

Communicating Global Climate Change:
Framing Patterns in the US 24-Hour News Cycle,
2007-2009

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3. Abstract

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The act of framing entails the categorization of reality for the purpose of social understanding and communication ease. The method of content analysis was used to investigate global climate change framing patterns identified in a sample of articles published online by selected US 24-hour cable news outlets (MSNBC, FOX, CNN). Google search analytics revealed samples of significantly high information seeking in the US for the terms 'climate' and 'warming' between 2004-2011. Between 2007-2009, three samples emerged. Each article was individually analyzed for the presence of 12 frames. To qualify a difference in framing patterns article headlines and bodies were examined separately. Differences between outlets were quantitatively explored. MSNBC, FOX, and CNN news coverage was quantitatively compared to explore differences between the outlets. Seven frames were identified as frequent (appeared in >10% of all articles), these were 1) strategy / conflict, 2) public accountability / governance, 3) Pandora's box / environmental catastrophe, and 4) scientific / technical (un)certainty, 5) middle way / alternative path, 6) economic development / competitiveness, and 7) social progress. Six of the seven frames were found frequent in both headlines and bodies, although their order of frequency varied. Economic development / competitiveness was the exception, appearing in headlines on rare occasion. Among these seven frequent frames, 39 differences were possible and 11 were found between the outlets. In general, MSNBC, FOX, and CNN appear to have translated a cohesive message about climate change during popular moments in 2007-2009, although each of the outlets distinguished their coverage with at least one significant and unique framing choice. Results provide insight for future exploration of global climate change framing during this period.

Key terms: public, framing, public issue, framing patterns

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Dedication

We live in the future. In an instant, we can retrieve information about anything from just about any point in history. The ways in which individuals choose to seek out information has an important role in their understanding of the world, society, and their role within them. Whether a person is searching for information about Friedrich Nietzsche or Kim Kardashian matters. What do people pay attention to? How do media outlets react? These are difficult questions that can really only be answered with very specific research.

The study present in this thesis is used to suggest that consideration of public attention and information seeking via Internet search engines can help guide climate change advocates to learn more about the information people find online. By investigating content at specific periods of high public attention experts may get a glance at the various angles, or frames, that appear around a subject during popular moments. Activists may then frame their own work in the light of previous successes or choose to learn about multiple arguments in order to prepare for public conversations.

Global climate change is not an easy issue to talk about, understand, or explain. It is complex and includes under its umbrella myriad other environmental and behavioral problems. The phenomenon is attached to almost every issue facing the planet. From campaign financing in the US to fishing demand in Indonesia and forestry in the Amazon, human choices are having an effect on the planet. Powerful forces are at work, both, in the sun and in the shadows. Each of us contributes to the problem through fear, disengagement, or diffusion of responsibility.

Sure, some groups may be more responsible than others, willing to do anything for a monetary return, but more than a third of all global emissions still come from individual homes. Like a computer warms and whirls when tasked to work as quickly as our brains, our planet is being thrust from a natural flow to an accelerated march. Yet, humans are the conductors of our own industrial symphony. What will become of our power? There is no enemy, but our own lethargy. Passivity appears to be a dangerous gamble in a world so full of sound and fury.

How do we approach desperate situations without getting overwhelmed with the possibility of defeat? How do we face those that do not agree, those that will not listen? I cannot say, but I know for certain that I remain a happy person despite the countless articles and discussions I seek out about global climate change on a daily basis. I fight to find ways to reach others, when I come up short I shut my mouth and redirect my ears. I believe there is a way to bridge our earthly and social selves if we are willing to accept the consequences of global climate change as more threatening than our own psychological discomfort. Let us learn to express hope and ambition in the face of disaster.

For now, the global climate change problem sits in limbo within the American political agenda. According to results from this study, the global climate change issue became important among the American populace between 2007-2009. Since that time, the issue has remained out of political sight, resting in the shadow of economic concern. Even when the problem of global climate change lays dormant in the public arena, it continues to be an issue in the natural world.

At this moment, in the Summer of 2012, fires have devoured land in Colorado, New Mexico, and Utah. Heat records are being shattered everywhere and violent, unprecedented weather events have threatened electric grids in most of the mid-west. People have died, corn stocks are suffering, and photographs of children taking relief in the showers of fire hydrants are becoming common. Some brave news sources and scientists-turned-activists are speaking up, warning that we have entered the age of global warming. We do not know for if these events are connected, but we can talk about the possibility. Unfortunately, when you take a look at Google search analytics for 'climate,' 'warming,' or 'fire' you find some, but very little activity (a common trend during summer months). Those of us concerned by this observation should ask ourselves what part we can play in changing it.

The United States now moves closer in time to a presidential election (2012), a United Nations Framework Convention on Climate Change (annual) and the fifth report from the International Panel on Climate Change (2013-2014). How political, scientific, and economic actors choose to engage with the issue remains to be seen. In support of rational thinking, deliberation, and collaborative learning, I suggest an exploration of the various global climate change frames for one that speaks to you.

Global climate change is a complex issue, it means something different to each of us, but there is no doubt, if you are reading this, that something has inspired your interest in the subject. Figure out what that is, build on it, learn what others think about it, and share your inspiration. Not everyone will agree, but

every conversation opens a doorway to new ideas. One day, I believe those ideas will save me, my younger sister, and all those born beside us here on Earth.

“When you look at the Earth from space, it is striking. There are no national boundaries visible. They have been put there, like the equator and the Tropic of Cancer and the Tropic of Capricorn, by humans. The planet is real. The life on it is real, and the political separations that have placed the planet in danger are of human manufacture. They have not been handed down from Mount Sinai. All the beings on this little world are mutually dependent. It’s like living in a lifeboat. We breathe the air that Russians have breathed, and Zambians and Tasmanians and people all over the planet. Whatever the causes that divide us, as I said before, it is clear that the Earth will be here a thousand or a million years from now. The question, the key question, the central question—in a certain sense the only question—is, will we?”

- Carl Sagan, Published in 2006

4. Introduction

This study focused on the issue of global climate change and was used to explore a specific flow of information produced by three 24-hour cable news outlets (MSNBC, FOX, CNN) in the US between 2007-2009. This thesis begins with an introduction to the importance of framing, accepting the postulate that mediated conversations parallel a similar social dialogue. Then the framing model used in the study is detailed, methodology is covered, and results are discussed.

When events occur citizens may gather and engage with one another on related issues and overarching problems, mobilizing to form opinions about various solutions and decisions (Blumer, 1946). With news media, high volume event coverage combined with public attention and disagreement leads to the formation of a public issue (Giddens, 2009; Shehata, 2012). When an issue is uniquely complex or distant, individuals may turn to news outlets and other mediated information sources, like the Internet, for context and understanding (Nisbet, 2009). As information is prepared by a source it is simplified for communication ease through the process of framing (Bubela, 2008). Like framing a photo to bring out a specific color, mediated framing provides focus and context for a particular view of a problem.

As an event, global climate change is a complex scientific matter. When presented to the American public, global climate change gains the potential to be transformed into a political issue, subject to judgment and framing. In this process, framing serves a function that defines what information is important and continues to flow through the public sphere over time. Accepting this, framing patterns alter scientific information in a flow from scientists to the public. The nature of these patterns, as they appeared under specific past conditions, provide the subject of this analysis.

A focus on framing highlights a stage in news creation that occurs before expressions of opinion are built into a news story. Frames are considered a foundational element in a society-wide dialogue, transcending public, private, and mediated spaces (Boykoff, 2008). A frame describes reality through an explicit perceptive lens that may help individuals assess new information and identify agreement on solutions among peer groups and society at large (Nisbet, 2009). Exploring how, when, and where media outlets have transferred emphasis about global climate change through the act of framing may help identify social constructions that have formed around related science.

Exploring specific conditions under which framing has taken place may reveal discrete details about global climate change framing in the news media. Framing patterns found in this study describe how three popular 24-hour news outlets in the US portrayed and altered global climate change science and related information during popular periods in 2007, 2008, and 2009. Results provide a snapshot of the American conversation about global climate change.

5. Literature Review

In this section, frames are considered elaborative tools for communicating complexity among the US populace. Current literature on framing and information seeking is discussed. Evaluation of framing is then explained in the context of Matthew Nisbet's (2009) model of global climate change frames, which provides categories for qualifying patterns and quantifying differences found between the selected 24-hour news outlets (MSNBC, FOX, CNN).

5.1 Framing reality

Frames represent varying perspectives on reality and are considered unbiased and neutral (Nisbet, 2009). They give meaning to the world by organizing information into symbolic categories (Reese, 2003). Framing patterns may play an important role in information engagement and translation, holding the power to alter and restrict information as it flows through society (Bubela et al., 2009). "There is no such thing as unframed information" (Nisbet, 2009, pg. 15). Journalists use framing to craft appeal, while audiences access understanding through framed gateways, and policymakers use framing to support specific solutions to broad problems (Nisbet, 2009).

Frames form references that individuals may depend on for perceptible clarity (Kahneman & Tversky, 1986). Different frames appeal to different subjective, experience-based observations stored in the memory of individuals (Slovic et al, 2002). When a frame is used or activated in a dialogue it may provide a bridge upon which ideas and opinions can be translated between people (Reese, 2003). Yet, when media outlets use framing they cannot tell an audience what to think; rather, they build the foundation for how the public could think about an issue (Cohen, 1963).

Frames surround events, serving to highlight details that direct attention to specific causes, ideas, problems, solutions, and responsible actors (Entman, 2004). A frame can potentially expand or narrow an understanding of possible options surrounding an issue. The perspective that frames present can be used to elaborate and translate new meaning for a subject, but may also encourage quick, efficient thinking (Kahneman & Tversky, 1986).

5.2 Seeking out sources of information

Where people receive information and seek it out has a role in their understanding of reality. Representations of ideas, thoughts, images, and knowledge framed between members of a collectivity

lead to the construction of social realities, where opinions and context for understanding a problem and its solutions become hardened (Miller & Riechert, 2001). Journalists take part in this exchange of information when they publish framing patterns that emerge in social dialogues. Thus, mediated information reflects public discussions and related processes of thought (Boykoff & Smith, 2010; McCombs & Bell, 1996; Scheufele, 1999).

Popular news sources may reveal patterns of information that are transferred to a large audience of Americans. In recent year, television and Internet sources have grown in popularity, while other news platforms have seen audiences decline (PEW, 2010. PEW, 2012). Newspaper and other types of coverage remain important to media studies (Boykoff, 2008; Shehata, 2012), but all media outlets have relevance when considering the flow of scientific information through society. In fact, “many newspapers have lost so much of their ad revenue - more than half since 2006 industry-wide - that without an infusion of digital subscription revenue, some may not survive” (PEW, 2012). This apparent shift in news consumption suggests that television and online news content seem to be growing more important to American politics and social dialogue. This study builds on news consumption trends by focusing on an analysis of content produced through the medium of television news and archived online.

5.3 Global climate change frames

A model of 11 global climate change frames designed by Matthew Nisbet (2009) was used to explore selected news content. Aside from the model proposed by Nisbet (2009), there are only a few others that can be used in a media study of global climate change framing patterns. Of the available models (Hart, 2008. Shehata, 2012), each includes the same frames as the Nisbet (2009) model. The alternative models offer approximately five frame categories when combined, while the Nisbet (2009) model offers 11.

