THESIS

MEDIA REPRESENTATION OF CLIMATE CHANGE: FRAMES AND CLAIMS-MAKERS IN THE NEW YORK TIMES AND THE WASHINGTON POST

Submitted by

GayLene W. Rossiter

Department of Journalism and Technical Communication

In partial fulfillment of the requirements

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WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION BY GAYLENE W. ROSSITER ENTITLED MEDIA REPRESENTATION OF CLIMATE CHANGE: FRAMES AND CLAIMS-MAKERS IN THE NEW YORK TIMES AND THE WASHINGTON POST BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE.

Committee on Graduate Work

_____

Joseph Champ

_____

Robert Sturtevant

_____

Advisor: Craig Trumbo

_____

Department Chair: Greg Luft

ABSTRACT OF THESIS

MEDIA REPRESENTATION OF CLIMATE CHANGE:
FRAMES AND CLAIMS-MAKERS IN THE NEW YORK TIMES AND THE WASHINGTON POST

This study examined climate change-related news coverage in two elite U.S. newspapers, the *New York Times* and the *Washington Post*, during the second George W. Bush presidential administration from January 2005 to January 2009. Framing theory, using four functional frames, laid the groundwork for the investigation. A quantitative content analysis was conducted to determine the story frames and claims-makers portrayed in the news coverage; an interpretation of the narrative content was then performed to further explore the quantitative findings. Results revealed that scientists were more likely represented in story frames diagnosing causes and defining problems, whereas politicians were more likely represented in story frames making judgments and suggesting solutions. In addition, industry interests were more likely represented in story frames suggesting solutions.

GayLene W. Rossiter
Department of Journalism and Technical Communication
Colorado State University
Fort Collins, CO 80523
Summer 2010

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CHAPTER 1. INTRODUCTION

> *Western civilization irrupted on the earth like a fever. More than just a symbol of a diseased spiritual state, that fever is now palpably evident in the rising temperature of the earth itself. A world that takes its environment seriously must come to terms with the roots of its problems, beginning with the place called home.*
>
> *~David Orr, Earth in Mind (1994, p. 170)*

This study examined climate change-related news coverage through a quantitative content analysis of articles published in two national elite U.S. newspapers, the *New York Times* and the *Washington Post*, between January 20, 2005 and January 20, 2009, the second presidential term of the George W. Bush administration. The purpose of the study was to examine the climate-related news articles and reveal the specific story *frames* and *claims-makers*, or quoted sources, portrayed in the news coverage. Additionally, a narrative overview of the climate story was included to enhance interpretation of observed results.

Climate change, global warming, and the greenhouse effect are terms used interchangeably. No matter what the terminology, this serious environmental problem has been underlined in the media for years. And, the issue has been the spotlight for prestigious international scientific efforts (Trumbo & Shanahan, 2000). Although scientists have researched our Earth's climate change for decades, it only became a public issue in the last thirty years. In 1981, an article in *Science* by James Hansen and colleagues at the NASA Goddard Institute for Space Studies reported that the Earth's atmospheric temperature was rising due to increases of atmospheric carbon dioxide with

a “high probability of warming in the 1980’s” and “potential effects on climate in the 21st century” (Hansen, et al., 1981, p. 957).

Then, public awareness of the issue steadily grew into the 1980s, many people knew of the greenhouse effect, and the U.S. Environmental Protection Agency indicated that climate change was a top concern for the EPA. However, it was not until 1997 that the United States and many other nations negotiated the Kyoto Protocol treaty at an international conference in Japan. The agreement would commit developed countries to reduce their greenhouse gas (GHG) emissions to 1990 levels, a substantial global effort to help counteract the buildup of atmospheric gases that many believe is causing the Earth’s changing climates (UNFCCC; Friedman, Dunwoody, & Rogers, 1999). In 2001 under the first term of the George W. Bush administration, the United States rejected the Kyoto Protocol. Despite the withdrawal of the U.S., the Kyoto Protocol came into force in February 2005. Currently, 190 countries have ratified the treaty (UNFCCC website).

The complexities that revolve around the climate change issue challenge news reporters who must sift through very technical information presented by claims-makers. It can be especially challenging for journalists to present climate debates between scientists, politicians, and competing special interest groups. Accurate media representation of these claims made by such groups is important to help clarify the problem and implement solutions.

Extensive research in climate change science already has occurred in the communication discipline. However, the complexities of the issue and the advances of science warrant further examination of the media’s role in helping people understand and respond responsibly to our changing climate. Climate change is an ecological

phenomenon without boundaries. The crisis is of vast social, economical, and political concern throughout our nation and the world.

> Additional research is needed to improve significantly our understanding of how scientific information takes shape in the news media, especially for the climate change issue. Understanding this will be significant and very useful in the policy-making and regulatory process that must address the problem of climate change (Trumbo & Shanahan, 2000, p. 203).

CHAPTER 2. LITERATURE REVIEW

This review presents literature relevant to the research purpose of this thesis and is organized into four primary sections after a *brief summary* of climate change in the media. The first section presents literature on *framing theory,* the foundation of the current study, and provides a theoretical background from infancy, including leading researchers who developed the theory. Highlights of more recent framing research in the media also are presented, followed by the framing approach used in this study of climate change-related news coverage.

Claims-makers, the second major element of this study, are addressed in the second section of the literature review. The review highlights communication studies that incorporate various quoted sources in the media. The section also reveals ways in which these prominent characters have been represented in news stories.

In the third section, *research relevant to the investigation* is covered, and includes academic researchers and studies that employed frames, claims-makers, or content analysis methodologies for their news exploration. Specific climate change studies are presented that serve more closely as models and examples for this study. Finally, the *two principal research questions* that guided this investigation are presented.

Climate change is a serious environmental phenomenon that scientists have studied for decades. Even so, it has only become a public issue in the last thirty years. News coverage of the issue still exhibited a cyclic pattern throughout the years (Trumbo, 1996; McComas & Shanahan, 1999) and debates continue between conflicting interests

about its science and uncertainty, economic burden, need for political action, and growing effects on the planet.

The media are highly influential sources of public information that portray, or frame, significant issues in our world. Also of influence in reflecting the significance of such critical environmental issues are people, many of them professionals that may either support or oppose an issue. Frequently, such individuals make claims on issues in the media. In the case of climate change, claims made by advocates of climate change, such as scientists, politicians, and special interests, may depict more certainty that climate change is actually happening or it is a human-caused event. On the other hand, adversary claims-makers, who also are scientists, special interest groups, and politicians, may be skeptical and express opposition, doubt, or uncertainty about this complex matter.

Framing Theory

Framing theory is the backbone of this study. This section highlights the theoretical background and leading researchers who have helped the field grow in media communication research. It also provides highlights of more current directions researchers have taken in their study of the theory as it applies to the media. Finally, framing foundation for this investigation is reviewed.

Theoretical Background

People use their predispositions or beliefs to screen information they encounter in the media, consequently focusing their attention on what they consider valid and ignoring what does not appeal to them. In this manner, frames used in the media help sort out people's central ideas and resonate their core values and assumptions. Frames can break down complex issues such as climate change by highlighting certain elements in text over

others. Simplifying an issue in this manner helps people more easily decide why the issue is important to them. (Nisbet & Mooney, 2007).

Framing originated in Sociology more than four decades ago. Sociologist Erving Goffman (1974) is recognized as establishing early work on framing. Still, Goffman attributed Gregory Bateson (1972), anthropologist-psychologist, with originating the framing metaphor. Through both of their social-psychological viewpoints, we have learned how people rely on expectations when making sense of everyday experience. Goffman's literature shaped the foundation for the social sciences and media studies framing concept. In particular, this term developed from Goffman's 1959 work, *The Presentation of Self in Everyday Life*, a commentary on the management of impressions (Reese, 2001). He "based his ideas on notions derived from both *symbolic interactionism* and *social constructionism*" (Baran & Davis, 2009, p. 314). Later in 1974, Goffman's book, *Frame Analysis: An Essay on the Organization of Experience*, explained his ethnographic research of frames as interpretive schemata that help one make sense of issues, which enable audiences to perceive meaning. Goffman stated that framing prompts "meaning through the lens of existing cultural beliefs and worldviews" (Nisbet, 2009, p. 7). American sociologist Gaye Tuchman took Goffman's description of frames — "news is a window on the world" — to a more sophisticated definition of frames (Tuchman, 1978, p. 1).

Contributions by Tuchman (1978) played a significant role in extending Goffman's ideas. Through her renowned book, *Making News: A Study in the Construction of Reality*, she spoke of learning of ourselves, others, and of lifestyles through news that is framed; frames tell us "what we want to know, need to know, and

should know" (p. 1). In her own words, Tuchman depicted how issues in the world can be complex to frame:

> The view through a window depends upon whether the window is large or small, has many panes or few, whether the glass is opaque or clear, whether the window faces a street or a backyard. The unfolding scene also depends upon where one stands, far or near, craning one's neck to the side, or gazing straight ahead, eyes parallel to the wall in which the window is encased (Tuchman, 1978, p. 1).

In the last two decades, sociological and political researchers explored how media portrayals, along with cultural forces, have shaped public perspectives. Frames, according to the classic definition, organize central ideas on an issue. Audiences use frames as interpretative schema to make sense of and discuss an issue, journalists use frames to condense complex events into interesting and appealing news reports, and policy-makers use frames to define policy options and reach decisions (Scheufele, 1999). In each of these contexts, frames simplify complex issues by lending greater weight to certain considerations and arguments. They endow certain dimensions of a complex topic with greater apparent relevance than the same dimensions might appear to have under an alternative frame (Gamson & Modigliani, 1989). "A frame is a central organizing idea for making sense of relevant events and suggesting what is at issue" (Gamson, 1989, p. 157).

William Gamson is one of the more innovative framing researchers (Gamson, 1989; Gamson, et al. 1992). His contributions advanced awareness about framing theory and how framing news influences the social world. He and his colleagues studied social movement and its impacts on framing successes and failures that attempt to match beliefs and interests, especially during his research of issues such as nuclear power and global warming (Gamson & Modigliani, 1989). Sharing the social constructionist view, he

argued that elite leaders and their social establishments can exert power on the social world by disseminating frames that reflect their interests (Baran & Davis, 2009, p. 320).

Another research endeavor of Gamson and his associate, Modigliani, was to examine public opinion and frames (Gamson & Modigliani, 1989; Gamson, 1992). They found that the public utilize media discourse, wisdom, and personal experience when deriving meaning from political issues. In his model, Gamson pooled these three influential elements — media discourse, wisdom, and personal experience — as participants assigned meaning to events they observed. His construct served as a guide for the responses to events. From this, Gamson (1992) drew his conclusion that the more people rely on culturally based meanings instead of their personal interpretations of situations, the more the media's messages influence people.

Researchers also applied framing to political evaluation (Gamson, 1992; Iyengar, 1991). In several experiments, Iyengar examined the effects of news frames (e.g., news about unemployed people versus unemployment news as a social and political event caused by social, political, and economic conditions). Ivengar (1991) found that in episodic news the prevalence of event- or person-related information improved the chances that audiences would make personal attributions (e.g., people are responsible for their poverty) rather than systemic attributions (e.g., poverty is due to institutional conditions). His research helped broaden framing from real-time decision-making bias to a social evaluation process (Price & Tewksbury, 1997).

Framing in discourse involves the selective organization of text embedded in media content in a particular manner. Framing delineates and emphasizes specific rhetoric within a story. Entman (1993) claimed that "frames highlight some bits of

information about an item that is the subject of a communication, thereby elevating them in salience" (p. 53). Framing a news story helps the audience pay attention to and even ignore certain information. Consequently, the concept of framing has a potential influence on people's interpretation of an issue represented in a story (Entman, 1993). He also described framing as "choosing how to put facts together and which to emphasize inevitably affects what audiences perceive as reality" (Entman, 1989, p. 31).

Framed messages can exist within the headline of a news story, lead sentence or paragraph, a story's images, sources quoted, metaphors, or in the general tone of the story. Entman explained "omissions of potential problem definitions, explanations, evaluations, and recommendations may be as critical as the inclusions in guiding the audience" (Entman, 1993, p. 54). The mass media, political and social movements, or organizations can create media frames.

Highlights of Recent Framing Research

Framing is still considered in its infancy compared to other communication theories since it emerged during mass communication's contemporary fourth era of meaning-making theories and media effects (Baran & Davis, 2008, p. 35). Many researchers have applied numerous frames to the study of the media. Here are a few examples of innovative framing theory research that has occurred in recent years.

Corbett and Durfee (2004) explored media representations of climate change in an experiment that tested readers on variations of text in news stories. They hypothesized the relationships between these concepts and the readers' perceptions of scientific uncertainty about global climate change. To do so, the researchers manipulated key concepts from previous research that affected people's evaluations of scientific certainty — *controversy*

and *context* and *neither controversy or context*. They found that news article with the context frame increased readers' perceptions of scientific certainty and the news article that included a controversy frame reduced perceptions of scientific certainty. Corbett and Durfee also suggested that a climate change issue "needs a more salient metaphor that emphasizes its seriousness, immediacy, and scientific credibility" (p. 144).

Durfee (2006) studied media framing effects on risk perception by developing an exploratory experiment regarding an environmental health risk, air quality, to find out if *social change* frames in news would influence participants' perceptions of health risks associated with unhealthy air quality more so than *status quo* news frames. Indeed, the news story that reported the risk in terms of social change frames did show the higher level of participant risk perception over the status quo news frames. Social change frames generally present information in a manner that eliminates doomsday tactics or rhetoric. A status quo frame emphasizes the power structure; a social change frame suggests action. In the experiment, factual problem information, quoted sources, or scientific jargon left participants felling they had little control over the risk thus, they avoided reaction or responsibility (Durfee, 2006). Framing research would benefit from further examination of the construct of the social change frame in order to better understand its cognitive applications in media framing effects.

