5: CHARACTERS AND NARRATIVE PERSUASION

In the first chapter of this dissertation a case is made that the condition of high salience necessary for public opinion to influence climate change public policy (Burstein 2003; 2006) is present (Leiserowitz, 2005; Nisbet & Myers, 2007). In practical terms, this means that what the public believes in relation to climate change is likely to influence what policy makers decide to do and what sorts of public policy emerge from those decisions. Therefore, it is worthwhile to know what and why the public believes what it does about this volatile political issue. It is also demonstrated in chapter one that while there is near unanimity in the scientific community on the reality of climate change (mean global temperature increases) and that anthropogenic greenhouse gasses are a principal cause of that warming, a non-trivial component of the American public does not agree with the scientific community (e.g., Nisbet & Myers, 2007).

Two academic theories have been offered to explain the gap in opinions between this potentially pivotal component of the American public and the scientific community. The first, the knowledge-deficit model (e.g., Kellstedt et al., 2008), finds that individuals simply lack the information necessary to draw the same conclusions as the scientific community. By extension then, the solution to the “problem” of a divergence between public and scientific opinion is to better inform the public by providing the largely agreed upon scientific findings—with more emphasis on the level of agreement. The second model



draws attention to the framing of climate change by mass media. Titled the sensational media model (e.g., Boykoff & Boycoff, 2008), this approach to understanding the divergence between scientific and public opinion finds that media's focus on sensational facets of climate change, such as conflict and novelty, create gross misconceptions in the public related to these foci. For example, scholars find that the focus on conflict (Boycoff & Boycoff, 2007) and the inherent uncertainty of scientific findings (Zehr, 2000) leads many members of the public to perceive larger levels of disagreement in the scientific community than can be empirically verified (Antilla, 2008; Boycoff & Boycoff, 2007). Similarly to the knowledge-deficit model, the solution in the case of the sensational media model is to have media outlets report more accurate information. While frequently portrayed as alternative explanations of mass opinion on climate change, both models normatively favor transferring "correct" information to the public. However, the discussion in chapter one also sought to draw attention to the incredibly complex science behind climate change and how it is very unlikely that the lay-person forms opinions about climate change by primarily relying on the science driving climate change findings. Emerging from the discussion of these two models and the science behind climate change is a gap in our social scientific knowledge concerning the possible synergies between prior values and the structure and content of incoming climate change communications. In short, despite the complexities of the science involved, individuals do form opinions about climate change and it is unlikely that simply providing more "objective"

information about climate change will close the gap between the public and scientists. When individuals process information, they do so through the filters provided by their identities, which in turn are constituted by their life experiences and values.

Specified in chapter two, the Cultural Narrative Model (CNM) posits an individual whose opinions about climate change are heavily biased by their prior values and knowledge. Importantly, it is also theorized that incoming narrative information is likely affectively interacting with these priors to facilitate opinion formation and change about climate change. In attempting to capture the influence of these interactions, CNM offers two general categories of variables: endogenous and exogenous. Endogenous variables specified in CNM include controls such as demographics, ideology, partisanship, and prior knowledge about climate change. The endogenous variables of interest in CNM are Cultural Theoretic (CT) priors.

CT measures respondent values along the two dimensions of grid and group (e.g., Tompson et al. 1990). Group measures the extent to which an individual values group interactions; grid measures the extent to which an individual values and expects those groups to constrain their behavior. By surveying respondents, individuals can be classified as one of four cultural types: individualist, fatalist, hierarch, and egalitarian. CT survey metrics have been frequently shown to outperform the controls modeled in CNM across an array of

public opinion related dependent variables (Wildavsky & Dake, 1990; Kahan & Braman, 2007).

Because narrative is likely the primary cognitive (e.g., Gerrig & Egid, 2003; Klein, 2003) and communicative schema for human beings (Berinsky & Kinder, 2006), narrative theory is employed to construct an exogenous message structure in the CNM. Narrative structures are defined as stories with a beginning, middle, and end that take place in a particular setting, have characters, and offer a moral to the story (Jones & McBeth, 2010). CT provides the cultural content for each narrative.

Focusing on the gap in climate change opinion research produced by insufficient attention to potential interactions between individual priors and message structure and content, an experiment was performed in the spring of 2009. The experimental manipulations in the experiment consist of climate change narratives populated by cultural theoretic content (e.g., Verweij et al. 2006), where narrative structure and content are alternatively held constant. Two research questions are addressed:

**RQ1:** *Cultural Narrative Structure:* Does cultural narrative structure influence opinions related to climate change?

**RQ2:** *Cultural Narrative Content:* Does cultural narrative content explain variation in opinions related to climate change?

Twenty-four hypotheses derived from these research questions are tested in chapters three and four, addressing each respective research question

in sequence. In what follows is a summary of findings presented in the stated chapters. While consistent statistically significant relationships were found, a substantial number of findings are either insignificant, or only intermittently so. However, the trends in the findings in both chapters point to the attribution of affect to characters as an important function of narrative. How might these affective character findings influence narrative persuasion? Subsequent sections of this chapter analyze the relationship between character affect and climate change opinion related dependent variables examined in this research. This chapter concludes by situating findings within the context of previous research discussed in chapter one and offers a discussion for the implications of these findings for the CNM theorized in chapter two.

### **5.1 Summary Findings for Narrative Structure and Content**

Employing statistical analyses including OLS regression and one-way ANOVA, chapter three addresses to what extent narrative structure influences respondent preferences for climate change opinion related dependent variables. Specifically, responses to survey questions by individuals randomly assigned to the cultural narrative treatments are compared to responses in the control group. In the first part of this chapter, OLS regression analysis are performed where the experimental cultural narrative treatments are the independent variables of interest, while also controlling for age, education, gender, income, race, ideology, climate change knowledge, and strength of cultural type.

Significantly negative relationships are found between the individualist and hierarchical narratives for both *narrator threat* and *author trust*. Respondents randomly assigned to these narrative treatments perceive the anonymous author of the individualist and hierarchical narratives as perceiving climate change less of a risk than respondents in the control. Similarly, respondents assigned to the individualist and hierarchal narratives also tend to trust the author of the narratively structured communication less than the anonymous author of the fact list presented in the control. There is some evidence to suggest that respondents react more negatively to narratively structured communications, particularly in levels of trust for the author.

The null hypotheses for these relationships were rejected (**H<sub>01</sub>** and **H<sub>02</sub>**); however it is important to note the difficulty in generalizing from these findings. The egalitarian cultural narrative does not yield a statistically significant relationship with either *author trust* or *narrator threat*. In fact, the partial regression coefficient for the egalitarian narrative's relationship with author trust nominally moves in the opposite direction of the partial regression coefficients in the other two cultural narrative treatments. Promising as these findings are, more conclusive research and analysis is necessary to draw forth generalizable relationships between these two dependent variables and narrative structure.

OLS regression analysis in chapter three confirms several hypotheses (**H<sub>6</sub>** through **H<sub>8</sub>**) related to respondent affective assessments of characters in each

narrative as well as preferences for each stories favored policy solution (i.e., the moral of the story). Related to characters, across the board and in every case narrative structure facilitates a strong affective response from individuals assigned to each cultural narrative treatment. Importantly, affect moves in directions specified by the cultural narrative: heroes receive more positive affect and villains receive more negative affect. Regarding narrative structure, policy preferences perform similarly, but less consistently than the character affect measures.

OLS regression analysis demonstrates that five of nine policy preferences partial regression coefficients are significantly related to narrative structure in directions specified by the narrative. Both hypotheses  $H_8$  and  $H_9$  are confirmed. In two cases, policies argued for are positively related to narrative structure. Respondents exposed to the individualist narrative prefer the cap-and-trade solution; respondents exposed to the egalitarian narrative prefer renewable energy. While each cultural narrative argues for a particular cultural solution, the narratives also admonish the two presented in the other two narratives. Three partial regression coefficients for the negatively portrayed policy solutions are significant. Respondent preferences for cap-and-trade and nuclear energy in the egalitarian narrative are found significant and negatively related to narrative structure. Likewise, renewable energy is demonstrated to be negatively related to exposure to the hierarchical narrative treatment.

The final section of chapter three assesses the influence of narrative structure while accounting for the potential synergy between cultural priors and the cultural narrative content of each story. This synergy is operationalized as congruence and incongruence, where strong cultural types were expected to resist or embrace information based upon the cultural symbolism of each narrative. Examining differences in mean responses for strong cultural types by cultural narrative treatment across all the dependent variables analyzed in the previous sections of chapter three yields the acceptance of one hypothesis (**H<sub>12a</sub>**). Respondents of congruent cultural type to the cultural narrative treatment show statistically meaningful differences in means from means of the same strong cultural type respondents in the control group for affective ascriptions to the hero of each narrative. This difference between the narrative treatments and the control is in all cases positive. However, if this finding is considered in light of the more pervasive hypotheses rejections for this section of chapter three, there is a clear pattern that indicates that affective character ascription is moving in directions specified by the narrative treatment and not by interactions with cultural priors and cultural narratives.

Taken in total, the findings and hypotheses tests in chapter three indicate that narrative structure matters across a host of climate change opinion related dependent variables. The influence of narrative is particularly pronounced in the cases of character affect and policy preferences. Surprisingly, however, the biased assimilation processes modeled in CNM, operationalized in terms of

cultural congruence and incongruence, do not perform as CNM expects. Chapter four examines these unexpected findings related to congruence and incongruence in more detail by comparing survey responses across cultural narrative treatments.

The analyses presented in chapter four addresses RQ2 in terms of congruence and incongruence. That is, what effect does the cultural content of each narrative have on respondent opinions about climate change? However, before directly addressing this research question the first section of chapter four examines the independent influence of CT measures on all of the climate change opinion related dependent variables analyzed throughout this research. The intent of this analysis is to determine the strength and direction of any influence over relevant DV's that CT might have.

OLS regression analysis is performed on a host of dependent variables, controlling for age, education, gender, income, race, ideology, and climate change knowledge. CT measures are aggregations of the three CT survey questions relevant for the individualist, hierarch, and egalitarian cultural types. In many ways CT measures perform as previous research would expect. Respondents that scored high on the individualism measure have lower perceptions of the risk climate change poses to both them directly and society more generally; the inverse is true for respondents that scored high in egalitarianism. High individualist scores also correspond to significantly less of a



belief that climate change is real, a belief that human beings are the cause, and a willingness to regulate GHG's. Again the inverse is true for egalitarianism.

The interesting finding in this section of chapter three's analysis is the direction of significant relationships for hierarchy. Typically, hierarchy is more in line with individualism in terms of the direction of relationships. For example, hierarchs and individualists both tend to support nuclear energy (Ellen & Slovic, 1996). However, many of the significant relationships identified by the OLS regression analyses indicate hierarchy parallels egalitarian findings. In two of the narrative treatments, hierarchy is positively related to sociotropic risk. In both the individualist and egalitarian cultural narratives, as hierarchy increases so too does a respondent's belief that climate change is real, the human beings are a cause, and the respondent's willingness to regulate GHG's increases as well. While the hierarchy CT measure does perform in the opposite way that we might expect for many of the relationships where significance is found, the findings are not out of bounds per se. Hierarchs are defined by their adherences to standard practices and norms and thus inherently conservative in a literal way. It may simply be the case that climate change as a reality is more a part of the status quo than it used to be. In any case, the fundamental conclusion drawn from chapter four's analyses of CT measures is that these measures are an effective way to explain many of the DV's examined in this research. Having found CT to be a meaningful explanatory variable across a multitude of dependent variables, the next section of chapter four sought to determine if meaningful interactions

are taking place between cultural priors and the cultural content of the experimental narrative instruments.

The CNM theorizes an individual that is biased in their processing of information. Individuals are hypothesized to process congruent information readily and perhaps passively. Incongruent information, on the other hand, is actively counter-argued and CNM posits an even stronger negative reaction by respondents to incongruent information (Taber & Lodge, 2006; Lodge & Taber, 2006). To assess congruence and incongruence the analyses in chapter three compares strong cultural type survey responses for climate change opinion related dependent variables across cultural narrative treatments. Mean differences are found to be insignificant for virtually all the dependent variables examined, save for character affect and policy preferences. Importantly, in each and every case where mean differences are significant, the direction of that difference is in the direction specified by the narrative: heroes are liked, villains are disliked, policies argued for are preferred, and policies argued against are not preferred—regardless of strong cultural type congruent or incongruent random assignment. Surprisingly, and very much against what the CNM would expect, not a single congruence or incongruence hypotheses related to narrative content was accepted in chapter four.

Chapter four's discussion conjectures as to why the congruence and incongruence tests fail to produce results the CNM would expect. Among several reasonable conjectures offered in chapter four was that the cultural

content of the narratives did not adequately represent CT biases. Perhaps, but it is also worthwhile to recognize that when examining mean differences within cultural narrative tracks, that strong cultural types do produce different means. Future analysis will examine these differences within experimental tracks to probe deeper into congruence and incongruence and the potential differential effect of cultural narratives on strong cultural type. At any rate, this research moves forward on the merits of the findings produced in chapters three and four. Narrative structure appears to play a central role in opinion formation and change, while narrative content does not. What stands out most noticeably in the analyses presented in the previous chapters is that the role of narrative structure is incredibly powerful and remarkably consistent in shaping affect for characters in ways directed by the narrative. Emerging from this process of discovery driven by the robust findings is a new and unexpected question. What role might these characters play in shaping climate change opinion more generally? The next section of this chapter examines this question.

## **5.2 Character Affect and Mass Opinions on Climate Change**

The heroic deed often signifies less a material than a symbolic reparation: *a shift of affect from the vulnerability of victimization to the powerful confidence of valiant accomplishment*. Redemption, restitution, reparation, and revenge are all codified within the hero's achievement and serve to deepen the significance of his or her deed.

--Anker, 2006, p.25 (emphasis added)

The findings presented in chapters three and four tell us that the cultural narratives deployed in this experimental research were quite effective in both convincing the reader to like the hero and dislike the villain. On the surface, these findings are interesting, but to this point the findings have not been linked to the transfer of climate change information and policy positions central to this dissertation's research. In short, characters are an obvious and necessary element of any narrative, but aside from being liked or disliked, what role might they play in shaping public opinion about climate change?

Narrative theory places a premium on the importance of characters to the stories they occupy. For example, Deborah Stone (2002) argues that policy stories "...have heroes and villains and innocent victims, and pit the forces of evil against the forces of good" (2002, p.138). A potential inference one may draw from Stone's statement is that values manifest and collide through the narrative vehicle of characters. Therefore, if this inference is correct, it is likely that the characters themselves come to embody the arguments, assumptions, and values of the stories they populate. In the case of the climate change story experimental manipulations, these arguments, assumptions, and values are explicit and consistent across all tracks.

Each cultural narrative begins from the same set of facts about climate change. Each narrative treatment assumes or explicitly argues that global warming is real, humans are a cause, there is a credible threat from warming effects, and that GHG's should be regulated. Each narrative also argues for a

culturally specific solution to the GHG problem and places a heroic champion in front of the reader capable of realizing that solution. Villains, on the other hand, are adorned with nefarious motives and manipulative policy solutions of the “other” cultural types. The hero of each story should embody each of the assumptions and arguments supported by all cultural narratives while the villains are the antitheses of the hero—and by extension all of the assumptions and arguments supported in all cultural narrative treatments. Empirically, then, two new hypotheses are tested:

**H<sub>25</sub>: The Hero:** As affect for the hero increases, respondent reactions to assumptions, arguments, and positions taken by the hero will increase.

**H<sub>26</sub>: The Villain:** As affect for the villain increases, respondent reactions to assumptions, arguments, and positions taken by the hero will decrease.

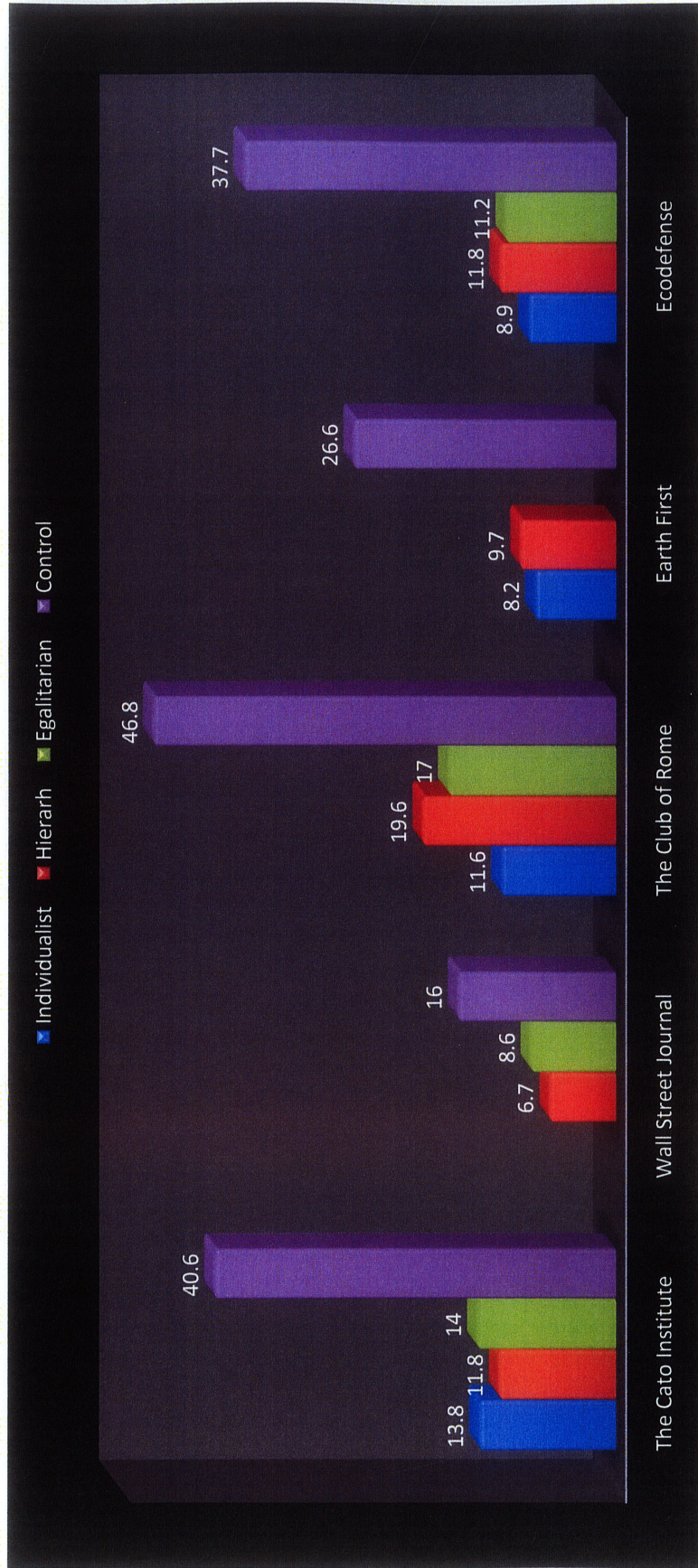
In testing these two hypotheses, the final analysis presented in this dissertation attempts to unearth *how* narratives influence public opinion.

The OLS regression analysis presented in an early section of chapter three shows that the cultural narrative treatments employed in this research’s experimental design are exceptionally effective at both increasing respondent affective ascriptions for heroes and reducing respondent affective ascriptions for villains. It is worthwhile to briefly revisit these findings. For all hero characters, a respondent’s exposure to a cultural narrative increases affect for that hero

ranging from .641 to .718 of a point on a scale of zero to ten. Similarly, for the villain characters, respondent affect decreases range from -1.281 to -1.754 when exposed to the cultural narrative stimuli. On an 11-point scale, such as the one used to assess character affect, a .641 positive shift equates to 5.8% increase from respondents in the control group. Alternatively, a -1.754 affective decrease equates to a 15.9% negative shift relative to the respondent affective assessments in the control. These shifts in affect are not slight. While the hero and villain structural narrative treatment of the groups in each cultural narrative help respondents shape affect, there is also strong evidence that the narrative treatment of characters also helps many respondents form any affective judgment whatsoever. Figure 5.1 illustrates this point.

Each column in Figure 5.1 represents the percentage of respondents who answered “don’t know” when prompted to provide affect for each of the groups treated as heroes or villains in each of the cultural narrative treatments. The difference between the control group and the remaining cultural narratives is striking. Recall that in the control group, respondents receive no textual cues related to the group. The “don’t know responses” are in all cases much higher in the control, ranging from a low of 26.6% for Earthfirst to a high of 46.8% for the Club of Rome. Clearly, as Figure 5.1 demonstrates, the cultural narratives are far more affective at providing cues that allow respondents to form emotional responses to groups in the first place.

**Figure 5.1. Character Affect by Cultural Narrative Treatment, Percent “Don’t Know Responses.”**



Having shown that the cultural narratives in this research help respondents form initial affective appraisals of the groups treated as characters and that once formed the affective assessment of the character moves in the direction specified by the narrative, the next set of analyses explore to what extent these affective ascriptions guide responses toward other assumptions and arguments built into each narrative.

OLS regression analysis is performed on each climate change dependent variable analyzed in chapters three and four to test  $H_{25}$  and  $H_{26}$ . The independent variables of interest in each regression are the character affective responses to heroes and villains by individuals randomly assigned to one of the three cultural narrative experimental treatments. Controls include age, education, gender, income, race, ideology, climate change knowledge, and CT measures. Each OLS regression is performed on a subpopulation of the entire sample broken down by cultural narrative track. Table 5.1 summarizes these findings (see appendix x-x for fully specified OLS regression tables).

The left hand column in Table 5.1 indicates the character independent variables of interest in each OLS regression. Moving from left to right, each column represents an independent OLS regression, reporting partial regression coefficients and significance for each regression. Moving from top to bottom are the population subdivisions of the analyses by cultural narrative treatment. The hero character is set off from the remaining table by grayed table cells and outlined table rows. The remaining white table cells represent villain characters.