As published, the Nisbet (2009) model included nine official and two suggested frame categories. The official frames are 1) social progress, 2) economic development / competitiveness, 3) fatalism / runaway problem, 4) morality / ethics, 5) Pandora’s box / environmental catastrophe, 6) scientific / technical (un)certainly, 7) public accountability / governance, 8) middle way / alternative path, and 9) strategy / conflict. The suggested frames are 10) national security and 11) public health. A 12th frame, humor, was added to the model when coders noticed its presence in several articles from our data set.

The revised Nisbet (2009) model containing 12 frame categories provides a foundation for this study. Descriptions of each frame are provided below, the complete model is available in Appendix A.

Use of the social progress frame refers to global climate change efforts that take place in society, within groups, publics, organizations, and businesses. This frame describes a human relationship with nature, either through responsibility to protect it or a right to master it (Nisbet, 2009). This frame does not discuss progress in the context of government decisions or efforts (Appendix A).

Use of an economic development / competitiveness frame leads to a discussion of the US national economy, covering both the positive and negative impacts of financial commitments required for action regarding global climate change.

The fatalism / runaway problem frame supports a pessimistic outlook regarding the impacts of global climate change, often to argue that effects are inevitable - whether anthropogenic or not - and that any chance to mitigate them has passed (Nisbet, 2009). The frame may point to adaptation as the only way forward (Appendix A).

The morality / ethics frame can be used to evoke questions about secular and religious values for present and future life on earth, be that life human or otherwise. It can also be used to describe moral and ethical values on a broad, philosophical or theological level (Nisbet, 2009). The frame may translate the values of a group or individual (Appendix A).

The Pandora's box / environmental catastrophe frame can be used to frame the potential threat of natural disasters and environmental impacts, like sea ice loss or hurricanes (Nisbet, 2009). The frame may discuss risks and human responsibility (Appendix A).

The scientific / technical (un)certainly frame can be used to describe both support for and skepticism of the scientific consensus regarding the reality of global climate change. It can be expended in a discussion of scientists or scientific bodies and organizations. Action is defined as necessary under the scientific consensus or it is considered unnecessary because science is considered uncertain (Nisbet, 2009). The frame is often paired with statistical references (Appendix A).

The public accountability / governance frame can be used to highlight scandals and inform the public. Its use often emphasizes the role of the media in educating the American populace about activity

among actors in the private and public sectors. This frame may also emerge alongside reporting of public opinion research (Nisbet, 2009).

The middle way / alternative path frame can be used to describe collaborative and neutral government-level approaches to global climate change that rise above political gridlock (Nisbet, 2009). The frame may focus on solutions and the process of government deliberation and decision-making, rather than disagreements (Appendix A).

The strategy / conflict frame is used to express the opposite perspective by presenting partisan polarization and contention. This frame transformed political campaigns, personalities, and conversations into parts of a competitive game (Nisbet, 2009).

The national security frame describes global climate change or action on global climate change as a threat to public safety. Links to terrorism, resource wars, the displacement of refugees, and dependence on foreign oil are examples of threats that may be posed under this frame (Nisbet, 2009).

The public health frame most often references predicted global climate change impacts that span populations via region-specific environmental influences, like air pollution and asthma. Homelessness, heat-related deaths, property destruction by extreme weather, water shortages, starvation, and agricultural failure all fall under this frame (Nisbet, 2009; Appendix A).

The humor frame takes global climate change less seriously. Comedy is used to tease, ridicule, or evoke interest. Humor can be used to frame action on global climate change as silly or hypocritical, while skepticism may be disregarded as ignorance or stupidity. When used to evoke interest, humor framing may attempt to discuss scientific information with irony or wit.

At the time of writing this thesis, researchers studying news media and coverage of global climate change information had focused on partisanship and belief regarding the reality of the phenomenon (Morton et al., 2009; Koepfer, 2010; Feldman, 2011; Hart, 2008; Semenza et al, 2010; Nisbet, 2011). This media study extends previous research on the communication of global climate change by focusing on the presence of frames, or angles, used in popular news coverage.

6. Methods

This section will cover the process of gathering a data set for this study. A PEW (2010) report describing the changing landscape of popular news consumption in the US guided methodology. Outlet selection is discussed first. A review of the process, tools, and outcome of sample selection follow. The method of content analysis was used to identify frame presence in sample data and is reviewed in detail as it was used in this study.

6.1 Outlet selection

An exploration of popular media sources began the search for analysis subjects. In 2010, PEW, reported that 57% of online news consumers cited two to five websites as their primary source of information. In terms of loyalty, 21% reported regular dependence on just one news website. When these fidelities were cited “the most popular are those of major news organization such as CNN and FOX, [were] favored by more than a third of online consumers who named a favorite site” (PEW, 2010, pg. 27). With this information, cable news outlets became an immediate focus.

In 2009, MSNBC, FOX, and CNN news websites were among the seven most trafficked by news-seeking consumers, while their television channels received high viewership rankings (PEW, 2010). Of the three, FOX was found to be the most popular television source for news information, while CNN led MSNBC by a narrow margin for the most popular online source for American news consumers (PEW, 2010). In 2011, FOX was named the most popular cable news outlet for the 10th year in a row (PEW, 2012). With popularity in mind, these three outlets were selected for further investigation.

MSNBC, FOX, and CNN are ideal subjects for comparison because they publish information through identical mediums of communication, making comparison straightforward. They provide 24-hour news programming on privately-owned cable television channels and publish supplemental material online. MSNBC, FOX, and CNN are each considered news originators, which means they have contracted journalists who write and publish fresh content under their name. Content from each is easily accessed through online archives, which are available to the public at no cost through their individual websites or a web search engine like Google News, which was used in this study. Additional social conditions were used to restrict collection of content from MSNBC, FOX, and CNN.

6.2 Sample selection

Several social conditions were considered while selecting a sample of news coverage for investigation. Boykoff (2009) tallied the number of newspaper articles written about global climate change around the world and found that reporting reached its high-water mark in 2006 and 2007, losing attention to stories about the global recession in 2008. In the US, the Global Language Monitor (2009) found that 'global warming' was the second most popular buzzword in the 2008 Presidential election. They also identified 'climate change' as the top phrase of the decade, while 'global warming and all things green' were ranked as the top word.

This study explored these observations online by identifying significantly high periods of Google information seeking, or searching, for the key terms 'climate' and 'warming' in all years that were available at the time of inquiry (2004-2011). Search activity was used to restrict sample selection and exemplify framing patterns that were published during specific periods of time. The result is a summary of significant framing patterns that were published in recent years by popular news outlets at the same time that significantly high Google information seeking took place.

Of all the web searches Americans have performed in the last decade, an average of 65% have been executed through the Google search engine each month (comScore, 2012). Most search engines use word count functions to return results, but the Google search engine uses a unique algorithm for returning results called PageRank (Google, 2011). In a sense, PageRank measures importance based on clicks and links shared between websites, while additional details are kept secret. Web sites use this knowledge to optimize their use of language so that search engines and searchers will find them with ease (Carroll, 1997).

The Google Insights for Search tool was used to verify focus on the terms 'climate' and 'warming,' which were found in all of the top ten searches related to global climate change from 2004-2011 (Google Insights for Search, 2011). This tool provides public users with a time-series graph of search behavior (Figure 1), as well as corresponding raw data collected at weekly intervals. This tool does not display media publishing frequency, but provides a legitimate and convenient method for identifying periods of public interest. It also provides top search data and related key terms.

For this study, five significantly high Google search peaks were identified using a Tukey-Pearson F-test with $\alpha=0.05$. Low points were also identified but not used for further inquiry. From 2004-2010,

these significant peaks spanned 1) January 28-February 10, 2007, 2) March 11-March 17, 2007, 3) April 2-May 5, 2007, 4) April 13-May 17, 2008, and 5) November 29-December 13, 2009. Articles were collected based on rising and falling attention around these peaks (Figure 1). Samples began when information seeking began rising above average toward a significant peak and ended when attention dropped consistently back to the average. As a result, articles were collected and framing was analyzed within three samples; 1) January 3rd-May 5th, 2007, 2) September 1st, 2007-May 30th, 2008, 3) August 9th-December 24th 2009.

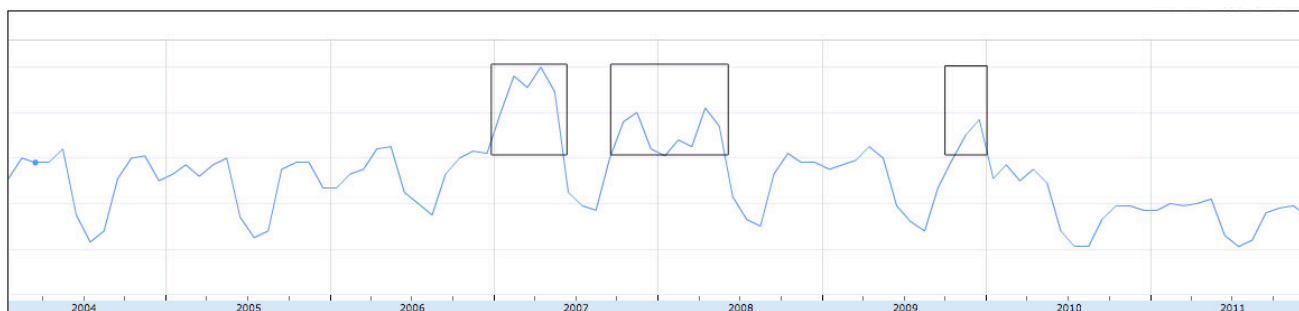


Figure 1: Time series graph of Google information seeking for key terms: 'climate' + 'warming'

Scale is based on the average traffic for 'climate' and 'warming' in the United States for all years available at the time of this study (2004-2011). Black boxes indicate sample periods. (Source: Google Insights for Search, 2012)

Articles were collected through the Google News advanced search engine. The Lexis-Nexis research database is most often used in content analysis studies, but the FOX archive was found to be limited. For example, a Lexis-Nexis search for 'warming' within the FOX News Watch and FOX News Business Lexis-Nexis archives for April 9-May 5th, 2007 provided no articles, whereas Google linked eight articles. Google provided consistent content collection across all three news outlets.

To minimize the size of the sample only headlines were searched for the terms 'warming' and 'climate.' In total, 510 articles were collected. Separately, CNN published 66 articles, FOX published 238, and MSNBC published 206. Outlet, author, section (e.g. Politics, Business, SciTech), date, headlines, use of 'climate' versus 'warming' in headlines, and article bodies were all collected. Opinion articles were not included in the sample.

Headline and article bodies were collected and investigated separately based on an observation by Condit (2001) that headlines provided a replacement effect when headline content was read in place of an entire article. Article headlines plus the byline - found between the headline and body - were qualified as the complete headline. In the absence of a byline the first paragraph was included. Article

'bodies' were represented by the remainder of the article. Framing patterns were analyzed separately between headlines and bodies using a content analysis approach.

