

GLOBAL WARMING COVERAGE IN THE MEDIA:
TRENDS IN A MEXICO CITY NEWSPAPER

by

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ABSTRACT

Global warming and its implications have astounding consequences for the global community. Although some research has been done on the trends within environmental reporting, few studies have looked at the issue of global warming in particular.

Global warming is a troublesome issue for reporters for a number of reasons, and hence, it is important that we delve into how newspapers cover the topic. Latin America, especially the Caribbean region, is expected to suffer extreme consequences due to global warming, yet no studies regarding global warming coverage have been done in these regions. The first purpose of this study was to discover how a Mexico newspaper frames the issue of global warming. Next, this study sought to expand the current knowledge of global warming coverage by the media. Lastly, this study sought to expand on existing literature to discover how journalists outside of the United States communicate, to the public, the issue of global warming. Based on previous studies on global warming a frame analysis was conducted to explore how the Mexico City-based newspaper *Reforma* covers the issue of global warming. This study identified that ecology/science and consequences are the most frequently occurring themes of coverage, while scientific conflict and North/South conflict are present, but in low frequencies and near the end of stories. This study also identified international relations as the most frequent solution to global warming, while global warming story frequencies peaked during international conferences. These results confirm previous research, which has found that news media outside of the United States tend to emphasize international relations and de-emphasize conflicts and controversies.

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INTRODUCTION

Global warming and its implications have astounding consequences for the global community. Decades ago, researchers found what they called a reappearing hole in the atmosphere above Antarctica. Soon after, scientists linked CFCs to the degradation of the stratosphere, a layer that protects humans from ultra-violet radiation. Most recently, scientists have said that the earth is warming, partially (if not completely) due to the release of chemicals emitted by human technologies.

According to one study, more than half of people rely on the media as their prime source for information regarding global warming, but very few people have sufficient knowledge to participate in public policy about the issue (Wilson, 1995). Accurate and descriptive media coverage is both important and troublesome when it comes to global warming, or any environmental issue, for that matter. Journalists must balance differing opinions between scientists, environmentalists and government officials. In addition, journalists must serve the public's best interest while at the same time maintaining audience interest, an often-difficult task. For this purpose, it is important to investigate the ways in which journalists are approaching global warming coverage.

Although some research has focused on the trends within environmental reporting, few studies have looked at the issue of global warming in particular, perhaps because it is a very specific topic and is a fairly new issue on the public agenda. The first purpose of this study was to discover how a Mexico newspaper frames the issue of global warming. Another purpose of this study was to expand the current knowledge of global warming coverage by the media. The final purpose of the study was to expand on existing

literature to discover how journalists outside of the United States communicate, to the public, the issue of global warming. This is not only important because of the valuable insight it offers regarding the values of the press in another culture, but it is also important because of the scope of global warming is not solely confined to the United States. It is an international issue with devastating implications for all of earth's citizens. In addition, some variations have been found between the news media in the United States and those in other countries when covering global warming. Thus, this study focuses on the Mexico City newspaper, *Reforma* to analyze frames of coverage. This will not only give insight into Mexican journalism, but may also point out important faults or strengths of coverage within the United States, especially when combined with previous findings. *Reforma* was chosen in particular for the following reasons:

- Latin American countries are expected to suffer extreme consequences due to global warming, yet media studies of global warming have yet to include a Latin-American perspective.
- *Reforma* is located in Mexico City, one of the largest metropolitan areas in the world, as well as a city well known for its pollution problem. Mexico City is located in the region of Mexico that will suffer the most extreme consequences of global warming.
- Many of Mexico's most-circulated newspapers are located in Mexico City, and *Reforma* has some of the largest circulation of any Mexico newspaper.

In the next chapter, the science of global warming and how global warming has been portrayed and framed in the media will be discussed. I will also outline the Mexican media, with an emphasis on Mexican print media. The theoretical perspective associated

with framing will also be explained in the next chapter. First, I will touch on the global warming information, including the science, controversy, international agreements and consequences, to provide background to the rest of the study.

LITERATURE REVIEW

Global warming background

This study examines the framing of global warming in the news media, so it is important to first give background information on global warming. This section will first address the controversy surrounding the validity of global warming. Next, it will address the consequences of global warming and Mexico's specific vulnerability to climate change. The section will conclude by discussing international agreements and organizations created to discuss global warming as well as other proposed solutions to global warming.

According to the Pew Center on Global Climate Change, "The world is undoubtedly warming. This warming is largely the result of emissions of carbon dioxide and other greenhouse gasses from human activities including industrial processes, fossil fuel combustion, and changes in land use, such as deforestation" (The Pew Center on Global Climate Change, n.d.). The Intergovernmental Panel on Climate Change (IPCC) has released several in-depth reports that include climate-projection models, expected consequences, and suggested policy issues regarding global warming.

Controversy regarding global warming

Although some still argue the validity of global warming, most of the scientific community has reached consensus on the issue. Dissenters include climatologist Patrick Michaels, one of the most heavily cited skeptics. Michaels (2005) says that we live in a culture of scientific exaggeration, and also argues against the idea of climate projection

models for global warming, saying that climate projection models are based on guesses, not scientific evidence: “The basic rule of science is that the hypotheses must be verified by testing their predictions against observed data, and a climate model is nothing more than a series of hypotheses that result in prediction of future temperatures.” (Michaels, 2005, p. 210).

Some organizations, such as Exxon Mobil, have also been cited as global warming skeptics. Exxon Mobil, in particular, has been cited as funding millions of dollars to media outlets and other groups in exchange for those groups advocating skepticism of global warming (Mother Jones, 2005).