**Table 5.1.** Cultural Theory and Opinion Related Dependent Variables, OLS Regression estimates

| Individualist Narrative   | Narrator Threat          | Narrator Trust           | Affect                   | Personal Risk            | Sociotropic Risk         | CC Belief                | Anthropogenic Cause      | GHG Regulation           | Cap-and Trade            | Nuclear Energy           | Renewable Energy         |
|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Ecodefense                | -0.49<br>(.074)          | .028<br>(.063)           | -.024<br>(.058)          | .088<br>(.080)           | .091<br>(.065)           | -.008<br>(.076)          | .120<br>(.075)           | <b>.220**</b><br>(.070)  | .015<br>(.088)           | .010<br>(.100)           | <b>.141*</b><br>(.085)   |
| The Club of Rome          | -.026<br>(.075)          | .052<br>(.064)           | .052<br>(.059)           | .051<br>(.080)           | -.031<br>(.066)          | -.019<br>(.077)          | .002<br>(.077)           | -.043<br>(.071)          | <b>.181*</b><br>(.089)   | .121<br>(.101)           | .037<br>(.087)           |
| <b>The Cato Institute</b> | <b>.101*</b><br>(.059)   | <b>.490***</b><br>(.051) | <b>.499***</b><br>(.046) | <b>.214***</b><br>(.063) | <b>.141**</b><br>(.052)  | <b>.301***</b><br>(.061) | <b>.268***</b><br>(.060) | <b>.386***</b><br>(.055) | <b>.399***</b><br>(.070) | .010<br>(.079)           | <b>.193**</b><br>(.067)  |
| Adjusted R2               | .157                     | .321                     | .326                     | .248                     | .280                     | .258                     | .303                     | .374                     | .153                     | .067                     | .033                     |
| F-Statistic               | 4.779                    | 10.603                   | 10.818                   | 7.681                    | 8.923                    | 8.092                    | 9.793                    | 13.035                   | 4.417                    | 2.386                    | 1.648                    |
| n                         | 284                      | 284                      | 284                      | 284                      | 285                      | 285                      | 283                      | 282                      | 265                      | 269                      | 270                      |
| Hierarch Narrative        | Narrator Threat          | Narrator Trust           | Affect                   | Personal Risk            | Sociotropic Risk         | CC Belief                | Anthropogenic Cause      | GHG Regulation           | Cap-and Trade            | Nuclear Energy           | Renewable Energy         |
| Ecodefense                | -.111*<br>(.066)         | -.013<br>(.067)          | -.072<br>(.064)          | -.021<br>(.071)          | .135*<br>(.066)          | .043<br>(.072)           | .048<br>(.072)           | .102<br>(.067)           | <b>.345***</b><br>(.088) | .017<br>(.085)           | <b>.242***</b><br>(.087) |
| <b>The Club of Rome</b>   | <b>.417***</b><br>(.061) | <b>.565***</b><br>(.062) | <b>.478***</b><br>(.058) | <b>.312***</b><br>(.065) | <b>.295***</b><br>(.061) | <b>.285***</b><br>(.066) | <b>.222***</b><br>(.066) | <b>.250***</b><br>(.062) | .130<br>(.080)           | <b>.451***</b><br>(.079) | <b>.207**</b><br>(.081)  |
| The Cato Institute        | -.209**<br>(.073)        | .105<br>(.074)           | .157*<br>(.070)          | -.113*<br>(.065)         | -.123*<br>(.073)         | -.074<br>(.078)          | -.061<br>(.079)          | -.178**<br>(.074)        | .176<br>(.096)           | <b>.204*</b><br>(.093)   | .113<br>(.096)           |
| Adjusted R2               | .340                     | .271                     | .219                     | .228                     | .258                     | .197                     | .230                     | .254                     | .235                     | .155                     | .090                     |
| F-Statistic               | 8.168                    | 7.296                    | 5.715                    | 5.976                    | 6.863                    | 5.112                    | 6.030                    | 6.685                    | 5.861                    | 3.986                    | 2.557                    |
| n                         | 236                      | 237                      | 236                      | 236                      | 236                      | 235                      | 236                      | 234                      | 221                      | 228                      | 221                      |
| Egalitarian Narrative     | Narrator Threat          | Narrator Trust           | Affect                   | Personal Risk            | Sociotropic Risk         | CC Belief                | Anthropogenic Cause      | GHG Regulation           | Cap-and Trade            | Nuclear Energy           | Renewable Energy         |
| Ecodefense                | <b>.216**</b><br>(.070)  | <b>.597***</b><br>(.059) | <b>.536***</b><br>(.061) | <b>.412***</b><br>(.061) | <b>.283***</b><br>(.056) | <b>.304***</b><br>(.064) | <b>.376***</b><br>(.063) | <b>.438***</b><br>(.059) | .088<br>(.087)           | .009<br>(.087)           | <b>.361***</b><br>(.072) |
| The Club of Rome          | -.145<br>(.090)          | -.024<br>(.076)          | .033<br>(.079)           | .006<br>(.079)           | -.011<br>(.072)          | -.061<br>(.083)          | .048<br>(.081)           | -.071<br>(.076)          | .108<br>(.111)           | -.096<br>(.112)          | .065<br>(.094)           |
| The Cato Institute        | -.007<br>(.092)          | -.021<br>(.078)          | -.055<br>(.080)          | .009<br>(.080)           | -.030<br>(.074)          | -.084<br>(.084)          | -.083<br>(.082)          | -.078<br>(.077)          | .072<br>(.114)           | <b>.305**</b><br>(.114)  | -.051<br>(.096)          |
| Adjusted R2               | .117                     | .427                     | .379                     | .438                     | .473                     | .390                     | .476                     | .513                     | .171                     | .103                     | .198                     |
| F-Statistic               | 3.408                    | 14.534                   | 12.049                   | 15.071                   | 17.159                   | 12.653                   | 17.455                   | 20.167                   | 4.437                    | 2.938                    | 5.187                    |
| n                         | 254                      | 254                      | 253                      | 253                      | 252                      | 255                      | 254                      | 255                      | 233                      | 236                      | 238                      |

\*p<.05; \*\*p<.01; \*\*\*p<.001 one-tailed test. Controls: Age, Education, Gender, Income, Race, Ideology, Climate Change Knowledge, Individualism, Hierarchy, Egalitarianism & Fatalism

In total there are thirty-three OLS regressions where the character independent variables (as well as the control variables) are regressed on eleven different dependent variables demarcated by cultural narrative treatment. The following discussion of findings that follows is broken down by dependent variable.

*Narrator threat* is a measure designed to assess how much of a threat the respondent feels the anonymous author of the cultural narrative believes climate change to pose. In all three cultural narrative treatments, as positive affect for the hero increases so too does the respondent's sense of narrator threat. In the hierarchy cultural narrative both villains show a significant relationship with narrator threat. As respondent affect for the villain increases, the respondent's perceptions of narrator threat decreases. Both findings for villains and heroes are as hypothesized where significance is found.

Measured on a scale of zero to ten, where one means no trust and ten means complete trust, *narrator trust* measures the extent to which the respondent believes they can trust that the information and arguments presented in the cultural narrative are forthright and accurate. Only the hero of each narrative demonstrates statistical significance and does so in expected directions in all treatments. In all cases a one point increase in character affect for the hero corresponds to roughly a half a point increase in narrator trust.

Measured on a scale from zero to ten where zero means extremely negative and ten means extremely positive, *affect* is a measure designed to assess a respondent's overall emotional reaction to the entire cultural narrative treatment. In

all cases, positive affect for the hero of each narrative is associated with positive increases in overall narrative affect. Much like *narrator trust*, a one point increase in hero affect is related to roughly a half of a point increase in affect. Interestingly, the Cato Institute is positively related to affect in the hierarch narrative. In the case of heroes, relationships are as hypothesized; however, the relationship found between the villain Cato Institute and affect moves in the opposite direction hypothesized.

Measured on a scale from zero to ten, where zero means no threat at all and ten means extreme threat, *personal risk* is a metric designed to assess how much of a threat a respondent believes climate change poses to them personally. In all cultural narrative treatments there is a significant and positive relationship between affect for the hero and *personal risk*. The enemy character of the Cato Institute in the hierarch narrative also shows a significant relationship with the *personal risk* dependent variable. A one point increase in a respondents affect for the Cato Institute corresponds with -.113 of a point decrease in the respondent's assessment of personal risk. All significant findings for *personal risk* move in directions hypothesized.

Measured in the same manner as *personal risk*, *sociotropic risk* is a metric designed to assess the respondent's perceptions of how much of a threat climate change poses for the United States over the next fifty years. In all cultural narrative treatments the hero of each story achieves significance in the positive direction hypothesized. Additionally, in the hierarchical narrative both villains demonstrate a significant relationship with *sociotropic risk*. As affect for the Cato Institute increases there is a negative corresponding decrease in *sociotropic risk*. The hero and Cato

Institute findings are as hypothesized. However, the remaining significant relationship between affect for the villain Ecodefense and *sociotropic risk* in the hierarchic narrative moves in the opposite direction hypothesized. A one point increase in affect for Ecodefense corresponds with a .135 increase in *sociotropic risk*.

Much like personal and sociotropic risk, *climate change belief*, *anthropogenic cause*, and *GHG regulation* are all affirmative positions taken by each of the cultural narratives. Measured on a scale from zero to ten, where zero means completely disagree and ten means completely agree, *climate change belief* is a post-stimulus survey question designed to assess how much the respondent believes that climate change is actually happening. In all of the narrative treatments positive affect for the hero is significantly related to an increase in *climate change belief*. None of the villains achieve statistical significance for this dependent variable.

*Anthropogenic cause*, measured on a scale from zero to ten where zero means completely disagree and ten means completely agree, is a metric that determines to what extent the respondent believes that human GHG emissions are a principal cause of climate change. The hero in each cultural narrative treatment achieves significance in directions hypothesized. Positive affect for the Cato Institute in the individualist narrative, the Club of Rome in the hierarchical narrative, and Ecodefense in the egalitarian narrative all translate into an increased belief by respondents that climate change is a human generated problem. Villain characters in all tracks fail to produce statistically meaningful relationships with the dependent variable.

*GHG regulation*, measured on a scale from zero to ten where zero means not at all important and ten means extremely important, is a measure intended to evaluate how willing the respondent is to regulate human generated greenhouse gasses. Two of the villain characters yield statistically significant relationships with the dependent variable. A positive affective increase for the Cato Institute in the hierarch narrative corresponds to respondents being less willing to regulate GHG's. This relationship is as hypothesized. The relationship between respondent affective assessments of Ecodefense in the individualist narrative moves in the opposite direction hypothesized for villains. A one point increase in affect for Ecodefense corresponds to a .220 increase in respondent willingness to regulate GHG's. As the hero hypothesis expects, each hero in all three cultural narratives shows a significant and positive relationship between hero affect and a willingness to regulate GHG's.

Three policy preference variables and their relationship to character affect are analyzed in Table 5.1: cap-and-trade, nuclear energy, and renewable energy. The individualist narrative advocates cap-and-trade, the hierarch narrative advocates nuclear energy, and the egalitarian narrative advocates renewable energy. Each of the cultural narratives maligns the favored solution of the other cultural types. Each preference is measured on a scale from zero to ten, where zero is completely disagree and ten is completely agree.

Increase in respondent affect for each hero in every cultural narrative corresponds with an increase in preference for the policy solution offered in each cultural narrative. H<sub>26</sub> states that as positive affect for the villain character increases,

that positions supported by the hero will decrease. Therefore, we would expect that support for the villain will reduce support for the advocated policy solution of a given cultural narrative. Two culturally narrative preferred policy variables demonstrate a significant relationship with villain affect.<sup>29</sup> Positive affect for the Club of Rome in the individualist narrative corresponds to increased preferences for cap-and-trade; increased affect for the Cato Institute in the hierarch narrative results in more support for nuclear energy. Hero coefficients move in directions hypothesized while villain coefficients (where significance is found) do not.

H<sub>25</sub> and H<sub>26</sub> are tested by regressing character independent variables and controls on each climate change dependent variable examined in the previous chapters of this research to discern to what extent narrative characters help to shape respondent opinion about climate change. In total thirty-three OLS regressions are presented in Table 5.1's summary of findings. In every case, positive affect for the hero character corresponds with an increase in measures designed to capture the assumptions and arguments presented in the cultural narrative experimental treatments. Affect for villain characters is only intermittently significant with eight of a possible thirty-three partial regression coefficients demonstrating significance. Of those eight, three move in the opposite direction hypothesized. Most importantly,

---

<sup>29</sup> Partial regression coefficients and significance for all policy preferences are reported in Table 5.1. However, only coefficients related to hypotheses H<sub>26</sub> are discussed in this analysis. Interesting findings not discussed at length do draw attention back to congruence and incongruence and cultural content. For example, affect for the villain Ecodefense corresponds to increased preferences for renewable energy in both the individualist and hierarch cultural narratives. In both of these narratives, renewable energy is maligned specifically for its egalitarian values.

eight of the nine coefficients demonstrating significance are found in the hierarch narrative. In all cases where coefficients move in the direction hypothesized, those cases occur in the hierarch narrative. The importance of this point is to recognize that there may be something specific to the hierarch narrative's focus on nuclear energy that brings mediating factors yet unspecified in the modeling that influence responses. In any case, there is more than enough evidence to accept  $H_{25}$ , while the evidence for  $H_{26}$  is underwhelming and largely only applicable to the hierarch narrative.  $H_{25}$  is accepted;  $H_{26}$  is rejected.

## **5.2 CNM Reconsidered: Narrative Implications for Climate Change Opinion**

This dissertation research set out to explain why there is a difference between scientific and public opinion about facts, arguments, assumptions, and policy preferences related to climate change. Two dominant social scientific models have been previously deployed to address this question. The knowledge-deficit model finds that the gap can be addressed by providing the correct scientific findings to the public; the sensational media model finds that media are primarily responsible for transferring both incorrect information and climate change foci that draw the public's attention to issues such as scientific uncertainty, which the lay person is thought to improperly understand. In both cases, the assumption is that objectively sanitized information will steer the public in right direction—that being toward the opinions held by scientists. However, the review of this previous research presented in chapter one finds that neither model pays sufficient attention to the likely interactions taking place between

messages about climate change and the values people filter those messages through. To address the difference between the public and the scientific community while attempting to capture these interactions, the Cultural Narrative Model (CNM) was offered.

The intent of CNM was to draw upon two of the most encompassing (and therefore compelling) theories of human behavior: Cultural Theory (CT) and narrative. The review of the literature in chapter two demonstrated that CT is empirically shown to explain a large array of preferences and opinions. Narrative, while rarely empirically verified, has long been claimed to have similar explanatory power, albeit by largely qualitative or analytic scholarship. Indeed, Wildavsky (1987) observed that one's culture is always at hand, providing valuable information shortcuts that facilitate decision-making and information processing; Hayden White (1987), a prominent narrative scholar, makes a similar observation about narrative, noting that narratives are ubiquitous if not omnipresent. It would seem, then, that CT and narrative have a natural synergy, which previous scholarship had confirmed (e.g., Verweij et al. 2006). If White and Wildavsky's daring assertions were correct, then these two theories merged into a single model (CNM) should explain considerable variation in public opinion about climate change and demonstrate portability to other policy domains—or at least that was the hope.

On this front, this research has largely failed. The CNM does not appear to capture the interactions that spawned its construction. Rather, the analyses of chapters three and four show that in only a few instances do the interactions between



cultural priors and the cultural content of narratively structured messages appear to matter. However, as is often the case with any truly deductive research endeavor, meaningful and unexpected findings did emerge.

Narrative structure was shown to play a prominent role in shaping many of the climate change opinion related dependent variables examined in this research.

Comparing cultural narrative survey responses to survey responses in the control, chapter three demonstrated that narrative structure, in a general sense, shapes *narrator trust*, *narrator risk*, *character affect*, and policy preferences.

Chapter four compared survey responses across cultural narrative treatments. Again, and perhaps more convincingly than the findings of chapter three, the interactions between respondent cultural priors and cultural narrative content failed to manifest. However, in the non-findings of chapter four emerged a pronounced pattern of differences in means that looked to be directed by the narrative structural treatments of the content identified in chapter three. Specifically, this pattern was most pronounced in the character affective assessments provided by respondents. In short, heroes were clearly liked and villains were clearly disliked. The numerical movement on character affect variables was observed to be large and undeniable. It is important to note that the decision to include characters in the CNM was driven by narrative theory and initially thought only to be a necessary structural component of narrative that help tie the various structural components together. That is, characters were theoretically conceived to play a contributing part to narrative persuasion when aggregated with other structural elements such as plot or setting. However, given the

strength and direction of character affective assessments, a new question and set of hypothesis emerged: what role might these characters play directly in shaping opinion about climate change?

In unorthodox fashion, this chapter, the concluding chapter, deployed a set of empirical analyses intended to isolate the driver of narrative persuasion: character affect. Reexamining every climate change opinion related dependent variable analyzed in the previous chapters, character affect was moved from the dependent variable side of the equation to the independent variable side of the equation. While findings for villain characters were scattered and in many cases moving in the opposite direction hypothesized, the results for hero characters were surprisingly consistent and robust.

In each and every case, regardless of group or cultural content, more positive affect for the hero means higher respondent scores on measures of *narrator threat*, *narrator trust*, *affect*, *personal risk*, *sociotropic risk*, *climate change belief*, *anthropogenic cause*, *GHG regulation*, and the preferred policy solution. This is an especially powerful set of findings when one considers other character related findings presented in this research. First, recall that being exposed to the cultural narrative dramatically lowered the number of “don’t know” responses for character affect relative to the control group. Respondents, when exposed to a cultural narrative, were better able to draw emotional conclusions about a group portrayed as either a villain or hero than respondents lacking a narrative stimulus in the control group. Second, the analysis of chapter three shows that when exposed to a cultural narrative,

respondents show higher levels of affect for the hero and lower levels of affect for the villain. In short, this research shows that narrative structures help respondents form affective judgments for characters, provide direction for those judgments, and then once in place, those affective assignments play a powerful role in convincing respondents to support the arguments and assumptions of the story. At least in the case of opinions about climate change, narrative structure matters. The portability of these findings will be determined by their applicability to other policy areas.

Situating these findings in previous scholarship is a relatively straightforward endeavor. The control group in this research received a simple list of facts taken from the IPCC 2007 report. The list lacked the narrative structure of the experimental treatments and was scrubbed of overt value statements and the cultural symbolism and content deliberately placed in the cultural narrative stimuli. These facts were designed to be a much more “objective” source of information for the respondents. Respondents clearly show a positive reaction to the narrative treatments in the sense they are more persuaded by them to align themselves with scientific opinion. Specifically, respondents are persuaded through the vehicle of the hero.

Importantly then, we can conclude that any climate change message is likely to be more effective if portrayed in narrative form. In terms of previous research, this means that the media is very likely to play a critical role in shaping opinion as the media is more likely to use narration and the media is also a primary source of the public’s information on all things climate change. This also means that it is likely that attempts at objective information dissemination are likely to be ineffective. The

reason for the posited ineffectiveness is that any group that is able to put out its arguments in narrative format is also more likely to be more influential in shaping opinions than those that do not.

What this research does not speak to is the longevity of the narrative's influence over a respondent's preferences. The analyses conducted here is a cross section of the population at one moment in time. It is an open question as to whether or not the persuasion effect sticks with the respondents. Despite the uncertainty of the long term influence of narrative persuasion, it does seem likely that individuals exposed to the same narrative again and again are likely to comply with the assumptions and arguments of that narrative more stridently than not. Again, this draws attention to the media. Individuals who selectively expose themselves to specific media outlets (e.g., Fox News or MSNBC) are likely to encounter reoccurring narrative themes that direct their opinions.

While this research fails in its attempts to model and capture interactions between individual priors and message structure, it does demonstrate the important role of narrative in human communication. Most importantly, this research shows that heroes, by helping people make sense of the world, are a core component of narrative persuasion. In my estimation, this finding has a high degree of face validity. Anecdotally at least, my experience tells me that everyone seems to need a hero; maybe now we are one step closer to knowing why this is the case.

## REFERENCES

- Abell, Peter. 2004. "Narrative Explanation: An Alternative to Variable-Centered Explanation?" *Annual Review of Sociology* 30(1): 287-310.
- Almond, Gabriel A., and Sidney Verba. 1963. *The Civic Culture: Political Attitudes and Democracy in Five Nations*. Princeton: Princeton University Press.
- Anker, Elisabeth. 2005. "Villains, Victims and Heroes: Melodrama, Media, and September 11." *The Journal of Communication* 55(1): 22-37.
- Antilla, Liisa. 2008. "Self-censorship and Science: a Geographical Review of Media Coverage of Climate Tipping Points." *Public Understanding of Science*.
- Ash, Sharon, Peachie Moore, Luisa Vesley, and Murray Grossman. 2007. "The Decline of Narrative Discourse in Alzheimer's Disease." *Brain and Language* 103(1-2): 181-182.
- Balmford, Andrew, Andrea Manica, Lesley Airey, Linda Birkin, Amy Oliver, and Judith Schleicher. "Hollywood, Climate Change, and the Public." *Science* 305(5691): 1713b.
- Bartels, Larry M. 2002. "Beyond the Running Tally: Partisan Bias in Political Perceptions." *Political Behavior* 24(2): 117-50.
- Benedict, Ruth. 1934. *Patterns of Culture*. Boston: Mariner Books.
- Berinsky, Adam J., and Donald R. Kinder. 2006. "Making Sense of Issues Through Media Frames: Understanding the Kosovo Crisis." *Journal of Politics* 68(3): 640-656.
- Berk, Richard A., and Daniel Schulman. 1995. "Public perceptions of global warming." *Climatic Change* 29(1): 1-33.
- Berk, Richard A., and Robert G. Fovell. 1999. "Public Perceptions of Climate Change: A 'Willingness to Pay' Assessment." *Climatic Change* 41(3): 413-446.
- Berrens, Robert P., Alok K. Bohara, Hank Jenkins-Smith, Carol Silva, and David L. Weimer. 2003. "The Advent of Internet Surveys for Political Research: A Comparison of Telephone and Internet Samples." *Political Analysis* 11(1): 1-22.
- Bodansky, Daniel M. 1995. "The Emerging Climate Change Regime." *Annual Reviews in Energy and the Environment* 20(1): 425-461.
- Bord, Richard J., Ann Fisher, and Robert E. O'Connor. 1998. "Public Perceptions of

- Global Warming: United States International Perspectives." *Climate Research* 11(1): 75-84.
- Bord, Richard J., Robert E. O'Connor, and Ann Fischer. 2000. "In What Sense does the Public Need to Understand Global Climate Change?" *Public Understanding of Science* 9(3): 205-218.
- Boykoff, Maxwell T., and Jules M. Boykoff. 2007. "Climate Change and Journalistic Norms: A Case-Study of US Mass-Media Coverage." *Geoforum* 38(6): 1190-1204.
- Brossard, Dominique, James Shanahan, and Katherine McComas. 2004. "Are Issue-Cycles Culturally Constructed? A Comparison of French and American Coverage of Global Climate Change." *Mass Communication & Society* 7(3): 359-377.
- Brown, Courtney. 1994. "Politics and the Environment: Nonlinear Instabilities Dominate." *American Political Science Review* 88(2): 292-303.
- Brunner, Ronald D. 2001. "Science and the Climate Change Regime." *Policy Sciences* 34(1): 1-33.
- Burstein, Paul. 2003. "The Impact of Public Opinion on Public Policy: A Review and an Agenda." *Political Research Quarterly* 56(1): 29-40.
- Burstein, Paul. 2006. "Why Estimates of the Impact of Public Opinion on Public Policy are Too High: Empirical and Theoretical Implications." *Social Forces* 84(4): 2273-2289.
- Carolan, Michael S. 2006. "The Values and Vulnerabilities of Metaphors Within the Environmental Sciences." *Society & Natural Resources* 19(10): 921-930.
- Carvalho, Anabela. 2007. "Ideological Cultures and Media Discourses on Scientific Knowledge: Re-reading News on Climate Change." *Public Understanding of Science* 16(2): 223-243.
- Converse, Philip. 1962. "Information Flow and the Stability of Partisan Attitudes." *Public Opinion Quarterly* 26: 578-599.
- Converse, Philip E. 2000. "Assessing the Capacity of Mass Electorates." *Annual Review of Political Science*: 331-353.
- Converse, Philip E. 1964. "The Nature of Belief Systems of Mass Publics." In *Ideology and Discontent*, ed. David Apter. London: Free Press, p. 206-261.