6.3 Content Analysis

Content analysis is a way of engaging with text in a critical matter. Researchers using this method become 'coders' as they are trained to use a model for qualifying large amounts of content into a specific set of classifications. It is a systematic and unobtrusive method for breaking down text into operationalized categories (Glynn et al, 1999. Krippendorff, 2004). It is unobtrusive in the sense that the analysis does not alter the content under investigation.

Content analysis can be performed by a single individual coding an entire data set, with the aid of a computer coding system, or among a group of people (Krippendorff, 2004). Content analysis involves the interpretation of messaging and meaning, making it susceptible to subjective bias if done without constant feedback from other people or a computer. Any number of personal biases could alter the interpretation of a researcher. For this study, the team analysis was used.

In a team, coding takes place over several stages. Coders are first introduced to the analysis model and trained to identify the presence of categories in text. A pilot-test is then run to determine the strength of group understanding. Once the model is verified as reliable among the group, the analysis begins. Coders in this study used a combined approach for analysis by starting the analysis as a group and then dividing to code individually.

Based on descriptive methods developed by Boykoff (2007 & 2008), four interns were trained to code news articles within the Nisbet (2009) framing model. The principal researcher also coded, resulting in a team of five. Coders were blinded from the outlet name, date, author, section and any identification of these elements found within the articles.

This study used the team approach in an effort to emphasize the benefits of collaborative analysis (Teasley, 1997). This approach utilized both inductive and deductive reasoning to create a framework for objectively interpreting global climate change news content as individuals and as a group. Coders went through several stages of training, discussion, and model editing before the codebook (Appendix A) was considered acceptable for final analysis. By creating input and building on that of group members, individuals were asked to participate in 'collaborative knowledge construction' (Teasley, 1997). This

interpretation of the text was mostly deductive. Definitions in the model were discussed based on broad individual interpretations, which were used to clarify group definitions. By first training with interpretation, rather than concrete examples, the team attempted to define the Nisbet (2009) framing model with the greatest possible objectivity before investigating news content (Krippendorff, 2004).

For training, content analysis literature from Glynn (1999) and the Nisbet (2009) article was read and discussed alongside 25 practice articles randomly selected from the data set. Additionally, the coders assisted in the collection of news articles.

Each article was considered an observational unit within which a maximum of four frames could be labeled present. Frames were selected based on presence or absence within the headline and body. Coders were allowed to choose, at most, two frames per headline and two frames per article body, in order to identify when frames were used alone and in tandem. If two frames were considered present in the headline or body, they were considered equal. In other words, coders did not assign a primary or secondary value to frames. For each frame found present, coders were asked to identify a valence score measuring support for action (climate change is real, action needed; unsure about climate change, ambivalent; climate change is not real, action is not needed; can't code).

The group made three important observations during this pre-analysis period. First, was difficulty in utilizing the Nisbet (2009) valence scale, which was meant to measure varying expressions of advocacy for action on the global climate change issue. It was unclear whether action that was pro-environmental should be the subject of the scale, given that action was found in the context of both, opposing and preventing pro-environmental change. For example, articles where global climate change was considered real, but natural and thus unable to be stopped by human action could not be coded on this scale. The task of modifying the scale was considered time-consuming, so group reliability was prematurely measured before the pilot-test. Intercoder reliability >40% is considered the bare minimum for content analysis models (Krippendorff, 2004). When reliability >40% could not be achieved the valence scale was abandoned.

Second, coders noticed some repeated content between articles that could be used to justify the presence of a frame. Nisbet (2009) claimed that frames can include a series of "framing devices such as catchphrases, metaphors, sound bites, graphics and allusions to history, culture or literature" which can

be used to quickly identify the related frame (pg. 18). The group discussed and recorded these clarifications under 'pilot-test notes' in our codebook (Appendix A). This initial step in the content analysis process involved inductive reasoning in that specific examples from news content were used to guide our understanding of the model before applying it to our individual analyses.

Third, was the discovery of a twelfth frame, humor. Examples of the frame were both mocking and light-hearted, reflecting the same argument flexibility of the original Nisbet (2009) frame. Humor can be used to cleverly describe climate change by enlightening strange or ironic observations, but it can also be used to ridicule people or groups involved with the issue (Appendix A).

After two weeks of discussion, feedback, and practice, a pilot-test was performed on 50 articles randomly selected from the data set in order to test for intercoder reliability. Reliability measures are considered most accurate when coding categories are stable between coders, thus high agreement is desired. Acceptable levels of agreement vary among experts, but 40% is considered the minimum for intercoder reliability to be considered accurate, whereas scores >70%-80% are advocated by most (Krippendorf, 2004).

A Scott's pi reliability analysis was run on the results of our pilot-test (Table 1). All frames returned an intercoder reliability score >40%. Four of the 12 frames received 80% or greater reliability among coders. These were, economic development / competitiveness (80%), Pandora's box / environmental catastrophe (82%), strategy / conflict (84%), and national security (89%). Six of the 12 of frames had between 70-80% reliability. Two of the 12 frames had >70% reliability. These were, morality / ethics (55%) and social progress (65%). Frames that fell below this threshold were discussed rigorously among coders both before and during the coding process, but were not abandoned.

Table 1: Pilot-test intercoder reliability results derived from a Scott's pi reliability analysis

Frame	Reliability Score
Social progress	0.65
Economic development / competitiveness	0.80
Fatalism / runaway problem	0.70
Morality / ethics	0.55
Pandora's box / environmental catastrophe	0.82
Scientific / technical (un)certainly	0.78

Public accountability / governance	0.78
Middle way / alternative path	0.73
Strategy / conflict	0.84
National security	0.89
Public health	0.71
Humor	0.71

The final analysis was then completed in several parts where a majority of the articles were coded as a group, while the rest were distributed among individual coders. In both circumstances, coders were asked to reach out to the group when a problem article arose. When low reliability frames were suspected to be present in an article, the individual coder also presented those examples to the group for examination. An online discussion board was used to facilitate this portion of the analysis.

A single article was considered an observational unit. For each, coders determined the presence and absence of each of the 12 frames, where a maximum of two could be selected for both the headline and body of the article. Coding results were then analyzed in several ways. First, the three outlets were considered as a cohesive media platform (US 24-hour cable news) and frame use was examined descriptively across that medium by looking at raw percentages for relative frequency. Frames were tallied as they appeared present in headlines and bodies. These totals were divided by the total number of articles in which they could have been present (N=510). Frames claiming more than 10% of all frame presence were considered frequent.

Once identified, frequent frames were investigated as they appeared between the selected outlets (MSNBC, FOX, CNN). A Chi-squared analysis was used to determine significant differences between framing patterns published by the outlets. A test was declared statistically 'significant' at the 0.05 level if the p-values were found to be less than 0.05. A test was declared 'highly significant' at the 0.01 level if the p-values were found to be less than 0.01. Both of these findings translate a degree of certainty about findings. Significant at the 0.05 level equates to 95% certainty or confidence in results. Significance at the 0.01 level equates to 99% certainty or confidence in results. Frequent frames and corresponding results are discussed in the following section.

7. Results

In this study, results describe the presence of frames as they appeared across articles from three American 24-hour news outlets during specific samples selected between 2007-2009. Data was investigated in several ways. First, framing patterns found across all outlets were investigated qualitatively as percent of all article headlines and bodies (N=510). Frames present in at least 10% of all articles, in either the headline or body, are considered 'frequent' and thus important. Next, a series of Chi-squared tests performed on these frequent frames were used to quantitatively investigate significant differences between the three outlets (MSNBC, FOX, CNN). Results indicate that a total of seven frames were used in a significant way within the data set. Significance was determined by an alpha level of 0.05, which translates to a 95% difference in frame use between outlets. A summary of findings concludes this section.

Each article was observed for the absence or presence of the 12 frames, a maximum of two could be selected for each the headline and body. Between CNN, MSNBC, and FOX, 510 articles were produced between the three outlets. Separately, the largest data set came from FOX with 238 articles, while MSNBC published 206 articles, and CNN published 66 articles. Within their respective articles, FOX used 323 frames in headlines and 379 frames in bodies, MSNBC used 271 frames in headlines and 318 frames in bodies, while CNN used 95 frames in headlines and 109 frames in bodies. The difference between total articles and total frames accounts for use of several frames within a single article.

7.1 Frequent frames across all outlets

Relative to all frame use by MSNBC, FOX, and CNN, a single frame was considered frequent when present in at least 10% of all frame use. The portion of articles covered by each frame are displayed in Figure 2 (N=510). Seven frames were used beyond this threshold and are discussed as they appeared separately in headlines and bodies. The percent of article coverage is indicated in parentheses. Frequent frames are presented in order from most to least present, Chi-squared test results are described, and examples from each of the three outlets are provided. A limited number of examples for the other five frames, which were not used in at least 10% of all articles, can be found in Appendix B.

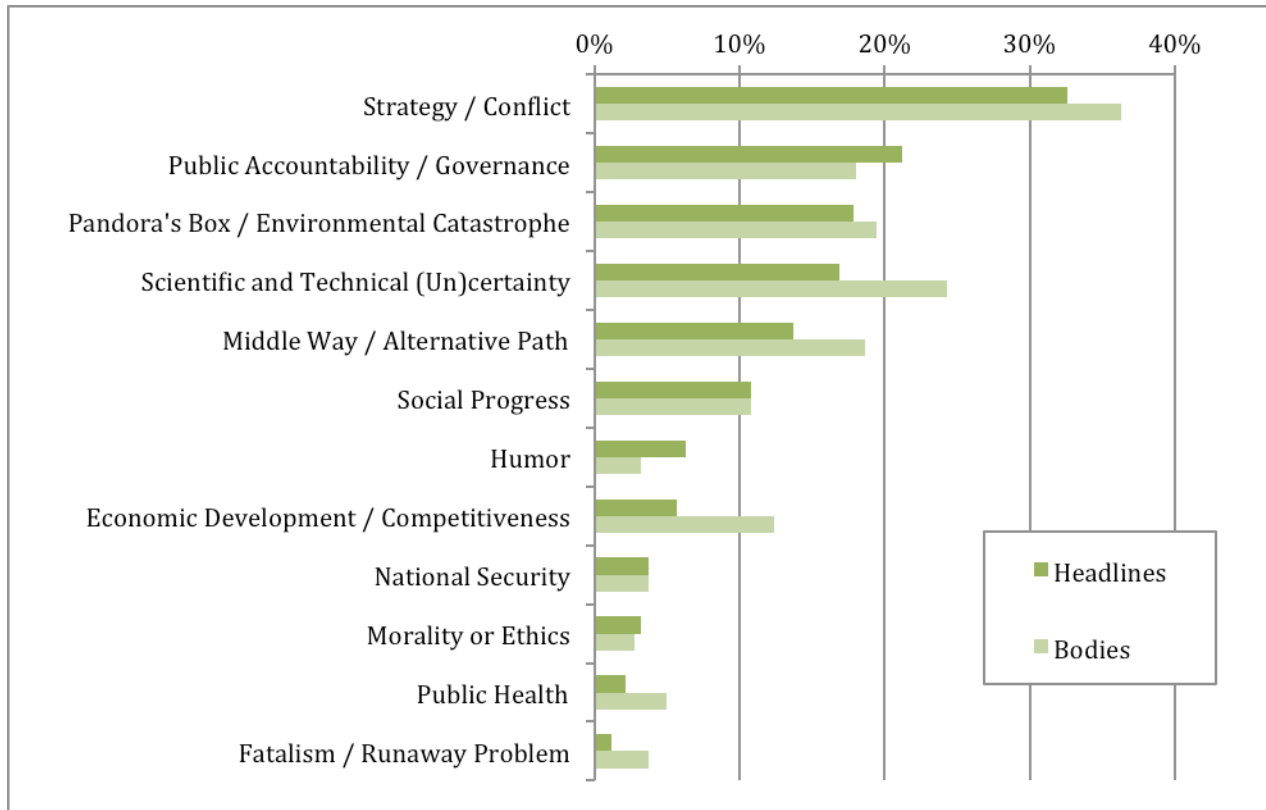


Figure 2: Frame presence in all articles across outlets (N=510): Frames are displayed from most (top) to least (bottom) frequent in headlines.