In order to understand how political power works in the media, Entman (2007) proposed incorporating approaches generated by framing, priming, and agenda-setting research. Bias was his organizing concept, a concept about media that deserves more attention and has "yet to be defined clearly" (p. 163). First, he illustrated how agenda setting, framing, and priming fit together as tools of political power. Entman then linked

the three terms to precise definitions of news slant and its related, but distinct, concept of bias. He defined the term bias in three primary ways: *Distortion bias* refers to news that falsifies reality, *content bias* means news that favors one side rather than equally treating both sides in a political conflict, and *decision-making bias* refers to journalists' approach to writing the biased content. Entman (2007) argued that bias can be a vigorous, theory-driven, and dynamic research concept if the *distortion bias* is discarded and more accurately defined *content bias* and *decision-making bias* concepts are created (Entman, 2007). His research helps advance our knowledge of the media's role in distributing power and holds significance for the study of political communication practices. In addition, such investigations may contribute to more balanced reporting in the newsroom.

Nisbet (2009) stated "framing offers a powerful theoretical tool for understanding the communication dynamics of science debates and the relationship to public opinion, media coverage, and policy decisions" (p. 26). He argued that scientists must deliberately frame issues in a way that connect with diverse audiences. In doing so, he developed a reliable typology of frames for science based on past science-related policy debate research, which was originally captured by sociologists Gamson and Modigliani (1989) in their nuclear energy research.

Following is a list and description of Nisbet's frame typology for science debate: *social progress* (quality of life, solving problems, harmony with nature, sustainability); *economic development/competitiveness* (economic investment, market benefits/risks; local, national, or global competitiveness); *morality/ethics* (right/wrong; respecting/crossing limits, thresholds, or boundaries); *scientific/technical uncertainty* (expert understanding; what's known and unknown, invoking or undermining consensus,

sound science, or peer-review); *Pandora's box/runaway science* (precaution in face of possible impacts or catastrophe, science as out-of-control, Frankenstein's monster including potentially fatalism, i.e. action is futile, path is chosen, no turning back); *public accountability/governance* (science in the public versus private interest, ownership and control, responsible use or abuse of power, majority versus minority opinion); *third way/alternative path* (possible compromise position, middle way between conflicting views or options); and *conflict/strategy* (science as a game among elites, who's ahead or behind in winning, battle of personalities or among groups.

Nisbet (2009) believes that his frame typology for science debate can be used in framing research to enhance awareness about interactions between audience dispositions, and the role media and scientists play in communicating highly contentious scientific and environmental issues. This scholar's examination of frames may prompt new developments about public engagement in critical issues like climate science.

Tankard (2001) pointed out that framing, as a concept, is significant since it can suggest an alternative to the old "objectivity and bias" paradigm and facilitates understanding media messages and audience effects (p. 96). The scholar also indicated that framing, a more complex concept, differs from bias in several important ways. The concept can be represented as *pro* or *con*, *favorable* or *unfavorable*, and *negative* or *positive* (Tankard, 2001). A frame can add a cognitive element to a message. Framing allows text, story, or media communication pieces to define an issue and to position the terms of a debate. "Framing essentially involves *selection* and *salience*. To frame is to *select some aspects of a perceived reality and make them more salient in a communicating text*" (Entman, 1993, p. 52).

Framing Approach Used in This Study

The current investigation was based on Entman's four functional frames and used them to discover how two elite newspapers framed climate change. These frames *define problems* by determining what a causal agent is doing with what costs and benefits and usually is measured in terms of common cultural values; *diagnose causes* by identifying the forces that create the problem; *make moral judgments* by evaluating causal agents and their effects; and *suggest solutions or remedies* by offering and justifying treatments for the problem and predict their likely effects (Entman, 1993, p. 52).

Before discussing the expanded definitions used in current investigation of climate change, here is an example of Entman's frames in context. A unique illustration of Entman's framing functions is in the Cold War frame of foreign affairs by U.S. news that prevailed in the media for an extended time period. Specific foreign civil wars were framed as *problems*; communist rebels as *causes*; atheistic aggression was the evaluated causal agent to *make moral judgment* about; and U.S. support for the other side represented the *suggested solution* for the problem (Entman, 1993).

The current study further defines Entman's frames to pertain to the climate change issue. *Problem defining* frames portray climate change impacts, whereas *cause diagnosing* frames identify scientific evidence of the reality of climate change. Frames *making moral judgments* present general statements to take action, or argue for or against climate-change action. And, frames s*uggesting solutions or remedies* provide information about specific solutions proposed, rejected, or debated (Trumbo, 1996). In today's news, many of the described framing functions and numerous others may be found in a story

headline or a sentence; however, not every sentence in the story needs to contain a framing element (Gamson, 1992; Entman, 1993).

"The climate change issue, in particular, is often framed in terms of debate, controversy, or uncertainty" (Antilla, 2005, p. 350). In the 1990s, the conservative movement mobilized in an effort to challenge global warming science (McCright & Dunlap 2000). Even today with extensive scientific evidence that supports the occurrence of climate change, conservative think tanks, political leaders, and critics of climate change continue to make claims in the media to downplay the issue's gravity (Nisbet, 2009).

The next section reviews claims-makers, the second fundamental component in this investigation and a key element in framing a news story.

Claims-Makers as News Sources

In addition to the story frame, the *claims-maker*, or one who gains access to media reporting and serves as a quoted source, is the second characteristic commonly found in news discourse. These sources are used in stories for many reasons such as for their respected work in their fields, their former history and relationship with the media, or their capability to provide journalists with important information about critical and emerging issues (Trumbo, 1996). Many claims-makers quoted in news about environment issues are scientists and bureaucratic officials (Corbett, 1992; Nelkin, 1995).

Corbett (1992) examined the use of *bureaucratic* over *non-bureaucratic authorities* as sources in news articles. She content analyzed 592 wildlife issue stories in three rural and three urban newspapers. The researcher also explored five story themes (frames) and coded them as: utilitarian, stewardship, natural history, threat, and

unusualness of a story. In addition, she coded five wildlife conflict types: physical of humans upon wildlife, physical conflict of wildlife upon humans, and environmental, management, and development conflicts. Findings showed that all papers relied on bureaucratic official sources and wildlife conflict stories were more widespread in the urban than rural newspapers (Corbett, 1992).

Stocking and Holstein (2009) conducted an approach that blended an online newspaper archive search and interviews. They investigated journalists' use of *industry claims-makers* to create doubt about the science that linked smoking with cancer. They studied how a tobacco company framed news about university research that threatened the industry's interests. The authors found that the tobacco industry issued claims about uncertainties in the university's science. They also discovered that *activists*, *special interests*, and *political groups* can use the media to facilitate doubt in science issues that otherwise might jeopardize their wellbeing.

Other researchers indicated that *fossil fuel industry claims-makers* may express doubt about climate change impacts regardless of widespread scientific support for its harmful impacts (Trumbo, 1996; Corbett & Durfee, 2004; Gelbspan, 2004). Such scientific misinterpretations represented in the media confuse the public and policymakers (Zehr, 2000).

Advocates of climate change such as *scientists*, *environmental interest groups*, and *politicians*, many who are sources or claims-makers for the media, generally are certain that climate change is occurring. However, other adversary scientists, special interest groups, and politicians, who also are common media claims-makers, can be

skeptical and express opposition, doubt, or uncertainty that climate change is a significant concern.

The complexity of this environmental challenge can indeed also challenge news reporters who must sift through complicated, even contradictory, technical information from claims-makers; it can be more difficult to accurately present debates between scientists, politicians, and competing special interest groups. Journalists constantly deal with the barrage of scientific claims and counter-claims. Claims-makers also can be used in media to portray both sides of an issue to demonstrate journalistic neutrality and balance in a news story (Dunwoody, 1999).

Scholars like Stocking and Holstein (2009) pointed out that many times news reporters build scientists' claims to be more "certain" than in actuality. Yet, reporters are also "lambasted for making science appear more uncertain and baffling than it, in fact, may be" (p. 23).

Scientists must energetically communicate climate change information in a manner that it is relevant to diverse audiences, including journalists, special interests, politicians, and laypersons. People generally do not evaluate opposing ideas about science issues presented in the news media by themselves. With all of the scientific, economical, and political complexities surrounding the climate change issue comes controversy that needs clarification. This study specifically investigates *scientists*, *policymakers*, *environmental* and *industry interests* as claims-makers represented in climate-related news stories. The next section covers studies that are relevant to and incorporate the two key concepts discussed in the literature review and examined in this investigation — *frames* and *claims-makers*.

Research Relevant to this Investigation

Research Unrelated to Climate Change

Nisbet, Brossard, and Kroepsch (2003) used frame and agenda building to investigate the role media played in the development of a well-known scientific controversy, stem cell research. The researchers examined how a scientific issue gained, maintained, or lost political and media attention. They conducted a *quantitative content analysis* to examine news coverage in the *New York Times* and *Washington Post* between 1975 and 2001 for media attention, media *framing*, and media *sourcing* over periods of scientific, political, and policy development. Findings across the study years revealed a shift toward frames highlighting strategy/conflict and ethics/morality. Results also showed an increase in the use of conflict and drama − familiar storytelling themes.

Carpenter (2007) researched the portrayal of the Iraq War with a *quantitative content analysis* of *frames* and *sources* used in two elite (*New York Times* and *Washington Post*) and four non-elite newspapers (*San Antonio Express News* (TX), *Roanoke Times* (VA), *News Tribune* (Tacoma, WA), and *Columbus Dispatch* (OH). The data collection consisted of three time periods during the war. She tested seven frames: military conflict, human interest, responsibility, media self-referential, diagnostic/cause, violence of war, and anti-war; she categorized claims-makers as either official or unofficial. Findings showed that frames and use of international, national, and local sources were significantly different. Yet, the inclusion of military sources was relatively balanced in elite and non-elite newspapers. Elite newspapers used national and international official sources more often, whereas non-elite papers more likely used local sources.

Relevant Climate Change Research

Although much framing research exists, studies that explicitly content analyzed climate change coverage to explore the frames and claims-makers represented in news stories were not as prevalent. This investigation was modeled, in part, after the research completed by Trumbo (1996). That study is summarized in this section. Also, briefly discussed are four additional climate change news studies that incorporated at least one of the two variables in their studies and a content analysis methodology.

Trumbo (1996) examined climate change-related news coverage from 1985-1995 in five elite U.S. newspapers, the *Christian Science Monitor Los Angeles Times*, *New York Times*, *Wall Street Journal*, and *Washington Post*. He based his empirical content analysis on framing, social problems theory and the Down's issue-attention cycle, a five-stage cycle generally attributed to the growing and diminishing attention to an issue. The scholars' measurements of climate-related news coverage consisted of claims-making (quoted sources) and framing, which supported four functions associated with news frames (Entman, 1993). He found that scientists were strongly associated with frames that diagnosed causes, while special interests and politicians were strongly associated with frames that made moral judgments. He also demonstrated that news quotes by scientists dropped off when the climate issue became "increasingly politicized" (Trumbo, 1996, p. 269).

Trumbo's study results pointed out that scientists left the media contest as the issue intensified. Scientists also received less media attention during a significant part of public debate. He explained that whether scientists chose to distance themselves from political debate or other claims-makers took over the limelight was unknown. With the

growing international agreement among climate scientists that human-caused global warming is real, Trumbo questioned if scientists might have a fair share of news coverage compared to politicians and special interests when the media refocus attention on the climate change issue (Trumbo, 1996).

McComas and Shanahan (1999) observed that journalists created narratives by using an explicit sequential order of events to construct their meanings. The particular frames that stories feature can form a larger meta-narrative across time. By examining climate change-related data collected from a content analysis of news coverage, the researchers found that the media's narrative generally corresponded with *dramatic claims*. Coverage of an issue started with a buildup of dramatic assertions that was an attention-getter for the issue.

In the 1990s, a conventional movement attempted to determine that climate change was not an environmental crisis. McCright and Dunlap (2000) investigated framing and claims-making practices supported by U.S. conservative think tanks who attempted to disprove truths about climate change. The researchers identified three primary frames: *criticism of scientific evidence*, *significant benefits of climate change*, and *actions to ameliorate* what would be a great threat to national economy and sovereignty. They found that the climate change issue primarily failed to remain on the public agenda because of opposing *special interests*' influences and their exercise of power. The failure of climate change to stay on the public agenda was not due to fading media attention or complexities of the science.

Zehr (2000) examined climate science uncertainty framing from 1986 to 1995, in U.S. news coverage in four elite newspapers, including the *New York Times*. News stories

were also reread for any emerging themes. From his content analysis, he found that scientific uncertainty was salient. Zehr also argued that uncertainty created a "rhetorical boundary" between scientists and the public (p. 85). He determined that a biased portrayal could result in doubt and confusion about an issue.

In a 2005 study, Antilla studied climate change with a quantitative content analysis of climate change coverage in U.S. newspapers. She combined it with a social constructivist approach in a qualitative, comparative analysis of news-created frames. The research focus was on articles framed by narrative that accentuated climate scepticism, controversy, and uncertainty. Her findings indicated that these frames were represented quite often. The study illustrated that climate skeptics continued to discredit climate change science through the news.