- Damasio, Antonio R. 1994. "Descartes' error and the future of human life." *Scientific American* 271(4): 144.
- Delli Carpini, Michael X., and Scott Keeter. 1996. *What Americans Know about Politics and Why It Matters*. Yale University Press.
- Derrida, Jacques. 1981. "The Law of Genre." In *On Narrative* ed. W.J.T. Mitchell, Chicago: The University of Chicago Press.
- Dessler, Andrew E., and Edward A. Parson. 2006. *The Science and Politics of Global Climate Change: A Guide to the Debate*. Cambridge University Press.
- Dispensa, Jaclyn Marisa, and Robert J. Brulle. 2003. "Media's social construction of environmental issues: Focus on global warming - a comparative study." *The International Journal of Sociology and Social Policy* 23(10): 74.
- Doble, John. 1995. "Public opinion about issues characterized by technological complexity and scientific uncertainty." *Public Understanding of Science* 4(2): 95-118.
- Dodge, Jennifer, Sonia M. Ospina, and Erica Gabrielle Foldy. 2005. "Integrating Rigor and Relevance in Public Administration Scholarship: The Contribution of Narrative Inquiry." *Public Administration Review* 65(3): 286-300.
- Doran, Peter T., and Maggie Kendall Zimmerman. 2009. "Examining the Scientific Consensus on Climate Change." *EOS* 90(3): 22-23.
- Douglas, Mary. 1982. *In the Active Voice*. London: Routledge.
- Downs, Anthony. 1957. *An Economic Theory of Democracy*. New York: Harper & Co.
- Downs, Anthony. 1972. "Up and Down with Ecology—The 'Issue-Attention Cycle.'" *The Public Interest* 28: 38-50.
- Druckman, James N., and Arthur Lupia. 2000. "Preference Formation." *Annual Review of Political Science* 3: 1–24.
- Druckman, James N. 2001. "The Implications of Framing Effects for Citizen Competence." *Political Behavior* 23(3): 225-256.
- Duncan, Seth, and Lisa Feldman Barrett. 2007. "Affect is a form of cognition: A neurobiological analysis." *Cognition & Emotion* 21(6): 1184-1211.
- Dunlap, Riley E., Xiao Chenyang, and Aaron M. McRight. 2001. "Politics and

Environment in America: Partisan and Ideological Cleavages in Public Support for Environmentalism." *Environmental Politics* 10(4): 23-48.

Dunlap, Riley E., and L. Saad. 2001. *Only One in Four Americans are Anxious About the Environment*. Gallup. Available at: <http://www.gallup.com/poll/releases/pr010416.asp> [Accessed April 16, 2001].

Durant, Robert F., and Jerome S. Legge. 2005. "Public Opinion, Risk Perceptions, and Genetically Modified Food Regulatory Policy: Reassessing the Calculus of Dissent among European Citizens." *European Union Politics* 6(2): 181-200.

Elazar, Daniel J. 1966. *American Federalism: A View from the States*. New York: Thomas Y. Crowell Company.

Erikson, Robert S., Michael B. Mackuen, and James A. Stimson. 2002. *The Macro Polity*. New York: Cambridge University Press.

Finucane, Melissa, Paul Slovic, C.K. Mertz, James Flynn, and Theresa A. Satterfield. 2000. "Gender, race, and perceived risk: the 'white male' effect." *Health, Risk & Society* 2(2): 159-172.

Fischer, Frank. 1993. "Policy Discourse and the Politics of Washington Think Tanks." In *The Argumentative Turn*, ed. Frank Fischer and John Forester. Durham, NC: Duke University Press, p. 21-42.

Fischer, Frank. 2003. *Reframing Public Policy: Discursive Politics and Deliberative Practices*. Oxford University Press, USA.

Fischer, Frank and John Forrester. 1993. *The Argumentative Turn in Policy Analysis and Planning*. Durham, NC: Duke University Press.

Gans, Herbert. 1979. *Deciding What's News: A Study of CBS Evening News, NBC Nightly News, Newsweek and Time*. 1st ed. Vintage.

Gastil, John, Donald Braman, Dan M. Kahan, and Paul Slovic. 2005. "The 'Wildavsky Heuristic': The Cultural Orientation of Mass Political Opinion." *SSRN eLibrary*. [Accessed May 15, 2009].

Genette, Gerard. 1980. *Narrative Discourse: An Essay in Method*. Ithaca: Cornell University Press.

Gerrig, Richard J., and Giovanna Egidi. 2003. "Cognitive Psychological Foundations of Narrative Experiences." In *Narrative Theory and the Cognitive Sciences*. ed. David Herman, Standford: CSLI Publications.



- Gilens, Martin. 2001. "Political Ignorance and Collective Policy Preferences." *American Political Science Review* 95(02): 379-396.
- Gilovich, Thomas. 1991. *How We Know What Isn't So: The Fallibility of Human Reason in Everyday Life*. New York: The Free Press.
- Goren, Paul. 2005. "Party Identification and Core Political Values." *American Journal of Political Science* 49(4): 881-896.
- Gough, Clair, and Simon Shackley. 2001. "The Respectable Politics of Climate Change: The Epistemic Communities and NGOs." *International Affairs* 77(2): 329-345.
- Graber, Doris A. 1997. *Mass Media and American Politics*. CQ Press Washington, DC.
- Granberg, Donald, and Thad A. Brown. 1989. "On Affect and Cognition in Politics." *Social Psychology Quarterly* 52(3): 171-182.
- Grundmann, Reiner. 2006. "Ozone and Climate: Scientific Consensus and Leadership." *Science Technology Human Values* 31(1): 73-101.
- Hajer, Maarten A. 1993. "Discourse Coalitions and the Institutionalization of Practice: The Case of Acid Rain in Britain." In *The Argumentative Turn*, ed. Frank Fischer and John Forester, Durham: Duke University Press, p. 43-76.
- Hajer, Maarten A. 1995. *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford University Press, USA.
- Hansen, Janus, Lotte Holm, Lynn Frewer, Paul Robinson, and Peter Sondoe . 2003. "Beyond the knowledge deficit: recent research into lay and expert attitudes to food risks." *Appetite* 41(2): 111-121.
- Hempel, Lamont C. 2003. "Climate Policy on the Installment Plan." In *Environmental Policy: New Directions for the Twenty-First Century*, Washington, D.C.: CQ Press, p. 299-324.
- Herman, David. 2009. *Basic Elements of Narrative*. Wiley-Blackwell.
- Herman, David. 2002. *Narrative Theory and the Cognitive Sciences*. Stanford: Center for the Study of Language and Inf.
- Herron, Kerry G., and Hank C. Jenkins-Smith. 2006. *Critical Masses and Critical Choices: Evolving Public Opinion on Nuclear Weapons, Terrorism, and National Security*. Pittsburgh: University of Pittsburgh Press.

- Holsti, Ole R. 2004. *Public Opinion and American Foreign Policy*. University of Michigan Press.
- Hovland, Carl I., and Walter Weiss. 1951. "The Influence of Source Credibility on Communication Effectiveness." *Public Opinion Quarterly* 15(4): 635-650.
- Huisman, Rosemary, Julian Murphet, and Anne Dunn. 2006. *Narrative and Media*. New York: Cambridge University Press.
- Hurwitz, Jon, and Mark Peffley. 1987. "How Are Foreign Policy Attitudes Structured? A Hierarchical Model." *The American Political Science Review* 81(4): 1099-1120.
- IPCC. 2007. 1-74 *Climate Change 2007: Synthesis Report*. Intergovernmental Panel on Climate Change.
- Iyengar, Shanto, and Donald R Kinder. 1985. "Psychological accounts of agenda-setting." *Mass media and political thought*.
- Iyengar, Shanto, and Donald R Kinder. 1987. *News that matters: Television and American opinion*. University of Chicago Press.
- Jenkins-Smith, Hank C., Neil J. Mitchell, and Kerry G. Herron. 2004. "Foreign and Domestic Policy Belief Structures in the U.S. and British Publics." *Journal of Conflict Resolution* 48(3): 287-309.
- Jones, Michael D., and Mark K. McBeth. 2010. "A Narrative Policy Framework: Clear Enough to Be Wrong?." *Policy Studies Journal* 38(2): 329-353.
- Kahan, Dan M., and Donald Braman. 2003. "More Statistics, Less Persuasion: A Cultural Theory of Gun-Risk Perceptions." *University of Pennsylvania Law Review* 151(4): 1291-1327.
- Kahan, Dan M., and Donald Braman. 2006. "Cultural Cognition and Public Policy." *Yale Law & Policy Review* 24: 147-170.
- Kahan, Dan M., Donald Braman, John Gastil, Paul Slovic, and C.K. Mertz. 2007. "Culture and Identity-Protective Cognition: Explaining the White-Male Effect in Risk Perception." *Journal of Empirical Legal Studies* 4(3): 465-505.
- Kellstedt, Paul M., Sammy Zahran, and Arnold Vedlitz. 2008. "Personal Efficacy, the Information Environment, and Attitudes Toward Global Warming and Climate Change in the United States." *Risk Analysis* 28(1): 113-126.

- Kinder, Donald R, and LM Sanders. 1996. *Divided by Color: Racial Politics and Democratic Ideals*. University Of Chicago Press.
- Klein, Kitty. 2003. "Narrative Construction, Cognitive Processing, and Health." In *Narrative Theory and the Cognitive Sciences* ed. David Herman, Stanford: CSLI Publications.
- Klingemann, Hans D. 1979. "Measuring ideological conceptualizations." In *Political Action: Mass Population in Five Western Democracies*, ed. Samuel H. Barnes and Max Kaase. Beverly Hills: Sage.
- Kraft, Michael E. 2007. *Environmental Policy and Politics*. 4th ed. Prentice Hall.
- Kriz, Margaret. 2005. "Heating Up. (cover story)." *National Journal* 37(32): 2504-2508.
- Kuklinski, James H., and Gary M. Segura. 1995. "Engogeneity, Exogeneity, Time and Space in Political Representation: A Review Article." *Legislative Studies Quarterly* 20(1): 3-21.
- Kunda, Ziva. 1990. "The Case for Motivated Reasoning." *Psychological Bulletin* 108(3): 480-498.
- Lahsen, Myanna. 2005a. "Seductive Simulations? Uncertainty Distribution Around Climate Models." *Social Studies of Science* 35(6): 895-922.
- Lahsen, Myanna. 2005b. "Technocracy, Democracy, and U.S. Climate Politics: The Need for Demarcations." *Science Technology Human Values* 30(1): 137-169.
- Leiserowitz, Anthony Allen. 2003. "Global Warming in the American Mind: The Roles of Affect, Imagery, and Worldviews in Risk Perception, Policy Preferences and Behavior." University of Oregon: Doctoral Dissertation.
- Leiserowitz, Anthony A. 2005. "American Risk Perceptions: Is Climate Change Dangerous?" *An International Journal* 25(6): 1433-1442.
- Leiserowitz, Anthony. 2006. "Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery, and Values." *Climatic Change* 77(1): 45-72.
- Leiserowitz, Anthony. 2007. *International Public Opinion, Perception, and Understanding of Global Climate Change*. United Nations Report.
- Lindzen, Richard S. 2008. "Is the Global Warming Alarm Founded on Fact?." In *Global*

*Warming: Looking Beyond Kyoto*, Center for the Study of Globalization, Yale University, p. 21-33.

Lippman, Walter. 1922. *Public Opinion*. New York: Macmillan.

Lippman, Walter. 1925. *The Phantom Public*. New York: Harcourt Brace.

Lippman, Walter. 1955. *Essays in Public Philosophy*. Boston: Little, Brown.

Lodge, Milton, and Charles Taber. 2007. "The Rationalizing Voter: Unconscious Thought in Political Information Processing."

Lodge, Milton, and Charles S. Taber. 2005. "The Automaticity of Affect for Political Leaders, Groups, and Issues: An Experimental Test of the Hot Cognition Hypothesis." *Political Psychology* 26(3): 455-482.

Lowe, Thomas et al. 2006. "Does Tomorrow Ever Come? Disaster Narrative and Public Perceptions of Climate Change." *Public Understanding of Science* 15(4): 435.

Lupia, Arthur, and Mathew D. McCubbins. 1998. *The Democratic Dilemma: Can Citizens Learn What They Need to Know?* Cambridge University Press.

Luttbeg, Norman R. and Michael M. Gant. 1985. "The Failure of Liberal/Conservative Ideology as a Cognitive Structure." *Public Opinion Quarterly* 49(1): 80-93.

Mamadouh, Virginie. 1999. "Grid-group cultural theory: an introduction." *GeoJournal* 47(3): 395-409.

Markus, Gregory B., and Philip E. Converse. 1979. "A Dynamic Simultaneous Equation Model of Electoral Choice." *The American Political Science Review* 73(4): 1055-1070.

Mattila, Anna S. 2000. "The Role of Narratives in the Advertising of Experiential Services." *Journal of Service Research* 3(1): 35-45.

Mattila, Anna S. 2002. "The Use of Narrative Appeals in Promoting Restaurant Experiences." *Journal of Hospitality & Tourism Research* 26(4): 379-395.

McBeth, Mark K., Elizabeth A. Shanahan, and Michael D. Jones. 2005. "The Science of Storytelling: Measuring Policy Beliefs in Greater Yellowstone." *Society & Natural Resources* 18: 413-429.

McComas, Katherine, and James Shanahan. 1999. "Telling Stories About Global Climate Change: Measuring the Impact of Narratives on Issue Cycles." *Communication*

*Research* 26(1): 30.

McComas, Katherine A., James Shanahan, and Jessica S. Butler. 2001. "Environmental Content in Prime-Time Network TV's Non-News Entertainment and Fictional Programs." *Society & Natural Resources* 14(6): 533-542.

McCombs, Maxwell E., and Donald L. Shaw. 1972. "The Agenda-Setting Function of Mass Media." *Public Opinion Quarterly* 36(2): 176-187.

McCright, Aaron M., and Riley E. Dunlap. 2000. "Challenging Global Warming as a Social Problem: An Analysis of the Conservative Movement's Counter-Claims." *Social Problems* 47(4): 499-522.

McCright, Aaron M., and Riley E. Dunlap. 2003. "Defeating Kyoto: The Conservative Movement's Impact on U.S. Climate Change Policy." *Social Problems* 50(3): 348-373.

McDermott, Rose. 2002. "Experimental Methods in Political Science." *Annual Reviews in Political Science* 5(1): 31-61.

McLennan, J. D. 2000. "To boil or Not: Drinking Water for Children in a Periurban Barrio." *Social Science & Medicine* 51(8): 1211-1220.

Mcquillan, Martin. 2000. *The Narrative Reader*. 1st ed. New York: Routledge.

Mondak, Jeffery J. 1999. "Reconsidering the Measurement of Political Knowledge." *Political Analysis* 8(1): 57.

Mondak, Jeffery J. 1993. "Source Cues and Policy Approval: The Cognitive Dynamics of Public Support for the Reagan Agenda." *American Journal of Political Science* 37(1): 186-212.

Morris, James P., Nancy Squires, Charles S. Taber, Milton Lodge. 2003. "Activation of Political Attitudes: A Psychophysiological Examination of the Hot Cognition Hypothesis." *Political Psychology* 24(4): 727-745.

Nelson, Thomas E., Zoe M. Oxley, and Rosalee A. Clawson. 1997. "Toward a Psychology of Framing Effects." *Political Behavior* 19(3): 221-246.

Ney, Steven. 2006. "Messy Issues, Policy Conflict and the Differentiated Polity: Analysing Contemporary Policy Responses to Complex, Uncertain and Transversal Policy Problems." Vienna, LOS Center for Bergen: Doctoral Dissertation.

- Ney, Steven, and Michael Thompson. 2000. "Cultural Discourses in the Global Climate Change Debate." *Society, behaviour, and climate change mitigation*. Kluwer Academic Publishers, Dodrecht, The Netherlands: 65–92.
- Nisbet, Matthew C., and Teresa Myers. 2007. "Trends: Twenty Years of Public Opinion about Global Warming." *Public Opinion Quarterly* 71(3): 444.
- Olson, Greta. 2003. "Reconsidering Unreliability." *Narrative* 11: 93-109.
- Oreskes, Naomi. 2004. "Beyond the Ivory Tower: The Scientific Consensus on Climate Change." *Science* 306(5702): 1686.
- Page, Benjamin I., and Robert Y. Shapiro. 1992. *The Rational Public: Fifty Years of Trends in Americans' Policy Preferences*. 1st ed. University Of Chicago Press.
- Page, Benjamin I., Robert Y. Shapiro, and Glenn R. Dempsey. 1987. "What Moves Public Opinion?" *The American Political Science Review* 81(1): 23-43.
- Parsons, Wayne. 1995. *Public Policy: An Introduction to the Theory and Practice of Policy Analysis*. Edward Elgar Pub.
- Peters, B. Guy, and Brian W. Hogwood. 1985. "In Search of the Issue-Attention Cycle." *The Journal of Politics* 47(1): 238-253.
- Peters, Ellen, and Paul Slovic. 1996. "The Role of Affect and Worldviews as Orienting Dispositions in the Perception and Acceptance of Nuclear Power 1." *Journal of Applied Social Psychology* 26(16): 1427-1453.
- Popkin, Samuel. L. 1991. *The Reasoning Voter: Communication and Persuasion in Presidential Campaigns*. University of Chicago Press.
- Qin, Wei, and J. Lynne Brown. 2006. "Consumer Opinions about Genetically Engineered Salmon and Information Effect on Opinions: A Qualitative Approach." *Science Communication* 28(2): 243-272.
- Rayner, Steve, and Elizabeth Malone. 1998. *The Societal Framework*. 1st ed. Battelle Press.
- Read, Daniel, Anne Bostrom, M. Granger, Baruch Fischhoff, and Tom Smutz. "What Do People Know About Global Climate Change? 2. Survey Studies of Educated Laypeople." *Risk Analysis* 14(6): 971-982.
- Redlawsk, David P. 2002. "Hot Cognition or Cool Consideration? Testing the Effects of Motivated Reasoning on Political Decision Making." *The Journal of Politics*

64(4): 1021-1044.

- Ricketts, Mitchell S. 2007. "The Use of Narratives in Safety and Health Communication." The University of Kansas, Department of Psychology: Doctoral Dissertation.
- Sabatier, Paul A., and Hank C Jenkins-smith. 1993. *Policy Change and Learning: An Advocacy Coalition Approach*. Westview Press.
- Schank, R. C., R. S. Wyer, and R. P. Abelson. 1995. *Knowledge and Memory: The Real Story*. Lawrence Erlbaum Associates.
- Selin, Henrik, and Stacy D. VanDeveer. 2007. "Political Science and Prediction: What's Next for US Climate Change Policy?" *Review of Policy Research* 24(1): 1-27.
- Shackley, Simon, and Brian Wynne. 1996. "Representing Uncertainty in Global Climate Change Science and Policy: Boundary-Ordering Devices and Authority." *Science, Technology, & Human Values* 21(3): 275-302.
- Shanahan, James, and Jennifer Good. 2000. "Heat and hot air: Influence of Local Temperature on Journalists' Coverage of Global Warming." *Public Understanding of Science* 9(3): 285-295.
- Shapiro, Robert Y., and Benjamin I. Page. 1988. "Foreign Policy and the Rational Public." *The Journal of Conflict Resolution* 32(2): 211-247.
- Shapiro, Robert Y., and Benjamin I. Page. 1994. "Foreign Policy and Public Opinion." In *The New Politics of American Foreign Policy*, New York: St. Martin's Press, p. 216-235.
- Singer, S. Fred, and Dennis T. Avery. 2008. *Unstoppable Global Warming: Every 1,500 Years, Updated and Expanded Edition*. Rowman & Littlefield Publishers, Inc.
- Slovic, Paul, Melissa L. Finucane, Ellen Peters, and Donald G. MacGregor. 2007. "The Affect Heuristic." *European Journal of Operational Research* 177(3): 1333-1352.
- Sniderman, Paul M., Richard A. Brody, and Phillip E. Tetlock. 1991. *Reasoning and Choice: Explorations in Political Psychology*. Cambridge University Press.
- Somers, Margaret R. 1992. "Narrativity, Narrative Identity, and Social Action: Rethinking English Working-Class Formation." *Social Science History* 16(4): 591-630.
- Stamm, Keith R., Fiona Clark, and Paula Reynolds Eblacas. 2000. "Mass Communication

and Public Understanding of Environmental Problems: The Case of Global Warming." *Public Understanding of Science* 9(3): 219-237.

- Steel, Brent. Peter List, Denise Lach, and Bruce Shindler. 2004. "The Role of Scientists in the Environmental Policy Process: A Case Study from the American West." *Environmental Science & Policy* 7(1): 1-13.
- Sterman, John, and Linda Sweeney. 2007. "Understanding Public Complacency about Climate Change: Adults' Mental Models of Climate Change Violate Conservation of Matter." *Climatic Change* 80(3): 213-238.
- Stimson, James A., Michael B. Mackuen, and Robert S. Erikson. 1995. "Dynamic Representation." *The American Political Science Review* 89(3): 543-565.
- Stone, Deborah. 2002. *Policy Paradox: The Art of Political Decision Making, Revised Edition*. 3rd ed. New York: W. W. Norton.
- Sundberg, Mikaela. 2007. "Parameterizations as Boundary Objects on the Climate Arena." *Social Studies of Science* 37(3): 473-488.
- Taber, Charles S., and Martin Lodge. 2006. "Motivated Skepticism in the Evaluation of Political Beliefs." *American Journal of Political Science* 50(3): 755-769.
- Thompson, Michael, Richard Ellis, and Aaron Wildavsky. 1990. *Cultural Theory*. Boulder: Westview Press.
- Troiani, Vanessa, Sherry Ash, Jamie Reilly, and Murray Grossman. 2006. "The Neural Correlates of Narrative Discourse: An Investigation Using Arterial Spin-Labeling." *Brain and Language* 99(1-2): 191-192.
- Trumbo, Craig. 1996. "Constructing Climate Change: Claims and Frames in US News Coverage of an Environmental Issue." *Public Understanding of Science* 5(3): 269.
- U.S. EPA Website, Climate Change. Available at: <http://www.epa.gov/climatechange/> [Accessed February 17, 2010].
- Ungar, Sheldon. 2000. "Knowledge, Ignorance and the Popular Culture: Climate Change Versus the Ozone Hole." *Public Understanding of Science* 9(3): 297-312.
- Verweij, Marco, Mary Douglas, Richard Ellis, Christoph Engel, Frank Hendriks, Susanne Lohmann, Steve Ney, Steve Raynor, and Michael Thompson. 2006. "Clumsy Solutions for a Complex World: The Case of Climate Change." *Public Administration* 84(4): 817-843.