7.1.1. Headlines. The strategy / conflict frame was used most frequently in headlines. It appeared in 33% of all headlines. By outlet, the frame was found in 33% of MSNBC headlines, 33% of FOX headlines, 30% of CNN headlines. Chi-squared tests revealed no significant differences between CNN and FOX ($\chi^2=0.20$; $df = 1$, n.s.), CNN and MSNBC ($\chi^2=0.11$; $df = 1$, n.s.), or MSNBC and FOX ($\chi^2=0.02$; $df = 1$, n.s.) use of the strategy / conflict frame in headlines. Headline examples from each of the outlets are provided.

Al Gore rebuts Palin's climate change claims: Former Alaska governor says Obama should boycott Copenhagen summit (MSNBC, 2009)

U.N.'s Top Climate Official: Ignoring Global Warming Is 'Criminal': challenged world policymakers Monday to map out a path to curb climate change, charging that to ignore the urgency of global warming would be "nothing less than criminally irresponsible." (FOX, 2007)

Sen. John Kerry and former House Speaker Newt Gingrich met in Washington on Tuesday for a verbal duel about climate change, finding agreement on the problem but vastly different approaches to a solution. (CNN, 2007)

The public accountability / governance frame was the second most frequent headline frame used among the outlets as a whole. It appeared in 21% of all headlines. By outlet, the frame was found in 15% of MSNBC headlines, 24% of FOX headlines, 29% of CNN headlines. Chi-squared tests revealed two significant differences between outlet use of the public accountability & governance frame in headlines. Results were used to determine that MSNBC was significantly different from CNN ($\chi^2 = 6.29$; $df = 1$, $p=0.012$) and FOX ($\chi^2 = 5.99$; $df = 1$, $p=0.014$) in its use of public accountability / governance, where MSNBC used the frame less than both. Headline examples from each of the outlets are provided.

NASA watchdog: Agency censored on warming: NASA's press office "marginalized or mischaracterized" studies on global warming between 2004 and 2006, the agency's own internal watchdog concluded. (MSNBC, 2009)

Carbonhagen: World Leaders Drive to Climate Summit in Gas-Guzzling Luxury Fleet: "World leaders and VIPs began pouring into Copenhagen Monday morning for the city's long-awaited climate summit, arriving in style in a fleet of gas-guzzling limos and luxury cars. (FOX, 2009)

One of the world's leading authorities on climate change has dismissed the contents of controversial e-mails leaked from the University of East Anglia as nothing more than friends and colleagues "letting off steam." (CNN, 2009)

Pandora's box / environmental catastrophe was the third most frequent headline frame used among the outlets as a whole. It appeared in 18% of all headlines. By outlet, the frame was found in 17% of MSNBC headlines, 18% of FOX headlines, 20% of CNN headlines. Chi-squared tests revealed no significant differences between CNN and FOX ($\chi^2=0.05$; $df = 1$, n.s.), CNN and MSNBC ($\chi^2=0.36$; $df = 1$, n.s.), or MSNBC and FOX ($\chi^2=0.30$; $df =1$, n.s.), use of the Pandora's box / environmental catastrophe frame in headlines. Headline examples from each of the outlets are provided.

Indonesia may lose 2,000 islands to warming: Minister says climate change could lead to rising sea level. (MSNBC, 2007)

Climate Change Threatens Britain's Coasts: Climate change is warming Britain's waters, eroding its coastline, harming its marine wildlife and increasing the likelihood of devastating storms and floods, the government said in a report published Wednesday. (FOX, 2008)

Risky business: insuring countries against climate catastrophe: The last 50 years have borne witness to a spate of climate-related disasters across the world causing over 800,000 fatalities and \$1 trillion in economic losses. (CNN, 2009)

Scientific / technical (un)certainty was the fourth most frequent headline frame used among the outlets as a whole. It appeared in 17% of all headlines. By outlet, the frame was found in 18% of MSNBC headlines, 19% of FOX headlines, 5% of CNN headlines. Chi-squared tests revealed two significant differences between outlet use of the scientific / technical (un)certainty frame in headlines. Results were used to determine that CNN was significantly different from MSNBC ($\chi^2 = 7.17$; $df = 1$, $p=0.007$) and FOX ($\chi^2 = 9.03$; $df = 1$, $p=0.004$) in its use of scientific / technical (un)certainty, where CNN used the frame less than both. Headline examples from each of the outlets are provided.

Study: Climate change not behind hurricanes: Research is the latest to look at link between storm and warmer temps. (MSNBC, 2008)

Study: Arctic Warming Partly Due to Natural Causes: There's more to the recent dramatic and alarming thawing of the Arctic region than can be explained by man-made global warming alone, a new study found. (FOX, 2008)

A rise in skepticism among Americans over global warming is mostly due to changes among Republicans, according to a new national poll. (CNN, 2009)

Middle way / alternative path was the fifth most frequent headline frame used among the outlets as a whole. It appeared in 14% of all headlines. By outlet, the frame was found in 13% of MSNBC headlines, 12% of FOX headlines, 23% of CNN headlines. Chi-squared tests revealed two significant differences between outlet use of the middle way / alternative path frame in headlines. Results were used to determine that CNN was significantly different from MSNBC ($\chi^2 = 3.99$; $df = 1$, $p=0.046$) and FOX ($\chi^2 = 4.64$; $df = 1$, $p=0.031$) in its use of middle way / alternative path, where CNN used the frame more than both. Headline examples from each of the outlets are provided.

Three senators join forces to revive climate bill: "Bid to get wider support would boost nuclear power, offshore drilling. (MSNBC, 2009)

Pacific Rim Leaders Adopt Global Warming Statement: Pacific Rim leaders agreed Saturday that the world needs to "slow, stop and then reverse" greenhouse gas emissions, and adopted goals on reducing energy intensity and reforestation as part of the effort. (FOX, 2007)

U.S., China vow action on climate change: China and the United States, the largest producers of greenhouse gases, will team up to fight climate change and create clean energy, their leaders said Tuesday. (CNN, 2009)

Social Progress was the sixth most frequent headline frame used among the outlets as a whole. It appeared in 11% of all headlines. By outlet, the frame was found in 12% of MSNBC headlines, 8% of FOX headlines, 20% of CNN headlines. Chi-squared tests revealed one significant difference between outlet use of the social progress frame in headlines. Results were used to determine that CNN was significantly different from FOX ($\chi^2 = 8.31$; $df = 1$, $p=0.004$) in its use of social progress, where CNN used the frame more. Headline examples from each of the outlets are provided.

Prince Charles likes warming to WWII effort: 'Things that seemed impossible were achieved almost overnight,' he says. (MSNBC, 2007)

Top Scientist Says Stir Up Oceans, Stop Global Warming: Add a new one to the list of somewhat zany suggestions to counteract global warming — only this time the idea comes from the "Gaia guy." (FOX, 2007)

From seabeds to mountaintops, people around the world were staging a day of demonstrations Saturday to call for urgent action on climate change. (CNN, 2009)

7.1.2. Bodies. The strategy / conflict frame was also the most frequent body frame used among the outlets as a whole. It appeared in 36% of all bodies. By outlet, the frame was found in 38% of MSNBC headlines, 32% of FOX headlines, 45% of CNN headlines. Chi-squared tests revealed one significant difference between outlet use of the strategy / conflict frame in bodies. Results were used to determine that CNN was significantly different from FOX ($\chi^2 = 4.16$; $df = 1$, $p=0.041$) in its use of strategy / conflict, where CNN used the frame more. Body examples from each of the outlets are provided.

Witherspoon painted a picture of [Governor Schwarzenegger as] being misled and micromanaged by a staff that was trying to weaken the global warming law out of fear that it would harm businesses. The picture is at odds with the governor's carefully tended public image as an environmental champion. (MSNBC, 2007)

Former Vice President Al Gore says global warming is to blame for the Myanmar cyclone. But many experts say it is impossible to make such a link. Jeff Poor of the Business and Media Institute writes that "using tragedy to advance an agenda has been a strategy for many global warming activists." (FOX, 2008)

Representatives of more than 100 developing nations walked out on the [United Nations Framework Convention on Climate Change] summit Monday to protest what they called inadequate offers of aid from richer countries. Island states in particular, which are more vulnerable to rising sea levels, are pushing for limits that would reduce carbon emissions enough to limit the expected rise in average global temperatures to 1.5 degrees Celsius (2.7 degrees Fahrenheit). (CNN, 2009)

Scientific / technical (un)certainty was the second most frequent body frame used among the outlets as a whole. It appeared in 24% of all bodies. By outlet, the frame was found in 22% of MSNBC bodies, 29% of FOX bodies, 14% of CNN bodies. Chi-squared tests revealed one significant difference between outlet use of the scientific / technical (un)certainty frame in bodies. Results were used to determine that FOX was significantly different from CNN ($\chi^2 = 6.39$; $df = 1$, $p=0.011$) in its use of scientific / technical uncertainty, where FOX used the frame more. Body examples from each of the outlets are provided.

By the end of the century, temperatures are predicted to increase by 3 to 10 degrees Fahrenheit [in California]. That could translate into even less rainfall across the southern half of the state, already under pressure from the increased frequency of wildfires and relentless population growth.' (MSNBC, 2007)

IPCC Changes Tune, Links Stronger Hurricanes to Global Warming: Global warming has made stronger hurricanes, including those in the Atlantic such as Katrina, an authoritative panel on

climate change has concluded for the first time, participants in the deliberations said Thursday.
(FOX, 2007)

In late November, a substantial file including more than 1,000 e-mails either sent from or to members of the University's Climatic Research Unit (CRU) in eastern England were allegedly hacked and leaked on the Internet. They contained language seized upon by climate skeptics who say they offer evidence that scientists have manipulated climate data to exaggerate the threat of global warming. The affair has been covered extensively in the global press under the moniker, "Climategate." (CNN, 2009)

Pandora's box / environmental catastrophe was the third most frequent body frame used among the outlets as a whole. It appeared in 19% of all bodies. By outlet, the frame was found in 21% of MSNBC bodies, 19% of FOX bodies, 17% of CNN bodies. Chi-squared tests revealed no significant differences between CNN and FOX ($\chi^2=0.17$; $df = 1$, n.s.), CNN and MSNBC ($\chi^2=0.56$; $df = 1$, n.s.), or MSNBC and FOX ($\chi^2=0.27$; $df =1$, n.s.) use of the Pandora's box / environmental catastrophe frame in bodies. Body examples from each of the outlets are provided.