Research Questions

The two principal research questions that lie beneath my exploration of the frames used in climate change newspaper stories and the sources quoted in those stories were:

RQ1: What frames and claims-makers are represented in the climate change news coverage?

RQ2: Are there differences in the representation of claims-makers across frames in the climate change news coverage?

CHAPTER 3. METHODS

Study Design

I conducted a quantitative content analysis of the newspaper coverage on the climate change issue from January 20, 2005 to January 20, 2009, the second presidential term of the George W. Bush administration. Additionally, I included an overview of the climate change issues at heart during the four-year period. This narrative material does not constitute a formal qualitative content analysis. However, it does serve to enhance my interpretation of the quantitative results, lending special attention to what might further emerge about the frames presented and claims-makers represented in the news.

I selected this time period for my study because the global climate change issue had become undeniably urgent; its impacts had hit 'home' for many people in our country and for the world at large. During 2005-2009, the Bush administration was hard-pressed to respond to growing scientific evidence that human-caused climate change was more certain. Therefore, I was curious how U.S. news coverage had portrayed the issue.

Sample

I used the online LexisNexis news archive database to explore how climate change was presented in two elite national newspapers in the United States. Research shows a strong inter-media agenda-setting effect in which such elite national newspapers lead other papers across the U.S., especially on science topics like climate change. My study examined stories in the *New York Times* and the *Washington Post*. Many other communication researchers have also discussed the newspapers' prominent stature for

use in content analysis (Gitlin, 1980; Rogers, Dearing, & Chang, 1991). Nisbet and his colleagues (2003) also pointed out that "this choice to focus on the elite national newspapers of record complements what other media analysts have observed: Stories tend to spread vertically within the news hierarchy, with editors at regional news outlets often deferring to elite newspapers and newswires to set the news agenda" (p. 47).

Both papers dedicate substantial "resources to coverage of national politics, and both newspapers are national leaders in science and technology coverage, with a large and prestigious staff of science writers and editors. In particular, the *New York Times* weekly science section is regarded as an international model for quality, depth, and breadth of science coverage. Given their influence, both papers are primary targets of media lobbying by various political actors" (Nisbet et al., 2003, p. 47).

Content selection included articles published in the two U.S. newspapers between the dates January 20, 2005 and January 20, 2009 and encompassed news stories, while the selection excluded editorials, opinion columns, letters to the editor, and advertisements.

To explore my selection strategy, I performed a preliminary test search of the LexisNexis database. A news article population of 1,901 (*N*) stories resulted when I set parameters to search for the keywords 'climate change' or 'global warming,' constrained the terms to appear in the headlines or lead paragraphs, and restricted to publication dates within the four-year time period. Stories were screened for relevance to the study. I determined my sample size for a margin of error of +/-5 percent at a confidence level of 95 percent, which resulted in 320 (*n*) articles in the *New York Times* ($n = 171$) and the *Washington Post* ($n = 149$). I used a systematic random sampling method by selecting

every sixth story. While results are not generalizable to all newspapers, or even all national elite newspapers they will provide insight into the major frames portrayed in the stories by media and the players shaping the news coverage of the climate change topic.

Measurements

The concepts I evaluated are the *frames* portrayed and the *claims-makers* represented in the climate change news stories.

Frames

Frame was operationalized as the assertions presented in the news stories' headlines and lead (first) paragraphs (and second paragraphs, if necessary to determine the frame). According to Entman (1993), frames typically are associated with four functions (purposes): defining problems, diagnosing causes, making moral judgments, and suggesting solutions (See the literature review for the general definition of each framing function used by Entman (1993). I expect that climate frames will reveal these purposes as they did for Trumbo (1996). I categorized and employed this approach to measure frames in this study, as they specifically apply to stories about climate change:

- *Define problems — Climate change impacts*. Stories that discuss what happens as a consequence of this phenomenon and will be expressed in terms that are negative (i.e. insect epidemic, extreme temperatures), positive (i.e. rainfall in dry climate), or debated (Entman, 1993, p. 52; Trumbo, 1996, p. 272). Story headline example: *As the Climate Changes, Bits of England's <u>Coast Crumble</u>* (coast crumble=problem)
- *Diagnose causes — Evidence of the reality of a climate change problem*. Stories with evidence typically will present scientific findings and will support the problem (evidence of atypical change), dispute the problem (evidence that change is within

natural variance, or state the unknown (present argument that reason for the problem is unknown) (Entman, 1993, p. 52; Trumbo, 1996, p. 272). Story Headline Example: *Study Links Tropical Ocean Warming to Greenhouse Gases* (study=scientific finding)

- *Make moral judgments — Action Statements*. Stories that present general statements to take action or report actions taken (U.S. should, will develop policy, has developed policy), argue against actions or reporting action blocked (scientific statement changed, greenhouse gas standards not needed), present argument that course of action is not clear (Entman, 1993, p. 52; Trumbo, 1996, p. 273). Story Headline Example: *U.S. Aims to Weaken G-8 Climate Change Statement* (weaken statement=argue against scientific statement)
- *Suggest solutions or remedies — Provide specific information about how solutions should be implemented*. Stories that report specific solutions proposed or implemented (tougher industry emission standards), solutions rejected or deemed inadequate (voluntary programs), or present debate about a specific solution(s). A specificity of the solution (a statement of exactly how the solution should be carried out) is an important distinction between an action statement and a solution statement (Entman, 1993, p. 52; Trumbo, 1996, p. 273). Story Headline Example: *Businesses in Bay Area May Pay Fee for Emissions* (pay fee for emissions=specific solution proposed)

Claims-makers

Claims-maker was operationally defined as a source quoted in the news story. Claims-maker was defined, categorized, and collapsed into groups called *scientists*, *policymakers*, *industry interests*, and *environmental interests*. I also included a category labeled *other* claims-makers who could not be collapsed or coded into one of the

scientist, policymaker, or the special interest groups; this helped achieve category exhaustivity. A scientist was defined as associated with a university, government agency, or other affiliation. Policymaker was further categorized as either associated as an elected official (at the local, state, or federal level) or an appointed spokesperson (at a local, state, or federal level). The interest groups were categorized as an environmental organization/group or an industry that has an interest, may benefit, or be harmed by issues relating to climate change. These definitions were reexamined during the training session and intercoder reliability procedure; no additional categories needed to be formed.

Coding Form

The unit of analysis was the newspaper story. To categorize the unit of analysis, frames, and claims-maker measurements, I developed a categorical coding form (Neuendorf, 2002) and created an Excel spreadsheet for data entry (see Table 3.1).

Table 3.1 Coding Form (Example)

Story #	**Date**	**Paper**	**Frame**	**Claims-maker1** 1st quote	**Story #** 2nd quote	**Etc.**
n	From 1/20/2005 to 1/20/2009	1=wp 2=nyt	1=problem 2=cause 3=judgment 4=solution 5=other	1=scientist 2=policymaker 3=int_industry 4=int_environment 5=other	1=scientist 2=policymaker 3=int_industry 4=int_environment 5=other	
2	2/28/2007	2	1	1	2	
3	3/02/2008	1	3	2	4	
Etc.						

Frame variable categories and codes are problem = 1, cause =2, judgment = 3, solution = 4, or other = 5. The variable called claims-maker is a source quoted in a story; multiple claims-makers can be cited in a story. This study coded each citation separately

by its order in a story (1st quote, 2nd quote, etc.) Claims-maker1a is the first quoted source in the story. Categories or types of claims-makers and their codes are: scientist = 1, politician = 2, industry interest = 3, environmental interest = 4, other = 5. Claimsmaker2a will be the second quoted source in the story, and values also will be coded 1 to 5. Claimsmaker3a will be the third quoted source in the story, and so on for additional claims-maker quotes. Each unique quoted source will only be counted once in each unit of analysis (story). Each story will follow this same coding method.

Codebook

My codebook included variable operationalization and category definitions. Two coders, including myself, examined and coded each story. I extensively trained my coder on the data entry process and use of the accepted codebook. She received a codebook for use during the entire coding process.

Inter-coder Reliability

I pre-tested the instrument by having her code several stories in my presence. Together, we reviewed each coded decision. Next, we separately coded the same 10% randomly selected stories to test for reliability between coders.

At this point before proceeding with data collection, I performed a check for inter-coder reliability (ICR) by applying the Scott's *pi* coefficient to determine the level of agreement our coding decisions. I applied the test to each coded value for both variables. I chose this test because it corrects for agreement by chance and is appropriate to utilize for a two-coder content analysis. Mass media research authors, Wimmer and Dominick (2006), affirmed that "Most published content analyses typically report about a .75 or above reliability when using Scott's *pi*." They also explained, "the greater the amount of

judgmental leeway given to coders, the lower the reliability coefficients are" (p. 169). In this study, Scott's *pi* inter-coder reliability test results for frame and claims-maker coding value agreement were .76 and .71, respectively.

Following are the study's resultant formulas for Scott's *pi*, where PAo = percent of observed agreement and PAe = percent of expected agreement:

Frame	$\frac{\text{PAo - PAe}}{\text{1 - PAe}}$	$\frac{0.52}{0.68}$	= .76
Claims-maker (Source quoted)	$\frac{\text{PAo - PAe}}{\text{1 - PAe}}$	$\frac{0.54}{0.76}$	= .71

Each disagreed upon coded value was discussed in detail, all measurements were clarified, and the pre-tested stories were re-coded by both coders together after clarification of measurement definitions. Minor revisions were made to the codebook to assure the categories were mutually exclusive.

After data collection, with SPSS I collapsed the variables for quoted sources into interval measures for the statistical analyses. Each claims-maker quote (claims-maker1, claims-maker2, etc.) was summed across stories. For example, if there were five quotes, three from scientists and two from policymakers, these variables on the story will be scientist = 3 and politician = 2.

Data Analysis

I performed an analysis of the resultant quantitative data collected from the 320 (*n*) stories in my completed coding scheme, using the Statistical Package for Social Sciences (SPSS) software to create data sets and perform a statistical analysis. I first organized and summarized all measures with descriptive statistics. Frequency distributions and percentages were calculated for all variables where appropriate, and

illustrated in graphical formats. As just described I converted each claims-maker categorical measure into an interval measure for inferential statistical analysis. I also examined the independence and associations between the frames and claims-makers by using cross-tabulation and chi-square, and a one-way ANOVA. I used a significance alpha level of .05 for these tests. The statistical analysis will allow me to draw inferences about climate change issue representation in these two elite national newspapers.

To expand the analysis, I read the stories' content, and specifically highlighted and commented on the frames presented and the claims-makers who made the news. From this examination, I crafted a clear account of major influential claims and potential science debate that may be portrayed in the media. I hope that the blending of a conclusive narrative with the findings from my quantitative analysis will reveal interesting phenomena about the media's depiction of climate change science during a challenging political time period.

CHAPTER 4. RESULTS

This study was guided by two questions: (1) What frames and claims-makers are represented in the media coverage of climate change? and (2) Are there differences in the representation of claims-makers by frames?

Research Question 1

What frames and claims-makers are represented in the media coverage of climate change? My first research question concerned how *New York Times* and the *Washington Post* framed their stories about the climate change issue and what claims-makers, or sources quoted, were depicted in those stories. I used descriptive statistics to answer this question.

Frequency Distributions of Frames and Claims-Makers

A *frequency distribution of frames* revealed that both newspapers supported all of Entman's (1993) four frames associated with the media. These frames were represented in the newspapers' headlines and lead sentences as follows: 42.2% of the stories made moral judgments about the climate change issue; 27.8% of the stories suggested solutions or remedies to the climate change problem; 19.1% of the stories defined problems associated with a changing climate; and 10.9% of the stories diagnosed the causes of climate change (Figure 4.1). A total of 1,299 quotes were coded and a *frequency distribution of claims-makers* showed that all five claims-maker categories were represented across stories as follows: policymakers had 528 (40.6%) of the quotes; scientists had 396 (30.5%) of the quotes; environmental interest groups had 203 (15.6%)

of the quotes; industry interests had 142 (10.9%) of the quotes; and other sources had 30 (2.3%) of the quotes (Figure 4.2).