Dessler and Parson (2006) said the claims that deny global warming or the consensus among scientists are often indirect and general in nature. The credibility of the IPCC, which has released several studies on global warming, is also evident (Dessler & Parson, 2006). Dessler and Parson (2006) summarized the argument made by critics of global warming as follows:

The response to climate change must be based on sound science, not on speculation or theory. We must not rush judgment before all the facts are in. There is too much uncertainty and too much that we do not know about climate change. It would be irresponsible to undertake measures to reduce emissions, which could carry high economic costs, until we know that these are warranted. (Dessler & Parson, 2006, p. 151).

While Dessler and Parson (2006) note that this argument is full of “rhetorical flourishes,” (Dessler & Parson, 2006, p. 151), they say that there validity to the argument that there is uncertainty about scientific knowledge of global warming.

However, Dessler and Parson (2006) also note that a summary of measurements of the changes of earth’s temperature validate a warming trend. The evidence of warming temperatures includes the following:

- An increase in direct surface air temperature of .6 degrees Celsius in the twentieth century (about half of this warming occurred from 1980-2000)
- A recession of glaciers
- Sea-level rise over the twentieth century
- A decrease in sea ice over the past 50 years, a 40% decrease in the thickness of sea ice in the past 50 years
- A .18 degree Celsius warming in ocean temperature in the past 50 years
- An increase of temperatures through climate proxies and satellite temperature measurements

Effects and consequences of global warming

In the past 100 years, global temperature has risen .6 degrees Celsius, and sea level has risen many inches (West, Lewis, Greenberg, Sachsman & Rogers, 2003; Dessler & Parson, 2006). Some climate models have predicted a rise in global temperature from between 1.4 to 5.8 degrees Celsius by the end of the twenty-first century (West et al., 2003). The IPCC developed several scenarios for climate change temperature increases in the twenty-first century, and they are as follows: low scenario is 1.8 degrees Celsius, with a range of 1.1 to 2.9 degrees Celsius; high scenario is 4 degrees Celsius, with a range of 2.4 to 6.4 degrees Celsius (Meehl et al., 2007). Some scientists say that the earth has not experienced a rise in temperature of more than 1 degree Celsius in 10,000 years. Others, however, have concluded that there may have been a period during the Holocene Climatic Optimum (approximately 6,000 years ago), where temperatures exceeded current temperatures by 1 degree Celsius (West et al., 2003). Heat waves are expected to

be longer and more intense, and cold episodes are expected to decrease significantly due to global warming (Meehl et al., 2007). Dessler and Parson (2006) said that based on current projections of climate change due to greenhouse gasses, the strongest warming will occur in polar regions.

Some predictions of the consequences of global warming are melting of polar ice, rising of sea levels, disruption of drinking water supplies, disruption of ecosystems, increased incidence of tropical disease and changes in agriculture (Columbia Encyclopedia online, 2006; West et al., 2003; Meehl et al., 2007). Intensity of precipitation is also expected to increase, especially in tropical and high latitude areas.

Scientists predict that average sea levels will rise from 3.5 to 34.3 inches by the year 2100, and sea levels are expected to continue to rise for centuries after greenhouse gasses are stabilized (West et al., 2003). Coastal areas will be susceptible to rising sea levels and the top ten most vulnerable areas according to the United Nations Environment Program (UNEP) are Bangladesh, Egypt, Gambia, Indonesia, Maldives, Mozambique, Pakistan, Senegal, Surinam and Thailand (West et al., 2003). In the twentieth century, global sea level rose by approximately 1.5 mm per year (Dessler & Parson, 2006). This caused a 15 cm total sea-level rise in the twentieth century, and tide-gauge records suggest that sea level rose faster in the twentieth century than in the nineteenth century (Dessler & Parson, 2006).

Increase of some diseases is also expected with global warming (Campbell-Lendrum & Woodruff, 2006; Furgal & Seguin 2006; Ebi, Lewis & Corvalan, 2006; Furgal et al., 2001; Casimiro, Calheiros, Santos & Kovats, 2006; Anderson, 2007; West et al., 2003). One prediction is that mosquito-borne illnesses are expected to increase and

move to areas that have not been previously affected by these illnesses (Anderson, 2007; West et al., 2003). For example, according to West et al. (2003), much of the central African population lives just above altitudes where malarial mosquitoes inhabit. Higher temperatures will allow these mosquitoes to extend their range and inhabit human communities, bringing them into closer contact with humans and increasing the odds of malarial outbreaks (West et al., 2003). Warming temperatures will also affect drinking water supplies and could cause higher incidence of water-borne illnesses such as cholera, salmonellosis and giardiasis (West et al., 2003). An increase in allergies among populations of people is another possible consequence of global warming (Ibarrarán & Boyd, 2006).

Mental health could also be affected by global warming (Anderson, 2007). Tony McMichael, director of the National Centre of Epidemiology and Population Health at the Australian University in Canberra, said rural Australia has already seen an increase in mental health issues because of prolonged drought (Anderson, 2007).

Average precipitation is also expected to increase, having a variety of direct and indirect results (Dessler & Parson, 2006). Global warming is expected to cause an increase in heavy downpours of precipitation, causing an increase in erosion, flooding and landslides (Dessler & Parson, 2006). An increase in precipitation will cause water to be less readily absorbed in the soil, and it will be more difficult to store water in reservoirs. Combined with warmer summers due to global warming, this will cause an increase of wet and dry extremes in the climate (Dessler & Parson, 2006). The wet extremes will cause an increase of risk of land erosion, flooding and landslides, while the dry extremes will cause an increase of risk for water shortages, wildfires and crop loss.

Dry extremes could also cause increased vulnerability of crops and forests to pests and diseases (Dessler & Parson, 2006).