Worldwide, warming waters can be expected to strain species that require lots of oxygen, forcing them to either relocate to cooler waters or face extinction, the authors write. (MSNBC, 2007)

The Earth is hurtling toward a warmer climate at a quickening pace, a Nobel-winning U.N. scientific panel said in a landmark report released Saturday, warning of inevitable human suffering and the threat of extinction for some species. (FOX, 2007)

U.N. Secretary-General Ban Ki-moon, presenting the Intergovernmental Panel on Climate Change report in Valencia, Spain, warned that some of the effects of rising levels of greenhouse gases may already be irreversible. The U.N. head said the situation was already "so severe and so sweeping that only urgent, global action" could head off the crisis. (CNN, 2007)

Middle way / alternative path was the fourth most frequent body frame used among the outlets as a whole. It appeared in 19% of all bodies. By outlet, the frame was found in 18% of MSNBC bodies, 16% of FOX bodies, 29% of CNN bodies. Chi-squared tests revealed one significant difference between outlet use of the middle way / alternative path frame in bodies. Results were used to determine that CNN was significantly different from FOX ($\chi^2 = 5.15$; $df = 1$, $p=0.023$) in its use of middle way / alternative path,

where CNN used the frame more. A difference between CNN and MSNBC was almost significant ($\chi^2 = 3.58$; $df = 1$, $p=0.058$), where CNN used the frame more. Body examples from each of the outlets are provided.

Having earlier won the backing of Wal-Mart, the world's largest retailer, 10 major corporations on Monday spelled out their strategy for combating global warming - urging lawmakers to pass mandatory curbs on carbon emissions, in contrast to President Bush's voluntary approach. Joined by four environmental groups, the corporations on Monday asked for legislation that would reduce carbon emissions by up to 80 percent by 2050. (MSNBC, 2007)

Nations around the world signed the Montreal Protocol in 1987 to control the production and use of substances that deplete the ozone layer, which shields the Earth from harmful ultraviolet radiation. By curbing their use, the pact has also cut in half the amount of greenhouse warming that would have occurred by 2010 had these substances continued to build unabated in Earth's atmosphere, according to the study published in the this week's online issue of the Proceedings of the National Academy of Sciences. (FOX, 2007)

President Obama announced what he called a "meaningful and unprecedented" climate change deal with China and other key nations that was expected to be sealed before the president headed home from the Copenhagen summit late Friday. (CNN, 2009)

Public accountability / governance was the fifth most frequent body frame used among the outlets as a whole. It appeared in 18% of all bodies. By outlet, the frame was found in 12% of MSNBC bodies, 23% of FOX bodies, 20% of CNN bodies. Chi-squared tests revealed one significant difference between outlet use of the public accountability / governance frame in bodies. Results were used to determine that FOX was significantly different from MSNBC ($\chi^2 = 8.41$; $df = 1$, $p=0.004$) in its use of public accountability / governance, where FOX used the frame more. Body examples from each of the outlets are provided.

Oil major Exxon Mobil Corp. is engaging in industry talks on possible U.S. greenhouse gas emissions regulations and has stopped funding groups skeptical of global warming claims — moves that some say could indicate a change in stance from the long-time foe of limits on heat-trapping gases. (MSNBC, 2007)

E-mails stolen from the climate unit at the University of East Anglia appeared to show some of world's leading scientists discussing ways to shield data from public scrutiny and suppress others' work. Those who deny the influence of man-made climate change have seized on the correspondence to argue that scientists have been conspiring to hide evidence about global warming. (FOX, 2009)

A CNN/Opinion Research Corporation poll in October found that 66 percent of the public wants the U.S. to take action to reduce greenhouse gases, even if other countries do not act. The poll's margin of error was plus-or-minus 4.5 percent. (CNN, 2007)

Economic development / competitiveness was the sixth most frequent body frame used among the outlets as a whole. It appeared in 12% of all bodies. By outlet, the frame was found in 15% of MSNBC bodies, 11% of FOX bodies, 11% of CNN bodies. Chi-squared tests revealed no significant differences between CNN and FOX ($\chi^2=0.01$; df = 1, n.s.), CNN and MSNBC ($\chi^2=0.67$; df = 1, n.s.), or MSNBC and FOX ($\chi^2=1.33$; df =1, n.s.) use of the economic development / competitiveness frame in bodies. Body examples from each of the outlets are provided.

[Prime Minister John] Howard says the Kyoto Protocol's steep cuts in carbon dioxide emissions would hurt Australia's economy by handing a competitive advantage to China and India, which are not bound by the treaty. Australian power companies issued a report Wednesday that said expanding the use of nuclear power and retrofitting coal-fired power stations to capture carbon dioxide is the best way to slow greenhouse emissions. (MSNBC, 2007)

Officials from more than 150 global companies — worth nearly \$4 trillion in market capitalization - have signed a petition urging "strong, early action on climate change" when political leaders meet in Indonesia. The hastily prepared petition drive, coordinated through the environmental office of Britain's Prince Charles, is signed by leaders from mainstream powerhouse companies such as Shell UK, GE International, Coca-Cola Co., Dupont Co., United Technologies Corp., Rolls Royce, Nestle SA, Unilever, British Airways and Volkswagen AG. (FOX, 2007)

Developing nations are especially under threat, according to Cristina Rumbaitis Del Rio, Associate Director of the Rockefeller Foundation. By 2030 they stand to lose between one and 12

percent of GDP, given current weather patterns. Higher global temperatures are likely to exacerbate future climate disasters, falling crop yields and lack of water availability. (CNN, 2009)

Social Progress was the seventh most frequent body frame used among the outlets as a whole. It appeared in 11% of all bodies. By outlet, the frame was found in 13% of MSNBC bodies, 9% of FOX bodies, 11% of CNN bodies. Chi-squared tests revealed no significant differences between CNN and FOX ($\chi^2=0.11$; df = 1, n.s.), CNN and MSNBC ($\chi^2=0.19$; df = 1, n.s.), or MSNBC and FOX ($\chi^2=1.31$; df =1, n.s.) use of the social progress frame in bodies. Body examples from each of the outlets are provided.

With strategically placed helmets and slogans painted on bare skin, scores of people shed their clothes and rode through this seaside resort on their bicycles Saturday to promote cycling as an environmentally friendly mode of transport. "It is time more motorists stripped off their armor plating and moved around more gently on this earth," said Duncan Blinkhorn, 45, one of the event's organizers. (MSNBC, 2007)

In a special energy and health series of the medical journal The Lancet, experts said people should eat fewer steaks and hamburgers. Reducing global red meat consumption by 10 percent, they said, would cut the gases emitted by cows, sheep and goats that contribute to global warming. (FOX, 2007)

It doesn't matter who you are, or where you are from, or, for that matter, what you usually blog about. All Blog Action Day wants you to do, for one day, is to write about climate change. (CNN, 2009)

7.2 Discussion of results

For the most part, MSNBC, CNN, and FOX published a cohesive narrative about global climate change during periods of significantly high Google information seeking for the terms 'climate' and 'warming.' The outlets as a whole presented seven frames in more than 10% of all frames published during sample periods. These were strategy / conflict, public accountability / governance, scientific / technical (un)certainly, Pandora's box / environmental catastrophe, middle way / alternative path, economic development / competitiveness, and social progress. Despite this apparent cohesion it is important to recognize where each of the individual outlets displayed a unique voice among the crowd. The term 'unique voice' describes an outlet's unique use of framing that does align with patterns found

among the most frequent frames. Differences between outlets are used to display where outlets were found unique from the group.

When looking at the presence of frequent frames between outlets, eleven differences were found. The total number of possible differences was 39, which equated to three Chi-squared tests for each frequent frame (six in headlines, seven in bodies). Economic development / competitiveness was only found frequent in article bodies. Overall, 11 differences were found across seven frames, which are described in further detail by outlet.

CNN displayed the greatest number of significant differences between its use of framing and that presented by the other outlets. CNN used the middle way / alternative path frame significantly more often and the scientific and technical (un)certainty frame significantly less often than both MSNBC and FOX in headlines. In bodies, the frame was used significantly less than FOX. Additionally, CNN used the social progress frame in headlines significantly more often than FOX. CNN also used the strategy / conflict and middle way / alternative path frames more often than FOX in bodies. MSNBC used the public accountability frame significantly more often than CNN and FOX in headlines, but FOX used the public accountability / governance frame significantly more often than MSNBC in bodies.

In terms of the most frequent frames, the importance of some may have been observed as differing between headlines and bodies because of specific outlets. The shift of importance for the public accountability frame from second in headlines to fifth in bodies may be attributed to a drop in presence among MSNBC bodies. The shift for the scientific / technical (un)certainty frame from fourth in headlines to second in bodies, may be due to an increase in presence among FOX bodies. Last, the shift observed for the middle way / alternative path frame from fifth in headlines to fourth in bodies may be attributed to an increase in presence among CNN bodies. Conclusions are drawn from these results in the following section.

8. Conclusion

This study was used to exemplify an investigation of global climate change framing patterns published during specific periods between 2007-2009 when significantly high Google information seeking for 'climate' and 'warming' took place. Results display a variety of frames used to discuss the issue. Seven of the 12 frames found in the Nisbet (2009) model were found significant. Across these seven frames were 11 differences between outlets. This section begins with a discussion of limits regarding results. Suggestions for future researched are provided based on experience and observations gathered during the study. A brief review of framing and information seeking summarizes the importance of this study. It is concluded that awareness of prevalent framing patterns surrounding an issue may help form a nuanced understanding of the way various publics and individuals access scientific information.

8.1. Suggestions for future research

First and foremost, a difference in the number of articles between the outlets is cause for caution when examining results. MSNBC and FOX published a similar number of articles with 'climate' or 'warming' in the headline, but CNN had far fewer. This may have been an issue with collection where CNN did not use the selected key terms as frequently as the other outlets, but it could also be related to the fact that CNN cut its entire science writing staff in 2007 (Oreskes & Conway, 2010). Either way, the CNN sample size is cause for concern.

Additionally, significantly low dips for Google information seeking were identified through a Tukey-Pearson F-test, but were not used to guide analysis. This study came with the goal to explore news content under specific social conditions where Google information seeking for 'climate' and 'warming' rose to significantly high levels of user activity. Popularity among the public was a major theme.

Without a survey, interview, or focus group aspect to the study no connection to public behavior could be made. However, public behavior was used to guide sample selection. Had the additional element of low information seeking moments been included in the Tukey-Pearson calculation results would have compared opposing conditions (high vs. low) for frame production. Significant framing differences found between opposing information seeking conditions would display reason to continue discrete studies of framing. As this study stands, results articulate a limited story about a much larger exploration of global climate change framing patterns.