- Verweij, Marco, and Michael Thompson, eds. 2006. *Clumsy Solutions for a Complex World: Governance, Politics, and Plural Perceptions*. Palgrave Macmillan, Houndmills.
- Weart, Spencer R. 2003. *The Discovery of Global Warming*. Cambridge: Harvard University Press..
- Weart, Spencer R. 2008a. "The Discovery of Global Warming - A History." Available at: <http://www.aip.org/history/climate/index.html> [Accessed March 10, 2009].
- Weart, Spencer R. 2008b. *The Discovery of Global Warming: Revised and Expanded Edition*. Revised and Expanded Edition. Harvard University Press.
- Webber, David J. 2008. "Earth Day and Its Precursors: Continuity and Change in the Evolution of Midtwentieth-Century U.S. Environmental Policy." *Review of Policy Research* 25(4): 313-332.
- White, Hayden. 1987. *The Content of the Form: Narrative Discourse and Historical Representation*. Baltimore: The Johns Hopkins University Press.
- White, Hayden. 1980. "The Value of Narrativity in the Representation of Reality." In *On Narrative* ed. W.J.T. Mitchell, Chicago: The University of Chicago Press, p. 1-24.
- Wildavsky, Aaron, and Karl Dake. 1990. "Theories of Risk Perception: Who Fears What and Why?." *Daedalus*: 41-60.
- Wildavsky, Aaron. 1987. "Choosing Preferences by Constructing Institutions: A Cultural Theory of Preference Formation." *American Political Science Review* 81(1): 3-22.
- Yearley, Steven. 1999. "Computer Models and the Public's Understanding of Science: A Case-Study Analysis." *Social Studies of Science* 29(6): 845-66.
- Young, Kay, and Jeffrey L. Saver. 2001. "The Neurology of Narrative." *SubStance* 30(1/2): 72-84.
- Zaller, John R. 1992. *The Nature and Origins of Mass Opinion*. Cambridge: Cambridge University Press.
- Zehr, Stephen C. 2000. "Public Representations of Scientific Uncertainty about Global Climate Change." *Public Understanding of Science* 9(2): 85-103.

## APPENDIX A: GLOBAL CLIMATE CHANGE SURVEY, 2009

My name is Michael D. Jones and I am a doctoral candidate in the Political Science Department at the University of Oklahoma. I am requesting that you volunteer to participate in a research study titled the Global Climate Change Survey 2010. You were selected as a participant because you volunteered to participate in online surveys through Survey Sampling Inc.

The purpose of this study is to measure the opinions and preferences of Americans regarding climate change. If you agree to participate in this study, you will be asked to respond to an internet survey that takes an average of 15 minutes to complete. There are no risks or benefits associated with participation in this study.

The study will ask questions about climate change. In the unlikely event that any of these questions make you uncomfortable, you may skip that question and continue with the survey. You may also quit the survey at any time, should you desire to do so. Should you complete the survey, you will receive three Paypal dollars in compensation.

The records of this study will be kept private. In published reports, there will be no information included that will make it possible to identify you as a research participant. Research records will be stored securely. The data will not include any information that would make it possible to identify you. Only approved researchers will have access to the records.

If you have any concerns or complaints about the research, I am the primary investigator conducting this study and I can be contacted at the Center for Applied Social Research at the University of Oklahoma, at 405-325-3084, or at [jonemic1@gmail.com](mailto:jonemic1@gmail.com). In the event of a research-related injury, contact the researcher. You are encouraged to contact the researcher if you have any questions. If you have any questions, concerns, or complaints about the research and wish to talk to someone other than the researcher, or if you cannot reach the researcher, you may contact the University of Oklahoma—Norman Campus Institutional Review Board (OU-NC IRB) at (405) 325-8110 or [irb@ou.edu](mailto:irb@ou.edu).

*Please print this information sheet for your records. By completing and submitting this questionnaire, you are agreeing to participate in this study.*

---

**Q1\_Age Screening:** Are you 18 years or older?

1. Yes [Go to Q2\_Age]
2. No [Exit: Thank you for participating]

**Q2\_Age:** How old are you? [Verbatim]

**Q3\_Education:** What is your highest level of education?

1. Elementary or some high school
2. High School Graduate/GED
3. Some college/vocational school
4. College graduate
5. Some graduate work
6. Master's degree
7. Doctorate (of any type)
8. Other degree (please specify) [verbatim]

**Q4\_Gender:** Are you male or female?

1. Male
2. Female

**Q5\_party:** With which political party do you most identify with?

1. Democratic Party [skip Q7\_lean]
2. Republican Party [skip Q7\_lean]
3. Independent [skip Q6\_iden and go to Q7\_lean]
4. Other (Please Specify) [go to Q6\_iden and then go to Q7\_lean]

**Q6\_iden:** Do you completely, somewhat, or slightly identify with that political party?

1. Completely
2. Somewhat
3. Slightly

**Q7\_lean:** If you had to choose, would you place yourself closer to either the Republican or Democratic Party?

1. Democratic Party
2. Republican Party
3. Neither Party represents my views in any way.

**Q8\_Ideology:** On a scale of political ideology, individuals can be arranged from strongly liberal to strongly conservative. Which of the following categories best describes your view?

1. Strongly liberal
  2. Liberal
  3. Slightly liberal
  4. Middle of the road
  5. Slightly conservative
  6. Conservative
  7. Strongly Conservative
- 

**Lead-in:** Now I would like to ask you some multiple-choice questions about the political process. Please answer to the best of your knowledge, and feel free to guess even if you aren't completely sure of your answer.

**Q9\_House:** Which party has the most members in the U.S. House of Representatives?

1. Republican
2. Democrat
3. Neither, there are equal numbers of both Republicans and Democrats in the House of Representatives.

**Q10\_Veto:** How much of a majority is required for the U.S. Senate and House to override a presidential veto?

1. Two-Thirds
2. Three-fourths
3. Four-fifths
4. Simple Majority

**Q10\_judge:** Whose responsibility is it to nominate judges to the Federal Courts?

1. The House of Representatives
2. The President
3. The Speaker of the House
4. The Governor from the state where the judge resides.

**Q11\_Senate:** How long is the term of office for a United States Senator?

1. 2 years
  2. 4 years
  3. 6 years
  4. 8 years
-

**Lead-in:** Scientists who specialize in the study of earth’s climate have debated the possible effects of climate change. To the best of your knowledge, do most scientists expect any of the following changes in the global climate to take place?

**[Random order: expt1--expt5]**

**Q12\_expt1:** Do most scientists expect temperature to rise?

1. Yes
2. No

**Q13\_expt2:** Do most scientists expect ocean levels to drop?

1. Yes
2. No

**Q14\_expt3:** Do most scientists expect more frequent droughts?

1. Yes
2. No

**Q15\_expt4:** Do most scientists expect fewer floods?

1. Yes
2. No

**Q16\_expt5:** Do most scientists expect more severe weather storms, like hurricanes and tornadoes?

1. Yes
2. No

---

**Lead-in:** A substantial amount of research has been conducted on the causes of global climate change. To the best of your knowledge:

**[Random order: cause1—cause5]**

**Q17\_cause1:** Do scientists believe exhausts from cars and trucks cause global temperatures to rise?

1. Yes
2. No

**Q18\_cause2:** Do scientists believe radiation from nuclear power plants causes global temperatures to rise?

1. Yes
2. No

**Q19\_cause3:** Do scientists believe disposal of toxic chemicals in landfills causes global temperatures to rise?

1. Yes
2. No

**Q20\_cause4:** Do scientists believe coal powered electricity plants cause global temperatures to rise?

1. Yes
2. No

**Q21\_cause5:** Do scientists believe the destruction of jungles and forests causes global temperatures to rise?

1. Yes
2. No

**Q22\_avgtemp:** To the best of your knowledge, how much do scientists think the average global temperature will increase over the next 50 to 70 years?

1. Average global temperature will not increase at all over the next 50 to 70 years.
2. Slight increase to one degree Fahrenheit
3. Two to five degrees Fahrenheit
4. Six to nine degrees Fahrenheit
5. Ten or more degrees Fahrenheit

---

**Lead-in:** Now I want to understand more about how you feel about American society. On a scale from one to seven, *where one means you strongly disagree, and seven means you strongly agree*, please respond to each of the following statements.

**[CULTURE random order: Q23—Q34]**

**Q23\_hier1\_ahead:** The best way to get ahead in life is to do what you are told to do.

- 1 - *Strongly disagree*
- 2
- 3
- 4
- 5

6

7 - *Strongly agree*

**Q24\_hier2\_authority:** Our society is in trouble, because we don't obey those in authority.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q25\_hier3\_rules:** Society would be much better off if we imposed strict and swift punishment on those that break the rules.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q26\_ind1\_fail:** Even if some people are at a disadvantage, it is best for society to let people succeed or fail on their own.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q27\_ind2\_disadvantaged:** Even the disadvantaged should have to make their own way in the world.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q28\_ind3\_indv:** We are all better off when we compete as individuals.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q29\_egal1\_Fair:** What our society needs is a fairness revolution to make the distribution of goods more equal.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q30\_egal2\_Power:** Society works best if power is shared equally.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q31\_egal3\_Income:** It is our responsibility to reduce the differences in income between the rich and the poor.

1 - *Strongly disagree*

2

3



4

5

6

7 - *Strongly agree*

**Q32\_fat1\_random:** Most of the important things that take place in life happen by random chance.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q33\_fat2\_fate:** No matter how hard we try, the course of our lives is largely determined by forces outside our control.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

**Q34\_fat3\_plans:** It would be pointless to make serious plans in such an uncertain world.

1 - *Strongly disagree*

2

3

4

5

6

7 - *Strongly agree*

---

[**Random Track Assignment:** Each respondent is randomly assigned to one of four tracks]

- **Track 1: Individualist (a)**
- **Track 2: Hierarchy (b)**
- **Track 3: Egalitarian (c)**
- **Track 4 : Control List (d)**

**(Text and following questions should be on different pages)**

**Track 1: Individualist Cultural Narrative (a)**

**Narrative Lead-in:** Now I would like to get your opinion on a recent opinion article dealing with climate change. The article is divided into sections followed by questions seeking your opinion on the content. Due to the nature of the survey, you will not be able to return to a section once you have selected next.

---

**Lead-in:** The issue of global climate change has been the subject of debate over the last few decades. Recently, a large group of scientists analyzed all of the existing studies on climate change and summarized these findings in a way that most involved in the debate agree with.

Most agree that the Earth is warming and that over the past one hundred years the average temperature has increased by one to two degrees. During this same time period, human beings have increased the amount of greenhouse gasses in the atmosphere. The release of carbon dioxide from the burning of fossil fuels like coal and oil are the main contributors to these increased greenhouse gasses. The summary of findings also confirmed that increases in greenhouse gasses tend to warm the planet. Few contest these findings.

**Q35a\_Standardized Fact Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the facts presented above.

*0 – not surprised at all*

1

2

3

4

5

6

7

8

9

10 –completely surprised

---

The summary report by the scientists also made several predictions about what could happen in the United States. Although a bit technical, it is worth looking at some of these predictions:

- In the Northeast, there is 90% likelihood that coastlines will be exposed to coastal erosion.
- In Polar Regions such as Alaska, infrastructure (roads, bridges, etc.) and native ways of life are 80% likely to suffer significant harm from the effects of climate change. There is an 80% certainty that migratory birds, mammals and higher predators will suffer significant harm from reductions in glaciers, ice sheets, and sea ice.
- It is 80% likely that heat waves in cities like Chicago will increase in number, intensity, and duration during the course of the century.
- It is 66% likely that the Great Plains area will experience more severe summer droughts and a 90% likelihood that increased springtime flooding will damage crop yields.
- There is 80% certainty that warming in western mountains will lead to decreased snowpack, more winter flooding and reduced summer flows, which would increase competition for water in many western states.

**Q36a\_ US Scenario Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the potential consequences of climate change in the United States.

0 – not surprised at all

1

2

3

4

5

6

7

8

9

10 –completely surprised

---

As you can see, climate change is real and the potential consequences here in the United States are unsettling. It is also apparent that a reduction in green house gasses is necessary. However, despite these potential consequences, real progress in reducing greenhouse gas emissions has been made nearly impossible by the efforts of destructive interests.

Government interests, represented by groups like bureaucratic unions and the infamous Club of Rome, are attempting to use climate change to promote their own agenda. They push for programs that solidify bureaucratic control and increase the size and cost of government. These programs include reliance on unsustainable nuclear energy, restrictive international treaties, and some of the more frightening positions even advocate across the board population control. They argue that due to the size of the problem, only centralized authority can be trusted to solve the problem.

Environmental advocates, represented by organizations like Ecodefense and the radical Earthfirst!, are attempting to use climate change to destroy our capitalist system. These groups demand radical policies that destroy free competition and reduce our individual quality of life. These groups put faith in socialized community-owned energy, invasive consumer laws, and the more dangerous positions advocate isolated “eco-communities,” where authority rests in environmental councils. They argue that due to the failure of free markets, only planned communities can be trusted to handle climate change.

---

**Lead-in:** The author mentioned several groups in the previous text. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to these groups.

[Random Q37a—Q39a]

**Q37a\_Enemy\_Egal1:** Earthfirst!:

*0 – completely negative*

1

2

3

4

5—*Neutral*

6

7

8

9

10—*completely positive*

11—*Don't Know*

**Q38a\_Enemy\_Egal2:** Ecodefense:

0—*completely negative*

1

2

3

4

5--*Neutral*

6

7

8

9

10—*completely positive*

11—*Don't Know*

**Q39a\_Enemy\_Hier1:** The Club of Rome:

0—*completely negative*

1

2

3

4

5--*Neutral*

6

7

8

9

10—*completely positive*

11—*Don't Know*

---

It is clear that both big government and radical environmental types are using the facts about climate change to push a destructive agenda that obstructs any meaningful solutions to the problem. To solve this problem we must invoke the value that has always served humans the best; that value is our historical reliance on free competition. The innovative cap-and-trade solution relies on this value by taking advantage of free competition to generate the cleanest substitutes for coal and oil. Thankfully organizations like the Cato Institute have been tirelessly advocating for this solution.

The cap-and-trade energy solution drastically reduces the overall amount of greenhouse gasses, as businesses are limited by how much they can produce. Each business can buy or trade permits within these emissions limits. So, if a company releases greenhouse gasses below what its permits would allow, it may sell or trade its permits to a business that produces more. This solution lets companies that have traditionally produced more greenhouse gasses buy from those that produce less. The benefit of the cap-and-trade solution is businesses will have time to adapt to a more climate conscious economy while also competing with companies that find creative ways to cut costs and emissions.

The problem of climate change reminds us all that the world is rapidly changing. When change turns for the worse, it can only get better if we are free to adapt. The cap-and-trade solution provides a clear path for corporations to freely adapt, provide innovative solutions, and solve the problem of global climate change. Radical ideology and more big government are not the answer.

**Q42a\_Argument Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the arguments made by the author.

*0 – not surprised at all*

1

2

3

4

5

6

7

8

9

10 –completely surprised

**Q43a\_Ally\_Ind1:** The author mentions the Cato Institute. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to this group.

0 – completely negative

1

2

3

4

5--Neutral

6

7

8

9

10 –completely positive

11—Don't Know

---

### Track 2: Hierarchical Cultural Narrative (b)

**Narrative Lead-in:** Now I would like to get your opinion on a recent opinion article dealing with climate change. The article is divided into sections followed by questions seeking your opinion on the content. Due to the nature of the survey, you will not be able to return to a section once you have selected next.

---

The issue of global climate change has been the subject of debate over the last few decades. Recently, a large group of scientists analyzed all of the existing studies on climate change and summarized these findings in a way that most involved in the debate agree with.

Most agree that the Earth is warming and that over the past one hundred years the average temperature has increased by one to two degrees. During this same time period, human beings have increased the amount of greenhouse gasses in the atmosphere. The release of carbon dioxide from the burning of fossil fuels like coal

and oil are the main contributors to these increased greenhouse gasses. The summary of findings also confirmed that increases in greenhouse gasses tend to warm the planet. Few contest these findings.

**Q35b\_Standardized Fact Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the facts presented above.

*0 – not surprised at all*

1

2

3

4

5

6

7

8

9

*10 – completely surprised*

---

The summary report by the scientists also made several predictions about what could happen in the United States. Although a bit technical, it is worth looking at some of these predictions:

- In the Northeast, there is 90% likelihood that coastlines will be exposed to coastal erosion.
- In Polar Regions such as Alaska, infrastructure (roads, bridges, etc.) and native ways of life are 80% likely to suffer significant harm from the effects of climate change. There is an 80% certainty that migratory birds, mammals and higher predators will suffer significant harm from reductions in glaciers, ice sheets, and sea ice.
- It is 80% likely that heat waves in cities like Chicago will increase in number, intensity, and duration during the course of the century.
- It is 66% likely that the Great Plains area will experience more severe summer droughts and a 90% likelihood that increased springtime flooding will damage crop yields.
- There is 80% certainty that warming in western mountains will lead to decreased snowpack, more winter flooding and reduced summer flows, which would increase competition for water in many western states.



**Q36b\_ US Scenario Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the potential consequences of climate change in the United States.

*0 – not surprised at all*

1

2

3

4

5

6

7

8

9

*10 – completely surprised*

---

As you can see, climate change is real and the potential consequences here in the United States are alarming. It is also evident that a reduction in green house gasses is necessary. However, despite these likely consequences, real progress in reducing greenhouse gas emissions has been made nearly impossible by the efforts of destructive interests.

Environmental interests, represented by groups like Ecodefense and the infamous Earthfirst!, are attempting to use climate change to promote their own agenda. They push for programs that ignore scientific evidence and dismiss how truly complex climate change is. These programs include reliance on unproven community-owned energy, ineffective consumer laws, and the more radical stances advocate isolated “eco-communities,” where authority rests in environmental councils. They argue that due to the nature of the problem, only isolated communities can be trusted to solve the problem.

Corporate advocates, represented by organizations like the Wall Street Journal and the radical Cato Institute, are attempting to use climate change to help generate larger profits. These groups demand radical policies that ignore societal responsibility and push pollution and costs onto citizens. They put faith in unregulated corporations, misinformed consumers, and the more dangerous positions advocate cap-and-trade policies that allow industry to sell the right to pollute. They argue that due to the

failure of government regulations, only competitive markets can be trusted to handle climate change.

---

*Lead-in:* The author mentioned several groups in the previous text. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to these groups.

[Random Q37b—Q41b]

**Q37b\_Enemy\_Egal1:** Earthfirst!:

*0 – completely negative*

1

2

3

4

*5--Neutral*

6

7

8

9

*10 –completely positive*

*11—Don't Know*

**Q38b\_Enemy\_Egal2:** Ecodefense:

*0 – completely negative*

1

2

3

4

*5--Neutral*

6

7

8

9

*10 –completely positive*

*11—Don't Know*

**Q40b\_Enemy\_Ind1:** the Cato Institute:

*0 – completely negative*

1

2

3

4

*5--Neutral*

6

7

8

9

*10 – completely positive*

*11—Don't Know*

**Q41b\_Enemy\_Ind2:** the Wall Street Journal:

*0 – completely negative*

1

2

3

4

*5--Neutral*

6

7

8

9

*10 – completely positive*

*11—Don't Know*

---

It is clear that both radical environmentalists and free market types are using the facts about climate change to push a destructive agenda that obstructs any meaningful solutions to the problem. To solve this problem we must invoke the value that has always served Americans the best; that value is our historical reliance on scientific expertise. The nuclear power solution relies on this value by taking advantage of

scientific expertise to use the cleanest substitute for coal and oil. Thankfully groups like the Club of Rome have been tirelessly advocating for this solution.

The Nuclear energy solution drastically reduces the overall amount of greenhouse gasses, as nuclear energy produces none. Nuclear power costs less than coal, wind, or solar. It doesn't need the sun to shine or the wind blowing, so it is also more reliable than wind or solar. Nuclear power plants are also safer than coal for those that both work and live near them. The one drawback to nuclear power is waste, which is easily dealt with by close monitoring and reprocessing waste into more nuclear energy. The benefits of the nuclear solution are a clean, plentiful, and inexpensive energy source that takes advantage of our greatest scientific accomplishments.

The problem of global climate change reminds us that the world is delicately balanced. When mankind disturbs this balance, we must rely on our expertise to bring things back into order. The nuclear energy solution provides a clear path for governments to reestablish control through expert management and solve the problem of climate change. Radical ideology and more corporate greed are not the answer.

**Q42b\_Argument Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and 10 means completely surprised*, please indicate how surprised you were by the arguments made by the author.

*0 – not surprised at all*

1

2

3

4

5

6

7

8

9

*10 – completely surprised*

**Q43b\_Ally\_Hier1:** The author mentions the Club of Rome. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to this group.

*0 – completely negative*

1

- 2
  - 3
  - 4
  - 5--*Neutral*
  - 6
  - 7
  - 8
  - 9
  - 10 –*completely positive*
- 

### Track 3: Egalitarian Cultural Narrative (c)

**Narrative Lead-in:** Now I would like to get your opinion on a recent opinion article dealing with climate change. The article is divided into sections followed by questions seeking your opinion on the content. Due to the nature of the survey, you will not be able to return to a section once you have selected next.

---

The issue of global climate change has been the subject of debate over the last few decades. Recently, a large group of scientists analyzed all of the existing studies on climate change and summarized these findings in a way that most involved in the debate agree with.

Most agree that the Earth is warming and that over the past one hundred years the average temperature has increased by one to two degrees. During this same time period, human beings have increased the amount of greenhouse gasses in the atmosphere. The release of carbon dioxide from the burning of fossil fuels like coal and oil are the main contributors to these increased greenhouse gasses. The summary of findings also confirmed that increases in greenhouse gasses tend to warm the planet. Few contest these findings.

**Q35c\_Standardized Fact Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the facts presented above.

- 0 – *not surprised at all*
- 1
  - 2
  - 3

- 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10 – *completely agree*
- 

The summary report by the scientists also made several predictions about what could happen in the United States. Although a bit technical, it is worth looking at some of these predictions:

- In the Northeast, there is 90% likelihood that coastlines will be exposed to coastal erosion.
- In Polar Regions such as Alaska, infrastructure (roads, bridges, etc.) and native ways of life are 80% likely to suffer significant harm from the effects of climate change. There is an 80% certainty that migratory birds, mammals and higher predators will suffer significant harm from reductions in glaciers, ice sheets, and sea ice.
- It is 80% likely that heat waves in cities like Chicago will increase in number, intensity, and duration during the course of the century.
- It is 66% likely that the Great Plains area will experience more severe summer droughts and a 90% likelihood that increased springtime flooding will damage crop yields.
- There is 80% certainty that warming in western mountains will lead to decreased snowpack, more winter flooding and reduced summer flows, which would increase competition for water in many western states.

**Q36c\_ US Scenario Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the potential consequences of climate change in the United States.