Global warming also will affect the world's ecosystems, preventing the migration of tree species, changing forest composition, and possibly depleting entire forests – all forces that would contribute to the further release of greenhouse gasses into the atmosphere (West et al., 2003). Certain climates/regions will also see reduction and/or loss of certain local species (West et al., 2003). Dessler and Parsons (2006) said that reproduction behavior, viability of species, spatial ranges of species, and relationships among species will all change due to global warming, with unknown implications.

Mexico's vulnerability to global warming

According to Ibararán and Boyd (2006), Latin America, especially the Caribbean, is extremely vulnerable to the effects of global warming. Studies from the National Institute of Ecology (INE) in Mexico suggested that rain patterns in Mexico may be altered as a result of global warming (Ibararán & Boyd, 2006). In particular, the humidity in soils and the atmosphere are expected to change significantly, damaging water deposits (Ibararán & Boyd, 2006). The INE's results also suggest Mexico's susceptibility to desertification, which would result in droughts and lead to a rise in forest fires (Ibararán & Boyd, 2006). Other expected consequences of global warming predicted by the INE are an increase in flooding, a rise in sea level and a change in seashore and deep-sea ecosystems (Ibararán & Boyd, 2006).

A regional assessment of Mexico suggests that the Central region, which includes Mexico City, is expected to be the most vulnerable to the consequences of global

warming because of high urban populations and large amounts of economic activity (Ibarrarán & Boyd, 2006). According to the INE model, the Central region is susceptible to desertification, drought and water scarcity (Ibarrarán & Boyd, 2006).

International conferences and solutions to global warming

The Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 (Intergovernmental Panel on Climate Change [IPCC], 2007). Established by the World Meteorological Association (WMO) and UNEP, the organization's mission was to assess scientific information, impacts and solutions to global warming. The IPCC issued its first report in 1990 (IPCC, 2007). In 1992 the United Nations Framework Convention on Climate Change (FCCC) was formed. One hundred eighty one governments, including the United States, are involved with the FCCC, which strives to find solutions to global warming (West et al., 2003).

Global warming is a topic of a global scope. As such, several international conferences on the matter have taken place. One of the most important global agreements on reducing greenhouse emissions was the Kyoto Protocol, named after the city where it was agreed upon (Kyoto, Japan) in 1997. The Kyoto Protocol was part of the Third Conference of the Parties at the international Framework Convention on Climate Change.

The Kyoto Protocol was preceded by the Earth Summit in Rio de Janeiro in 1992, which set a voluntary goal of reducing emissions of developed countries to 1990 levels by the year 2000 (West et al., 2003; The Pew Center on Global Climate Change, nd.). Kyoto, which legally went into effect in February 2005, was a treaty that has been signed by more than 100 nations in an effort to reduce emissions of six greenhouse gasses

(carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) among the largest industrialized nations (West et al., 2003; The Pew Center on Global Climate Change, nd.). The treaty set targets to reduce emissions at 5.2% below 1990 levels by 2012 (West et al., 2003; The Pew Center on Global Climate Change, nd.). These targets would lower greenhouse gas emissions in each of the developed nations to 30% below what scientists believe they would be without Kyoto (West et al., 2003). The original thirty-eight participating developed countries were Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom of Great Britain and Northern Ireland, and the United States (West et al., 2003).

The George W. Bush administration of the United States has not joined the other nations who have ratified the protocol (The Pew Center on Global Climate Change, n.d.; West et al., 2003). The United States has contended that developing countries should also have to make the same emissions cuts as industrialized nations, that a global emissions trading system should be implemented, and that nations should be allowed to count the reductions in emissions caused by absorption of greenhouse gasses into forests and farmlands (West et al., 2003). In 2002, the Bush administration created the Clear Skies initiative, in which three major pollutants must be cut by 70% by using a cap and trade system. However, factories and power plants are exempt from the policy (West et al., 2003). After Australia signed the Kyoto Protocol in December 2007, reversing the

nation's previous policy on the issue, the United States remained as the only industrialized country not to sign the Kyoto Protocol (United Nations Framework, 2007).

The United Nations held the United Nations Climate Change Conference in Bali, Indonesia in December 2007 (United Nations Framework, 2007). The main goals of the 2007 conference were to a) launch climate change negotiations for the years following 2012 (post Kyoto), b) to set the agenda for this set of negotiations, and c) to reach agreement on a timeframe for which these negotiations will conclude (United Nations Framework, 2007). The Conference of Parties was held on the first day of the conference (United Nations Framework, 2007).

Other proposed solutions to global warming

Greenhouse emissions come from energy production and use, transportation, agriculture and deforestation, and will affect both developed and developing nations all over the world (West et al., 2003). Some proposed strategies for curbing the creation of greenhouse gasses include the following: research and development of low-emitting technologies; limiting and taxing emissions; increasing the use of renewable energy sources such as wind, solar and hydroelectric power; promoting more energy efficient and sustainable building practices; providing and promoting safe public transportation systems; adopting sustainable forest management; and switching to less carbon-intensive fuels (West et al., 2003).

However, there are barriers and applicability issues to each of these solutions, especially in developing nations (West et al., 2003). For example, developing nations such as Mexico will have the most immediate needs for these kinds of policies, but their

applicability may be challenging for a developing economy, as fiscal resources may become a barrier. Developing nations will need global assistance and access to inexpensive and new, environmentally acceptable technologies (West et al., 2003). Now that the science, consequences, and policy related to global warming have been discussed, the next section will address Mexico's attempts to mitigate environmental risks and global warming.

Mexico's attempts to mitigate environmental risks and global warming

The previous section addressed the background of global warming, including controversy, consequences, international treaties and solutions. Mexico's vulnerability to global warming was also discussed. This study will focus on global warming coverage in the media, with a focus on a Mexico City newspaper, *Reforma*. Thus, this section will touch on Mexico's attempts to mitigate environmental risks and global warming.