An exploration of frames and their relation to specific events related to the issue of global climate change might serve to focus framing studies more effectively in the future. Originally, a time-series analysis of Google searching was meant to determine specific events driving public attention using a method similar to Liu (2011), who looked at the causal effects of global climate change related events on legislation. However, this idea became time consuming and, for the most part, unimportant to a study of framing patterns. For future studies that aim to investigate framing with measured framing effects, such an analysis could provide important insight. The collection and interpretation of user data from the Internet provides an endless field for investigation. New media content (e.g. blogs, social networks, e-mail) may provide equally important indicators of public framing in our shared virtual reality (PEW, 2012).

As for results from this study, there is also something to be said about the unique voices of each of the outlets tested. Each of the outlets used at least one frame in a way that was significant from another outlet, but only MSNBC and CNN separated themselves from both of their counterparts. MSNBC stood out by using the public accountability / governance frame less often than FOX and CNN in headlines. Notably, CNN also published frames out of line with MSNBC and FOX by emphasizing the middle way / alternative path frame in headlines and bodies, while nearly ignoring the scientific / technical (un)certainty frame in headlines. That fact that differences between headlines and bodies appeared may provide evidence for their exploration in future studies, especially given the possibility of a replacement effect that occurs when readers skim news for headline updates without reading entire articles (Condit, 2001).

To further explore the unique voices of individual news outlets, coders suggest an analysis of quotes, publishing authors and, perhaps, removing authors/articles that are not native to the outlet (e.g. produced by the Associated Press). For this study, republished content was kept in the data set, given that any choice in publishing reflects something about the outlet. However, removing such articles could provide a more detailed means for understanding the outlet as a unique aggregator of information. Adjusting the Nisbet (2009) model to include fewer frames might also help focus on specific differences.

Nisbet's (2009) observations discuss frames as they appear qualitatively in a body of news content across the American media. He created the model as an expert interpreter, whereas coders from this study have applied it rigorously to a body of data. Two frames (social progress and morality / ethics)

emerged from this evaluation with reliability <70%, which is considered unacceptable by most content analysis experts (Krippendorff, 2004). Despite measures of caution when these frames appeared in the data set it is important to note limits related to conclusions about these frames. Low reliability increases the possibility of errors, in that coders may find a frame absent or present when it is not.

Seven of the twelve frames appear to have been significant in someway between 2007-2009, which justifies Nisbet's (2009) observation of their importance. However, low reliability scores from the pilot test used in this study suggest that combining a few of the frames may help control reliability when applying the model to media content. Coders from this study gathered suggestions for improving the original model, which can be found in Appendix A. Since creating the model, Nisbet's framing research has focused mainly on the Public health frame (Akerlof, et al, 2010; Maibach et al, 2010; Nisbet et al, 2011). Results from this study suggest that future researchers should follow this example by exploring the use and effects of frames in isolation.

8.2. Why care about framing?

Frames are powerful organizing and storytelling devices that can be used to enhance or focus the perspectives of news content. Translation of ideas and events is a natural function of social living, of being an individual within a society. Mediated dialogue often reflects a broad societal conversation, driving how people could think about issues at hand (Cohen, 1963). When current events occur in the world they only gain importance and attention with disagreement, creating a public issue. Action is then determined by majority agreement.

As audience and groups gather and grow, public issues gain attention and conversations cross social, mediated, and academic spheres. When this occurs, publics form around perspectives and solutions. Dominant group perspectives shape various frames that help individuals access communal understanding and define priorities. Solutions represent opinion, which are only formed after agreements about basic comprehensive details are accepted. When a media outlet uses a frame they contribute to this flow of information by emphasizing certain perspectives.

This study focused on popular sources of information, starting with an exploration of online and television content. Results provide evidence that the selected 24-hour news networks (MSNBC, CNN, FOX) framed global climate change in at least seven ways on a frequent basis. Separately, CNN and

MSNBC were found to have distinguished their coverage of global climate change with at least one framing choice that was not significant in content from the other outlets.

Even issues like global climate change - which retain an empirical foundation no matter the conversation driven around it - must face the unique, human characteristic of judgment when posed as a problem among society. Although cohesion was found within the most frequent frames, each of the outlets chose to use at least one in their own unique way. The fact that three popular media sources discussed global climate change from seven of the twelve possible framing perspectives and differed from each other in at least 11 ways appears to indicate that the public conversation was complicated during periods of high Google information seeking between 2007-2009.

Investigating the multiple perspectives for translating the global climate change issue proved complex. Researchers interested in framing should consider focusing investigations on a single frame from the collection of 12 posed in this study. At this point, the multi-faceted observations of US 24-hour news outlets (MSNBC, FOX, CNN) appear to have altered global climate change information in a variety of ways. The emergence of a complicated narrative among selected news outlets may serve as a symbol for the national discussion about the global climate change problem, which remains unresolved as a public issue in the US.

9. Appendix A: Revised global climate change framing model

FRAME	ARGUMENTS	SUGGESTED RHETORICAL REVISIONS
<p>1) SOCIAL PROGRESS: Climate change is fundamentally about societal growth, prosperity, quality of life. Defined as balancing growth and environmental protection, harmony with nature i.e. “sustainability.” Alternatively, progress is sacrificing or “mastering” the environment to boost the overall standard of living, domestically or abroad.</p> <p><i>Pilot-test notes:</i> <i>Social progress</i> frames discuss changes that have been made or will be performed, etc. Often they are public relations types of events or actions where one group is trying to set an example for others. They usually involve non-governmental efforts and can occur in the public and private spheres. This frame can be used as a reaction to government response, either as support or as a reaction to discontent (i.e. “taking the problem into our own hands”). This frame may imply that individuals, not government, will improve our standard of living.</p>	<ul style="list-style-type: none"> • Society needs to “go green,” be “sustainable” • Need for “environmental stewardship,” take care of environment. [<i>No religious emphasis here.</i>] • Society and communities will become stronger if people work together to solve climate change. • Societal development needs to come first, especially in poorer countries, before environmental measures. 	<p>Social and personal collaboration, innovation and action: Coders suggest that social progress frame might be more clearly communicated as “Social and personal collaboration, innovation, and action.” This may help distinguish the frame from Middle way/ alternative path. The team faced difficulty trying to discern between these two kinds of society-wide change.</p> <p>By clarifying the societal level at which these changes occur, they might be easier to identify. In the same light, Middle way/alternative path could be relabeled as “Government collaboration, innovation, and action.” These titles recognize the similarities between the frames while differentiating the source of social change.</p>
<p>2) ECONOMIC DEVELOPMENT / COMPETITIVENESS: Fundamentally about economic risks, benefits, and impacts. Action will either lead to negative economic consequences or action is an opportunity to re-invent, grow the economy.</p> <p><i>Pilot-test notes:</i> This frame relates to national economies. It can be related to a specific organization’s or business’</p>	<ul style="list-style-type: none"> • Action will negatively impact economy, result in loss of jobs, hurt consumers, business move overseas. • Action is unfair, not effective bc countries such as India and China are not also taking action. • Action can re-invent the economy, create “green jobs” and make the U.S. or region a leader in clean energy technology. 	<p>No suggestions.</p>

<p>economic concerns but that must be explicitly stated by the journalist or present in a quote. A story about a group expressing economic concerns to or about the federal government would fit here. If someone is investing money in a certain image or debate related to their market you might suspect this frame, but that is likely an example of <i>conflict/strategy</i>.</p>		
<p>3) MORALITY / ETHICS: Climate change is fundamentally a moral, ethical, or religious question. Moral or religious teachings and norms require action; or alternatively teachings and norms dictate “dominion” over nature.</p> <p><i>Pilot-test notes: Morality / Ethics</i> frames are obvious if either of the terms in the title are present. Mention of a god, a religious figure/place or other religious entities evokes this frames if the subject is tied to religious opinion. The <i>fatalism</i> frame can also involve a god, if global warming is considered a damming fate.</p>	<ul style="list-style-type: none"> • Action required bc of moral duty to future generations or to most vulnerable domestically / internationally. • Action required bc <u>religion or the Bible</u> teaches that we are to be stewards of environment. • Action required bc morally thrifty, counters consumerism, materialism, and excess. • Action required because we have a responsibility to animals and to all life. • Action not required, religion teaches dominion over nature. 	<p>No suggestions.</p>
<p>4) FATALISM / RUNAWAY PROBLEM: Climate change is fundamentally a problem so great that action will do little good and is “futile”, i.e. the “train has left the station” and the opportunity for action has been lost. Alternatively, religious teachings and faith in God mean that human actions can have little bearing on the course of nature or the world, therefore action will do little good.</p> <p><i>Pilot-test notes: Fatalism</i> is pessimistic and conclusive about the future and doom of</p>	<ul style="list-style-type: none"> • Problem is so great that it is already too late to effectively act. • Expression that there is nothing the respondent can do that matters or counters problem. • God has a plan that human’s have little ability to influence. Need to trust in God. 	<p>Inevitable change / runaway problem: Like pandora’s box / environmental catastrophe framing, fatalism / runaway problem framing expressed certainty about global climate change. Yet, it did not necessarily attribute the cause to humanity. Fatalism was also considered a troublesome choice of rhetoric for coders without an background in philosophy. The term ‘inevitable’ might help clarify meaning.</p> <p>In either context this frame described global climate change as</p>

<p>human beings in relation to climate change. A claim about adaptation is probably <i>Fatalism</i>, because it implies that the impacts must be reacted to and that they cannot be prevented.</p> <p>If there is optimism expressed in terms of altering even the most desperate and dire impacts, the frame is <i>Pandora's box</i>.</p> <p>If dire impacts are suggested with strong vocabulary then do two things: 1. Look up the Merriam-Webster definition of the strong vocabulary. 2. Consider, is there mention of hope? No hope = <i>Fatalism</i>. A warning with hope = <i>Pandora's box</i>.</p>		<p>unstoppable, thus framing the issue as an environmental problem that cannot or can no longer be solved. Coders suggest that greater clarity could be achieved by better distinguishing expressions of certainty (See suggestions for the Scientific and technical (un)certainty frame for more comment).</p>
<p>5) PANDORA'S BOX / ENVIRONMENTAL CATASTROPHE: Climate change is fundamentally an environmental problem set in motion by man that will have devastating environmental consequences if action is not taken. Emphasis is on specific severe environmental impacts such as hurricanes, species death, ice melting, or sea level flooding. Climate change is defined as an environmental issue with severe consequences.</p> <p><u>Pilot-test notes:</u> <i>Sci (un)ertainty</i> and <i>Pandora's box</i> are easy to confuse, be careful. <i>Pandora's box</i> usually relates to impacts and human responsibility. <i>Pandora's box</i> would also be present with a discussion of risk.</p> <p><i>Sci. (un)certainty</i> is usually about statistics, numbers and unpredictability.</p>	<ul style="list-style-type: none"> • Emphasize danger from hurricanes, sea level rise, or flooding. • Danger to animal species such as polar bears. • Unspecific, general risks to the environment. • A warning about impacts, catastrophe. • Hope is present 	<p>Environmental catastrophe: There was trouble interpreting the difference between Fatalism / runaway problem and Pandora's box/environmental catastrophe – mostly because of the phrase "Pandora's Box," which was considered abstract. We suggest simplifying the title to "Environmental Catastrophe."</p> <p>Coders also suggest that the Pandora's box/environmental catastrophe frame should only be considered present when there is not an expressed threat to human beings (See suggestions for the Public health and National security frames for more comments).</p>
<p>6) SCIENTIFIC / TECHNICAL</p>		<p>Scientific / technical uncertainty:</p>