*0 – not surprised at all*

- 1
- 2
- 3
- 4
- 5
- 6

7

8

9

10 – *completely surprised*

---

As you can see, climate change is real and the potential consequences here in the United States are terrifying. It is also obvious that a reduction in green house gasses is necessary. However, despite these terrifying consequences, real progress in reducing greenhouse gas emissions has been made nearly impossible by the efforts of destructive interests.

Government interests, represented by groups like the infamous Club of Rome and selfish politicians, are attempting to use climate change to promote their own agenda. They push for programs that reinforce existing inequalities and increase the wealth and power of politicians. These programs include reliance on unsafe nuclear energy, indulgent international treaties, and some of the more frightening positions even advocate population control for the poor. They argue that due to the complexity of the problem, only specialized experts can be trusted to solve the problem.

Corporate advocates, represented by organizations like the Wall Street Journal and the radical Cato Institute, are attempting to use climate change to exploit people for profit. These groups demand radical policies that destroy local communities and dramatically increase inequality around the globe. They put faith in greedy corporations, ill-informed consumers, and the more dangerous positions advocate cap-and-trade policies that allow industry to sell the right to pollute. They argue that due to the failure of community-level efforts only competitive markets can be trusted to handle climate change.

---

**Lead-in:** The author mentioned several groups in the previous text. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to these groups.

[Random 39c-41c]

**Q39c\_Enemy\_Hier1:** The Club of Rome:

0 – *completely negative*

- 1
- 2
- 3
- 4
- 5--Neutral
- 6
- 7
- 8
- 9
- 10 –completely positive
  
- 11—Don't Know

**Q40c\_Enemy\_Ind1:** The Cato Institute:

- 0 – completely negative
- 1
- 2
- 3
- 4
- 5--Neutral
- 6
- 7
- 8
- 9
- 10 –completely positive
  
- 11—Don't Know

**Q41c\_Enemy\_Ind2:** The Wall Street Journal.

- 0 – completely negative
- 1
- 2
- 3
- 4
- 5--Neutral
- 6
- 7
- 8



9

10—*completely positive*

11—*Don't Know*

---

It is clear that both big government and free market types are using the facts about climate change to push a destructive agenda that obstructs any meaningful solutions to the problem. To solve this problem we must invoke the value that has always served humanity the best; that value is our historical reliance on equal participation. The community-owned renewables solution relies on this value by taking advantage of equal participation to decentralize the cleanest substitutes for coal and oil. Thankfully groups like Ecodefense have been tirelessly advocating for this solution.

The community-owned renewable energy solution drastically reduces the overall amount of greenhouse gasses, as wind and solar energy produce none. This plan involves local communities purchasing and maintaining their own renewable power. In cooperatively purchasing wind and solar farms, communities seize ownership from the cause of climate change: government and corporate greed. Community-owned renewables have demonstrated three times the job creation and four times the property value increases of their corporate counterparts. Local ownership also strengthens communal bonds as people work together to maintain something in which they all have a stake. The benefits of community-owned renewable energy are clean, plentiful, and inexpensive energy sources that help strengthen communities.

The problem of global climate change reminds us all that the world is fragile. When humanity loses sight of our relationship with nature, the environment will always retaliate for our carelessness. The community-owned renewable energy solution provides a clear path for humanity to correct our reckless behavior and solve the problem of global climate change. Governmental excesses and bottomless corporate greed are not the answer.

**Q39c\_Argument Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the arguments made by the author.

0—*not surprised at all*

1

2

- 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10 –completely surprised
- 

**Q43c\_Ally\_Egal2:** The author mentions Ecodefense. Using a scale from zero to ten, where zero means completely negative and ten means completely positive, please indicate your reaction to this group.

0 – completely negative

- 1
- 2
- 3
- 4
- 5--Neutral

- 6
- 7
- 8
- 9
- 10 –completely positive

11—Don't Know

#### **Track 4: Control (d)**

**Lead-in:** Now I would like to get your opinion on a recent summary article dealing with climate change. The article is divided into sections followed by question seeking your opinion on the content. Due to the nature of the survey, you will not be able to return to a section once you have selected next.

---

**Lead in:** The issue of global climate change has been the subject of debate over the last few decades. Recently, a large group of scientists analyzed all of the existing studies on climate change and summarized these findings:

- Most agree that the Earth is warming and that over the past one hundred years the average temperature has increased by one to two degrees.
- During this same time period, human beings have increased the amount of greenhouse gasses in the atmosphere.
- The release of carbon dioxide from the burning of fossil fuels like coal and oil are the main contributors to these increased greenhouse gasses.
- The summary of findings also confirmed that increases in greenhouse gasses tend to warm the planet.

**Q35d\_ Standardized Fact Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the list of facts presented above.

*0 – not surprised at all*

1

2

3

4

5

6

7

8

9

*10 – completely surprised*

**Lead in:** The summary report by the scientists also made several predictions about what could happen in the United States:

- In the Northeast, there is 90% likelihood that coastlines will be exposed to coastal erosion.
- In Polar Regions such as Alaska, infrastructure (roads, bridges, etc.) and native ways of life are 80% likely to suffer significant harm from the effects of climate change. There is an 80% certainty that migratory birds, mammals and higher predators will suffer significant harm from reductions in glaciers, ice sheets, and sea ice.
- It is 80% likely that heat waves in cities like Chicago will increase in number, intensity, and duration during the course of the century.
- It is 66% likely that the Great Plains area will experience more severe summer droughts and a 90% likelihood that increased springtime flooding will damage crop yields.

- There is 80% certainty that warming in western mountains will lead to decreased snowpack, more winter flooding and reduced summer flows, which would increase competition for water in many western states.

**Q36d\_ US Scenario Surprise:** Using a scale from zero to ten, *where zero means not surprised at all and ten means completely surprised*, please indicate how surprised you were by the potential consequences of climate change in the United States.

*0 – not surprised at all*

1

2

3

4

5

6

7

8

9

*10 – completely surprised*

**Lead-in:** Now we would like to ask your opinion about a few groups commonly associated with debates about climate change. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to these groups.

[Random 37d-41d]

**Q37d\_Egal1:** Earth First!:

*0 – completely negative*

1

2

3

4

*5--Neutral*

6

7

8

9

*10 – completely positive*

11—Don't Know

**Q38d\_Egal2:** Ecodefense:

0 – completely negative

1

2

3

4

5--Neutral

6

7

8

9

10 – completely positive

11—Don't Know

**Q39d\_Hierar1:** The Club of Rome:

0 – completely negative

1

2

3

4

5--Neutral

6

7

8

9

10 – completely positive

11—Don't Know

**Q40d\_Ind1:** The Cato Institute:

0 – completely negative

1

2

3

4  
5--Neutral  
6  
7  
8  
9  
10 –completely positive

11—Don't Know

**Q41d\_Ind2:** *The Wall Street Journal:*

0 – completely negative

1  
2  
3  
4  
5--Neutral  
6  
7  
8  
9  
10 –completely positive

11—Don't Know

---

**Q44\_Narrator\_threat:** Using a scale from zero to ten, *where zero is no threat at all and ten is extreme threat*, how much of a threat do you feel the author of the previous article believes climate change to be?

0 – no threat at all

1  
2  
3  
4  
5  
6  
7  
8

9

10 –extreme threat

**Q45\_Author\_trust:** Using a scale from zero to ten, *where zero means no trust and ten means complete trust*, how much do you trust that the facts and arguments presented in the previous article are accurate?

0 – no trust

1

2

3

4

5

6

7

8

9

10 –complete trust

**Q46 \_ Affect:** Using a scale from zero to ten, *where zero means extremely negative and ten means extremely positive*, what is your overall reaction to the previous article you just read?

0 – extremely negative

1

2

3

4

5

6

7

8

9

10 –extremely positive

**Q47\_Respondent Risk:** Using a scale from zero to ten, *where zero is no threat at all and ten is extreme threat*, in your considered assessment, how much of a threat do you believe climate change poses to you personally in the next 50 years?

0 – no threat at all

1

- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 –extreme threat

**Q48\_CC\_Action:** Using a scale from zero to ten, *where zero means not at all important and ten means extremely important*, how important do you think it is for the U.S. to reduce greenhouse gas emissions?

*0 - Not at all important*

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 – Extremely important

**Lead-in:** Using a scale from zero to ten, *where zero means completely disagree and ten means completely agree*, please indicate how much you agree with the accuracy of the following statements:

**Q49\_CC\_Belief:** The Earth is warming and over the past one hundred years the average temperature has increased by one to two degrees.

*0 – completely disagree*

- 1
- 2
- 3
- 4
- 5



- 6
- 7
- 8
- 9

10 – *completely agree*

**Q50\_Human GHG Cause:** Human produced greenhouse gasses, such as those resulting from the combustion of coal, oil, natural gas, and others are the cause of average global temperature increases.

0 – *completely disagree*

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

10 – *completely agree*

**Q51\_US\_Scenario Assessment:** The author indicated that global climate change posed some risk to the United States. Using a scale from zero to ten, *where zero means no problem whatsoever and ten means devastating*, how much of a problem do you believe climate change will be for the United States in the next 50 years?

0 – *no problem whatsoever*

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

10 – *completely devastating*

**Lead-in:** Now, I would like to assess your opinion on several proposals that many argue will reduce greenhouse gas emissions. Using a scale from zero to ten, where zero means completely disagree and ten means completely agree, please indicate how much you support each of the following proposals:

**[Random Order: Pref1—Pref3]**

**Q52\_Pref1\_Hier:** Many argue that the problem of excessive greenhouse gas emissions should be solved by relying more on **nuclear energy**. How much do you agree or disagree with the nuclear energy approach to reducing greenhouse gases?

*0 – completely disagree*

1

2

3

4

5

6

7

8

9

*10 – completely agree*

*11 – Don't Know*

**Q53\_Pref2\_Ind:** One proposal to deal with greenhouse gas emissions is to use a **cap-and-trade** system (also called tradable emissions). This solution places an overall limit on company and industry emissions. Permits are issued and companies that emit less greenhouse gasses can trade or sell their permits to companies that produce more. How much do you agree or disagree with the cap-and-trade approach to reducing greenhouse gases?

*0 – completely disagree*

1

2

3

4

5

6

7

8

9

10 –completely agree

11—Don't Know

**Q54\_Pref3\_Egal:** Many argue that excessive greenhouse gas emissions are best handled at the community level. The **community based approach** contends that it is through communities taking direct ownership of renewable energy, such as wind and solar farms, that greenhouse gas emissions are best reduced (as opposed to corporations or government). How much do you agree or disagree with the community approach to reducing greenhouse gases?

0 – completely disagree

1

2

3

4

5

6

7

8

9

10 –completely agree

11—Don't Know

**Q55\_Race:** Which of the following do you most associate with your own ethnicity or race?

1. American Indian
2. Asian
3. Black or African American
4. Hispanic
5. White Non-Hispanic
6. Other: Please Specify

**Q56\_Income:** Which of the following income categories approximates the total estimated annual income from your household for the previous year?

1. Less than \$50,000 [Go to Q56i\_Income]
2. At least \$50,000 but less than \$100,000 [Go to Q56ii\_Income]

3. At least \$100,000 but less than \$150,000 [Go to Q56iii\_Income]
4. \$150,000 or more? [Go to Q56iv\_Income]

**Q56i\_Income:** Was the estimated annual income for your household last year:

1. Less than \$10,000.
2. \$10,000 to less than \$20,000
3. \$20,000 to less than \$30,000
4. \$30,000 to less than \$40,000
5. \$40,000 to less than \$50,000

**Q56ii\_Income:** Was the estimated annual income for your household last year:

1. \$50,000 to less than \$60,000
2. \$60,000 to less than \$70,000
3. \$70,000 to less than \$80,000
4. \$80,000 to less than \$90,000
5. \$90,000 to less than \$100,000

**Q56iii\_Income:** Was the estimated annual income for your household last year:

1. \$100,000 to less than \$110,000
2. \$110,000 to less than \$120,000
3. \$120,000 to less than \$130,000
4. \$130,000 to less than \$140,000
5. \$140,000 to less than \$150,000

**Q56iv\_Income:** Was the estimated annual income for your household last year:

1. \$150,000 to less than \$160,000
2. \$160,000 to less than \$170,000
3. \$170,000 to less than \$180,000
4. \$180,000 to less than \$190,000
5. \$190,000 to less than \$200,000
6. \$200,000 or more

**Q57\_zip:** What is the five digit zip code at your residence? (This information will only be used to compare grouped regional differences, not to identify you.) [verbatim]

**Q58\_nsort:** The text you just read provided a specific perspective on climate change. I am interested in your perspective as well. Listed below are terms and phrases related to popular debates about climate change. Please group these words into categories that you think they belong in based upon whether or not you believe the terms or phrases to be related in some way. There is no right or wrong answer and you should organize the terms and phrases in ways that you think they are linked. For example,

one person may see no relationship between a freezer and a gas can, while another would view them as linked because they are found in their garage. Both responses are perfectly valid. Using as many or as few of the six boxes below, please drag and drop the term or phrase into one of the boxes below. You do not have to use all of the boxes or all of the words or phrases.

**[Random Ordering 1-27]**

1. Club of Rome
2. Bureaucracy
3. Government
4. Nuclear energy
5. Population control
6. Scientific expertise
7. Environmentalists
8. Earthfirst!
9. Ecodefense
10. Community-owned energy
11. Eco-communities
12. Equal participation
13. Cato Institute
14. The Wall Street Journal
15. Free Markets
16. Cap-and-trade
17. Industry
18. Competition
19. Radical
20. Terrifying
21. Alarming
22. Unsettling
23. Unproven
24. Unsafe
25. Balance
26. Fragile
27. Changing

**Survey Closing Message**

Thank you for participating in The University of Oklahoma's 2009 Global Climate Change Survey.

## APPENDIX B: CULTURAL NARRATIVE SENTENTIAL CONTENT COMPARISON

### **The Setting: Standardized Facts (100% Agreement across Conditions: 372 words)<sup>30</sup>**

The issue of global climate change has been the subject of debate over the last few decades. Recently, a large group of scientists analyzed all of the existing studies on climate change and summarized these findings in a way that most involved in the debate agree with. (47)

Most agree that the Earth is warming and that over the past one hundred years the average temperature has increased by one to two degrees. During this same time period, human beings have increased the amount of greenhouse gasses in the atmosphere. The release of carbon dioxide from the burning of fossil fuels like coal and oil are the main contributors to these increased greenhouse gasses. The summary of findings also confirmed that increases in greenhouse gasses tend to warm the planet. Few contest these findings. (86).

### **The Setting: US Scenario**

The summary report by the scientists also made several predictions about what could happen in the United States. Although a bit technical, it is worth looking at some of these predictions: (31)

- In the Northeast, there is 90% likelihood that coastlines will be exposed to coastal erosion. (15)
- In Polar Regions such as Alaska, infrastructure (roads, bridges, etc.) and native ways of life are 80% likely to suffer significant harm from the effects of climate change. There is an 80% certainty that migratory birds, mammals and higher predators will suffer significant harm from reductions in glaciers, ice sheets, and sea ice. (53)
- It is 80% likely that heat waves in cities like Chicago will increase in number, intensity, and duration during the course of the century. (24)
- It is 66% likely that the Great Plains area will experience more severe summer droughts and a 90% likelihood that increased springtime flooding will damage crop yields. (27)
- There is 80% certainty that warming in western mountains will lead to decreased snowpack, more winter flooding and reduced summer flows, which would increase competition for water in many western states. (31)

---

<sup>30</sup> See page XX for a comparison of the cultural narrative setting structures and the control list.

- Global average sea level rose at an average rate of 1.8 millimeters per year over 1961 to 2003 and at an average rate of about 3.1 millimeters per year from 1993 to 2003. (33)
- The magnitude and timing of the effects of all predictions and estimates listed above will ultimately depend upon the amount and rate of climate change. (25).

### Transition to Enemy

| <b>Egalitarian:</b> (52/55: 94.54%)   | <b>Hierarch:</b> (52/55: 94.54%)   | <b>Individualist:</b> (52/55: 94.54%)   |
|---|--|---|
| <ol style="list-style-type: none"> <li>1. As you can see, climate change is real and the potential consequences here in the United States are <b>terrifying</b>. (18/19)</li> <li>2. It is also <b>obvious</b> that a reduction in green house gasses is necessary. (12/13)</li> <li>3. However, despite these <b>terrifying</b> consequences, real progress in reducing greenhouse gas emissions has been made nearly impossible by the efforts of destructive interests. (22/23)</li> </ol> | <ol style="list-style-type: none"> <li>1. As you can see, climate change is real and the potential consequences here in the United States are <b>alarming</b>. (18/19)</li> <li>2. It is also <b>evident</b> that a reduction in green house gasses is necessary. (12/13)</li> <li>3. However, despite these <b>likely</b> consequences, real progress in reducing greenhouse gas emissions has been made nearly impossible by the efforts of destructive interests. (22/23).</li> </ol> | <ol style="list-style-type: none"> <li>1. As you can see, climate change is real and the potential consequences here in the United States are <b>unsettling</b>. (18/19)</li> <li>2. It is also <b>apparent</b> that a reduction in green house gasses is necessary. (12/13)</li> <li>3. However, despite these <b>potential</b> consequences, real progress in reducing greenhouse gas emissions has been made nearly impossible by the efforts of destructive interests. (22/23)</li> </ol> |

## The Enemy: Number One

| Individualist   | Egalitarian   | Hierarch   |
|---|---|--|
| <p><b>The Enemy: The Hierarch</b></p> <ol style="list-style-type: none"> <li>1. Government interests, represented by groups like {<b>bureaucratic unions</b>} and the infamous {<b>Club of Rome</b>}, are attempting to use climate change to promote their own agenda. (20/22)</li> <li>2. They push for programs that <b>solidify bureaucratic control</b> and <b>increase the size and cost of government</b>. (6/16)</li> <li>3. These programs include reliance on <b>unsustainable nuclear energy</b>, <b>restrictive international treaties</b>, and some of the more frightening positions even advocate <b>across the board</b> population control.<br/><br/>(20/25: Egalitarian)(5/25: Hierarch)</li> <li>4. They argue that due to the <b>size</b> of the problem, only <b>centralized authority</b> can be trusted to solve the problem. (17/20)</li> </ol> <p><b>Egalitarian Agreement: 63/83 75.9%</b></p> <p><b>Hierarch Agreement: 48/83 57.83%</b><br/>Purple text indicates agreement between two (not three) sets of text.</p> | <p><b>The Enemy: The Hierarch</b></p> <ol style="list-style-type: none"> <li>1. Government interests, represented by groups like the infamous {<b>Club of Rome</b>} and {<b>selfish politicians</b>}, are attempting to use climate change to promote their own agenda. (20/22)</li> <li>2. They push for programs that <b>reinforce existing inequalities</b> and <b>increase the wealth and power of politicians</b>. (6/16)</li> <li>3. These programs include reliance on <b>unsafe nuclear energy</b>, <b>indulgent international treaties</b>, and some of the more frightening positions even advocate <b>population control for the poor</b>.<br/><br/>(20/25: Individualist)(5/25: Hierarch)</li> <li>4. They argue that due to the <b>complexity</b> of the problem, only <b>specialized experts</b> can be trusted to solve the problem. (17/20)</li> </ol> <p><b>Individualist Agreement: 63/83 75.9%</b></p> <p><b>Hierarch Agreement: 48/83 57.83%</b><br/><br/>Purple text indicates agreement between two (not three) sets of text.</p> | <p><b>The Enemy: The Egalitarian</b></p> <ol style="list-style-type: none"> <li>1. Environmental interests, represented by groups like {<b>Ecodefense</b>} and the infamous {<b>Earthfirst!</b>}, are attempting to use climate change to promote their own agenda (20/22).</li> <li>2. They push for programs that <b>ignore scientific evidence</b> and <b>dismiss how truly complex climate change is</b>. (6/16)</li> <li>3. These programs include reliance on <b>unproven community-owned energy</b>, <b>ineffective consumer laws</b>, and the more radical stances advocate isolated “eco-communities,” where <b>authority rests in environmental councils</b>. (5/25)</li> <li>4. They argue that due to the <b>nature</b> of the problem, only <b>isolated communities</b> can be trusted to solve the problem. (17/20)</li> </ol> <p><b>Individualist Agreement: 48/83 57.83%</b></p> <p><b>Egalitarian Agreement: 48/83 57.83%</b></p> |



**Egalitarian Comparative Treatment: Enemy 1 v. Enemy 2**

| <b>Individualist: (49/83: 59.04%)</b>   | <b>Hierarch: (49/83: 59.04%)</b>   |  |
|---|--|--|
| <p style="text-align: center;"><b>The Enemy (2)</b></p> <p style="text-align: center;"><b>The Egalitarian</b></p> <ol style="list-style-type: none"> <li>1. Environmental <b>advocates</b>, represented by <b>organizations</b> like {Ecodefense} and the <b>radical</b> {Earthfirst!}, are attempting to use climate change to <b>destroy our capitalist system</b>. (15/22)</li> <li>2. <b>These groups demand radical policies that destroy free competition and reduce our individual quality of life</b>. (2/16)</li> <li>3. These <b>groups put faith in socialized</b> community-owned energy, <b>invasive</b> consumer laws, and the more <b>dangerous positions</b> advocate isolated “eco-communities,” where authority rests in environmental councils. (17/25)</li> <li>4. They argue that due to the <b>failure of free markets</b>, only <b>planned</b> communities can be trusted to <b>handle climate change</b>. (15/20).</li> </ol> | <p style="text-align: center;"><b>The Enemy (1)</b></p> <p style="text-align: center;"><b>The Egalitarian</b></p> <ol style="list-style-type: none"> <li>1. Environmental <b>interests</b>, represented by <b>groups</b> like {Ecodefense} and the <b>infamous</b> {Earthfirst!}, are attempting to use climate change to <b>promote their own agenda</b>. (15/22)</li> <li>2. <b>They push for programs that ignore scientific evidence and dismiss how truly complex climate change is</b>. (2/16)</li> <li>3. These <b>programs include reliance on unproven</b> community-owned energy, <b>ineffective</b> consumer laws, and the more <b>radical stances</b> advocate isolated “eco-communities,” where authority rests in environmental councils. (17/25)</li> <li>4. They argue that due to the <b>nature</b> of the problem, only <b>isolated</b> communities can be trusted to <b>solve the problem</b>. (15/20)</li> </ol> |  |