Mexico is the worst polluter among Latin American countries, and the eleventh worst polluter internationally (Marland, Boden & Andres, 2007). The country produces two percent of worldwide carbon, with emissions of about 119 million metric tons per year. Per capita emissions were reported at 1.10 metric tons per person each year (Marland et al., 2007). Other figures estimate Mexico's per capita emissions of 1.14 metric tons per person each year (Marland et al., 2007). Nonetheless, Mexico was one of the first Latin American countries to sign the Kyoto Protocol, and although they are exempt from the first round of emissions cuts, some Mexican companies have already started emissions-cutting practices. A state oil company, Pemex, began a program in 2001 to decrease carbon emissions, and 21 smaller companies soon followed suit to try to

curb emissions in 2005. The country already produces nearly one fourth of its power from hydro-electric plants (which eliminates carbon emissions) and is also transitioning from fossil fuels to cleaner natural gas (Mexico's Gulf, 2005).

In addition, the Mexican Secretariat for Environment and Natural Resources (SEMARNAT) launched a climate initiative called the Mexico GHG Pilot Program. The program aims to create a voluntary national program for reporting business greenhouse gas emissions (World Resources Institute, 2007). According to Jonathan Lash, president of the World Resources Institute, an environmental think tank out of Washington D.C., although many industries throughout the world have implemented the GHG protocol, Mexico was the first country to adopt it (World Resources Institute, 2007).

Mexico also has made attempts at curbing energy use, and launched the Proyecto de Uso Racional de Iluminación en México (ILUMEX) in 1995. The project, which involves residential lighting in Mexico, aims to distribute compact fluorescent lamps (CFLs) throughout Mexico. CFLs are more energy efficient than incandescent bulbs – they use 75% less energy and last 10-13 times longer (Harvey & Bush, 1997). Through this program, consumers received loans to purchase compact fluorescent lights. The loans could be repaid from the electricity bill savings that the consumers would receive. More than 600,000 lamps have been sold at a price of about \$1.64 (U.S. dollars). Estimated annual energy savings as a result of this program is 160 GWh/year, 34,400 tons of Carbon and 2,510 tons of SO₂ (United States Energy Association, 2007).

Mexico City is home to more than 30,000 factories and three million cars, which contribute to its distinct smog line (Ristroph, 2000). The city fails to meet air standards set by the World Health Organization for 300 days each year. In fact, all Mexico City

children in the city under 14 years of age were barred from attending school on March 17, 1992, because of the extremely high levels of air pollution. The city's mayor declared a 28-day state of emergency in the following week because of pollution (Chelala, 1996).

However, the city has made some attempts to curb pollution. One tactic that the city implemented in 1989 was the Hoy No Circula policy (Zegras, Makler, Gakenheimer, Howitt, & Sussman, 2000). Vehicles were assigned days that they could be driven based on the last digit of their license plate number. This meant that only 20% of vehicle owners would be driving on any given day within the city. However, there are doubts about the success of this program (Zegras et al., 2000). A 1995 study reported that 22 percent of Mexico City's drivers obtained a second car in response to this program. Families with two cars still had access to drive both cars on three days out of the week, and it was only those families that could not afford a second car that were affected by the Hoy No Circula policy (Onursal & Gautum, 1997).

Another tactic has been installing catalytic converters into vehicles. The Programa Integral de Reducción de Emisiones Contaminantes (PIREC) under the Secretary of Environment in Mexico, reported installing more than 46,223 catalytic converters in 2006 (no information was available for December 2006) (Secretaría del Medio Ambiente, 2007). Now that Mexico's environmental and global warming policies have been discussed, the next section will address global warming coverage in the media.

Global warming coverage throughout time

This study concerns itself with media coverage of global warming with an analysis of Mexico as a case study. So far, a background of global warming was

discussed as well as Mexico's attempts to mitigate environmental risks and global warming. Now, the history of global warming coverage in the United States will be discussed to give a general frame of events, as no sources were found for Mexico.

According to Mazur and Lee (1993), there were two main focuses made by the U.S. media on global warming prior to 1993, and although the two concepts are much intertwined, few interconnections on these processes were made. The first of those focused on ozone depletion, a problem that was first made public in 1971, during the Nixon era. Ozone is a naturally occurring part of the atmosphere, located in the stratosphere. This layer absorbs the majority of ultraviolet rays. Ultra-violet radiation is a main cause of skin cancer. A Molina and Rowland (1974) theorized the depletion of the ozone as being caused by CFCs, a non-naturally occurring industrial chemical that was mainly used in aerosol sprays. After the release of Rowland and Molina's study, the issue received limited press from the journal *Nature* (Mazur & Lee, 1993).

The story was not covered by the U.S. mass media until Molina's appearance at the American Chemical Society meeting later that year (Mazur & Lee, 1993). Mazur and Lee (1993) hypothesized this sudden interest by journalists as being a possible result of the attack at the time to spray cans for their possible connection to liver cancer. There was also a remarkable amount of coverage on CFCs in the next two years – coverage that mainly focused on the battle between the industry and those in support of the theory. In this battle, DuPont claimed that the dangers of CFCs (such as ozone depletion) was a theory and unproven by scientific evidence. In the late 1970s, media attention dwindled, as several federal agencies banned cosmetic spray cans, which comprised almost half of

all CFC consumption in the nation. As media attention dwindled, so did that of the government and the public.

However, in 1985, attention to ozone depletion returned, as what was described as a hole was discovered in the ozone directly above the continent of Antarctica (Mazur & Lee, 1993). Journalists were slow to respond to the discovery – *The New York Times* was the only major newspaper to cover the story, and only after a phone call from Sherwood Rowland. Ozone was once again a major news story and in 1986, the Geneva Convention was held (Mazur & Lee, 1993).