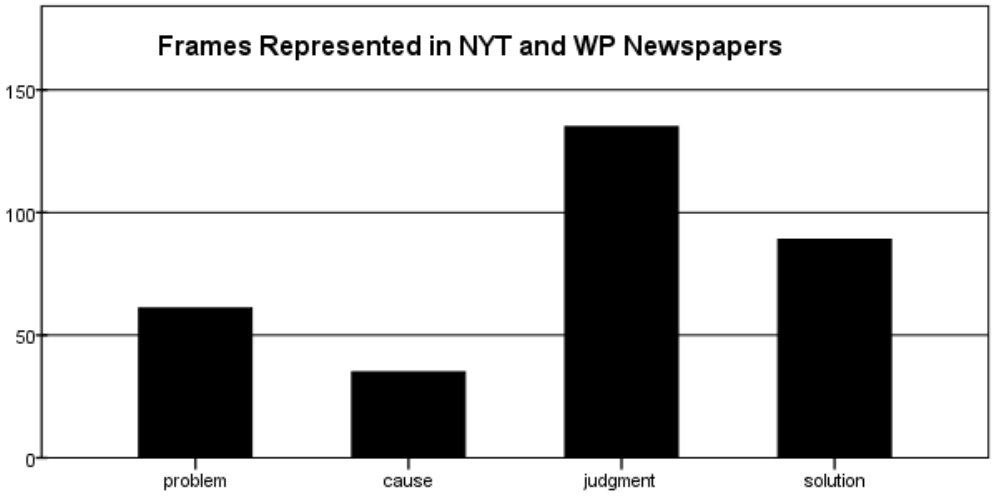

Figure 4.1 Frames Represented in the *New York Times* (*n*=171) and *Washington Post* (*n*=149) from January 20, 2005 to January 20, 2009

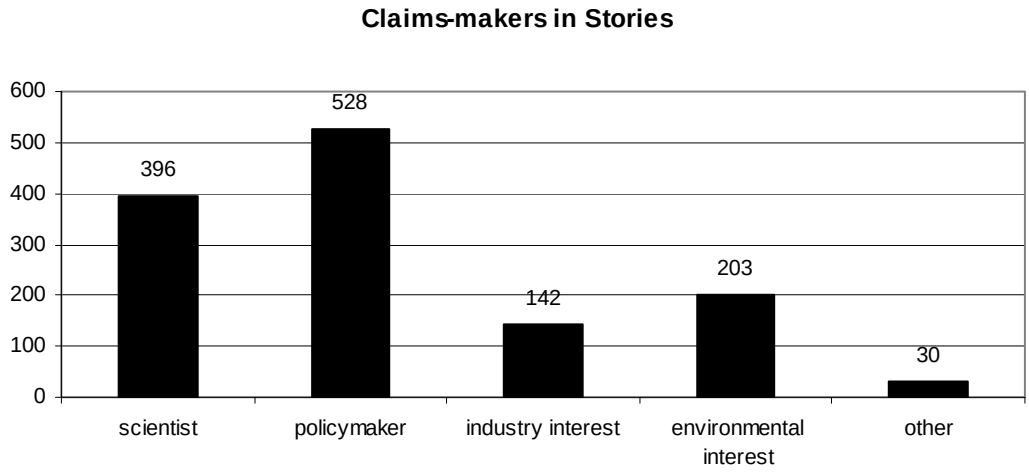

Figure 4.2 Claims-Maker Frequency Distribution (1,299 quotes) in the *New York Times* and *Washington Post* from January 20, 2005 to January 20, 2009

Research Question 2

Are there differences in the representation of claims-makers by frames? I used an alpha level of .05 for all calculated statistical tests used for this question. To address the second research question and determine if differences existed, I chose to calculate a

chi-square test of independence to test the frame by newspaper relationship; a one-way analysis of variance (ANOVA) between the two variables − frame and claims-maker; and a univariate analysis of variance (UNIANOVA) to test differences among three variables − frame, claims-maker, and newspaper.

I wanted to know if there was a difference between *framing* of the climate change stories and the *newspaper* in which the climate change stories appeared. To do so, I first calculated a cross-tabulation to obtain the frequencies of frames by newspaper (Figure 4.3 and Table 4.1).

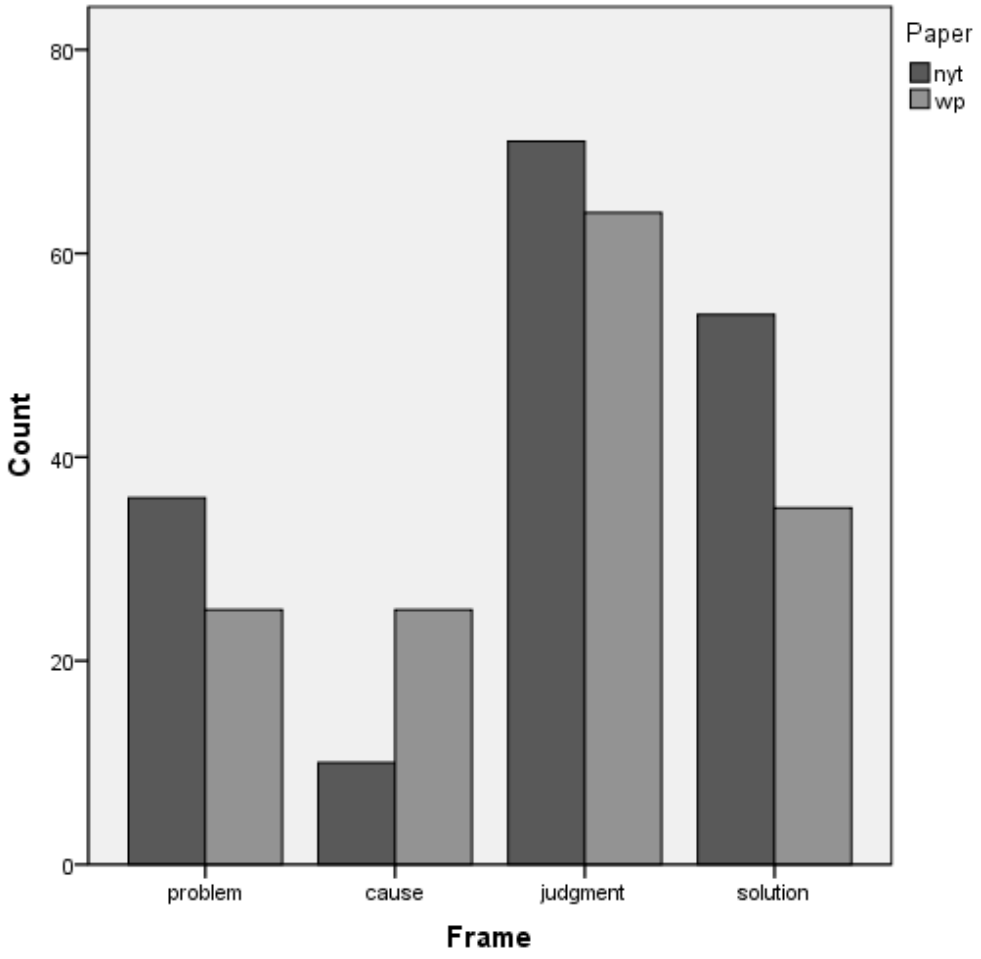

Figure 4.3 Cross-Tabulation of Frame by Newspapers *New York Times* (*n*=171) and *Washington Post* (*n*=149)

Table 4.1 Cross-Tabulation of Frame and Newspaper

Frame	Paper		Total
	1 nyt	2 wp	
1 problem	59.0%	41.0%	100.0%
2 cause	28.6%	71.4%	100.0%
3 judgment	52.6%	47.4%	100.0%
4 solution	60.7%	39.3%	100.0%
Total	53.4%	46.6%	100.0%

The second step in this analysis was a chi-square test of independence (Table 4.2). The results using the Pearson coefficient indicated there was a significant difference between the framing of the story and the newspaper $\chi^2(3, N = 320) = 11.37, p = .01$).

Table 4.2 Chi-Square Test of Independence for Frame by Paper

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.373[a]	3	.010
Likelihood Ratio	11.573	3	.009
Linear-by-Linear Association	.788	1	.375
N of Valid Cases	320		

0 cells (.0%) have expected count less than 5. The minimum expected count is 16.30.

Differences in Claims-Making by Frames

Before using more powerful statistics to determine relationships between specific frames and claims-makers, I needed to collapse all quote variables (claims-maker1, claims-maker2, etc.) to create five additional variables which gave me a total count of each claims-maker category across all stories within my SPSS data set. These new variables were *scientist*, *policymaker*, *industry interest*, *environmental interest*, and *other*. An analysis of variance (ANOVA) then could be calculated.

I used a one-way ANOVA to determine if there were differences across each *claims-maker* (dependent variable) type quoted in all stories by each *frame* portrayed (independent variable) and plotted error bar charts to visualize the results.

I graphed error bars that displayed means across variables for each claims-maker by frame. The graphs illustrated the important differences across three claims-makers and specific frames used in stories. Scientists were more likely than other sources to be represented in problem and cause frames. Although they were still quoted in judgment and solution framed stories, they were found less often. Since results of the ANOVA were significant for the scientist, policymaker, and industry interest claims-makers, a post-hoc analysis was calculated as the second stage of the analysis. These tests formally support the visual interpretation of the differences as shown in each error bar plot. The post hoc test analysis for significance presented every possible combination of the frame (independent variable) with each claims-maker (dependent variable).

As illustrated in each error bar plotted by claims-maker, findings revealed that a significant difference existed across the framing of the climate change news coverage and three claims-makers: *scientists*, *policymakers*, and *industry interests* (See Figures 4.4, 4.5, and 4.6, respectively). Results are presented in the one-way ANOVA Tables 4.3, 4.4, and 4.5, respectively and are: *scientists* ($F(3, 316) = 36.38$, $p < .01$); *policymakers* ($F(3, 316) = 16.88$, $p < .01$); and *industry interests* ($F(3, 316) = 19.06$, $p < .01$).

Table 4.3 Scientists Across Frames – One-Way ANOVA

Scientist	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	227.415	3	75.805	36.375	.000
Within Groups	658.535	316	2.084		
Total	885.950	319			

As shown in Figure 4.4, *scientist* claims-makers appeared more often in problem and cause framed stories; although less often, they still appeared in problem and cause framed stories.

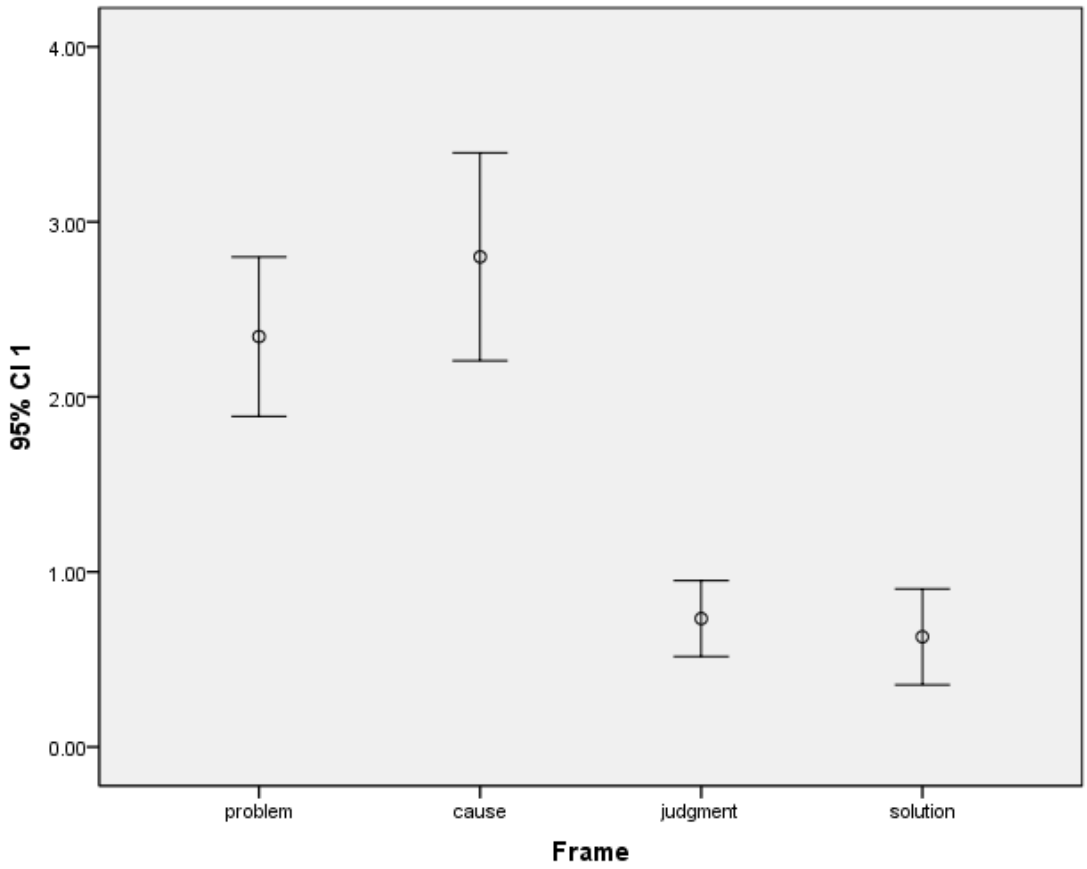

Figure 4.4 Scientists Across Frames – Error Bar Plot

Table 4.4 Policymakers Across Frames – One-Way ANOVA

Policymaker	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	120.265	3	40.088	16.879	.000
Within Groups	750.535	316	2.375		
Total	870.800	319			

As depicted in Figure 4.5, *policymaker* claims-makers were found more often in judgment and solution frames in the stories; and although less often, they still appeared in problem and cause framed stories.