**The Enemy: Number Two**

| Egalitarian   | Hierarch  | Individualist  |
|---|---|--|
| <p><b>The Individualist</b></p> <ol style="list-style-type: none"> <li>1. Corporate advocates, represented by organizations like {the Wall Street Journal} and the radical {Cato Institute}, are attempting to use climate change to exploit people for profit. (18/22: Hierarch) (16/22: Individualist)</li> <li>2. These groups demand radical policies that destroy local communities and dramatically increase inequality around the globe. (7/16: Hierarch)(8/16: Individualist)</li> <li>1. They put faith in greedy corporations, ill-informed consumers, and the more dangerous positions advocate cap-and-trade policies that allow industry to sell the right to pollute. (23/25: Hierarch) (8/25: Individualist)</li> <li>3. They argue that due to the failure of community-level efforts only competitive markets can be trusted to handle climate change. (16/20)</li> </ol> <p>Hierarch Agreement: 64/83 77.11%<br/>Individualist Agreement: 47/83 56.62%</p> <p>Purple text indicates agreement between two (not three) sets of text.</p> | <p><b>The Individualist</b></p> <ol style="list-style-type: none"> <li>1. Corporate advocates, represented by organizations like {the Wall Street Journal} and the radical {Cato Institute}, are attempting to use climate change to help generate larger profits. (18/22: Egalitarian) (15/22: Individualist)</li> <li>2. These groups demand radical policies that ignore societal responsibility and push pollution and costs onto citizens. (7/16: Egalitarian and Individualist)</li> <li>3. They put faith in unregulated corporations, misinformed consumers, and the more dangerous positions advocate cap-and-trade policies that allow industry to sell the right to pollute. (23/25: Egalitarian) (8/25: Individualist)</li> <li>4. They argue that due to the failure of government regulations, only competitive markets can be trusted to handle climate change. (16/20)</li> </ol> <p>Egalitarian Agreement: 64/83 77.11%<br/>Individualist Agreement: 46/83 55.42%</p> <p>Purple text indicates agreement between two (not three) sets of text.</p> | <p><b>The Egalitarian</b></p> <ol style="list-style-type: none"> <li>1. Environmental advocates, represented by organizations like {Ecodefense} and the radical {Earthfirst!}, are attempting to use climate change to destroy our capitalist system. (15/22: Hierarch and Egalitarian)</li> <li>2. These groups demand radical policies that destroy free competition and reduce our individual quality of life. (8/16: Egalitarian)(7/16: Hierarch)</li> <li>3. These groups put faith in socialized community-owned energy, invasive consumer laws, and the more dangerous positions advocate isolated “eco-communities,” where authority rests in environmental councils. (8/25: Hierarch and Egalitarian)</li> <li>4. They argue that due to the failure of free markets, only planned communities can be trusted to handle climate change. (16/20).</li> </ol> <p>Egalitarian Agreement: 47/83 56.62%<br/>Hierarch Agreement: 46/83 55.42%</p> |

## Cultural Transition: Introducing the Heroes

| Egalitarian: (77/90: 85.55%)   | Hierarch: (77/90: 85.55%)   | Individualist: (77/90: 85.55%)   |
|--|---|--|
| <ol style="list-style-type: none"> <li>1. It is clear that both <b>big government</b> and <b>free market</b> types are using the facts about climate change to push a destructive agenda that obstructs any meaningful solutions to the problem. (27/31)</li> <li>2. To solve this problem we must invoke the value that has always served <b>humanity</b> the best; that value is our historical reliance on <b>equal participation</b>. (22/25)</li> <li>3. The <b>community-owned renewables</b> solution relies on this value by taking advantage of <b>equal participation</b> to <b>decentralize</b> the cleanest substitutes for coal and oil. (18/23)</li> <li>4. Thankfully groups like <b>{Ecodefense}</b> have been tirelessly advocating for this solution. (10/11)</li> </ol> | <ol style="list-style-type: none"> <li>1. It is clear that both <b>radical environmentalists</b> and <b>free market</b> types are using the facts about climate change to push a destructive agenda that obstructs any meaningful solutions to the problem. (27/31)</li> <li>2. To solve this problem we must invoke the value that has always served <b>Americans</b> the best; that value is our historical reliance on <b>scientific expertise</b>. (22/25)</li> <li>3. The <b>nuclear power</b> solution relies on this value by taking advantage of <b>scientific expertise</b> to <b>use</b> the cleanest substitute for coal and oil. (18/23)</li> <li>4. Thankfully groups like <b>{the Club of Rome}</b> have been tirelessly advocating for this solution. (10/11)</li> </ol> | <ol style="list-style-type: none"> <li>1. It is clear that both <b>big government</b> and <b>radical environmental</b> types are using the facts about climate change to push a destructive agenda that obstructs any meaningful solutions to the problem. (27/31)</li> <li>2. To solve this problem we must invoke the value that has always served <b>humans</b> the best; that value is our historical reliance on <b>free competition</b>. (22/25)</li> <li>3. The <b>innovative cap- and-trade</b> solution relies on this value by taking advantage of <b>free competition</b> to <b>generate</b> the cleanest substitutes for coal and oil. (18/23)</li> <li>4. Thankfully organizations like <b>{the Cato Institute}</b> have been tirelessly advocating for this solution. (10/11)</li> </ol> |

## The Moral of the Story

| Egalitarian (15/109:12.96%)  | Hierarch (15/109:12.96%)   | Individualist (15/109:12.96%)   |
|--|--|---|
| <ol style="list-style-type: none"> <li>1. The <b>community-owned renewable</b> energy solution drastically reduces the overall amount of greenhouse gasses, as <b>wind and solar energy produce none.</b> (20)</li> <li>2. This plan involves local communities purchasing and maintaining their own renewable power. (12)</li> <li>3. In cooperatively purchasing wind and solar farms, communities seize ownership from the cause of climate change: government and corporate greed. (20)</li> <li>4. Community-owned renewables have demonstrated three times the job creation and four times the property value increases of their corporate counterparts. (20)</li> <li>5. Local ownership also strengthens communal bonds as people work together to maintain something in which they all have a stake. (20)</li> <li>6. The benefits of community-owned renewable energy are clean, plentiful, and inexpensive energy sources that help strengthen communities. (17)</li> </ol> | <ol style="list-style-type: none"> <li>1. The <b>Nuclear</b> energy solution drastically reduces the overall amount of greenhouse gasses, as <b>nuclear energy produces none.</b> (17)</li> <li>2. Nuclear power costs less than coal, wind, or solar. (9)</li> <li>3. It doesn't need the sun to shine or the wind blowing, so it is also more reliable than wind or solar. (21)</li> <li>4. Nuclear power plants are also safer than coal for those that both work and live near them. (17)</li> <li>5. The one drawback to nuclear power is waste, which is easily dealt with by close monitoring and reprocessing waste into more nuclear energy. (23)</li> <li>6. The benefits of the nuclear solution are a clean, plentiful, and inexpensive energy source that takes advantage of our greatest scientific accomplishments. (22)</li> </ol> | <ol style="list-style-type: none"> <li>1. The <b>cap-and-trade</b> energy solution drastically reduces the overall amount of greenhouse gasses, as <b>businesses are limited by how much they can produce.</b> (22)</li> <li>2. Each business can buy or trade permits within these emissions limits. (11)</li> <li>3. So, if a company releases greenhouse gasses below what its permits would allow, it may sell or trade its permits to a business that produces more. (26)</li> <li>4. This solution lets companies that have traditionally produced more greenhouse gasses buy from those that produce less. (17)</li> <li>5. The benefit of the <b>cap-and-trade</b> solution is businesses will have time to adapt to a more climate conscious economy while also competing with companies that find creative ways to cut costs and emissions. (34)</li> </ol> |

## The Moral of the Story: Policy Solution

| Egalitarian (33/64:51.56% )   | Hierarch (36/64:51.56% )  | Individualist (36/64:51.56% )   |
|---|---|---|
| <ol style="list-style-type: none"> <li>1. The problem of global climate change reminds us all that the world is fragile. (12/14)</li> <li>2. When humanity loses sight of our relationship with nature, the environment will always retaliate for our carelessness. (1/17)</li> <li>3. The community-owned renewable energy solution provides a clear path for humanity to correct our reckless behavior and solve the problem of global climate change. (15/23)</li> <li>4. Governmental excesses and bottomless corporate greed are not the answer. (5/10)</li> </ol> | <ol style="list-style-type: none"> <li>1. The problem of global climate change reminds us that the world is delicately balanced. (12/14)</li> <li>2. When mankind disturbs this balance, we must rely on our expertise to bring things back into order. (1/17).</li> <li>3. The nuclear energy solution provides a clear path for governments to reestablish control through expert management and solve the problem of climate change. (15/23)</li> <li>4. Radical ideology and more corporate greed are not the answer. (5/10)</li> </ol> | <ol style="list-style-type: none"> <li>1. The problem of climate change reminds us all that the world is rapidly changing. (12/14).</li> <li>2. When change turns for the worse, it can only get better if we are free to adapt. (1/17)</li> <li>3. The cap-and-trade solution provides a clear path for corporations to freely adapt, provide innovative solutions, and solve the problem of global climate change. (15/23)</li> <li>4. Radical ideology and more big government are not the answer. (5/10)</li> </ol> |

## APPENDIX C: CONTROL VARIABLE DESCRIPTIVE STATISTICS

**Q2\_Age:** How old are you? [Verbatim]

| n    | Minimum | Maximum | Mean  |
|------|---------|---------|-------|
| 1586 | 18      | 88      | 46.01 |

**Q3\_Education:** What is your highest level of education?

| Category                          | Frequency   |
|-----------------------------------|-------------|
| 1: Elementary or some high school | 42          |
| 2: High School Graduate/GED       | 358         |
| 3: Some college/vocational school | 577         |
| 4: College Graduate               | 379         |
| 5: Some graduate work             | 90          |
| 6: Master's Degree                | 101         |
| 7: Doctorate of any type          | 17          |
| Other Degree (specify)            | 16          |
| <b>Total</b>                      | <b>1580</b> |

**Q4\_Gender:** Are you male or female?

| Category     | Frequency   |
|--------------|-------------|
| Male         | 893         |
| Female       | 688         |
| <b>Total</b> | <b>1581</b> |

**Income (Q56-Q56iv):** Which of the following income categories approximates the total estimated annual income from your household in the previous year?

| Category           | Frequency |
|--------------------|-----------|
| Less than 10,000   | 149       |
| 10,000 to 19,999   | 180       |
| 20,000 to 29,999   | 215       |
| 30,000 to 39,999   | 224       |
| 40,000 to 49,999   | 149       |
| 50,000 to 59,999   | 181       |
| 60,000 to 69,999   | 131       |
| 70,000 to 79,999   | 98        |
| 80,000 to 89,999   | 61        |
| 90,000 to 99,999   | 38        |
| 100,000 to 109,999 | 29        |

|                    |      |
|--------------------|------|
| 110,000 to 119,999 | 21   |
| 120,000 to 129,999 | 16   |
| 130,000 to 139,999 | 19   |
| 140,000 to 149,999 | 15   |
| 150,000 to 159,999 | 13   |
| 160,000 to 169,999 | 3    |
| 170,000 to 179,999 | 1    |
| 180,000 to 189,999 | 0    |
| 190,000 to 199,999 | 4    |
| 200,000 or more    | 3    |
| Total              | 1550 |

**Q55\_Race:** Which of the following do you most associate with your own ethnicity or race?

| Category        | Frequency |
|-----------------|-----------|
| American Indian | 14        |
| Asian           | 28        |
| Black           | 256       |
| Hispanic        | 176       |
| White           | 1075      |
| Other (Specify) | 30        |
| Total           | 1579      |

**Q8\_Ideology:** On a scale of political ideology, individuals can be arranged from strongly liberal to strongly conservative. Which of the following categories best describes your view?

| Category              | Frequency |
|-----------------------|-----------|
| Strongly Liberal      | 103       |
| Liberal               | 233       |
| Slightly Liberal      | 174       |
| Middle of the Road    | 551       |
| Slightly Conservative | 163       |
| Conservative          | 240       |
| Strongly Conservative | 109       |
| Total                 | 1573      |

**Climate Change Knowledge (composite measure: q12-q22)**

| Minimum | Maximum | Mean   | N    |
|---------|---------|--------|------|
| 2       | 11      | 7.7447 | 1508 |

**Q12\_Temp correct:** Do most scientists expect temperatures to rise?

|               |      |
|---------------|------|
| Correct (Yes) | 1395 |
| Incorrect     | 180  |
| Total         | 1575 |

**Q13\_Ocean Correct:** Do most scientists expect ocean levels to drop?

|              |      |
|--------------|------|
| Correct (No) | 1001 |
| Incorrect    | 574  |
| Total        | 1575 |

**Q14\_Drought correct:** Do most scientists expect more frequent droughts?

|               |      |
|---------------|------|
| Correct (Yes) | 1281 |
| Incorrect     | 297  |
| Total         | 1578 |

**Q15\_Flood Correct:** Do most scientists expect fewer floods?

|              |      |
|--------------|------|
| Correct (No) | 1334 |
| Incorrect    | 237  |
| Total        | 1571 |

**Q16\_Weather Correct:** Do most scientists expect more severe weather storms, like hurricanes and tornados?

|               |      |
|---------------|------|
| Correct (Yes) | 1371 |
| Incorrect     | 205  |
| Total         | 1576 |

**Q17\_Auto Correct:** Do most scientists believe exhausts from cars and trucks cause global temperatures to rise?

|               |      |
|---------------|------|
| Correct (Yes) | 1392 |
| Incorrect     | 179  |
| Total         | 1571 |

**Q18\_Nuclear Correct:** Do most scientists believe radiation from nuclear power plants causes global temperatures to rise?

|              |      |
|--------------|------|
| Correct (No) | 644  |
| Incorrect    | 922  |
| Total        | 1566 |

**Q19\_Chemical Correct:** Do most scientists believe disposal of toxic chemicals in landfills causes global temperatures to rise?



|              |      |
|--------------|------|
| Correct (No) | 499  |
| Incorrect    | 1072 |
| Total        | 1571 |

**Q20\_Coal Correct:** Do scientists believe coal powered electricity plants cause global temperatures to rise?

|               |      |
|---------------|------|
| Correct (Yes) | 1167 |
| Incorrect     | 402  |
| Total         | 1586 |

**Q21\_Deforest Correct:** Do most scientists believe the destruction of jungles and forests causes global temperatures to rise?

|              |      |
|--------------|------|
| Correct (No) | 1360 |
| Incorrect    | 211  |
| Total        | 1571 |

**Q22\_Avgtempcorrect:** To the best of your knowledge, how much do scientists think the average temperature will increase over the next 50 to 70 years?

|           |      |
|-----------|------|
| Correct   | 716  |
| Incorrect | 858  |
| Total     | 1586 |

#### Cultural Totals

|                | Minimum | Maximum | Mean    | N    |
|----------------|---------|---------|---------|------|
| Individualism  | 3       | 21      | 12.333  | 1557 |
| Hierarchism    | 3       | 21      | 11.6100 | 1559 |
| Egalitarianism | 3       | 21      | 12.3201 | 1559 |
| Fatalism       | 3       | 21      | 9.8544  | 1566 |

## APPENDIX D: DEPENDNET VARIABLE DESCRIPTIVES

**Q44\_Narrator\_threat:** Using a scale from zero to ten, *where zero is no threat at all and ten is extreme threat*, how much of a threat do you feel the author of the previous article believes climate change to be?

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 6.9492       | 7.2060  | 6.6068                  | 6.7541             | 7.2265                |
| <b>n</b>    | 1574         | 403     | 412                     | 366                | 393                   |

**Q45\_Author\_trust:** Using a scale from zero to ten, *where zero means no trust and ten means complete trust*, how much do you trust that the facts and arguments presented in the previous article are accurate?

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 5.2405       | 5.5608  | 5.0583                  | 5.0707             | 5.2621                |
| <b>n</b>    | 1576         | 403     | 412                     | 368                | 393                   |

**Q46\_Affect:** Using a scale from zero to ten, *where zero means extremely negative and ten means extremely positive*, what is your overall reaction to the previous article you just read?

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 5.3442       | 5.2975  | 5.2597                  | 5.3351             | 5.4897                |
| <b>n</b>    | 1569         | 400     | 412                     | 367                | 390                   |

**Q47\_Respondent Risk:** Using a scale from zero to ten, *where zero is no threat at all and ten is extreme threat*, in your considered assessment, how much of a threat do you believe climate change poses to you personally in the next 50 years?

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 5.7513       | 5.6965  | 5.5461                  | 5.8529             | 5.9284                |
| <b>n</b>    | 1572         | 402     | 412                     | 367                | 391                   |

**Q51\_Sociotropic Risk:** The author indicated that global climate change posed some risk to the United States. Using a scale from zero to ten, *where zero means no problem whatsoever and ten means devastating*, how much of a problem do you believe climate change will be for the United States in the next 50 years?

|  | Total | Control | Individualist | Hierarch | Egalitarian |
|--|-------|---------|---------------|----------|-------------|
|--|-------|---------|---------------|----------|-------------|

|             | Sample |        | Narrative | Narrative | Narrative |
|-------------|--------|--------|-----------|-----------|-----------|
| <b>Mean</b> | 6.2705 | 6.2918 | 6.2203    | 6.3651    | 6.2128    |
| <b>n</b>    | 1571   | 401    | 413       | 367       | 390       |

**Q49\_CC\_Belief:** Using a scale from zero to ten, *where zero means completely disagree and ten means completely agree*, please indicate how much you agree with the accuracy of the following statements: The Earth is warming and over the past one hundred years the average temperature has increased by one to two degrees.

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 7.2738       | 7.4119  | 7.1235                  | 7.3770             | 7.1939                |
| <b>n</b>    | 1574         | 403     | 413                     | 366                | 392                   |

**Q50\_Anthropogenic Cause:** Using a scale from zero to ten, *where zero means completely disagree and ten means completely agree*, please indicate how much you agree with the accuracy of the following statements: Human produced greenhouse gasses, such as those resulting from the combustion of coal, oil, natural gas, and others are the cause of average global temperature increases.

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 6.5334       | 6.6244  | 6.2944                  | 6.7575             | 6.4809                |
| <b>n</b>    | 1573         | 402     | 411                     | 367                | 393                   |

**Q48\_GHG Regulation:** Using a scale from zero to ten, *where zero means not at all important and ten means extremely important*, how important do you think it is for the U.S. to reduce greenhouse gas emissions?

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 7.3416       | 7.4020  | 7.1732                  | 7.5452             | 7.2665                |
| <b>n</b>    | 1572         | 403     | 410                     | 365                | 394                   |

## The Cast of Characters

**Control:** Now we would like to ask your opinion about a few groups commonly associated with debates about climate change. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to these groups.

**Narrative Experimental Tracks:** The author mentions {*INSERT GROUP NAME*}. Using a scale from zero to ten, *where zero means completely negative and ten means completely positive*, please indicate your reaction to this group.

### EarthFirst (No DK)

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 4.490        | 5.8253  | 3.8259                  | 4.0725             | na                    |
| <b>n</b>    | 1002         | 292     | 379                     | 331                | na                    |

### Ecodefense (No DK)

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 4.5668       | 5.2520  | 3.5771                  | 3.7430             | 5.9162                |
| <b>n</b>    | 1295         | 250     | 376                     | 323                | 346                   |

### The Club of Rome (No DK)

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 3.9705       | 4.5288  | 3.2127                  | 5.6849             | 2.9102                |
| <b>n</b>    | 1185         | 208     | 362                     | 292                | 323                   |

### The Cato Institute (No DK)

|             | Total Sample | Control | Individualist Narrative | Hierarch Narrative | Egalitarian Narrative |
|-------------|--------------|---------|-------------------------|--------------------|-----------------------|
| <b>Mean</b> | 4.2352       | 4.9017  | 5.6429                  | 3.3889             | 3.1272                |
| <b>n</b>    | 1246         | 234     | 350                     | 324                | 338                   |

**The Wall Street Journal (No DK)**

|             | <b>Total Sample</b> | <b>Control</b> | <b>Individualist Narrative</b> | <b>Hierarch Narrative</b> | <b>Egalitarian Narrative</b> |
|-------------|---------------------|----------------|--------------------------------|---------------------------|------------------------------|
| <b>Mean</b> | 4.2203              | 5.2844         | na                             | 3.6140                    | 3.8078                       |
| <b>n</b>    | 1035                | 334            | na                             | 342                       | 359                          |

**Policy Preferences**

Now, I would like to assess your opinion on several proposals that many argue will reduce greenhouse gas emissions. Using a scale from zero to ten, where zero means completely disagree and ten means completely agree, please indicate how much you support each of the following proposals:

**Q52\_Pref1\_Hier:** Many argue that the problem of excessive greenhouse gas emissions should be solved by relying more on *nuclear energy*. How much do you agree or disagree with the nuclear energy approach to reducing greenhouse gases?

**Nuclear Energy (No DK)**

|             | <b>Total Sample</b> | <b>Control</b> | <b>Individualist Narrative</b> | <b>Hierarch Narrative</b> | <b>Egalitarian Narrative</b> |
|-------------|---------------------|----------------|--------------------------------|---------------------------|------------------------------|
| <b>Mean</b> | 5.2740              | 5.5847         | 5.2310                         | 5.2759                    | 4.9943                       |
| <b>n</b>    | 1445                | 366            | 381                            | 348                       | 350                          |

**Q53\_Pref2\_Ind:** One proposal to deal with greenhouse gas emissions is to use a *cap-and-trade* system (also called tradable emissions). This solution places an overall limit on company and industry emissions. Permits are issued and companies that emit less greenhouse gasses can trade or sell their permits to companies that produce more. How much do you agree or disagree with the cap-and-trade approach to reducing greenhouse gases?

**Cap-and-Trade (No DK)**

|             | <b>Total Sample</b> | <b>Control</b> | <b>Individualist Narrative</b> | <b>Hierarch Narrative</b> | <b>Egalitarian Narrative</b> |
|-------------|---------------------|----------------|--------------------------------|---------------------------|------------------------------|
| <b>Mean</b> | 4.8018              | 4.8247         | 5.5187                         | 4.5549                    | 4.2368                       |
| <b>n</b>    | 1418                | 365            | 374                            | 337                       | 342                          |

**Q54\_Pref3\_Egal:** Many argue that excessive greenhouse gas emissions are best handled at the community level. The *community based approach* contends that it is through communities taking direct ownership of renewable energy, such as wind and solar farms, that greenhouse gas emissions are best reduced (as opposed to corporations or government). How much do you agree or disagree with the community approach to reducing greenhouse gases?