The second theme mentioned by Mazur and Lee (1993) is the greenhouse effect. Although the “greenhouse effect” or global warming was suggested almost a century ago by Nobel chemist Svante Arrhenius, it was not brought to public attention until the “energy crisis” of 1981. The original theory by Arrhenius (1896) theorized that carbon dioxide was accumulating in the atmosphere. This accumulation was due to the increasing use by humans of fossil fuels. Arrhenius (1896) said that this accumulation of industrial chemicals in the atmosphere would cause the earth to warm and he estimated that the global temperature would increase 5-6 degrees Celsius. Arrhenius’ (1896) estimate was not too far from current estimates made by scientists. The UN Intergovernmental Panel on Climate Change, in 1994, estimated a 0.8-3.5 degree Celsius rise in temperature by 2100 if nothing is done (Columbia Encyclopedia online, 2006). Similarly, most projections of global warming currently fall between 1.4 to 5.8 degrees Celsius (Intergovernmental Panel, 2001).

News stories started appearing in the *New York Times* around 1982 and increased until 1984, after which there was a decrease in stories. A similar drop occurred in 1985 in

Reader's Guide. According to Mazur and Lee (1993), this decrease in public concern was due to the vanishing energy crisis. The supply of oil was replenished at that time and prices were again cheap to consumers. In addition, there was a new conflict on the scene – the American movement to freeze nuclear weapon production. This “more pressing” issue gathered the interest of many people who would have otherwise interested themselves in the global warming movement (including scientists, journalists, politicians and environmental activists). Hence, the “unimportant” issue of global warming was all but left behind (Mazur & Lee, 1993).

In 1995, two key things happened that may have caused resurgence in coverage. First, the nuclear issue was losing strength, and second, the hole in the ozone was discovered and verified (Mazur & Lee, 1993). The years of 1986 and 1987 saw a significant increase in coverage of the greenhouse effect. *Time* magazine featured the 1987 Antarctic expedition on the front page of its magazine (Lemonick, 1987). The expedition's purpose was to study the ozone hole (Mazur & Lee, 1993). The drought of 1988, accompanied with abnormal heat, also fueled public interest in global warming (Mazur & Lee, 1993). Stories reached a peak in 1989, with the *New York Times* covering almost 150 stories about global warming that year. This is in stark contrast to the near absence of the issue just a decade earlier (Mazur & Lee, 1993).

However, thirteen years after the publication of the Mazur & Lee study, Jones (2006) found that print media sources did not have a high rate of reportage on global warming, nor did they treat it as a matter of importance to society their tones of opinion and headline frames (Jones, 2006). *Time* magazine, for instance, only generated four stories related to global warming in 10 years. However, each story was a feature-style

article; none were specifically related to global warming (Jones, 2006). Next, theoretical framework will be discussed.

Framing theory and framing analysis

So far, this study has addressed the background of global warming, Mexico's attempts to mitigate environmental risks and global warming, and global warming coverage throughout time. This section will address framing theory to give a theoretical background for the study.

This study uses framing theory to determine how the Mexico City newspaper, *Reforma*, frames the issue of global warming. Sociologist Erving Goffman (1974) is most frequently cited for introducing framing. Goffman used the word frame to signify to a specific set of expectations that are used to make sense out of a situation. Goffman defined a frame as "schemata of interpretation," and his work called for the consideration of how humans form expectations from everyday internal and external cues to interpret and plan human action (Goffman, 1974). Also heavily cited is anthropologist Gary Bateson, who described frames as "meta-communications" or messages about messages (Bateson, 1972).

Framing has been applied to the field of mass communications in many ways to assess how the media frames events and objects. However, there is no one definition of framing as applied to media. Entman (1993) recognized this problem: "Framing is often defined casually, with much left to an assumed tacit understanding of reader and researcher. After all, the words frame, framing and framework are common outside of formal scholarly discourse, and their connotation there is roughly the same," (Entman,

1993, p. 52). Scheufele (1999) also noted a lack of a commonly shared theoretical model in framing research: “the term framing has been used repeatedly to label similar but distinctly different approaches” (p. 103). For this reason, some have criticized framing as being an imprecise “catchall” phrase that means slightly different things to each researcher (Entman, 2004).

Although no one definition of framing exists, Entman (2004) defined framing as “selecting and highlighting some facets of events or issues, and making connections among them so as to promote a particular interpretation, evaluation, and/or solution,” (Entman, 2004, 5). Gamson (1989) defined frames as central organizing ideas that help make sense of relevant events, and, in turn, suggest what an issue is. Gamson and Modigliani (1987) define a frame as a “central organizing idea or story line that provides meaning to an unfolding strip of events” (p. 143). Framing may also help the media to shape public perception of a given issue (McCombs & Shaw, 1972; Bridges & Nelson, 1999).

Tuchman (1978) said that frames are institutionalized through the news beats and affect the dominant norms, values and culture of a society. Gitlin (1980), however, recognized that frames are unavoidable in journalism, and that they enable journalists to process large amounts of information, assign cognitive categories, and package them for effective delivery to the audience. Weaver (1994) said that the mass media can (through framing) contribute to the construction of a perceived reality for its audiences. Reese, Gandy & Grant (2001), however, identified news framing as an exercise of power by the media, but also emphasized that frames must be consistent with audience beliefs and values in order to be effective. This is elaborated in the idea of cultural congruency, -- if

frames are culturally incongruent, there will be a tipping point in which audience members will block the information (Entman, 2004). While opinions and definitions of news framing are vast, news framing can be generally defined as the way the news media organize and present a story.