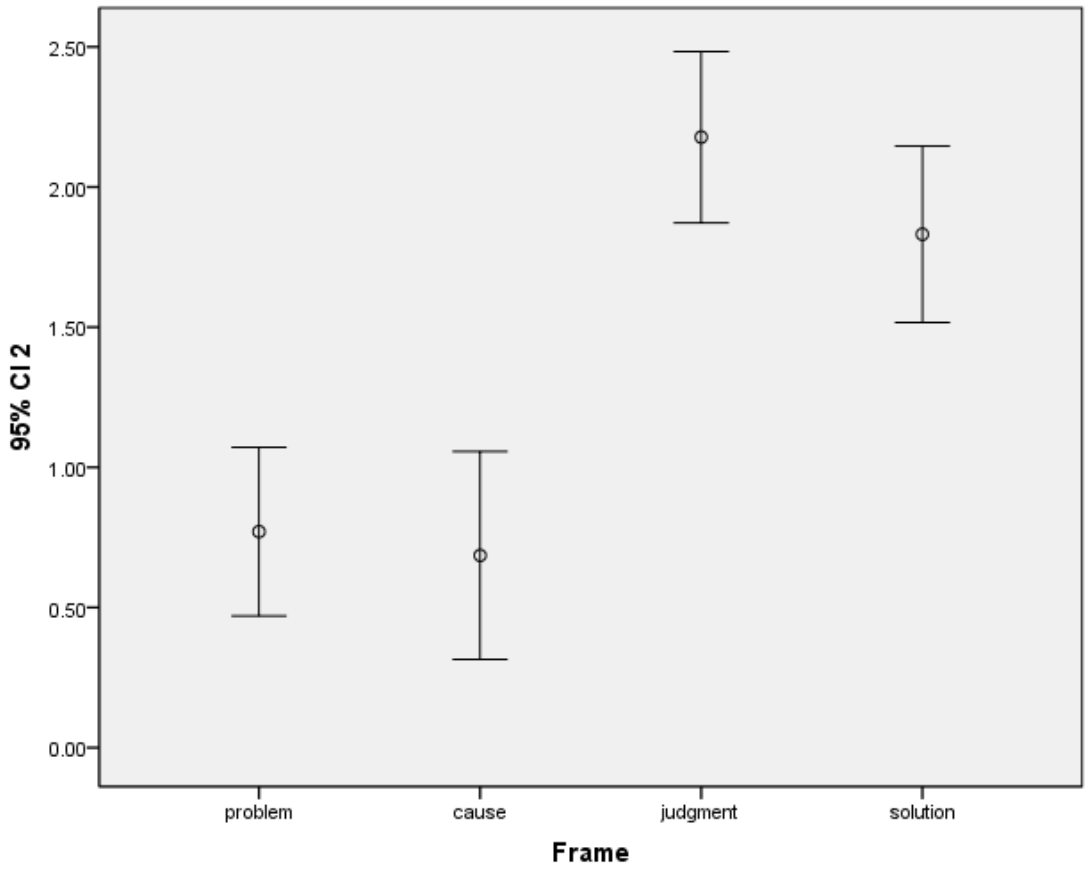

Figure 4.5 Policymakers Across Frames – Error Bar Plot

Table 4.5 Industry Interests Across Frames – One-Way ANOVA

Industry	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	36.931	3	12.310	19.064	.000
Within Groups	204.057	316	.646		
Total	240.988	319			

As illustrated in Figure 4.6, *industry interest* claims-makers were found more often in the solution framed stories. Even so, these claims-makers appeared to a lesser degree in problem, cause, and judgment framed stories.

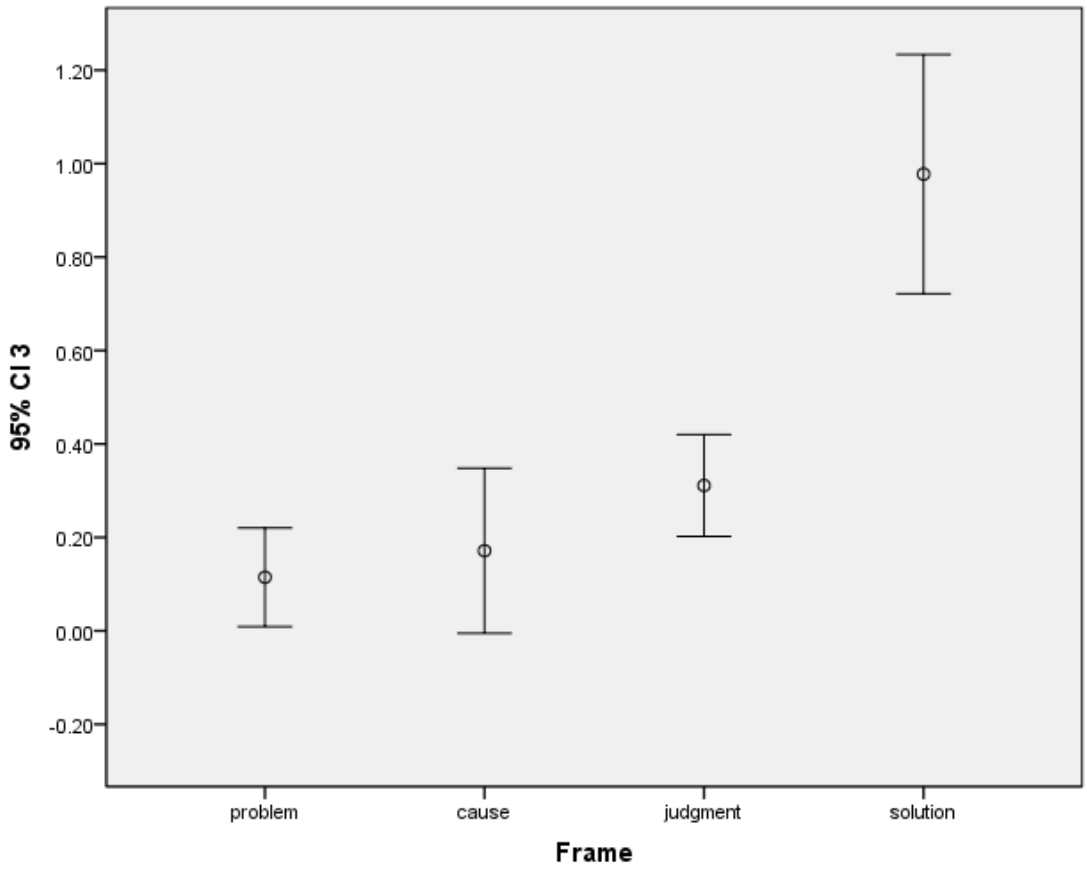

Figure 4.6 Industry Interests Across Frames – Error Bar Plot

The one-way ANOVA Table 4.6 showed no significant differences within *environmental interests* ($F(3, 316) = 1.82$, $p = .14$).

Table 4.6 Environmental Interests Across Frames – One-Way ANOVA

Environmental	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.775	3	1.258	1.820	.143
Within Groups	218.447	316	.691		
Total	222.222	319			

Although not considered significant in this analysis, *environmental interest* claims-makers seemed to appear slightly more in judgment and solution framed stories, and was noted across all frame types (Figure 4.7).

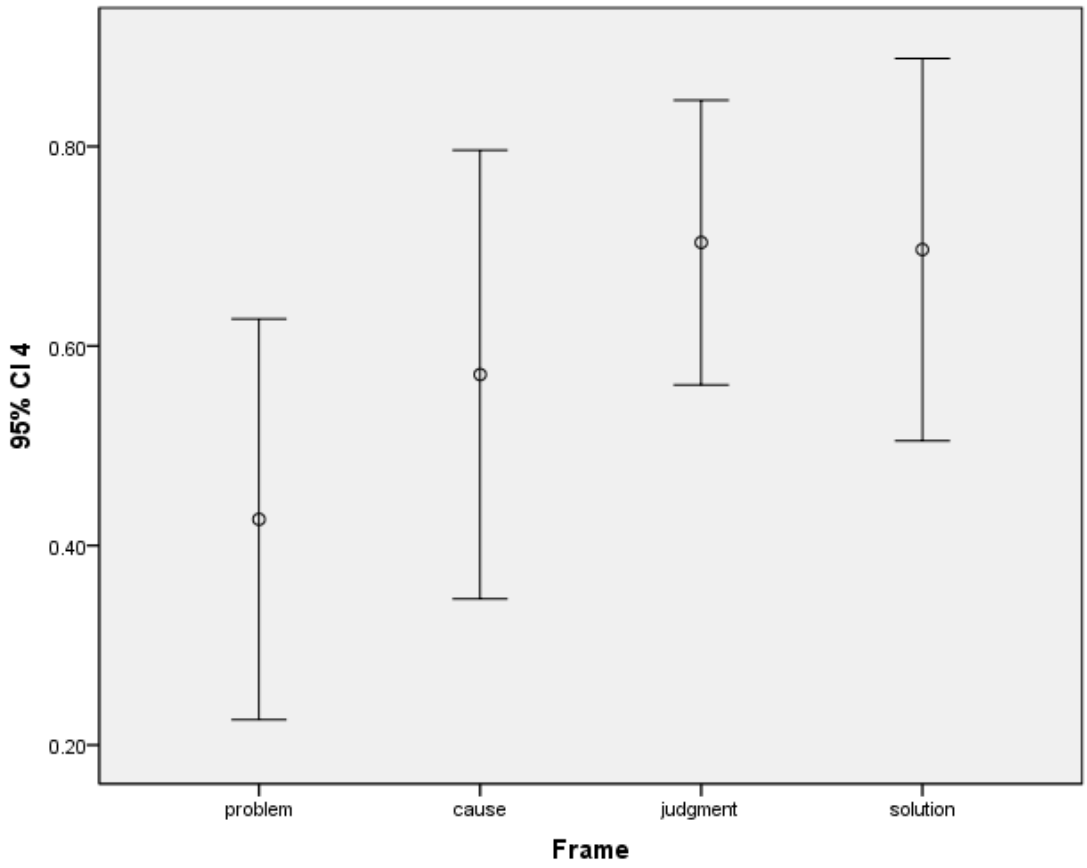

Figure 4.7 Environmental Interests Across Frames – Error Bar Plot

As shown in the one-way ANOVA Table 4.7, no significant differences were found within the *other* claims-maker category ($F(3, 316) = .34$, $p = .80$).

Table 4.7 Other Claims-makers Across Frames – One-Way ANOVA

Other	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.176	3	.059	.337	.798
Within Groups	55.011	316	.174		
Total	55.188	319			

Although not considered significant in this analysis, the *other* claims-maker category was noted across all frame types (Figure 4.8).

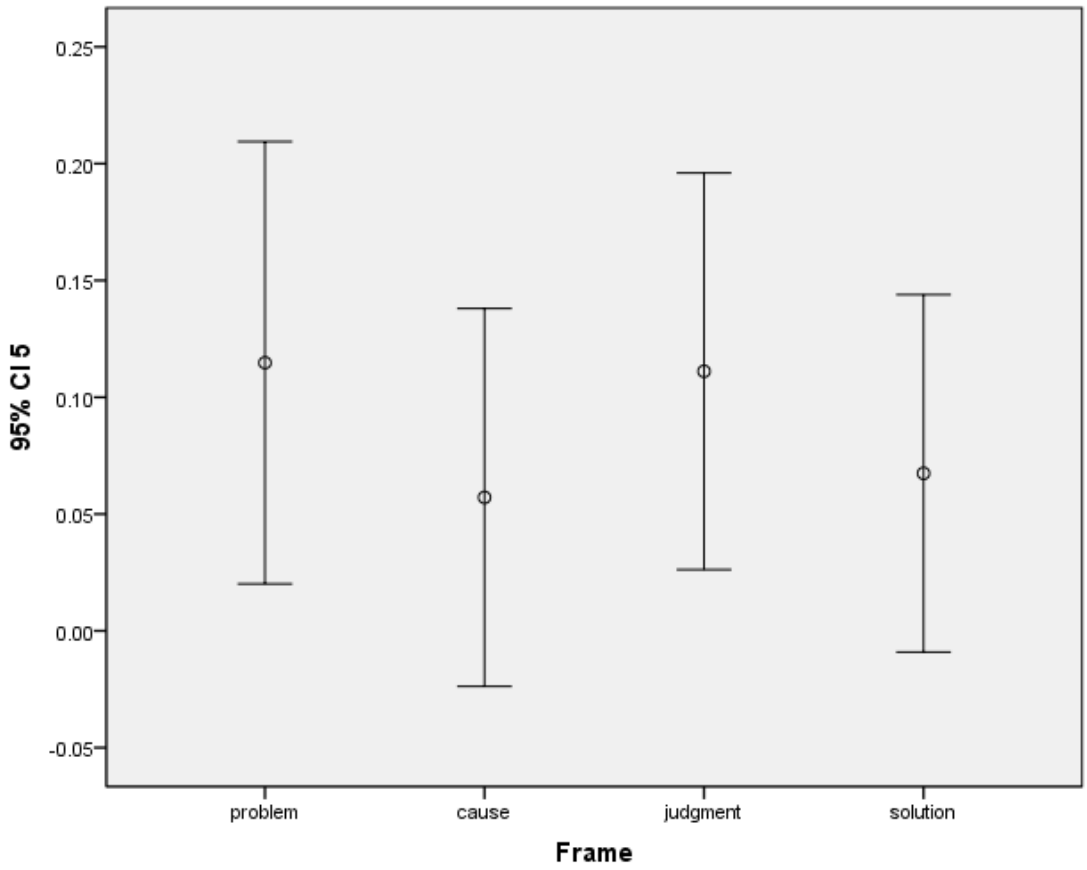

Figure 4.8 Other Claims-makers Across Frames – Error Bar Plot

Differences Across Claims-Makers, Frames, and Newspapers

Finally, I also calculated a univariate ANOVA between three variables to determine significant effects between claims-makers and frames as well as newspapers. Results showed that *scientists* have a significant effect by frame ($F(df = 3) = 34.99$, $p < .01$), but not significant by paper ($F(df = 1) = .40$, $p = .53$). *Industry interests* also had a significant effect by frame ($F(df = 3) = 19.69$, $p < .01$), but not by paper ($F(df = 1) = 1.92$, $p = .17$). However, as illustrated in Figure 4.9, *policymakers did have significant effects by frame* ($F(df = 3) = 16.58$, $p < .01$), *and* by paper, ($F(df = 1) = 8.20$, $p < .01$).