<p>(UN)CERTAINTY: Climate change is fundamentally a matter of science, what is known versus unknown. Action is required based on scientific consensus or strong expert agreement. Alternatively, action is not required because scientific understanding remains uncertain, scientists are in disagreement, or the relative severity of climate change in comparison to other problems is unclear.</p> <p><u>Pilot-test notes:</u> <i>Scientific (Un)certainty</i> frames occur first if science is mentioned, but the journalist must discuss findings and differences in opinion regarding certainty of findings. These findings are often expressed in numbers, as opposed to impacts (<i>Pandora's box</i>) or doom (<i>Fatalism</i>). In science, uncertainty is defined by how confident we are in our results. Stories about this might describes discussions about translating these numerical findings into words or percentages (95% confidence = "very likely" v. "certain" v. "almost certain" etc).</p>	<ul style="list-style-type: none"> • Science compels action, based on scientific consensus society needs to respond. • CC simply does not exist. There is no problem, there is no evidence of a problem. • Alternative scientific explanations exist such as solar flares or natural climate cycles. • Uncertainty because of gaps in the temperature record, the inability to forecast the future through climate modeling. • Earth is actually cooling, CC is not a problem • Scientific evidence on both sides, so need for action uncertain. • Severity unclear bc of "winners and losers," some places agriculture will benefit, or winters will be less severe etc. • Severity unclear bc resources better spent on more pressing problems such as malaria, extreme poverty etc. • Before CC becomes a threat, technology will solve it. • Uncertainty over cost of action or harm to economy. • Uncertainty green technology hype, "green bubble" etc. 	<p>The pandora's box / environmental catastrophe and scientific / technical (un)certainty frames were both similar in a discussion of science, whereas they diverged in expression of seriousness.</p> <p>Pandora's box / environmental catastrophe was tied to statistical discussions of new science and precaution in the face of predicted threats, while Scientific and technical (un)certainty took scientific findings less seriously.</p> <p>Coders suggest removing the brackets from the (un)certainty label. This would allow the Pandora's box/environmental catastrophe frame to cover expressions of certainty and environmental problems (See also suggestions for the Fatalism runaway problem frame).</p>
<p>7) PUBLIC ACCOUNTABILITY & GOVERNANCE: Climate change is fundamentally a matter of Public accountability & governance. Decisions should be based on public will, either demand for action or public opposition. Possible reference to public opinion, understanding, and knowledge. Alternatively, decision-making is "politicized,"</p>	<ul style="list-style-type: none"> • CC politicized by conservatives and/or industry. • CC politicized by liberals, elites, and the liberal media e.g Al Gore, United Nations, celebrities, focus on Gore or liberal hypocrisy etc. • Concern over science literacy or public 	<p>Transparency, oversight and public understanding: Strategy / conflict is important because of its distinction from the second most used frame, Public accountability and governance. The former frame often included descriptions of conflict and political strategy, whereas the latter frame was used to speculate and hold public entities accountable to the</p>

<p>not operating in public interest but following ideology or powerful special interests.</p> <p><u>Pilot-test notes:</u> <i>Public Accountability</i> frames will mention accountability organizations, scientific studies, polls, surveys, or public discourse. These arise with “breaking news” stories that inform the public or attempt to rally public support. A story framed as betrayal of the public will falls under this category. This frame can lead to <i>middle way</i> conclusions if the public concern is defended and taken seriously.</p>	<p>understanding, absence of public support, focus on need for better communication.</p> <ul style="list-style-type: none"> • Concern over lack of effective national or international institutions that will allow collective and political decisions. • Emphasis that all individuals have to take personal responsibility through consumer and household choices and/or through political participation. 	<p>American people.</p> <p>A guiding theme in strategy / conflict framing was partisan division, whereas Public accountability and governance supported public transparency and awareness. It was concluded that Public accountability / governance inherently express opinion on part of what journalists believe the public should know.</p> <p>Coders observed that changing the title of Public accountability and governance to “Transparency, oversight and public understanding” might add clarity. The term “governance” was removed because it was considered confusing and unclear when the frame was used to describe non-governmental actors and actions. A Transparency, oversight and public understanding frame might thus provide added clarity in the context of scandals or government interference in public, academic, and private sectors.</p>
<p>8) MIDDLE WAY / ALTERNATIVE PATH: Climate change is fundamentally a debate that requires a “third way,” policies and actions that offer novel approaches or that go beyond the current gridlocked and polarized debate. Need to “think outside the box” or adopt a compromise, middle ground position.</p> <p><u>Pilot-test notes:</u> <i>Middle way</i> frames will discuss solutions that were birthed through a deliberative process. A journalist can also suggest middle way solutions or exemplify one by displaying a calm, neutral perspective. They are easy to spot when there is reference to alternative energy sources like wind, solar, nuclear, geothermal, etc. International or national</p>	<ul style="list-style-type: none"> • Argument in support of nuclear energy as solution. • Argument for carbon tax instead of cap and trade. • Emphasis on the need for greater compromise and collaboration. • Focus on possibility of geo-engineering. • Need for greater energy exploration and/or off-shore drilling. • General emphasis on need for compromise and/or new solutions. 	<p>Government collaboration, innovation, and action: The coding team faced difficulty trying to discern differences between the Social progress and Middle way/Alternative path frames. This was due to the fact that they represent differing kinds of society-wide change.</p> <p>By clarifying the societal level at which these changes occur, they might be easier to identify. Middle way/alternative path could be relabeled as “Government collaboration, innovation, and action.” These titles recognize the similarities between the frames while differentiating the source of social change.</p>

<p>agreements are also examples.</p> <p>If only one side of a <i>middle way</i> argument is discussed in an article, you might consider adding a second <i>conflict/strategy</i> frame. Use of “compromise” would also add a <i>strategy</i> frame.</p>		
<p>9) STRATEGY / CONFLICT: Climate change is fundamentally about power and politics, emphasizing the factors that will defeat or pass legislation; how climate change is connected to other political debates; how the issue relates to the fortunes of the president or political leaders, the strategies and tactics involved, and the personalities.</p> <p><i>Pilot-test notes:</i> <i>Conflict/strategy</i> is present when political infighting is stalling action, forcing disagreement. This frame is obvious when the journalist references tactical actions like “watering down,” “selling,” “pushing,” “persuading,” etc. Usually it is present if the journalist mentions a person or organization trying to force power on others (Bush and the GOP, Greenpeace and environmentalists, scientists and Al Gore, country v. country, party v party, candidate v. candidate, etc).</p> <p>Mention of a political figure is not enough to qualify for this frame, although this can often be a clue. Look at how the person is discussed; are they proposing a solution (maybe <i>middle way</i>) or attempting to persuade (<i>conflict</i>)? There is a big difference. Discussions about scientific evidence <i>do not</i> fall under this category unless someone is manipulating them or hiding evidence.</p>	<ul style="list-style-type: none"> • Argument that climate change lacks political importance, not priority, compared to economy, health care debate. • Emphasis on how climate change relates to the popularity or success of president Obama. • Arguments as to the motivations of political leaders in pushing or opposing climate change, relative to re-election or gaining political power. • Focus on the strategies and tactics of either side, discussing climate politics as if it were sports game, who’s ahead, who’s behind etc. 	<p>Political conflict or struggle: Strategy/conflict is important because of its distinction from the second most used frame, Public accountability and governance. The former frame often included descriptions of conflict and political strategy, whereas the latter frame was used to speculate and hold public entities accountable to the American people. A guiding theme in Strategy/conflict framing was partisan division, whereas Public accountability and governance supported public transparency and awareness. It was concluded that Public accountability and governance inherently express opinion on part of what journalists believe the public should know.</p> <p>Relabeling Strategy/conflict as “Political conflict or struggle” might help clarify coding. “Struggle” was added to clarify political conflicts that occur externally among political figures and internally among political campaigns, movements, or organizations.</p> <p>Framing of “strategy” might be best qualified under the Public accountability and governance frame given the speculative nature of the label (See also Public accountability and governance suggestions).</p>
<p>10) NATIONAL SECURITY:</p>		<p>Human risk, health and safety:</p>

<p>Climate change is fundamentally an issue about national and global security, with linkages to terrorism and dependence on foreign oil, instability across key regions of the world including wars, the displacement of refugees and climate-related immigration.</p> <p><u>Pilot-test Notes:</u> <i>National security</i> and <i>Public health</i> were confused a couple times. <i>Nat. Sec.</i> relates to war and conflict over resources, for the most part. Where as <i>Public health</i> discusses disease, death, and health risks. Death is the one tricky in between, so think about how it is connected to the rest of the article. Is death predicted because of drought (<i>Public health</i>) or war over water (<i>National security</i>)? Is it predicted because of homelessness (<i>Public health</i>) or a refugee movement (<i>National security</i>)?</p>	<ul style="list-style-type: none"> • Dependence and depletion of foreign oil supplies as National security threat. • Instability and conflict in key regions such as Africa. • Refugees and displaced peoples. • Environmental or health impacts defined as National security risk. • Reference to intelligence agency report or military officials warnings as reason for action. 	<p>Additionally, coders observed that national security and public health frames could be combined into a “Human risk, health and safety” frame. We observed that use of these frames sought to rouse personal and societal threats in the face of global climate change impacts. The term “public” often made it difficult to distinguish between different publics and threats between and among countries. We considered that impacts described within a human context could be confused with the Environmental catastrophe frame and thus suggest that Environmental catastrophe frames should only be considered present when there is not an expressed threat to human beings. Separating threats between human and non-human descriptions might also provide further insight for applying an ecological system measure to the Nisbet (2009) framing model. This will be discussed further in the next section.</p>
<p>11) PUBLIC HEALTH: Climate change is fundamentally a Public health problem, with linkages to disease, lung problems such as asthma or allergies, harm and death from storms, flooding, and heat waves and other health impacts.</p> <p><u>Pilot-test notes:</u> <i>National security</i> and <i>Public health</i> were confused a couple times. <i>Nat. Sec.</i> relates to war and conflict over resources, for the most part. Where as <i>Public health</i> discusses disease, death, and health risks. Death is the one tricky in between, so think about how it is connected to the rest of the article. Is death or crop failure predicted because of drought (<i>Public health</i>) or war over water (<i>National security</i>)? Is it predicted because of homelessness (<i>Public health</i>) or refugee movement (<i>National</i></p>	<ul style="list-style-type: none"> • Focus on respiratory and air quality problems such as asthma, allergies, and lung disease. • Focus on harm from storms, flooding, and heat waves, emphasis on human health impact. • Focus on infectious disease such as West Nile virus or food / water borne disease such as e. coli. • General reference of health quality and human health. 	<p>Human risk, health and safety: Combine with the Public Health frame. See suggestions for the National security frame.</p>

security)?		
<p>12) HUMOR: Climate change is discussed within a joke. Comedy or ridicule is used to depict the situation. The issue is mentioned sarcastically, to tease or to invoke interest. Witty comments, personality descriptions or mocking are expressed. Science is simplified in a way that makes it sound preposterous, overly complicated or, conversely, very easy. Action taken is considering silly, stupid or hypocritical.</p> <p><u>Pilot-test:</u> Humor frames are often a way for a news outlet to express support or discontent in a round about way. Using silly examples from a set of actions, discussing things in an overly simplified way or failing to take something seriously are all examples of this frame.</p>	<ul style="list-style-type: none"> • Science is explained in a mocking manner, where those who agree or disagree are considered unintelligent or “out of it.” • Environmentalists are portrayed as hippies, druggies or extremists with little knowledge. • Skeptics are portrayed as jerks, oil profiteers or muckrakers. • Sarcasm is used to describe the beliefs or actions of a climate skeptic, scientist or activist. • The issue, person or action is called a ‘joke’ or degraded. • Actions, a person or ideas are belittled. 	New frame, no suggestions.