**Renewable Energy**

|             | <b>Total<br/>Sample</b> | <b>Control</b> | <b>Individualist<br/>Narrative</b> | <b>Hierarch<br/>Narrative</b> | <b>Egalitarian<br/>Narrative</b> |
|-------------|-------------------------|----------------|------------------------------------|-------------------------------|----------------------------------|
| <b>Mean</b> | 5.8862                  | 6.0187         | 5.8661                             | 5.3481                        | 6.2809                           |
| <b>n</b>    | 1450                    | 374            | 381                                | 339                           | 356                              |

**APPENDIX E: NARRATIVE STRUCTURAL DEPENDENT VARIABLES: AUTHOR  
TRUST AND NARRATIVE AFFECT**

| <b>Variable</b>                | <b>Author<br/>Trust</b>  | <b>Affect</b>            | <b>Narrator<br/>Threat</b> |
|--------------------------------|--------------------------|--------------------------|----------------------------|
| Constant                       | <b>5.085**</b><br>(.547) | <b>4.329**</b><br>(.520) | <b>4.666**</b><br>(.551)   |
| Age                            | -.009<br>(.005)          | .002<br>(.004)           | -.004<br>(.005)            |
| Education                      | -.056<br>(.059)          | -.053<br>(.056)          | .061<br>(.060)             |
| Gender                         | <b>-.415*</b><br>(.137)  | -.095<br>(.129)          | <b>-.420**</b><br>(.138)   |
| Income                         | .003<br>(.021)           | -.003<br>(.020)          | .038<br>(.021)             |
| White/Asian                    | -.245<br>(.151)          | <b>-.482**</b><br>(.143) | -.040<br>(.152)            |
| Ideology                       | <b>-.225**</b><br>(.045) | <b>-.142**</b><br>(.043) | .040<br>(.045)             |
| Climate Change Knowledge       | <b>.127**</b><br>(.038)  | <b>.122**</b><br>(.036)  | <b>.292**</b><br>(.038)    |
| Individualism                  | <b>-.039*</b><br>(.018)  | <b>-.035*</b><br>(.017)  | .016<br>(.018)             |
| Hierarchy                      | <b>.066**</b><br>(.020)  | <b>.059*</b><br>(.019)   | .011<br>(.020)             |
| Egalitarianism                 | <b>.099**</b><br>(.017)  | <b>.072**</b><br>(.016)  | <b>.049**</b><br>(.017)    |
| Fatalism                       | -.017<br>(.019)          | -.012<br>(.018)          | <b>-.085**</b><br>(.019)   |
| <b>Individualist Narrative</b> | <b>-.456*</b><br>(.182)  | .032<br>(.173)           | <b>-.562**</b><br>(.184)   |
| <b>Hierarchical Narrative</b>  | <b>-.474*</b><br>(.187)  | .138<br>(.177)           | <b>-.376*</b><br>(.189)    |
| <b>Egalitarian Narrative</b>   | .303<br>(.185)           | .247<br>(.175)           | .117<br>(.187)             |
| Adjusted R <sup>2</sup>        | .106                     | .063                     | .081                       |
| F Statistic                    | 12.725                   | 7.645                    | 9.665                      |
| N                              | 1384                     | 1380                     | 1382                       |

\* p < .05; \*\* p < .001

**APPENDIX F: NARRATIVE STRUCTURE AND PERCEPTIONS OF RISK ABOUT  
CLIMATE CHANGE**

| <b>Variable</b>                | <b>Personal Risk</b>     | <b>Sociotropic Risk</b>  |
|--------------------------------|--------------------------|--------------------------|
| Constant                       | <b>4.787**</b><br>(.579) | <b>4.937**</b><br>(.495) |
| Age                            | <b>-.018**</b><br>(.005) | -.005<br>(.004)          |
| Education                      | .002<br>(.062)           | -.023<br>(.054)          |
| Gender                         | <b>-.625**</b><br>(.144) | <b>-.597**</b><br>(.124) |
| Income                         | .003<br>(.022)           | -.024<br>(.019)          |
| White/Asian                    | <b>-.346*</b><br>(.159)  | <b>-.535**</b><br>(.137) |
| Ideology                       | <b>-.180**</b><br>(.047) | <b>-.283**</b><br>(.041) |
| Climate Change Knowledge       | <b>.261**</b><br>(.040)  | <b>.284**</b><br>(.034)  |
| Individualism                  | <b>-.099**</b><br>(.019) | <b>-.088**</b><br>(.016) |
| Hierarchy                      | .027<br>(.021)           | .044<br>(.018)           |
| Egalitarianism                 | <b>.171**</b><br>(.018)  | <b>.164**</b><br>(.015)  |
| Fatalism                       | -.029<br>(.020)          | -.019<br>(.017)          |
| <b>Individualist Narrative</b> | .005<br>(.192)           | .157<br>(.165)           |
| <b>Hierarchical Narrative</b>  | .243<br>(.197)           | .262<br>(.169)           |
| <b>Egalitarian Narrative</b>   | <b>.322*</b><br>(.195)   | -.015<br>(.168)          |
| Adjusted R <sup>2</sup>        | .197                     | .265                     |
| F Statistic                    | 25.161                   | 36.461                   |
| N                              | 1382                     | 1380                     |

\* p < .05; \*\* p < .001



**APPENDIX G: NARRATIVE STRUCTURE, CLIMATE CHANGE OPINION, NAD  
WILLINGNESS TO REDUCE GHG'S**

| Variable                       | Climate<br>Change Belief | Anthropogenic<br>Cause   | US GHG<br>Reductions     |
|--------------------------------|--------------------------|--------------------------|--------------------------|
| Constant                       | <b>4.550**</b><br>(.549) | <b>4.439**</b><br>(.553) | <b>5.277**</b><br>(.555) |
| Age                            | .008<br>(.005)           | -.008<br>(.005)          | .005<br>(.005)           |
| Education                      | -.045<br>(.059)          | -.098<br>(.060)          | -.052<br>(.060)          |
| Gender                         | <b>-.545**</b><br>(.137) | <b>-.498**</b><br>(.139) | <b>-.557**</b><br>(.138) |
| Income                         | .011<br>(.021)           | .028<br>(.021)           | .005<br>(.021)           |
| White/Asian                    | .168<br>(.151)           | <b>-.326*</b><br>(.153)  | -.105<br>(.153)          |
| Ideology                       | <b>-.284**</b><br>(.045) | <b>-.319**</b><br>(.045) | <b>-.291**</b><br>(.045) |
| Climate Change Knowledge       | <b>.388**</b><br>(.038)  | <b>.396**</b><br>(.039)  | <b>.354**</b><br>(.039)  |
| Individualism                  | <b>-.043*</b><br>(.018)  | <b>-.094**</b><br>(.018) | <b>-.085**</b><br>(.018) |
| Hierarchy                      | <b>.044*</b><br>(.020)   | <b>.083**</b><br>(.020)  | .034<br>(.020)           |
| Egalitarianism                 | <b>.106**</b><br>(.017)  | <b>.168**</b><br>(.017)  | <b>.160**</b><br>(.017)  |
| Fatalism                       | <b>-.054*</b><br>(.019)  | <b>-.051*</b><br>(.019)  | <b>-.060*</b><br>.019    |
| <b>Individualist Narrative</b> | -.105<br>(.183)          | -.196<br>(.185)          | -.120<br>(.185)          |
| <b>Hierarchical Narrative</b>  | .063<br>(.188)           | .177<br>(.189)           | .241<br>(.189)           |
| <b>Egalitarian Narrative</b>   | -.165<br>(.186)          | -.102<br>(.187)          | -.063<br>(-.187)         |
| Adjusted R <sup>2</sup>        | .171                     | .251                     | .220                     |
| F Statistic                    | 21.366                   | 34.088                   | 28.728                   |
| N                              | 1382                     | 1382                     | 1380                     |

\* p < .05; \*\* p < .001

**APPENDIX H: NARRATIVE STRUCTURE AND GROUP AFFECT**

| <b>Variable</b>                | <b>The Cato<br/>Institute</b> | <b>The Club of<br/>Rome</b> | <b>Ecodefense</b>         |
|--------------------------------|-------------------------------|-----------------------------|---------------------------|
| Constant                       | <b>4.011**</b><br>(.613)      | <b>3.443**</b><br>(.614)    | <b>6.019**</b><br>(.607)  |
| Age                            | <b>-.011*</b><br>(.005)       | <b>-.012*</b><br>(.005)     | <b>-.021**</b><br>(.005)  |
| Education                      | .063<br>(.066)                | .081<br>(.067)              | -.008<br>(.066)           |
| Gender                         | .285<br>(.154)                | .047<br>(.154)              | .180<br>(.152)            |
| Income                         | -.019<br>(.023)               | -.020<br>(.023)             | -.009<br>(.023)           |
| White/Asian                    | -.063<br>(.168)               | -.194<br>(.168)             | -.278<br>(.166)           |
| Ideology                       | .003<br>(.051)                | -.038<br>(.051)             | <b>-.204**</b><br>(.050)  |
| Climate Change<br>Knowledge    | -.028<br>(.042)               | -.069<br>(.042)             | -.025<br>(.042)           |
| Individualism                  | .038<br>(.020)                | .012<br>(.020)              | <b>-.098**</b><br>(.020)  |
| Hierarchy                      | <b>.056*</b><br>(.022)        | <b>.067*</b><br>(.022)      | <b>.114**</b><br>(.022)   |
| Egalitarianism                 | -.003<br>(.019)               | <b>.060**</b><br>(.019)     | <b>.095**</b><br>(.019)   |
| Fatalism                       | .039<br>(.022)                | <b>.056*</b><br>(.021)      | .014<br>(.021)            |
| <b>Individualist Narrative</b> | <b>.718**</b><br>(.220)       | <b>-1.281**</b><br>(.222)   | <b>-1.614**</b><br>(.214) |
| <b>Hierarchical Narrative</b>  | <b>-1.530**</b><br>(.223)     | <b>1.214**</b><br>(.230)    | <b>-1.509**</b><br>(.220) |
| <b>Egalitarian Narrative</b>   | <b>-1.754**</b><br>(.222)     | <b>-1.553**</b><br>(.226)   | <b>.641**</b><br>(.218)   |
| Adjusted R <sup>2</sup>        | .182                          | .231                        | .258                      |
| F Statistic                    | 18.413                        | 23.483                      | 29.181                    |
| N                              | 1092                          | 1045                        | 1135                      |

\* p < .05; \*\* p < .001

**APPENDIX I: NARRATIVE STRUCTURE AND THE MORAL OF THE STORY**

| <b>Variable</b>                | <b>Cap-and-Trade</b>     | <b>Nuclear Energy</b>    | <b>Community Renewable Energy</b> |
|--------------------------------|--------------------------|--------------------------|-----------------------------------|
| Constant                       | <b>3.389**</b><br>(.696) | .164<br>(.688)           | <b>4.522**</b><br>(.640)          |
| Age                            | <b>-.020**</b><br>(.006) | <b>.014*</b><br>(.006)   | -.001<br>(.005)                   |
| Education                      | .072<br>(.074)           | <b>.190*</b><br>(.073)   | <b>-.229**</b><br>(.068)          |
| Gender                         | -.140<br>(.173)          | <b>.559**</b><br>(.171)  | <b>-.494*</b><br>(.160)           |
| Income                         | -.013<br>(.026)          | .039<br>(.026)           | .034<br>(.024)                    |
| White/Asian                    | -.111<br>(.192)          | .231<br>(.190)           | .235<br>(.176)                    |
| Ideology                       | <b>-.145*</b><br>(.057)  | <b>.166*</b><br>(.056)   | -.032<br>(.052)                   |
| Climate Change Knowledge       | -.021<br>(.048)          | .044<br>(.048)           | .065<br>(.045)                    |
| Individualism                  | -.024<br>(.023)          | <b>.102**</b><br>(.022)  | .011<br>(.021)                    |
| Hierarchy                      | <b>.092*</b><br>(.025)   | <b>.081**</b><br>(.024)  | .025<br>(.023)                    |
| Egalitarianism                 | <b>.140**</b><br>(.021)  | .007<br>(.021)           | <b>.114**</b><br>(.019)           |
| Fatalism                       | <b>.056*</b><br>(.024)   | .024<br>(.024)           | -.008<br>(.022)                   |
| <b>Individualist Narrative</b> | <b>.776**</b><br>(.229)  | -.355<br>(.227)          | -.056<br>(.211)                   |
| <b>Hierarchical Narrative</b>  | -.124<br>(.234)          | -.211<br>(.232)          | <b>-.546*</b><br>(.216)           |
| <b>Egalitarian Narrative</b>   | <b>-.535*</b><br>(.235)  | <b>-.539**</b><br>(.233) | <b>.366*</b><br>(.215)            |
| Adjusted R <sup>2</sup>        | .128                     | .090                     | .057                              |
| F Statistic                    | 14.119                   | 10.026                   | 6.465                             |
| N                              | 1248                     | 1273                     | 1275                              |

\* p < .05; \*\* p < .001

APPENDIX J: INDIVIDUALIST CULTURAL NARRATIVE TREATMENT AND CULTURAL THEORY, OLS ESTIMATES

|                          | Narrator Threat <sup>a</sup> | Narrator Trust  | Affect          | Personal Risk    | Sociotropic risk | Climate Change Belief | Anthropogenic Cause | GHG Regulation   | Cap-and Trade    | Nuclear Energy  | Renewable Energy |
|--------------------------|------------------------------|-----------------|-----------------|------------------|------------------|-----------------------|---------------------|------------------|------------------|-----------------|------------------|
| Constant                 | 3.163<br>(.978)              | 3.846<br>(.957) | 3.371<br>(.902) | 4.341<br>(1.072) | 3.728<br>(.873)  | 3.308<br>(1.005)      | 3.488<br>(1.007)    | 4.454<br>(1.038) | 3.543<br>(1.219) | -435<br>(1.271) | 3.483<br>(1.158) |
| Age                      | -.009<br>(.009)              | -.006<br>(.009) | -.001<br>(.008) | -.012<br>(.010)  | -.001<br>(.008)  | .011<br>(.009)        | -.008<br>(.009)     | .000<br>(.010)   | -.024<br>(.011)  | .021<br>(.012)  | -.000<br>(.011)  |
| Education                | -.098<br>(.102)              | -.005<br>(.100) | -.093<br>(.094) | -.014<br>(.112)  | -.065<br>(.091)  | -.011<br>(.105)       | -.026<br>(.105)     | .106<br>(.108)   | .072<br>(.129)   | .094<br>(.133)  | -.084<br>(.120)  |
| Gender                   | -.541<br>(.266)              | -.290<br>(.259) | -.021<br>(.244) | -.973<br>(.290)  | -.945<br>(.237)  | -.977<br>(.272)       | -.948<br>(.273)     | .493<br>(.280)   | -.651<br>(.333)  | .613<br>(.345)  | -.606<br>(.314)  |
| Income                   | .126<br>(.039)               | .006<br>(.038)  | .011<br>(.036)  | .014<br>(.043)   | -.012<br>(.035)  | .026<br>(.040)        | -.011<br>(.040)     | .047<br>(.041)   | -.011<br>(.048)  | .042<br>(.050)  | .038<br>(.046)   |
| White/Asian              | -.019<br>(.293)              | -.180<br>(.285) | -.474<br>(.269) | -.229<br>(.320)  | -.496<br>(.261)  | .288<br>(.300)        | -.375<br>(.301)     | -.177<br>(.309)  | .166<br>(.369)   | .351<br>(.385)  | .081<br>(.348)   |
| Ideology                 | .127<br>(.086)               | -.179<br>(.085) | -.028<br>(.079) | -.157<br>(.094)  | -.160<br>(.077)  | -.203<br>(.089)       | -.244<br>(.089)     | -.263<br>(.091)  | -.159<br>(.106)  | .115<br>(.111)  | -.070<br>(.100)  |
| Climate Change Knowledge | .311<br>(.074)               | .154<br>(.074)  | .189<br>(.068)  | .303<br>(.081)   | .332<br>(.066)   | .492<br>(.076)        | .474<br>(.077)      | .363<br>(.078)   | .164<br>(.091)   | -.004<br>(.095) | .108<br>(.087)   |
| Individualism            | .060<br>(.036)               | -.054<br>(.035) | .006<br>(.033)  | -.136<br>(.039)  | -.109<br>(.032)  | -.095<br>(.036)       | -.119<br>(.036)     | -.111<br>(.037)  | .038<br>(.044)   | .124<br>(.046)  | -.063<br>(.042)  |
| Hierarchism              | .048<br>(.039)               | .109<br>(.037)  | .059<br>(.035)  | .072<br>(.042)   | .090<br>(.034)   | .111<br>(.039)        | .129<br>(.040)      | .108<br>(.041)   | .092<br>(.048)   | .107<br>(.050)  | .054<br>(.045)   |
| Egalitarianism           | .054<br>(.032)               | .085<br>(.031)  | .061<br>(.029)  | .149<br>(.035)   | .170<br>(.028)   | .076<br>(.033)        | .162<br>(.033)      | .136<br>(.034)   | .089<br>(.040)   | -.029<br>(.041) | .091<br>(.038)   |
| Fatalism                 | -.113<br>(.037)              | -.034<br>(.036) | -.032<br>(.034) | -.023<br>(.040)  | .000<br>(.032)   | -.052<br>(.037)       | -.061<br>(.037)     | -.078<br>(.038)  | -.017<br>(.045)  | .079<br>(.047)  | -.034<br>(.043)  |
| Adjusted R2              | .117                         | .075            | .028            | .173             | .300             | .190                  | .253                | .184             | .057             | .105            | .021             |
| F-Statistic              | 5.388                        | 3.696           | 1.944           | 7.949            | 17.399           | 8.830                 | 12.223              | 8.460            | 2.837            | 4.624           | 1.659            |
| n                        | 366                          | 366             | 366             | 366              | 338              | 367                   | 365                 | 364              | 334              | 341             | 340              |

\* p<.05; \*\* p<.01; \*\*\* p<.001 one-tailed test (a: two-tailed test)

**APPENDIX K: HIERARCH CULTURAL NARRATIVE TREATMENT AND CULTURAL THEORY, OLS ESTIMATES**

|                          | Narrator Threat <sup>a</sup> | Narrator Trust   | Affect           | Personal Risk    | Sociotropic Risk | Climate Change Belief | Anthropogenic Cause | GHG Regulation   | Cap-and Trade    | Nuclear Energy  | Renewable Energy |
|--------------------------|------------------------------|------------------|------------------|------------------|------------------|-----------------------|---------------------|------------------|------------------|-----------------|------------------|
| Constant                 | 5.527<br>(1.216)             | 4.637<br>(1.164) | 6.581<br>(1.086) | 5.369<br>(1.200) | 7.041<br>(1.049) | 4.840<br>(1.155)      | 4.600<br>(1.144)    | 6.120<br>(1.113) | 3.671<br>(1.508) | .902<br>(1.427) | 5.146<br>(1.413) |
| Age                      | .0000<br>(.010)              | -.010<br>(.010)  | -.004<br>(.009)  | -.014<br>(.010)  | .010<br>(.009)   | .010<br>(.010)        | -.011<br>(.010)     | .010<br>(.009)   | -.037<br>(.013)  | -.010<br>(.012) | -.017<br>(.012)  |
| Education                | .110<br>(.131)               | .018<br>(.126)   | .024<br>(.115)   | .080<br>(.129)   | .020<br>(.118)   | .049<br>(.124)        | .019<br>(.123)      | -.050<br>(.117)  | .067<br>(.160)   | .184<br>(.150)  | -.111<br>(.147)  |
| Gender                   | -.308<br>(.304)              | -.142<br>(.292)  | .348<br>(.267)   | -.295<br>(.301)  | -.389<br>(.264)  | -.352<br>(.288)       | -.381<br>(.288)     | -.419<br>(.272)  | .562<br>(.372)   | .629<br>(.351)  | -.044<br>(.348)  |
| Income                   | -.005<br>(.046)              | -.043<br>(.044)  | -.023<br>(.040)  | -.043<br>(.046)  | -.095<br>(.040)  | -.030<br>(.044)       | -.014<br>(.043)     | -.099<br>(.042)  | .043<br>(.058)   | -.009<br>(.053) | .048<br>(.053)   |
| White/Asian              | .468<br>(.326)               | -.138<br>(.312)  | -.340<br>(.287)  | .044<br>(.322)   | -.509<br>(.282)  | .303<br>(.307)        | .052<br>(.307)      | .078<br>(.291)   | -.429<br>(.403)  | .294<br>(.378)  | .427<br>(.374)   |
| Ideology                 | -.074<br>(.092)              | -.138<br>(.088)  | -.133<br>(.081)  | -.181<br>(.091)  | -.394<br>(.080)  | -.245<br>(.087)       | -.302<br>(.087)     | -.255<br>(.082)  | -.142<br>(.117)  | .082<br>(.107)  | -.009<br>(.107)  |
| Climate Change Knowledge | .197<br>(.091)               | .031<br>(.087)   | -.081<br>(.081)  | .199<br>(.090)   | .201<br>(.080)   | .344<br>(.086)        | .348<br>(.086)      | .348<br>(.082)   | -.038<br>(.112)  | .096<br>(.106)  | -.057<br>(.106)  |
| Individualism            | -.001<br>(.039)              | .026<br>(.037)   | -.027<br>(.034)  | -.077<br>(.039)  | -.058<br>(.034)  | .021<br>(.037)        | -.041<br>(.037)     | -.015<br>(.035)  | -.030<br>(.048)  | .135<br>(.045)  | -.009<br>(.045)  |
| Hierarchy                | -.031<br>(.042)              | .056<br>(.040)   | .084<br>(.037)   | -.009<br>(.041)  | -.008<br>(.036)  | -.047<br>(.040)       | .043<br>(.039)      | -.035<br>(.037)  | .112<br>(.052)   | .083<br>(.048)  | .024<br>(.047)   |
| Egalitarianism           | .038<br>(.035)               | .006<br>(.034)   | -.047<br>(.031)  | .121<br>(.035)   | .078<br>(.030)   | .081<br>(.033)        | .132<br>(.033)      | .107<br>(.032)   | .155<br>(.043)   | -.005<br>(.041) | .091<br>(.041)   |
| Fatalism                 | -.056<br>(.043)              | .058<br>(.041)   | .026<br>(.038)   | .002<br>(.042)   | -.015<br>(.037)  | -.031<br>(.041)       | -.025<br>(.040)     | -.054<br>(.038)  | .028<br>(.053)   | .023<br>(.050)  | .008<br>(.049)   |
| Adjusted R2              | .026                         | .015             | .013             | .101             | .183             | .109                  | .158                | .164             | .108             | .062            | .007             |
| F-Statistic              | 1.803                        | 1.442            | 1.399            | 4.333            | 7.655            | 4.630                 | 6.543               | 6.763            | 4.297            | 2.836           | 1.190            |
| n                        | 325                          | 327              | 326              | 326              | 326              | 325                   | 326                 | 324              | 298              | 308             | 300              |

\*p<.05; \*\*p<.01; \*\*\*p<.001 one-tailed test (a: two-tailed test)