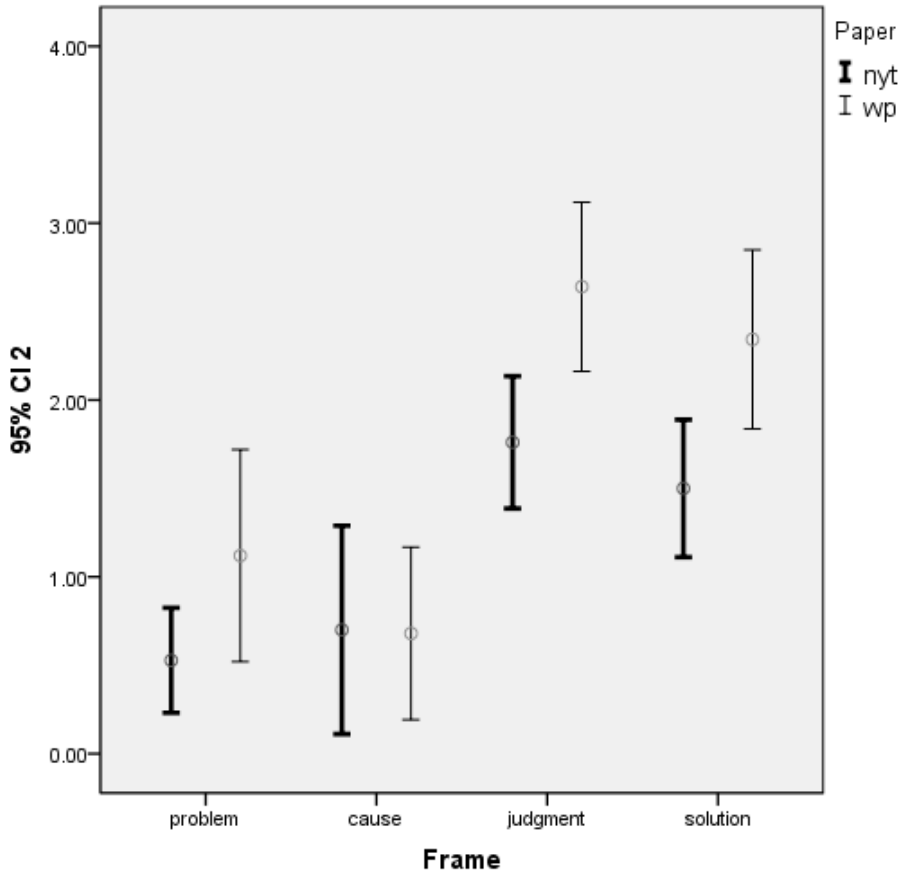

Figure 4.9 Policymakers by Frame and Paper – UniANOVA

No significant effects were found between environmental interests and the frame, ($F(df = 3) = 2.28$, $p = .08$), or paper, ($F(df=1) = 2.15$, $p = .14$). The analysis of other claims-makers represented in stories also showed no significant effects by frame, ($F(df = 3) = .23$, $p = .88$), or paper, ($F(df = 1) = 1.76$, $p = .19$).

CHAPTER 5. NARRATIVE CONTENT INTERPRETATION

In addition to discussing the study's quantitative results, it is important to gain a deeper understanding of the climate change-related news coverage during the study period from January 2005 to January 2009, the second presidential term of the George W. Bush administration.

This narrative section is meant to enhance the interpretation of the study results by presenting key story examples that illustrate the four frames represented in the climate change-related news coverage during the study period. The content is discussed in terms of the framing approach used in the study analysis. Content of story examples included in this narrative depict the frames represented and claims made in climate change-related news coverage in the *New York Times* and *Washington Post*.

I examined many news stories in their entirety. In this narrative, I include more prominent examples of headlines, lead paragraphs, and claims (quotes) that reflect my findings and illustrate the bigger climate picture during the study time period. The narrative is not intended to be a comprehensive qualitative analysis, but only an interpretation based on study results and story content.

Results from the present study suggested several emergent themes within the four frames measured in the sampled stories that would help illustrate how the media portrayed climate change. Altheide (1996) suggested that in qualitative textual studies, "several overlapping concepts that aim to capture the emphasis and meaning are frame, theme, and discourse" (p. 28). He also explained that "*themes* are the recurring typical

theses [opinions] that run through a lot of the reports. *Frames* are the focus, a parameter or boundary, for discussing a particular event." and "certain themes become appropriate if particular frames are adopted" (p. 31).

The interpretive part of the narrative section begins with a description of the three primary emerging themes that I felt were implied from the study results. Next, examples of story headlines, lead sentences, and claims-maker quotes are used to illustrate and support the results and implication of themes within the frames. In order of presentation are examples of climate change-related stories in the news that are framed to diagnose causes and define problems, to make judgment, and to suggest solutions.

Emerging Themes Implicated by the Study Results

Three primary themes emerged out of the frames and claims represented in the study results.

First, scientists' quotes were most associated with stories that framed climate-change by *diagnosing causes* (scientific findings) and *defining problems* (impacts). Associations implied that impacts of climate change were increasing and scientific research had become more certain.

Second, policymakers claims appeared strongest in *judgment* framed stories about climate change. The associations implied White House debates about state and federal climate policy action, disagreements with international efforts, and lingering doubts cast on climate science.

Third, a notable theme was industries' association with climate change *solution* frames. These frames implied their efforts to help with solutions to reduce greenhouse gas emissions. Many corporations, along with other policymakers, scientists, and

environmental interests called for the Bush administration take mandatory action with a federal climate change policy.

This narrative will provide notable headlines, lead paragraphs, news clips, and claims-maker quotes found in sampled stories from the *New York Times* and *Washington Post* in order to illustrate these emerging themes in the news coverage. It is not intended to be a complete qualitative analysis of the sampled stories.

A Glance at Climate Change During the Study Period

An appropriate story example that illustrated the climate change challenges during the study time period was explicitly weaved into an article with the headline, *On the Move to Outrun Climate Change; Self-Preservation Forcing Wild Species, Businesses, Planning Officials to Act.* The bigger global picture is illustrated in its lead paragraph:

> With the issue of a warming planet shifting rapidly from scientific projection to on-the-ground reality, animals and plants are being compelled, along with businesses and bureaucracies, to take action aimed at self-preservation. They are doing so even as the Bush administration eschews regulations, laws or international treaties that would require limits on carbon dioxide emissions, which scientists say are the main cause of global warming (*Washington Post*, November 26, 2006).

Also, during this time period, the climate change controversy and a plea to act on the issue were expressed by Al Gore during his 2007 Nobel Peace Prize acceptance speech. He shared the award with the Intergovernmental Panel on Climate Change, who won the distinguished award for their climate science research reported in their fourth assessment report of climate change. Gore won the award for his documentary, *An Inconvenient Truth*, that heightened public awareness about the climate crisis. In a sampled *New York Times* article, Gore remarked:

> Now is the time to make peace with the planet. The future is knocking at our door right now. Make no mistake, the next generation will ask us one of two questions. Either they will ask, 'What were you thinking; why

> didn't you act?' Or they will ask instead, 'How did you find the moral courage to rise and successfully resolve a crisis that so many said was impossible to solve?' (*New York Times*, December 11, 2007)

First Theme – Scientists, Diagnosing Cause and Defining Problem

Cause – Scientific Findings About Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is a United Nations body that conducts an exhaustive periodic review research about the causes and impacts of climate change. The scientific team represents nearly 200 countries (IPCC website).

In a *New York Times* article headlined *World Scientists Near Consensus on Warming,* a scientist stated:

> [T]he findings presented Friday should lead decision makers to accelerate efforts to slash carbon emissions and to help people in vulnerable parts of the world prepare for climate change (*New York Times*, January 30, 2007).

The United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) developed the IPCC in 1988 to provide a balanced view of the understanding of climate change and its probable effects. Thousands of scientists worldwide voluntarily contribute to the climate science research for the IPCC reports. In 2007, the IPCC released the *Fourth Assessment Report (AR4)* that contains four volumes. The February 3, 2007 a *New York Times* article summed the results of the report when stating, "Feb. 2 will be remembered as the date when uncertainty was removed as to whether humans had anything to do with climate change on this planet. The evidence is on the table." Previous reports were completed in 1990, 1995, and 2001 (IPCC website).

The *New York Times* article stated:

> The group operates under the aegis of the United Nations and was chartered in 1988 −a year of record heat, burning forests and the first big

> headlines about global warming − to provide regular reviews of [the most recent worldwide] climate science to governments to inform policy choices (*New York Times*, February 3, 2007).

The article also reported that the leading international network of climate scientists [IPCC] has concluded for the first time that global warming is "unequivocal" and that human activity is the main driver, "very likely" causing most of the rise in temperatures since 1950 (*New York Times*, February 3, 2007).

The following statement in the same article stressed the scientists' certainty in their climate research findings and let it be known that politicians needed to do something about the problem:

> Policy makers paid us to do good science, and now we have very high scientific confidence in this work −this is real, this is real, this is real, said Richard B. Alley, one of the lead [IPCC report] authors and a professor at Pennsylvania State University. So now act, the ball's back in your court (*New York Times*, February 3, 2007).

The risks of political inaction were expressed in an article headlined *U.N. Report on Climate Details Risks of Inaction*, which discussed further discussed the IPCC's fourth climate change assessment. The article stated:

> Synthesizing reams of data from its three previous reports, the United Nations Intergovernmental Panel on Climate Change for the first time specifically points out important risks if governments fail to respond: melting ice sheets that could lead to a rapid rise in sea levels and the extinction of large numbers of species brought about by even moderate amounts of warming, on the order of 1 to 3 degrees (*New York Times*, November 17, 2007).
>
> You look to a synthesis report to provide clarity, to clarify what was obscure in previous reports,'' said Michael Oppenheimer, a climate scientist at Princeton University. ''Now, how can we take these findings and formulate a policy response that's quick enough and big enough?'

The fourth assessment report of the Intergovernmental Panel on Climate Change was discussed in the *New York Times* article headlined *Science Panel says Global*

Warming is 'Unequivocal.' In the panel's fourth assessment report, the scientists described a new significant ecological impact research finding. The article stated:

> The summary added a new chemical consequence of the buildup of carbon dioxide to the list of mainly climatic and biological effects foreseen in its previous reports: a drop in the pH of seawater as oceans absorb billions of tons of carbon dioxide, which forms carbonic acid when partly dissolved. The ocean would stay alkaline, but marine biologists have said that a change in the direction of acidity could imperil some kinds of corals and plankton (*New York Times*, February 3, 2007).

A sampled story in the *Washington Post* titled *NOAA Cites Threats to U.S., Pacific Coral Reefs*, announced their assessment (finding) for the problem in an article almost two years prior to IPCC scientists confirmation of carbon dioxide's effect on coral reefs. NOAA's assessment The lead paragraph in the earlier article stated:

> Coral reefs in U.S. waters and the Pacific are under stress from both humans and nature, according to a national assessment released yesterday by the National Oceanic and Atmospheric Administration. Climate change along with overfishing, pollution, and disease was impacting the health of several areas in the U.S. and its territories, including the Florida Keys (*Washington Post*, August 19, 2005).

The next year in July 5, 2006, an article in the *Washington Post* again defined the problem with a gripping headline that read, *Growing Acidity of Oceans May Kill Corals*. These examples of stories represented in the study sample also associated scientists' claims with climate change-related news coverage and were framed as *defining problems* and *diagnosing causes* (climate science research findings).

In addition, other examples of sampled story headlines depicted oceanic events, such as rising sea temperatures and levels that were indicated in climate research findings. A few of these were:

Glacier Melt Could Signal Faster Rise in Ocean Levels (Washington Post, February 17, 2006); *Rising Ocean Temperatures Threaten Florida's Coral Reef* (*New*

York Times, May 22, 2006); *2 Studies Link Global Warming to Greater Power of Hurricanes* (*New York Times*, May 31, 2006); *Study Links Tropical Ocean Warming to Greenhouse Gases* (*New York Times*, September 12, 2006); and *Study Warns of Threat to Coasts From Rising Sea Levels* (*New York Times*, January 17, 2009).

Problem – Impacts on Arctic Ice Shelves

The study's sampled news coverage also framed climate change problems that implied associations with natural events occurring during the study period. For example, a *Washington Post* article headline read, *Giant Ice Shelf Breaks Free in Arctic; Climate Change Cited as Major Factor*.

The article defined the dramatic impact in its lead statement:

> A giant ice shelf has snapped free from an island south of the North Pole, scientists have said, citing climate change as a 'major' reason for the event. We are crossing climate thresholds, and these may signal the onset of accelerated change ahead (*Washington Post*, December 30, 2006).

Problem – Impacts on Forests

A pine beetle epidemic in Canadian forests hit the news to link climate change with climate warming. The *Washington Post* headlined this article, *'Rapid Warming' Spreads Havoc in Canada's Forests; Tiny Beetles Destroying Pines* and revealed the intensity of the climate change impact on forests in the lead statement:

> Millions of acres of Canada's lush green forests are turning red in spasms of death. A voracious beetle, whose population has exploded with the warming climate, is killing more trees than wildfires or logging (*Washington Post*, March 1, 2006).

> It's pretty gut-wrenching, said Allan Carroll, a research scientist at the Pacific Forestry Centre in Victoria, whose studies tracked a lock step between warmer winters and the spread of the beetle. People say climate change is something for our kids to worry about. No. It's now (*Washington Post*, March 1, 2006).

> Scientists with the Canadian Forest Service say the average temperature of winters here has risen by more than 4 degrees in the last century. That's not insignificant, said Jim Snetsinger, British Columbia's chief forester. Global warming is happening. We have to start to account for it (*Washington Post*, March 1, 2006).