10. Appendix B: Examples for frames present in less than 10% of all articles.

Frame	Selected examples from data
<p>Morality / ethics</p>	<p><i>"Some of us have required considerable convincing before becoming persuaded that these are real problems that deserve our attention," the statement says." But now we have seen and heard enough to be persuaded that these issues are among the current era's challenges that require a unified moral voice. The Southern Baptist Convention's 16 million members make up roughly 7 percent of the U.S. adult population, according to the convention and the Pew Forum on Religion & Public Life. (CNN, 2008)</i></p> <p><i>"This is not crying wolf. This is the only world we have. If this world disappears, whether you are rich or poor, whether you are free or oppressed the fate is the same for all of us." (Quote from Desmond Tutu, CNN, 2009).</i></p>
<p>Fatalism / run away problem</p>	<p><i>Study: Warming is stronger, happening sooner: Higher CO2 emissions from fossil fuels, and weaker Earth, cited as reasons. (MSNBC, 2007)</i></p> <p><i>Analysis by the United Nations and outside management systems experts show that those voluntary reductions will not keep temperatures from increasing by more than 1.3 degrees Celsius (2.3 degrees Fahrenheit) compared with now. That's the level that scientists, the United Nations, the European Union and the Obama administration</i></p>

	<i>have said the world cannot afford. (MSNBC, 2009)</i>
National security	<p><i>Warming as dangerous as war, U.N. chief says: "Upheaval from droughts, floods 'likely to become a major driver of war' (MSNBC, 2007)</i></p> <p><i>John McCain Links Climate Policy to Terror Threat in Energy Speech: Warned about U.S. reliance on foreign oil and the threat of global warming, dismissing even some in his own party who suggest climate change is a Hollywood-driven notion (FOX, 2007)</i></p> <p><i>Study: Global Warming May Weaken Transport Infrastructure: Flooded roads and subways, deformed railroad tracks and weakened bridges may be the wave of the future with continuing global warming, a new study says. (FOX, 2008)</i></p>
Public Health	<p><i>Climate Change Brings African Disease to Europe. (FOX, 2007)</i></p> <p><i>Because of global warming, [Olav Kjørven, head of the U.N. Development Program's bureau for development policy] said, 600 million people more in sub-Saharan Africa will go hungry from collapsing agriculture, an extra 400 million people will be exposed to malaria and other diseases and an added 200 million will be flooded out of their homes. (FOX, 2007)</i></p>
Humor	<p><i>Is global warming affecting your pancakes? Warm temperatures confuse maple trees into making sap too early. (MSNBC, 2007)</i></p> <p><i>Report: Sheryl Crow's Solutions to Global Warming: Americans may be using less toilet paper, if Sheryl Crow has her way. (FOX, 2007)</i></p> <p><i>Cow methane: A trump card in the fight against global warming? The butt -- in more ways than one -- of a thousand puerile schoolboy jokes, methane, in the form of natural gas, has for some time now been used to fuel cars and other modes of transport. The Honda Civic GX, which uses natural gas, has been rated the cleanest car on earth. (CNN, 2007)</i></p>

BIBLIOGRAPHY

- Akerlof, K., Debono, R., Berry, P., Leiserowitz, A., Roser-Renouf, C., Clarke, K. L., Rogaeva, A., Maibach, E. W. (2010). Public perceptions of climate change as a human health risk: surveys of the United States, Canada and Malta. *International Journal of Environmental Research and Public Health*, 7, 6: p.2559-2606.
- Blumer, H. (1946). *Collective Behavior*. New York: Barnes and Noble.
- Boykoff, M. (2009). We Speak for the Trees: Media Reporting on the Environment. *Annual Review of Environment & Resources*, 34: p.1.
- Boykoff, M. (2008). Lost in translation? United States television news coverage of anthropogenic climate change, 1995–2004. *Climatic Change*, 86, 1-2: p.1-11.
- Bubela, T., Nisbet, M., Borchelt, R., Brunger, F., Critchley, C., Einsiedel, E., Geller, G., Caulfield, T.(2009). Science communication reconsidered. *Nature Biotechnology*, 27, 6; p.514.
- Carroll, N. (1997). Information is not understanding. *Ivey Business Journal*, 62: p.2.
- Cohen, B (1963). *The press and foreign policy*. Harcourt.
- comScore (2009). June 2009 US Search Engine Rankings. In Press Releases. Retrieved April 2, 2012 from http://www.comscore.com/Press_Events/Press_Releases/2009/7/comScore_Releases_June_2009_U.S._Search_Engine_Rankings
- Condit, C. M., Ferguson, A., Kassel, R., Thadhani, C., Gooding, H. C., & Parrott, R. (2001). An Exploratory Study of the Impact of News Headlines on Genetic Determinism. *Science Communication*, 22, 4: p.379-395.
- Entman, R. (2010). Media framing biases and political power: Explaining slant in news of Campaign 2008. *Journalism*, 11, 4: p.389-408.
- Feldman, L., Maibach, E. W., Roser-Renouf, C., & Leiserowitz, A. (2012). Climate on cable: The nature and impact of global warming coverage on Fox news, CNN, and MSNBC. *International Journal of Press/politics*, 17, 1: p.3-31.
- Giddens, A. (2009). *The politics of climate change*. Cambridge: Polity.

- Global Language Monitor (2008). Top Word of 2008. In Archives. Retrieved April 2, 2012 from <http://www.languagemonitor.com/about/news/top-words-of-2009/>
- Global Language Monitor (2009). Top Word of 2009. In Archives. Retrieved April 2, 2012 from <http://www.languagemonitor.com/about/news/top-words-of-2008/>
- Glynn, C. J. (1999). Public opinion. Boulder, Colo: Westview Press
- Google (2011). Google: Inside Search. In Help Home. Retrieved June 15, 2011 from <http://support.google.com/websearch/bin/answer.py?hl=en&answer=4115>
- Google Insights for Search (2011). Google Insights for Search. In Google. Retrieved June 15, 2011 from <http://www.google.com/insights/search/#q=climate%20%2B%20warming&geo=US&date=1%2F2004%2096m&cmpt=q>
- Hart, P. S. (2008). Market influences on climate change frames in CNN and Fox News climate change broadcasts. Paper presented at the annual conferences of the International Communication Association, Montreal, Canada.
- Tversky, A., & Kahneman, D. (1986). Rational Choice and the Framing of Decisions. *Journal of Business*, 59: p.4.
- Krippendorff, K. (2004). Reliability in Content Analysis: Some Common Misconceptions and Recommendations. *Human Communication Research*, 30, 3: p.411-433.
- Leiserowitz, A., Maibach, E., & Roser-Renouf, C. & Smith, N. (2010) Global Warming's Six Americas, June 2010. Yale University and George Mason University. Yale Project on Climate Change.
- Liu, X., Lindquist, E., & Vedlitz, A. (2011). Explaining Media and Congressional Attention to Global Climate Change, 1969-2005: An Empirical Test of Agenda-Setting Theory. *Political Research Quarterly*, 64, 2: p.405-419.
- Maibach, E. W., Nisbet, M., Baldwin, P., Akerlof, K., & Diao, G. (January 01, 2010). Reframing climate change as a public health issue: an exploratory study of public reactions. *Public Health*, p.10.
- McCombs, M., & Bell, T. (1996). The agenda-setting role of mass communication. An integrated approach to communication theory and research. Lawrence Erlbaum Associates.

- Miller, M., Riechert, B. (2001) *The Spiral of Opportunity and Frame Resonance: Mapping the Issue Cycle in News and Public Discourse. Framing public life: Perspectives on media and our understanding of the social world.* Lawrence Erlbaum Associates.
- Morton, T. A., Rabinovich, A., Marshall, D., & Bretschneider, P. (2011). The future that may (or may not) come: How framing changes responses to uncertainty in climate change communications. *Global Environmental Change*, 21, 1: p.103-109.
- Nisbet, M. C., Maibach, E., & Leiserowitz, A. (2011). Framing Peak Petroleum as a Public Health Problem: Audience Research and Participatory Engagement in the United States. *American Journal of Public Health*, 101: p.9.
- Nisbet, M. (2009). *Communicating Climate Change: Why Frames Matter for Public Engagement.* *Environment Magazine*, 51, 2: p.12.
- Oreskes, N., & Conway, E. M. (2010). *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming.* Bloomsbury Press.
- PEW, Project for Excellence in Journalism and PEW Internet & American Life Project: *The State of the News Media (2010). Online Aggregators, Originators and Commentators.* Retrieved June 20, 2011 from http://www.stateofthemedias.org/2010/online_nielsen.php#online_aggregators
- PEW, Project for Excellence in Journalism and PEW Internet & American Life Project: *The State of the News Media (2012). Key Findings.* Retrieved June 20, 2011 from <http://stateofthemedias.org/2012/overview-4/key-findings/>
- Reese, S. D., Gandy, O. H., & Grant, A. E. (2001). *Framing public life: Perspectives on media and our understanding of the social world.* Lawrence Erlbaum Associates.
- Sagan, Carl. (2006). *Crimes against Creation. Varieties of Scientific Experience.* Penguin Press. 8: p.127-140.
- Semenza, J. C., Ploubidis, G. B., & George, L. A. (2011). Climate change and climate variability: personal motivation for adaptation and mitigation. *Environmental Health: A Global Access Science Source*, 10.

- Slovic, P., Finucane, M., Peters, E., & MacGregor, D. G. (August 01, 2002). Rational actors or rational fools: implications of the affect heuristic for behavioral economics. *Journal of Socio-Economics*, 31: p.4.
- Scheufele, D. A. (March 07, 2000). Framing as a Theory of Media Effects. *Journal of Communication*, 49, 1: p.103-22.
- Shehata, A., & Hopmann, D. N. (April 01, 2012). Framing climate change: A study of US and Swedish press coverage of global warming. *Journalism Studies*, 13, 2: p.175-192.
- Teasley, S. (1997). Talking about reasoning: How important is peer collaboration? *Discourse, tools and reasoning: Essays on situated cognition*.
- Zaller, J. (1992). *The nature and origins of mass opinion*. Cambridge University Press.