APPENDIX I: EGALITARIAN CULTURAL NARRATIVE TREATMENT AND CULTURAL THEORY, OLS ESTIMATES

|                          | Narrator Threat <sup>a</sup> | Narrator Trust   | Affect           | Personal Risk    | Sociotropic Risk | Climate Change Belief | Anthropogenic Cause | GHG Regulation   | Cap-and Trade    | Nuclear Energy  | Renewable Energy |
|--------------------------|------------------------------|------------------|------------------|------------------|------------------|-----------------------|---------------------|------------------|------------------|-----------------|------------------|
| Constant                 | 6.824<br>(1.107)             | 6.529<br>(1.113) | 6.936<br>(1.050) | 5.869<br>(1.063) | 6.173<br>(.934)  | 5.379<br>(1.055)      | 5.936<br>(1.081)    | 6.343<br>(1.084) | 4.818<br>(1.430) | .093<br>(1.463) | 5.358<br>(1.281) |
| Age                      | .007<br>(.010)               | .003<br>(.010)   | .005<br>(.009)   | -.022<br>(.009)  | -.017<br>(.008)  | -.003<br>(.009)       | -.010<br>(.009)     | .000<br>(.010)   | -.018<br>(.012)  | .022<br>(.012)  | .013<br>(.011)   |
| Education                | .075<br>(.122)               | -.248<br>(.122)  | -.261<br>(.114)  | -.044<br>(.115)  | .015<br>(.103)   | -.264<br>(.116)       | -.255<br>(.119)     | -.193<br>(.119)  | .154<br>(.146)   | .218<br>(.147)  | -.322<br>(.130)  |
| Gender                   | -.379<br>(.285)              | -.272<br>(.287)  | -.158<br>(.267)  | -.195<br>(.270)  | -.455<br>(.239)  | -.242<br>(.272)       | -.094<br>(.278)     | -.287<br>(.279)  | .265<br>(.350)   | .723<br>(.356)  | -.383<br>(.315)  |
| Income                   | -.008<br>(.049)              | -.013<br>(.049)  | -.019<br>(.045)  | -.046<br>(.046)  | -.047<br>(.041)  | .024<br>(.046)        | .030<br>(.047)      | .024<br>(.048)   | -.085<br>(.058)  | .030<br>(.058)  | .025<br>(.052)   |
| White/Asian              | .087<br>(.314)               | -.013<br>(.316)  | -.586<br>(.295)  | -.205<br>(.299)  | -.332<br>(.266)  | .341<br>(.301)        | -.341<br>(.306)     | -.102<br>(.308)  | .119<br>(.393)   | .584<br>(.400)  | .118<br>(.353)   |
| Ideology                 | -.154<br>(.100)              | -.326<br>(.100)  | -.304<br>(.093)  | -.306<br>(.094)  | -.374<br>(.084)  | -.430<br>(.095)       | -.471<br>(.097)     | -.362<br>(.097)  | -.343<br>(.122)  | .085<br>(.125)  | -.181<br>(.110)  |
| Climate Change Knowledge | .174<br>(.074)               | .099<br>(.075)   | .147<br>(.070)   | .354<br>(.071)   | .325<br>(.062)   | .482<br>(.071)        | .441<br>(.073)      | .412<br>(.073)   | -.171<br>(.094)  | -.004<br>(.096) | .098<br>(.084)   |
| Individualism            | -.021<br>(.037)              | -.126<br>(.037)  | -.103<br>(.035)  | -.121<br>(.035)  | -.155<br>(.031)  | -.112<br>(.035)       | -.158<br>(.036)     | -.169<br>(.036)  | -.039<br>(.045)  | .130<br>(.046)  | -.072<br>(.041)  |
| Hierarchism              | .011<br>(.040)               | .111<br>(.040)   | .055<br>(.037)   | .043<br>(.038)   | .079<br>(.034)   | .089<br>(.038)        | .117<br>(.039)      | .057<br>(.039)   | .051<br>(.049)   | .068<br>(.050)  | .105<br>(.044)   |
| Egalitarianism           | .028<br>(.037)               | .065<br>(.037)   | .083<br>(.034)   | .156<br>(.035)   | .138<br>(.031)   | .114<br>(.035)        | .156<br>(.036)      | .151<br>(.036)   | .126<br>(.044)   | -.004<br>(.046) | .124<br>(.040)   |
| Fatalism                 | -.088<br>(.039)              | -.037<br>(.039)  | -.057<br>(.036)  | -.073<br>(.037)  | -.031<br>(.032)  | -.053<br>(.037)       | -.088<br>(.038)     | -.056<br>(.038)  | .105<br>(.047)   | -.040<br>(.048) | -.049<br>(.043)  |
| Adjusted R2              | .041                         | .127             | .149             | .262             | .348             | .274                  | .328                | .281             | .158             | .087            | .102             |
| F-Statistic              | 2.311                        | 5.493            | 6.413            | 11.964           | 17.399           | 12.673                | 16.135              | 13.170           | 6.060            | 3.629           | 4.176            |
| n                        | 341                          | 341              | 340              | 340              | 338              | 340                   | 341                 | 342              | 296              | 304             | 308              |

\*p<.05; \*\*p<.01; \*\*\*p<.001 one-tailed test (a: two-tailed test)

**APPENDIX M: INDIVIDUALIST CULTURAL NARRATIVE TREATMENT AND CHARACTER AFFECT, OLS ESTIMATES**

|                          | Narrator Threat           | Narrator Trust           | Affect                   | Personal Risk             | Sociotropic risk          | Climate Change Belief    | Anthropogenic Cause      | GHG Regulation            | Cap-and Trade            | Nuclear Energy         | Renewable Energy       |
|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|------------------------|------------------------|
| Constant                 | <b>3.656**</b><br>(1.172) | 1.064<br>(1.004)         | .789<br>(.921)           | <b>3.441**</b><br>(1.258) | <b>3.112**</b><br>(1.030) | 1.240<br>(1.213)         | <b>2.474*</b><br>(1.198) | <b>2.999**</b><br>(1.097) | .794<br>(1.405)          | .006<br>(1.594)        | 2.504<br>(1.354)       |
| Age                      | -.014<br>(.010)           | .001<br>(.009)           | .005<br>(.008)           | .000<br>(.011)            | .006<br>(.009)            | .006<br>(.011)           | -.003<br>(.011)          | .013<br>(.010)            | -.004<br>(.013)          | .021<br>(.014)         | .008<br>(.012)         |
| Education                | -.169<br>(.118)           | .094<br>(.101)           | .017<br>(.093)           | -.030<br>(.127)           | -.019<br>(.104)           | .194<br>(.122)           | .034<br>(.120)           | .060<br>(.110)            | .075<br>(.142)           | .030<br>(.162)         | -.104<br>(.137)        |
| Gender                   | -.453<br>(.296)           | -.225<br>(.253)          | .407<br>(.232)           | -.639*<br>(.317)          | -.475<br>(.259)           | -.516<br>(.305)          | -.539<br>(.302)          | -.165<br>(.276)           | -.211<br>(.363)          | .282<br>(.404)         | -.490<br>(.347)        |
| Income                   | <b>.134**</b><br>(.042)   | -.018<br>(.036)          | -.006<br>(.033)          | .013<br>(.045)            | -.016<br>(.037)           | .015<br>(.043)           | -.014<br>(.043)          | .033<br>(.039)            | -.007<br>(.050)          | .045<br>(.056)         | .025<br>(.049)         |
| White/Asian              | -.042<br>(.335)           | .080<br>(.286)           | -.358<br>(.263)          | -.250<br>(.359)           | -.528<br>(.293)           | .346<br>(.346)           | -.230<br>(.342)          | -.082<br>(.312)           | .638<br>(.408)           | .421<br>(.459)         | .423<br>(.391)         |
| Ideology                 | .078<br>(.097)            | -.259**<br>(.083)        | -.111<br>(.076)          | -.240*<br>(.104)          | -.222**<br>(.085)         | -.260**<br>(.100)        | -.325***<br>(.100)       | -.364***<br>(.090)        | -.276**<br>(.116)        | .094<br>(.131)         | -.136<br>(.111)        |
| Climate Change Knowledge | <b>.313***</b><br>(.080)  | .111<br>(.070)           | .169**<br>(.063)         | <b>.304***</b><br>(.086)  | <b>.310***</b><br>(.070)  | <b>.509***</b><br>(.083) | <b>.488***</b><br>(.083) | <b>.373***</b><br>(.075)  | .140<br>(.096)           | .002<br>(.109)         | .099<br>(.094)         |
| Individualism            | .042<br>(.039)            | -.039<br>(.034)          | .004<br>(.031)           | -.174***<br>(.042)        | -.120***<br>(.034)        | -.107**<br>(.040)        | -.142***<br>(.040)       | -.121***<br>(.036)        | .044<br>(.048)           | <b>.128*</b><br>(.053) | .083<br>(.045)         |
| Hierarchism              | .102*<br>(.043)           | <b>.122***</b><br>(.037) | .074*<br>(.034)          | .069<br>(.046)            | <b>.097**</b><br>(.038)   | <b>.129**</b><br>(.044)  | <b>.134**</b><br>(.044)  | .071<br>(.040)            | .074<br>(.052)           | .106<br>(.059)         | .036<br>(.050)         |
| Egalitarianism           | .036<br>(.037)            | .056<br>(.032)           | .022<br>(.029)           | <b>.116**</b><br>(.039)   | <b>.135***</b><br>(.032)  | .052<br>(.038)           | <b>.074*</b><br>(.038)   | <b>.069*</b><br>(.034)    | <b>.039</b><br>(.044)    | -.052<br>(.050)        | .028<br>(.042)         |
| Fatalism                 | -.150***<br>(.040)        | -.050<br>(.034)          | -.069<br>(.031)          | -.038<br>(.043)           | -.025<br>(.035)           | -.051<br>(.041)          | -.078<br>(.040)          | -.110**<br>(.037)         | -.044<br>(.048)          | .052<br>(.054)         | -.038<br>(.046)        |
| Ecodefense               | -.049<br>(.074)           | .028<br>(.063)           | -.024<br>(.058)          | .088<br>(.080)            | .091<br>(.065)            | -.008<br>(.076)          | .120<br>(.075)           | <b>.220**</b><br>(.070)   | .015<br>(.088)           | .010<br>(.100)         | .141<br>(.085)         |
| The Club of Rome         | -.026<br>(.075)           | .052<br>(.064)           | .052<br>(.059)           | .051<br>(.080)            | -.031<br>(.066)           | -.019<br>(.077)          | .002<br>(.077)           | -.043<br>(.071)           | <b>.181*</b><br>(.089)   | .121<br>(.101)         | .037<br>(.087)         |
| The Cato Institute       | .101<br>(.059)            | <b>.490***</b><br>(.051) | <b>.499***</b><br>(.046) | <b>.214***</b><br>(.063)  | <b>.141**</b><br>(.052)   | <b>.301***</b><br>(.061) | <b>.268***</b><br>(.060) | <b>.386***</b><br>(.055)  | <b>.399***</b><br>(.070) | .010<br>(.079)         | <b>.193*</b><br>(.067) |
| Adjusted R2              | .157                      | .321                     | .326                     | .248                      | .280                      | .285                     | .303                     | .374                      | .153                     | .067                   | .033                   |
| F-Statistic              | 4.779                     | 10.603                   | 10.818                   | 7.681                     | 8.923                     | 8.092                    | 9.793                    | 13.035                    | 4.417                    | 2.386                  | 1.648                  |
| n                        | 284                       | 284                      | 284                      | 284                       | 285                       | 285                      | 283                      | 282                       | 265                      | 269                    | 270                    |

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

**APPENDIX N: HIERARCH CULTURAL NARRATIVE TREATMENT AND CHARACTER AFFECT, OLS ESTIMATES**

|                          | Narrator Threat           | Narrator Trust          | Affect                     | Personal Risk             | Sociotropic risk           | Climate Belief           | Anthropogenic Cause     | GHG Regulation             | Cap-and Trade          | Nuclear Energy           | Renewable Energy        |
|--------------------------|---------------------------|-------------------------|----------------------------|---------------------------|----------------------------|--------------------------|-------------------------|----------------------------|------------------------|--------------------------|-------------------------|
| <b>Constant</b>          | <b>3.863**</b><br>(1.206) | <b>1.587</b><br>(1.222) | <b>5.056***</b><br>(1.191) | <b>3.226**</b><br>(1.297) | <b>5.241***</b><br>(1.211) | <b>2.865*</b><br>(1.311) | <b>1.951</b><br>(1.315) | <b>4.991***</b><br>(1.271) | <b>.876</b><br>(1.623) | <b>-0.882</b><br>(1.570) | <b>2.959</b><br>(1.641) |
| Age                      | -0.16<br>(.011)           | -0.07<br>(.011)         | .004<br>(.010)             | -0.19<br>(.011)           | .002<br>(.011)             | .012<br>(.011)           | -0.18<br>(.011)         | .008<br>(.011)             | -0.18<br>(.014)        | .002<br>(.014)           | -0.02<br>(.014)         |
| Education                | .137<br>(.124)            | .039<br>(.126)          | -0.048<br>(.119)           | .061<br>(.134)            | .035<br>(.131)             | .160<br>(.134)           | .121<br>(.135)          | .062<br>(.126)             | -0.27<br>(.167)        | .169<br>(.160)           | -0.216<br>(.162)        |
| Gender                   | -0.009<br>(.307)          | -0.293<br>(.311)        | .223<br>(.295)             | -0.151<br>(.331)          | -0.182<br>(.310)           | -0.326<br>(.334)         | -0.259<br>(.336)        | -0.348<br>(.312)           | .042<br>(.412)         | .203<br>(.399)           | -0.484<br>(.408)        |
| Income                   | -0.013<br>(.045)          | -0.024<br>(.045)        | .013<br>(.043)             | -0.044<br>(.048)          | -0.091*<br>(.045)          | -0.037<br>(.048)         | .005<br>(.049)          | -0.095*<br>(.046)          | .055<br>(.062)         | -0.031<br>(.059)         | .044<br>(.059)          |
| White/Asian              | .844**<br>(.316)          | .148<br>(.320)          | -0.157<br>(.304)           | .110<br>(.340)            | -0.478<br>(.317)           | .483<br>(.341)           | .360<br>(.345)          | .427<br>(.323)             | -0.977*<br>(.429)      | .117<br>(.413)           | .024<br>(.419)          |
| Ideology                 | -0.156<br>(.092)          | -0.194*<br>(.093)       | -0.236**<br>(.088)         | -0.255*<br>(.099)         | -0.411***<br>(.092)        | -0.271**<br>(.099)       | -0.272**<br>(.100)      | -0.270**<br>(.093)         | -0.103<br>(.126)       | .030<br>(.120)           | .012<br>(.123)          |
| Climate Change Knowledge | .160<br>(.088)            | .031<br>(.089)          | -0.075<br>(.087)           | .226*<br>(.095)           | .244**<br>(.090)           | .337***<br>(.095)        | .424***<br>(.096)       | .322***<br>(.091)          | .150<br>(.118)         | .109<br>(.115)           | .052<br>(.120)          |
| Individualism            | .019<br>(.038)            | .010<br>(.039)          | -0.101**<br>(.037)         | -0.043<br>(.041)          | -0.059<br>(.038)           | .021<br>(.041)           | -0.043<br>(.042)        | -0.050<br>(.039)           | -0.033<br>(.051)       | .109*<br>(.049)          | .004<br>(.051)          |
| Hierarchism              | -0.010<br>(.042)          | -0.001<br>(.042)        | .068<br>(.040)             | .022<br>(.045)            | .003<br>(.042)             | -0.056<br>(.046)         | .069<br>(.046)          | -0.013<br>(.043)           | .056<br>(.056)         | .022<br>(.054)           | -0.017<br>(.055)        |
| Egalitarianism           | .064<br>(.034)            | .020<br>(.034)          | -0.070*<br>(.032)          | .136***<br>(.036)         | .065<br>(.033)             | .091*<br>(.036)          | .143***<br>(.037)       | .082*<br>(.034)            | .127**<br>(.045)       | -0.030<br>(.043)         | .044<br>(.046)          |
| Fatalism                 | -0.003<br>(.041)          | .067<br>(.042)          | .029<br>(.039)             | .036<br>(.044)            | -0.008<br>(.041)           | -0.034<br>(.044)         | -0.039<br>(.045)        | -0.056<br>(.042)           | .000<br>(.054)         | .014<br>(.053)           | .033<br>(.054)          |
| Ecodefense               | -1.11<br>(.066)           | -0.13<br>(.067)         | -0.072<br>(.064)           | -0.021<br>(.071)          | .135*<br>(.066)            | .043<br>(.072)           | .048<br>(.072)          | .102<br>(.067)             | .345***<br>(.088)      | .017<br>(.085)           | .242***<br>(.087)       |
| The Club of Rome         | .417***<br>(.061)         | .565***<br>(.062)       | .478***<br>(.058)          | .312***<br>(.065)         | .295***<br>(.061)          | .285***<br>(.066)        | .222***<br>(.066)       | .250***<br>(.062)          | .130<br>(.080)         | .451***<br>(.079)        | .207**<br>(.081)        |
| The Cato Institute       | -0.209**<br>(.073)        | .105<br>(.074)          | .157*<br>(.070)            | -0.113<br>(.065)          | -0.123<br>(.073)           | -0.074<br>(.078)         | -0.061<br>(.079)        | -0.178*<br>(.074)          | .176<br>(.096)         | .204*<br>(.093)          | .113<br>(.096)          |
| Adjusted R2              | .340                      | .271                    | .219                       | .228                      | .258                       | .197                     | .230                    | .254                       | .235                   | .155                     | .090                    |
| F-Statistic              | 8.168                     | 7.296                   | 5.715                      | 5.976                     | 6.863                      | 5.112                    | 6.030                   | 6.685                      | 5.861                  | 3.986                    | 2.557                   |
| n                        | 236                       | 237                     | 236                        | 236                       | 236                        | 235                      | 236                     | 234                        | 221                    | 228                      | 221                     |

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



APPENDIX O: EGALITARIAN CULTURAL NARRATIVE TREATMENT AND CHARACTER AFFECT, OLS ESTIMATES

|                          | Narrator Threat     | Narrator Trust    | Affect            | Personal Risk      | Sociotropic risk    | Climate Change Belief | Anthropogenic Cause | GHG Regulation      | Cap-and Trade    | Nuclear Energy    | Renewable Energy  |
|--------------------------|---------------------|-------------------|-------------------|--------------------|---------------------|-----------------------|---------------------|---------------------|------------------|-------------------|-------------------|
| Constant                 | 6.472***<br>(1.348) | 2.847*<br>(1.146) | 2.931*<br>(1.185) | 2.447*<br>(1.188)  | 4.528***<br>(1.088) | 3.847**<br>(1.236)    | 3.527**<br>(1.211)  | 3.830***<br>(1.131) | 3.451<br>(1.760) | -1.046<br>(1.780) | 2.813<br>(1.477)  |
| Age                      | .005<br>(.011)      | -.002<br>(.009)   | .005<br>(.010)    | -.023*<br>(.010)   | -.015<br>(.009)     | .000<br>(.010)        | -.009<br>(.010)     | .008<br>(.009)      | -.030*<br>(.014) | .015<br>(.014)    | .013<br>(.011)    |
| Education                | .149<br>(.133)      | -.107<br>(.113)   | -.149<br>(.115)   | .099<br>(.115)     | .045<br>(.107)      | -.215<br>(.122)       | -.209<br>(.120)     | -.087<br>(.111)     | .017<br>(.168)   | .141<br>(.162)    | -.230<br>(.138)   |
| Gender                   | -.256<br>(.321)     | .274<br>(.273)    | .260<br>(.279)    | -.019<br>(.279)    | -.375<br>(.258)     | .108<br>(.294)        | .181<br>(.288)      | -.085<br>(.269)     | .141<br>(.407)   | .321<br>(.401)    | -.244<br>(.338)   |
| Income                   | -.002<br>(.054)     | -.011<br>(.046)   | .003<br>(.047)    | -.027<br>(.047)    | -.028<br>(.043)     | .030<br>(.050)        | .046<br>(.049)      | .032<br>(.045)      | -.027<br>(.070)  | .071<br>(.067)    | .059<br>(.056)    |
| White/Asian              | -.370<br>(.352)     | -.349<br>(.300)   | -.483<br>(.308)   | -.209<br>(.309)    | -.599*<br>(.286)    | .241<br>(.323)        | -.523<br>(.317)     | -.244<br>(.296)     | .092<br>(.447)   | .302<br>(.443)    | -.248<br>(.374)   |
| Ideology                 | -.112<br>(.112)     | -.137<br>(.096)   | -.167<br>(.097)   | -.172<br>(.097)    | -.230*<br>(.090)    | -.383***<br>(.103)    | -.293**<br>(.101)   | -.246**<br>(.094)   | -.199<br>(.145)  | .158<br>(.141)    | -.020<br>(.118)   |
| Climate Change Knowledge | .071<br>(.082)      | -.008<br>(.070)   | .081<br>(.072)    | -.289***<br>(.072) | .273***<br>(.066)   | .383***<br>(.075)     | .375***<br>(.074)   | .327***<br>(.069)   | -.077<br>(.106)  | .043<br>(.106)    | .024<br>(.089)    |
| Individualism            | .007<br>(.042)      | -.063<br>(.035)   | -.029<br>(.036)   | -.086*<br>(.036)   | -.147***<br>(.034)  | -.093*<br>(.038)      | -.146***<br>(.037)  | -.143***<br>(.035)  | -.050<br>(.052)  | .124*<br>(.052)   | -.004<br>(.044)   |
| Hierarchy                | -.011<br>(.046)     | .071<br>(.039)    | .019<br>(.041)    | -.019<br>(.041)    | .010<br>(.038)      | .074<br>(.042)        | .076<br>(.042)      | -.009<br>(.039)     | .036<br>(.058)   | .060<br>(.057)    | .032<br>(.049)    |
| Egalitarianism           | .030<br>(.041)      | .008<br>(.035)    | .045<br>(.036)    | .148***<br>(.036)  | .115***<br>(.033)   | .074<br>(.038)        | .125***<br>(.037)   | .101**<br>(.035)    | .141**<br>(.052) | .067<br>(.052)    | .115**<br>(.044)  |
| Fatalism                 | -.081<br>(.044)     | .020<br>(.038)    | -.047<br>(.038)   | -.004<br>(.038)    | .060<br>(.035)      | .027<br>(.040)        | -.020<br>(.040)     | .032<br>(.037)      | .096<br>(.056)   | -.063<br>(.055)   | -.028<br>(.047)   |
| Ecodefense               | .216**<br>(.070)    | .597***<br>(.059) | .536***<br>(.061) | .412***<br>(.061)  | .283***<br>(.056)   | .304***<br>(.064)     | .376***<br>(.063)   | .438***<br>(.059)   | .088<br>(.087)   | .009<br>(.087)    | .361***<br>(.072) |
| The Club of Rome         | -.145<br>(.090)     | -.024<br>(.076)   | .033<br>(.079)    | .006<br>(.079)     | -.011<br>(.072)     | -.061<br>(.083)       | .048<br>(.081)      | -.071<br>(.076)     | .108<br>(.111)   | -.096<br>(.112)   | .065<br>(.094)    |
| The Cato Institute       | -.007<br>(.092)     | -.021<br>(.078)   | -.055<br>(.080)   | .009<br>(.080)     | -.030<br>(.074)     | -.084<br>(.084)       | -.083<br>(.082)     | -.078<br>(.077)     | .072<br>(.114)   | .305**<br>(.114)  | -.051<br>(.096)   |
| Adjusted R2              | .117                | .427              | .379              | .438               | .473                | .390                  | .476                | .513                | .171             | .103              | .198              |
| F-Statistic              | 3.408               | 14.534            | 12.049            | 15.071             | 17.159              | 12.653                | 17.455              | 20.167              | 4.437            | 2.938             | 5.187             |
| n                        | 254                 | 254               | 253               | 253                | 252                 | 255                   | 254                 | 255                 | 233              | 236               | 238               |

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