Frames highlight bits of information and can elevate their salience, which results in the probability that receivers will perceive, process and store information in their memory (Entman, 1993; Sniderman, Brody & Tetlock, 1991). “The effect of framing is to prime values differently, establishing the salience of one issue over another,” (Sniderman, et al., 1991). Entman (1993) said that placement or repetition of information, or association with culturally familiar symbols can increase salience in a story. The omission of certain information also defines frame salience, as frames are defined by what they omit as well as include, and receiver’s responses are thus affected by these omissions (Entman, 1993; Sniderman, et al., 1991; Chyi & McCombs, 2004). The media often neglects certain angles or frames of stories, or neglects to provide evaluations of related events or issues. As a result, audience members must fill in these voids in news frames with their own previous understandings of the world (known as schemas). The audience may also simply choose to ignore gaps in framing (Entman, 2004).

Issue salience may shift over time, and can be linked to the media’s desire to keep high issue salience for certain events (Chyi & McCombs, 2004). In a study of coverage of the Columbine school shootings, Chyi and McCombs (2004) found that the New York Times built issue salience by emphasizing different aspects of the issue throughout time. For instance, societal and future frames became more popular throughout the coverage of

the event (Chyi & McCombs, 2004). Chyi and McCombs (2004) proposed that a news event begins with a core frame that emerges during the beginning of an issue, which is likely to be complemented by a changing pattern of frames over time.

The above view of issue salience and priming suggests that framing is an extension of second-level agenda setting and has been suggested by McCombs, Shaw and Weaver (1997). Second-level agenda setting theory suggests, "...elements prominent in the media picture become prominent in the audience picture" (McCombs, Llamas, Lopez-Escobar & Rey, 1997, p. 703). However, there is much debate on whether framing is an extension of agenda setting. According to Scheufele (2000), framing does not involve making issues more salient, but instead influences how audience members interpret the situation through subtle changes in wording. Scheufele (2000) and Carragee and Roefs (2004) said that while framing and agenda setting theories are similar, they are different. Scheufele (1999) attributed the debate to terminological and conceptual inconsistencies in current framing research.

Frames define problems, diagnose causes, make moral judgements and suggest remedies (Entman, 1993). While one sentence in a story may perform more than one of these roles, it may not perform any of them. An entire story might not perform all of these roles (Entman, 1993). Entman (2004) also suggested that framing in the news is typically manifested in reporting of three different classes of objects: events, issues and actors. However, news stories are not confined to one frame; they often frame simultaneously more than one object. Producing a completely comprehensive narrative frame consists of framing all three classes of objects (Entman, 2004).

Framing theory and analysis will be applied to global warming in the next section, as global warming news frames in the mass media will be discussed.

Global warming news frames

So far, global warming background, Mexico's attempts to mitigate environmental risks, global warming coverage throughout time and the framing analysis research method have been discussed. This section will touch on several key studies relating to global warming in the mass media and frames of coverage. Jones (2006) found that the media cover global warming only marginally unless there are political or economic factors central to the coverage. Jones (2006) study of global warming-related news stories located on news channels, network news, newspapers, magazines and radio within the United States, only 19.3% of the stories focused directly on the issue of global warming. Jones (2006) also found the following:

- 15.3% of stories from the sample focused loosely on global warming in larger stories about the “environment.”
- Only 12% of newspaper stories about global warming focused directly on the issue.
- Politics was the leading frame used in global warming stories, accounting for 21.4% of the sample, followed by focus on global warming (19.3%) and policy (18%).

Other news frames found by Jones (2006) (in descending order and accounting together for 25.6% of news coverage) included the following: the environment, business/economics, air pollution, science, lifestyle, weather phenomena, general news

overview, culture and disease, tourism/entertainment, genetic modification/agriculture, deforestation, species extinction and potable water. Focus on tourism/entertainment, genetic modification/agriculture, deforestation, species extinction and potable water each accounted for less than one percent of news stories (Jones, 2006).

Jones (2006) also looked at news media focus on cause, effects and solutions of global warming. Stories addressing solutions of global warming were the most dominant, with 22% of news stories (Jones, 2006). However, Jones (2006) found that most of these focused on debates surrounding the Kyoto Protocol, rather than informing the public.

In terms of newspaper coverage of causes, effects and solutions for global warming, Jones (2006) found that 36.5% of stories addressed solutions. Causes, effects and solutions were covered in 11.1% of stories, however, which was the lowest percent of any of the media studied by Jones (2006). Jones (2006) found that the total percent of all news stories addressing causes, effects and solutions with 12.9%. Television news channels were the most frequent medium to cover causes, effects and solutions, with 16.9% (Jones, 2006).

Interestingly, Jones (2006) found that 73% of news stories portrayed global warming as a problem, with 10.2% framing it as a non-issue. About 16% described global warming as an issue in need of further study, and less than one percent of stories described global warming as a benefit to society (Jones, 2006).

An important discovery by Jones (2006) was the use of passive voice to describe global warming. More than two-thirds of stories studied by Jones (2006) were written in passive voice, and failed to address humans as the source of the problem. For example, wordings such as “the burning of fossil fuels,” “the emitting of carbon dioxide” or “the

driving of cars” were used, which would imply a non-human cause for global warming (Jones, 2006). For stories written in active voice, many of these stories humanized automotive and industrial emitters of greenhouse gases, implying that things such as cars and factories were responsible for global warming, rather than the people using them (Jones, 2006).

Thirty-four percent of stories studied by Jones (2006) reported fossil fuel use as the leading cause of global warming. Carbon dioxide (27%) and natural climatic cycle (15%) followed (Jones, 2006). Other factors mentioned in news stories (in descending order based on percentage) were the following: consumption activities, air pollution, water vapor, deforestation, agricultural activities, methane, aerosols, nitrous oxide, fire, overpopulation and cirrus clouds (Jones, 2006).