The beetle also has also devastated forests across the Western U.S. and the impacts have also been partly blamed on the changing climate.

In another *Washington Post* article headlined *Report Details Effects of Climate Change Across U.S*, consequences to ecological resources were described. The article's lead paragraph stated:

> Global warming is already affecting the nation's forests, water resources, farmland and wildlife, and will have serious negative consequences over the next 25 to 50 years, according to a report issued yesterday by the federal government (*Washington Post*, May 28, 2008).

The researchers said that of 1,598 animal species examined in more than 800 studies, nearly 60 percent were found to have been affected by climate change.

> In addition, the number and frequency of forest fires and insect outbreaks are increasing in the interior West, the Southwest, and Alaska, while precipitation, stream flow, and stream temperatures are increasing in most of the continental United States and snowpack is declining in the West. (*Washington Post*, May 28, 2008).

Another article discussed the consequences our warming planet would have for our forests. The article headlined *In Far North, Peril and Promise; Great Forests Hold Fateful Role in Climate Change*, emphasized the mystery in the lead statement:

> Here on the edge of the silent and frozen northern tier of the Earth, the fate of the world's climate is buried beneath the snow and locked in the still limbs of aspen trees (*Washington Post*, February 22, 2007).

Following are excerpts from the same article that describe the complexities and gravity of the relationship between climate change and our forests:

> Nearly half of the carbon that exists on land is contained in the sweeping boreal forests, which gird the Earth in the northern reaches of Canada, Alaska, Scandinavia and Russia. Scientists now fear that the steady rise in the temperature of the atmosphere and the increasing human activity in those lands are releasing that carbon, a process that could trigger a vicious cycle of even more warming (*Washington Post*, February 22, 2007).
>
> As the released carbon rises, it adds to the belt of greenhouse gases in the atmosphere, trapping even more heat, which causes more warming. Scientists call it a 'feedback loop.' Others have a more ominous term: the carbon time bomb (*Washington Post*, February 22, 2007).

Problem – Other Impacts

Another catastrophic U.S. event in 2005 − Hurricane Katrina − prompted media focus on the connection between climate change and rising sea temperatures. A *Washington Post* article headlined *Severe Hurricanes Increasing, Study Finds* on September 16, 2005, is a prime example of the diagnosing cause story frame. The lead paragraph depicted the association as:

> A new study concludes that rising sea temperatures have been accompanied by a significant global increase in the most destructive hurricanes, adding fuel to an international debate over whether global warming contributed to the devastation wrought by Hurricane Katrina (*Washington Post*, September 16, 2005).

In the article, other climatologists argued that the wave of severe storms was only normal weather variability (*Washington Post*, September 16, 2005).

In January 2005, a *New York Times* article headlined *Antarctica, Warming, Looks Ever More Vulnerable*. It stated this about the Antarctica event:

> The evidence is piling up; everything fits, Dr. Robert Thomas, a glaciologist from NASA who is the lead author of a recent paper on accelerating sea-level rise, said as the Chilean Navy plane flew over the sea ice here on an unusually clear day late in November. Around the Amundsen Sea, we have surveyed a half dozen glaciers. All are thinning, in some cases quite rapidly, and in each case, the ice shelf is also thinning (*New York Times*, January 25, 2005).

Later that year, the *Washington Post* illustrated the massive event in Greenland with the headline, *A Chilling Beauty In Arctic Icefalls; Changes in Greenland Alarm Scientists*. This article described the problem as:

> Greenland is the canary in a mine shaft alerting us, said Corell, the American meteorologist, standing on the edge of the Sermeq Kujalleq glacier. In the U.S., global warming is a tomorrow issue. . . . For us working here, it hits you like a ton of bricks when you see it. (*Washington Post*, September 25, 2005).

Problem – Impacts on Amphibians

Both the *New York Times* and the *Washington Post* headlined stories about frog species on the threshold of extinction due to climate change. Each framed the story as diagnosing causes through scientific findings.

The *New York Times* headline read *Frog Killer is Linked to Global Warming* and its lead sentence stated:

> Scientists studying a fast-dwindling genus of colorful harlequin frogs on misty mountainsides in Central and South America are reporting today that global warming is combining with a spreading fungus to kill off many species (*New York Times*, January 12, 2006).

The 2006 article said a Princeton University ecologist and zoologist at Oregon State University stated:

> The frogs are sending an alarm call to all concerned about the future of biodiversity and the need to protect the greatest of all open-access resources − the atmosphere (*New York Times*, January 12, 2006).

On the same day, the *Washington Post* headline read *Warming Tied To Extinction Of Frog Species* and stated in a lead sentence:

> Rising temperatures are responsible for pushing dozens of frog species over the brink of extinction in the past three decades, according to findings being reported today by a team of Latin American and U.S. scientists" (*Washington Post*, January 12, 2006).

> Disease is the bullet killing frogs, but climate change is pulling the trigger, Pounds said. Global warming is wreaking havoc on amphibians and will cause staggering losses of biodiversity if we don't do something first (*Washington Post*, January 12, 2006).

Problem – Impacts on Polar Bears

On May 15, 2008, a story even highlighted controversy surrounding the climate change impacts on polar bears. The article was headlined *Polar Bear is Named 'Threatened' Species; U.S. Cites Shrinking Arctic Ice*.

> Although the Bush administration handed environmentalists a victory they had sought for more than three years, Interior Secretary Kempthorne said he would ensure that his decision did not "open the door" for activists to force the adoption of limits on greenhouse gas emissions linked to global warming (*Washington Post*, May 15, 2008).
>
> Sen. James M. Inhofe (R-Okla.), a leading congressional skeptic on climate change, said that the decision to list the polar bear as 'threatened' appears to be based more on politics than science, adding: With the number of polar bears substantially up over the past 40 years, the decision announced today appears to be based entirely on unproven computer models (*Washington Post*, May 15, 2008).

The preceding story examples marked only a few of many that used frames to *define the problem* and *diagnose cause* concerning climate change.

Second Theme – Policymakers and Making Judgment

Politics Meet Science in Deadlock

The debate at heart was well versed in a *Washington Post* article that stated:

> Wild species don't care who is in the White House. It is very obvious they are desperately trying to move to respond to the changing climate. Some are succeeding. But for the ones that are already at the mountaintop or at the poles, there is no place for them to go. They are the ones that are going extinct (*Washington Post*, November 26, 2006).

During Bush's second presidential term, his administration disagreed with state and other federal officials' efforts to regulate emissions, edited reports to stir doubt into

climate scientists' research, and refuted international countries' attempts to reduce global emission levels.

A 2005 article in the *New York Times* headlined *Political Science* described the contention (making judgment frame) in the lead paragraph and quotes by biologist and editor of the prominent *Science* journal. When Donald Kennedy "was asked what had led so many American scientists to feel that George W. Bush's administration is anti-science, he isolated a familiar pair of culprits: climate change and stem cells." In the article, Kennedy stated:

> These represent, he said, two solid issues in which there is a real difference between a strong consensus in the science community and the response of the administration to that consensus. Both issues have in fact riled scientists since the early days of the administration, and both continue to have broad repercussions. (*New York Times*, September 4, 2005).

> Yet what remains most divisive, according to Kennedy, is not the Bush administration's specific policies, but a more general sense that scientific conclusions, reached either within agencies or by people outside of government, are being changed for political reasons by people who have not done the scientific work. It is this sense that science is being misused… (*New York Times*, September 4, 2005).

Judgment – Interference with Scientific Findings

A *New York Times* article headlined *Bush Aide Edited Climate Reports*, explained how a member of Bush's staff placed doubt into solid climate research reports by changing scientific statements (making judgment frame). The article's lead statement read:

> A White House official who once led the oil industry's fight against limits on greenhouse gases has repeatedly edited government climate reports in ways that play down links between such emissions and global warming, according to internal documents (*New York Times*, June 8, 2005).

> Efforts by the Bush Administration to highlight uncertainties in science pointing to human-caused warming have put the United States at odds with other nations and with scientific groups at home (*New York Times*, June 8, 2005).

The article cited claims from scientists and environmental groups that felt the report edits intended to delay decisions to curtail greenhouse gas emissions. One spokesperson who formerly worked in the office that coordinates government climate research (currently the Climate Change Science Program) stated:

> Each administration has a policy position on climate change. But I have not seen a situation like the one that has developed under this administration during the past four years, in which politicization by the White House has fed back directly into the science program in such a way as to undermine the credibility and integrity of the program (*New York Times*, June 8, 2005).

An official with the Pew Center on Global Climate Change stated:

> They've got three more years, and the only way to control this issue and do nothing about it is to muddy the science (*New York Times*, June 8, 2005).

Another story example that supports my study findings of policymakers and framing judgment in climate change debate was expressed in an article headlined Climate Researchers Feeling Heat From White House. The article discussed the censorship scientists received from the federal administration when attempting to present climate science findings to the public. The lead paragraph stated:

> Scientists doing climate research for the federal government say the Bush administration has made it hard for them to speak forthrightly to the public about global warming. The result, the researchers say, is a danger that Americans are not getting the full story on how the climate is changing (*Washington Post*, April 6, 2006).

The federal administration even wanted to silence a highly respected climatologist as illustrated in the article:

> The assertion that climate scientists are being censored first surfaced in January when James Hansen, who directs NASA's Goddard Institute for Space Studies, told the *New York Times* and *The Washington Post* that the administration sought to muzzle him after he gave a lecture in December calling for cuts in emissions of carbon dioxide and other greenhouse gases (*Washington Post*, April 6, 2006).

Judgment – Debate About Climate Policy Action

Without federal action toward a mandatory emissions policy from the Bush administration, many states attempted to create their own mandatory policies, only to find themselves clashing in courtrooms with the federal government.

The White House showed an outward lack of support for mandatory measures to curb greenhouse gas emission at U.S. federal and international levels. An example of this lack of support was described in a 2006 *New York Times* article headlined *Supreme Court to Hear Key Environment Case*, which was framed as making judgment and stated as:

> Spurred by states in a pollution battle with the Bush administration, the court said it would decide whether the Environmental Protection Agency is required under the federal clean air law to treat carbon dioxide from automobiles as a pollutant harmful to health (*New York Times*, June 26, 2006).

The lawsuit was brought about by 12 states − California, Connecticut, Illinois, Maine, Massachusetts, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, and Washington. Also included in the lawsuit were the U.S. cities Baltimore, New York City, and Washington D.C. The Pacific island of America Samoa, the Union of Concerned Scientists, Greenpeace, and Friends of the Earth also united against the federal government in the lawsuit.

> President Bush has rejected calls by environmentalists and some lawmakers in Congress to regulate carbon dioxide, the leading heat-trapping "greenhouse" gas going into the atmosphere. Bush favors voluntary actions and development of new technologies to curtail such emissions (*New York Times*, June 26, 2006).

In April 2007, a *New York Times* article titled, *Ruling Undermines Lawsuits Opposing Emissions Controls*, described the Supreme Court's ruling that the federal government had the authority under the EPA to regulate heat-trapping gases. The article stated:

> Yesterday's Supreme Court ruling on carbon dioxide emissions largely shredded the underpinning of other lawsuits trying to block regulation of the emissions and gave new momentum to Congressional efforts to control heat-trapping gases linked to climate change (*New York Times*, April 3, 2007).

Judgment – Administration Rejects International Efforts

Just two months after the Supreme Court had required the EPA to include climate change-causing carbon dioxide and other greenhouse gas emissions into its Clean Air Act, an article headline, *As Group of 8 Starts Meeting, Bush Rebuffs Germany on Cutting Greenhouse Emissions*, still showed the administration's rejection of international mandatory efforts to curb global climate emissions. The story example was framed as making judgment and the lead stated:

> As leaders of wealthy nations converged Wednesday on a Baltic Sea resort for their annual meeting, the White House effectively derailed a climate change initiative backed by one of President Bush's strongest European allies, Chancellor Angela Merkel of Germany (*New York Times*, June 7, 2007).

To effectively tackle climate change, the United States needs to lead both here and abroad. Fast-developing countries, such as China and India, are increasing their emissions. The U.S. must reconnect with international efforts and commit to a mandatory federal climate policy that restrains greenhouse gas emissions in the U.S.

On the international front, a *Washington Post* article reflected this message with a headline that read *World Leaders Press U.S. To Act on Climate Change.*

The following excerpt is from the story that described world leaders' concern about the Bush administration's lack of support for mandatory curbs on greenhouse gas emissions.

> Using unusually blunt language, several high-ranking ministers from abroad, as well as American lawmakers, said the Bush administration's resistance to a national, economy-wide carbon cap is jeopardizing the world's ability to address climate change (*Washington Post*, September 26, 2007).

Third Theme – Industry Interests and Suggesting Solution

Solution – Industry Interests Step up to the Challenge

A decade ago, most industries were opposed to federal climate policy action. Now, with the climate science research more certain than ever, many companies have stepped up to help with solutions to the problem (Pew Center on Global Climate Change, 2009).

During the study period, sampled stories highlighted industries that understood the reality of climate change and the necessity to help mitigate its impacts within the frameworks of their industries. Following are story examples of headlines, lead sentences, and quotes that portrayed industries associated with the solution frame.

> The chief executive of the General Electric Company, Jeffrey R. Immelt, pushed the company squarely into the global warming debate on Monday, asking the government for a clear energy policy and saying later in an interview that he expected Washington to eventually impose controls on carbon emissions. They have forthrightly embraced the need for government policy on heat-trapping gases. (*G.E. Chief Urges U.S. to Adopt Clearer Energy Policy*, *New York Times*, May 10, 2005)

> While the political debate over global warming continues, top executives at many of the nation's largest energy companies have accepted the scientific consensus about climate change and see federal regulation to cut greenhouse gas emissions as inevitable. (*Energy Firms Come to Terms With Climate Change*, *Washington Post*, November 25, 2006)

> We have to deal with greenhouse gases, John Hofmeister, president of Shell Oil Co., said in a recent speech at the National Press Club. From Shell's point of view, the debate is over. When 98 percent of scientists agree, who is Shell to say, 'Let's debate the science'? (*Energy Firms Come to Terms With Climate Change*, *Washington Post*, November 25, 2006)
>
> Exxon Mobil Corp., the highest-profile corporate skeptic about global warming, said in September that it was considering ending its funding of a think tank that has sought to cast doubts on climate change. And on Nov. 2, the company announced that it will contribute more than $1.25 million to a European Union study on how to store carbon dioxide in natural gas fields in the Norwegian North Sea, Algeria and Germany. (*Energy Firms Come to Terms With Climate Change*, *Washington Post*, November 25, 2006)
>
> On the eve of the State of the Union address, the chief executives of 10 major corporations urged President Bush to embrace mandatory ceilings on U.S. greenhouse gas emissions in order to stem climate change. (*CEOs Urge Bush to Limit Greenhouse Gas Emissions*, *Washington Post*, January 23, 2007)
>
> The U.S. Climate Action Partnership says its ability to reach consensus is a crucial step forward since its 32 members include corporate giants such as General Electric, Conoco Phillips, Duke Energy, DuPont and General Motors as well as the Environmental Defense Fund and World Resources Institute. (*Coalition Agrees on Emissions Cuts; Businesses, Environmentalists Set Plans on Climate Change, Washington Post*, January 15, 2009)

When I explored sampled story contents for this narrative section, I found support for my principal quantitative results. Within the stories' contents, I discovered an overall four-year snapshot of the global climate change concern. The themes I explored highlighted some of the growing impacts on ecological systems, more certainty grounded in scientists' research findings, continued political debate and judgment regarding climate policy direction, and cooperative efforts by industries regarding solutions to reduce greenhouse gas emissions. Additional narrative conclusions are presented in the next chapter.

CHAPTER 6. DISCUSSION

The purpose of this study was to examine climate-related news articles in the *New York Times* and *Washington Post* newspapers to determine how the media portrayed specific frames and claims-makers.

Overall, there were three main findings from the quantitative analysis of my sample stories. First, *scientists* quoted in the sampled stories were more closely associated with stories framing climate change *causes*, or evidence of the reality of climate change, and *problems*. Secondly, results showed that *policymakers* quoted in the stories were more closely associated with stories depicting *judgments* of and *solutions* for climate change issues. The third finding was that quotes by *industry interests* were most associated with stories that suggest *solutions* or remedies to help offset climate change impacts. Although results did not show environmental interests to be significant in any particular frame, their quotes were found, to a lesser degree, with all story frames.

I asked two research questions in this investigation. The first was answered by performing a descriptive statistical analysis to illustrate the frequency distributions of the frames used, claims-makers quoted, and newspapers sampled.

My first research question asked how the claims-makers and frames were distributed across the climate news coverage. In my sample of 320 stories and a total of 1,299 quotes, overall results established that the five *claims-makers* were represented across stories as follows: *policymakers* had 40.6% of the quotes; *scientists* had 30.5% of the quotes; *environmental interest groups* had 15.6% of the quotes; *industry interests* had

10.9% of the quotes; and *other* sources had 2.3% of the quotes. From my study results, scientists held second place as sources in climate change-related news coverage; overall, politicians were quoted most often.

All four frames were represented across the sampled stories. These frames were: *defining problems* or impacts associated with climate change, *diagnosing causes* of climate change with climate science evidence, *making moral judgments* about the issue, and *suggesting solutions or remedies* for the issue. As well, the frames appeared across both the *New York Times* and the *Washington Post* climate-related stories.

I found that, together, the frames emphasizing *judgment* and *solution* represented 70% of all stories sampled. Within this percentage, 42.2% used the *making moral judgments* frame and 27.8% used the *suggesting solutions or remedies* frame. Clearly, a judgment emphasis dominated climate change-related stories, with the solution emphasis being the second highest frame. Results suggest that most story discussions evolved around general statements of judgment calling for or reported climate action; arguing for, against, or blocking action; or arguing that a course of action was unclear.

Many stories covered the solution/remedy stage to discuss more specific statements about proposed, implemented, or debated methods to help remedy the climate change problem.

On the other hand, the frames emphasizing, *problem* and *cause* represented only 30% of all sampled stories. Within this percentage, 19.1% used the *defining problems* frame and only 10.9% used the *diagnosing causes* frame suggesting that climate change may have been more widely accepted as occurring and the media may bring the impacts of climate change into stories as natural events happened, such as in December 2006

when the *Washington Post* wrote a story headlined, *Giant Ice Shelf Breaks Free in Arctic; Climate Change Cited as Major Factor,* or earlier that year when a pine beetle epidemic hit the news again linking it to climate change as illustrated in the *Washington Post* headline, *'Rapid Warming' Spreads Havoc in Canada's Forests; Tiny Beetles Destroying Pines.*

Since my study did not investigate the issue by time period associated with events, I can only imply that this may be a reason for fewer stories framed to define climate change problems or to diagnose causes through scientific evidence. Trumbo (1996), on the other hand, discussed representation of climate change in phases throughout the decade using Downs' issue-attention cycle to explain the rise and fall of the issue.

Generally, media stories of climate research occur in cycles (Trumbo, 1996; McComas & Shanahan, 1999). The issue can rise and fall depending on different factors, such as during possible associated catastrophic events, when scientists report their findings, policymakers review scientific reports, or when interest groups make claims to support or refute the climate science findings. All can again prompt a rise in attention by the media.

The second research question asked if certain associations (relationships) existed between the frames portrayed in the stories and the claims-makers that were quoted in the climate news coverage. Findings indicated that *scientists* were more likely associated with the stories that defined *problems* arising from climate change and those that diagnosed *causes* by presenting evidence to support, dispute, or state the unknown about climate change issues.

Results also showed that *policymakers* quoted in the stories were more closely associated with stories depicting *judgments* of and *solutions* for climate change issues. Another finding indicated that *industry interests* were mostly associated with stories that suggested *solutions* or remedies to help offset climate change impacts. Last, although results did not show *environmental interests* associated with particular frames, was that this claims-maker group showed up to a lesser degree across all story frames.

A closer examination in my previous narrative section provided insight and enhanced my interpretation of the quantitative study results. Even though the research behind climate science revealed more evidence that global climate change was occurring (IPCC, 2007), much controversy still surrounded the issue. Generally, the White House expressed an outward lack of support for mandatory measures to curb greenhouse gas emission at U.S. federal and international levels. An example of this lack of support was described in a *New York Times* article, which stated that "President Bush has rejected calls by environmentalists and some lawmakers in Congress to regulate carbon dioxide, the leading heat-trapping "greenhouse" gas going into the atmosphere. Bush favors voluntary actions and development of new technologies to curtail such emissions" (*New York Times*, June 26, 2006).

The results may imply that the administration's conservative posture, or possible doubt about the certainty and seriousness to act immediately, prompted the controversy among the administration and other politicians, scientists, environmental interests, and industries.

The study findings appear rational since stories making *judgments* would discuss general policy action statements, argument for or against course of action, and policy

development. The *solutions* frame profiles stories with more solution-specific discussion, or debate over potential solutions to the climate change problems, such as mandating specific automobile and industry emission standards. Study results may also reflect that the climate change debates have advanced after years of publicly witnessing the impacts and providing more sound scientific evidence of regional and global climate change.

Comparison to Previous Research

When comparing my study to Trumbo's content analysis of climate change news coverage, I found similar results with regard to the significant representations among frames and claims-makers. Trumbo (1996) also found that scientists were strongly associated with the cause frame while politicians and special interests were strongly associated with the judgment frame across the study period (1985-1995). A difference in our results was that in my study industry interests were represented most with the solution frame.

No further comparisons could be made since my study did not measure findings for claims-maker quotes across a timeline as Trumbo did. His results showed a significant decline in scientists' quotes across time. The change in quotes across time for both politicians and special interests rose slightly and were not significant. Trumbo concluded that even though both scientific and political sources were important to the climate debate, the scientists were not foremost as the issue developed. He stated the obvious, that scientists "left the debate as it heated up" (Trumbo, 1996, p. 281). A question Trumbo left for future research was: Will scientists regain their part of news coverage as the issue regains attention?

Narrative Content Conclusion

A story content narrative interpretation (Chapter 5) included many examples of notable headlines, lead paragraphs, and sources quoted that were taken from the sampled news articles in the *New York Times* and the *Washington Post*. This discourse was then organized by the frames and significant associated claims-makers as found in my quantitative results.

I wanted to explore the four frames represented in my overall study, so I organized the headline, lead, and quote examples under their respective frame and associated claims-maker type based on my study findings. This was done to determine emerging themes that might exist within the framework of those stories.

A summary of the climate change-related news coverage during the second presidential term of the George W. Bush administration showed some interesting elements. After extensive debates on climate change's reality as well as the publication of highly developed climate science reports, many people, including politicians and industry interests, believed climate change was occurring. Because of continuous, credible climate science research noted in the news, certainly more individuals realized it was mostly human-caused and due to greenhouse gas emissions from our gas and oil usage.

Even though causes and some impacts of climate change have been more clearly defined through scientific research, questions remained about the seriousness of the issue and what solutions would prompt reductions in emissions without economic consequences. New debates cropped up, even as scientists provided more disconcerting evidence for worldwide ecological, economical, and social impacts. There were still claims against scientific certainty and debate over the lack of U.S. federal policy.

When I explored sampled story contents for this narrative section, I found support for my principal quantitative results. Within the stories' contents, I discovered an overall four-year snapshot of the global climate change concern. The themes I explored highlighted some of the growing impacts on ecological systems, more certainty grounded in scientists' research findings, continued political debate and judgment regarding climate policy direction, and cooperative efforts by industries regarding solutions to reduce greenhouse gas emissions.

Although, my study cannot draw conclusions on how stories were framed or claims-makers were quoted over time, I do feel my results were quite well represented within the content of sampled stories.

Limitations of Study

In interpreting the study findings, the sample size is a limiting factor in the obtained results. The entire content analysis methodology was very time consuming. I restricted my database search to specific parameters that still resulted in a population of 1,901 news stories. After downloading all content of each story, I had the extensive task to check each story for its relevancy to my study topic. I determined my final 320 story sample size from a margin of error of +/-5 percent at a confidence level of 95. A larger sample size may have given a better perspective of the portrayal of climate change-related news coverage in the two newspapers. As I scanned headlines and lead paragraphs for my narrative section, I noticed what appeared to be very relevant stories outside of my systematic random sample.

With any content analysis, flaws in the methodology may occur even if variables are operationalized, a pretest is done, and intercoder reliability is checked. The coding

value decisions made can still come down to one's opinion when uncertain of the story headline or lead sentence to determine the appropriate frame. Some of my sampled stories required reading further into the text to determine how they were framed. Value decisions during data collection in any content analysis are subjective, based on the coders understanding of the topic.

My study was strong in respects. I followed the methodology for a content analysis, even to the point of the careful choice of my second coder. Both she and I have similar well-rounded educational science backgrounds and our level of understanding for such complex issues is also comparable. Having also studied argumentative discourse, we were familiar with the concepts examined in my research study. I believe we made conscientious choices during the data collection phase of the study.

Future Research

My study only lightly touched the horizons of media communication of the climate change issue since I only examined the relationships between my two variables, frames and claims-makers. Although my story sample covered a full four-year presidential term, a time-series analysis was outside the scope of my study.

I recommend that a future study could include a time analysis such as Trumbo's with an associated qualitative analysis of environmental, social, economical, and political events that coincide with the developing frames. This could offer more current data beyond Trumbo's research about how climate change coverage is portrayed and why some claims-makers receive more consideration in current debates. This might further explain the cyclic manner in which this environmental issue gains attention in the news (Trumbo, 1996; McComas & Shanahan, 1999).

A future climate change news coverage research study could examine how multiple claims-makers in a story can create balance *or* bias with the issue. Using various claims-makers may even introduce an uncertainty frame into the study.

Another future research area could be the adaptation to the impacts of climate change as a means to help curtail the damage to natural resources and communities. The media may present this issue more often in upcoming news stories where frames could define ecological, economical, and even survival adaptations. For instance, forest land management plans, wildlife migration patterns, coastal community adjustments, agricultural food crop alternatives, organizational modifications to energy consumption, and many other adaptations are currently being discussed, both regionally and internationally. A valid message presented earlier in Chapter 5 recaps the need for adaptation. The headline reads, *On the Move to Outrun Climate Change; Self-Preservation Forcing Wild Species, Businesses, Planning Officials to Act.* The bigger global picture is illustrated in its lead paragraph:

> With the issue of a warming planet shifting rapidly from scientific projection to on-the-ground reality, animals and plants are being compelled, along with businesses and bureaucracies, to take action aimed at self-preservation. (*Washington Post*, November 26, 2006).

In conclusion, advancing media research may help close the climate science gap between journalists, scientists, politicians, special interests, and the general public. By portraying the science behind the issue in a more informative and less complex manner, we might get closer to reaching shared regional and global climate solutions in the future.

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