When addressing the effects of global warming, Jones (2006) found the leading factor covered by news media was increase in global temperatures, accounting for 32% of stories. Extreme weather phenomena (17%), polar and glacial ice melt (12%), rising sea levels (12%), threats/benefits to viability of species (nine percent) followed (Jones, 2006). Other effects addressed by the media included the following: increase in mortality from disease, decreases/increases in agricultural productivity, displacement of humans (environmental refugees), alteration of habitat/ecosystems and conflict over increasingly scarce resources (Jones, 2006).

Coverage of solutions to global warming was dominated by policies that provide incentives to reduce emissions, such as emissions trading and tax incentives (this accounted for 24% of the sample) (Jones, 2006). Jones (2006) also found the following:

- Technological improvements that enhance efficiency and reduce emissions was the second most dominant theme (20%).
- Adoption/development of renewable energy sources appeared in 12% of stories.
- Voluntary action by polluter industries appeared in 11% of stories.

Other themes found by Jones (2006) included state regulation of industrial emissions, reduce reliance on fossil-fuel burning in forms of transportation, reforestation (create new carbon sinks), adaptations (altering climate change is impossible), carbon sequestration, reduce reliance on 'new' inputs in production process (recycle), alteration of individual lifestyles, adoption of nuclear power as an alternative energy source, radical solutions not readily realizable and geoengineering. Although technological improvements to reduce emissions and enhance efficiency was present in 20% of news stories, most stories that included this theme described this as a solution for developing countries, not industrialized countries, thus allowing industrialized nations to continue their reliance on fossil fuels (Jones, 2006). Next, the Issue Attention Cycle will be explained.

Issue Attention Cycle and global warming coverage

This study has discussed global warming background, Mexico's attempts to mitigate environmental risks and global warming, global warming coverage throughout time, framing analysis and common global warming frames found in previous studies. The Issue Attention Cycle theory seeks to explain why coverage of some events happens

in cycles over time. This section will explain the Issue Attention Cycle, and touch on key studies as related to global warming research.

Downs (1972) proposed that certain societal issues appear in cycles of high and low frequencies within society. Downs (1972) also noted that environmental issues are especially likely to exert this issue-attention cycle for certain inherent qualities of the phenomena and events involved. According to Downs (1972), a problem jumps into prominence, remains there for a period of time, and then fades away. Downs (1972) posited that perception of severity of a crisis was not dependent on the actual severity, but on the issue attention cycle proliferated by the media in response to interest and eventual boredom of an audience regarding an issue.

Downs (1972) classified five stages of this issue attention cycle. The first stage is the Pre-problem Stage, in which the problem exists, yet it has received little or no public attention. The problem is worse at this stage than when the public actually hears about it, as was the case with issues such as racism and poverty in the United States (Downs, 1972).

The second stage in this cycle is the Alarmed Discovery and Euphoric Enthusiasm Stage. This stage is marked by a sudden public awareness of the issue for some reason, such as a dramatic event (Downs, 1972). The public is then both aware and alarmed by the issue. Downs (1972) also says that this is followed by an optimism of society's ability to overcome the obstacle by the public.

Following the discovery stage is the Realizing the Cost of Significant Progress Stage. The public realizes that the costs of solving this issue are high and that major sacrifices may need to be made to rectify it (Downs, 1972). Often in this stage, the public

realizes that the cost of rectifying the problem will cause sacrifices from some sector of the public, if not all (Downs, 1972).

Gradual Decline of Intense Public Interest is the next stage. As more and more people realize the difficulty of fixing the problem and how costly it would be to them, they eventually lose interest (Downs, 1972). Some people feel discouraged, others threatened and some bored, with most experiencing some combination of these feelings (Downs, 1972).

The last stage proposed by Downs (1972) is the Post-problem Stage in which the issue is replaced by some other issue and it moves into a limbo stage with constant low interest marked by periods of spasmodic recurrence.

While they agreed with the basic premise of the issue attention cycle, McComas and Shanahan (1999) thought that narrative styles were an important consideration in measuring attention cycles. Hence, the cycle was not inherently caused by some facet of the phenomenon itself. They tested the application of the issue-attention cycle theory to global warming coverage in two newspapers (*New York Times* and *The Washington Post*) to analyze the effects of narrative style on the issue-attention cycle. Through their content analysis, McComas and Shanahan (1999) found that narrative styles did affect the issue-attention cycle.

Some research has suggested that the cyclical nature of global warming coverage may be culturally constructed. In a comparison between global warming coverage of the *New York Times* and the French newspaper, *Le Monde*, Brossard, Shanahan & McComas (2004) found that although clear patterns of coverage were present for the *New York Times*, no pattern was evident in *Le Monde*. However, in the years of international

conferences on global climate change (1989, 1992, 1995 and 1997), there was an increase in coverage of the topic, which researchers interpreted as a reflection of the importance of international relations at *Le Monde* (Brossard et al., 2004).

The *Le Monde/New York Times* study also showed a more restricted range of viewpoints in the French coverage as compared to the *New York Times*. American coverage emphasized conflicts between politicians and scientists — a feature that *Le Monde* was less likely to report. This, according to Brossard et al. (2004), could be a contributing factor as to why the U.S. used more cyclical coverage.

The French and Americans have very different approaches to journalism: U.S. journalists hold objectivity as a very important concept, while French rely heavily on “opinion journalism.” According to Brossard et al. (2004), the tradition of objective journalistic practices can lead to cyclical patterns in coverage of scientific issues for several reasons. First, the tendency to collect different opinions in an issue may bring strength to certain scientific viewpoints that are not widely accepted in the scientific community. Second, disputes of this nature are rarely resolved through media debate. Even though there has been general agreement on the issue of global warming within the scientific community, those opposing forces are still allowed contribute dialogue on the topic. Third, this results in a sort of “back and forth” coverage of the topic, in which the public tends to lose interest in the issue after listening to repeated debates between both sides. As public interest fades, so does media coverage

There is other international evidence that the United States is more likely to focus on objectivity, and hence, cyclical coverage of environmental issues, especially when analyzing the Americas (which are closer to the United States and likely more influenced

than European nations). Canadian journalist Jacques Rivard (2005) said that his editors rarely emphasized presenting balanced stories, which he believes is due to the fact that there are fewer groups in Canada than the United States that are working against ecological actions. With the opposition by the United States on the Kyoto Protocol, Rivard said that most of the focus of his articles were political in nature (focusing on the pressure being put on the United States to ratify Kyoto), rather than on opposing viewpoints, which Rivard (2005) said, was already provided by the words and actions of the president of Canada's "powerful neighbor to the south." "The obligation to look to opposing pressure groups in Canada isn't as great when powerful opposition is found next door in the words and actions of the American president (Rivard, 2005).

In another study of cyclical media coverage (Dessai, Branco & Doria, 2001), researchers studied the Portuguese newspaper, *Público*, from 1991-2000. Researchers found that the Portuguese media also followed the issue-attention cycle proposed by Downs (1972). As with the *Le Monde* study, researchers found that *Público* published more stories on global warming during time periods surrounding international conferences on the matter, with the most stories written in the months surrounding the Rio Conference in 1992, the Berlin Conference in 1995 and the Kyoto Conference in 1997. These spurts were each followed by dramatic drops in coverage (from about 30 articles in December 1997, to less than five articles in January 1998), for example. There were also smaller spurts during smaller conventions such as Buenos Aires in 1998 (Dessai et al., 2001).

As one can see, studies of global warming coverage outside of the U.S. have found differences in the issue-attention cycle and in themes. Non-U.S. news media have

been shown to have a less defined cyclical pattern, although there are dramatic increases of press coverage on the issues during international global warming conferences. It is unclear whether other non-European countries will follow in suit or if they would follow patterns such as those of the United States. Now frames and themes of global warming coverage outside of the United States will be covered.

Frames and themes of global warming coverage outside of the United States

Much of what has been discussed in previous sections focused on global warming coverage frames from within the United States media. This section will focus solely on media outside of the United States. Although it is to be expected that each respective non-U.S. country's media would differ regarding global warming news frames, the most dominant theme in current literature is the emphasis of international relations/events (Dessai et al., 2001; Brossard et al., 2004). However, international media outlets give very little focus to scientific controversy, in contrast to themes found within the mass media of the United States (Dessai et al., 2001; Brossard et al., 2004; Becker, 2005; Rivard, 2005). The same can be said for environmental issues in general, as was seen in Brazil (Reis, 1999).

One study of global warming stories in the French newspaper, *LeMonde*, found that the most frequently occurring theme in coverage of global warming from 1987-1997 was international relations. The international relations theme was defined as summits, treaties, disputes and UN-sponsored research. The mean presence of this theme was about 1.1 on a scale of 0 to 2, with 2 representing an outstanding focus on the issue within a story and 0 being absent from a story. The second most frequent theme was science

background, with a mean presence of about 0.5. Other themes used for the study, in descending order of their mean scores, were: science background, consequences, new evidence, economics, domestic politics, current weather and controversies. Controversies, the least frequently reported theme, had a mean presence of less than 0.2 in the sample (Brossard et al., 2004).

Similarly, in a study focusing on the Portuguese newspaper, *Público*, international relations was an important theme. Another theme that emerged in *Público* was the clash between the European Union and the United States regarding global warming (Dessai et al., 2001).

Although not specifically focused on global warming, a study of Brazilian coverage of the Earth Summit conference found that international agreements was a main focus of coverage in *Folha*, representing 18.8% of all issues found. International agreements was the second most frequent theme in *O Globo*, representing 14.5% of the sample. Other themes present in the two newspapers were government policies, economic topics, city life, and the conference's organization (Reis, 1999).

Jones (2006) analyzed global warming news frames in United Kingdom, Ireland, Japan, Malaysia, Singapore, Australia, New Zealand and Canada. Global warming was the main focus of 26.9% of stories in the 769 story sample (as compared to 19.3% of stories in a United States story sample) (Jones, 2006). Jones (2006) found that another 13.8% of stories were broadly focused on the environment, and 25.5% focused on politics and policy surrounding global warming (politics and policy information accounted for 39.4% in the U.S. sample). Other frames found by Jones (2006) science, lifestyle, weather phenomena, species extinction, business/economics, disease, air pollution,

genetic modification/agriculture, tourism/entertainment, potable water, culture, general news overview and deforestation. Tourism/entertainment, potable water, culture, general news overview and deforestation each accounted for less than one percent of the sample (Jones, 2006).

Similarly, ecological topics only accounted for 34% of coverage of the Earth Summit conference in Brazilian newspapers (Reis, 1999). Of non-ecological topics, international agreements was the most frequent topic covered in stories (18.8% of all issues found), followed by government policies (13.4%) (Reis, 1999).

Jones (2006) also found that 91.8% of stories presented global warming as a problem (as compared to 70% of stories in the U.S. sample), with 2.2% conveying it as a non-issue for society. This is consistent with the low coverage of scientific conflict that has been found in many international media outlets when compared to the United States (Rivard, 1999; Brossard et al., 2004). There was a wide range of results regarding the question of covering causes, effects and solutions of global warming. Percentages ranged from four percent in the *The Dominion* to 29% in *The Independent*. *The Independent* (New Zealand), *The Dominion* (country of origin not mentioned in study), *The Mercury* (country of origin not mentioned in study) and *The Irish Times* (Ireland) all contained articles describing global warming as a phenomenon that would benefit society. For instance, *The Irish Times* gave the perspective that global warming could potentially transform Ireland into a wine-producing country (Jones, 2006).

International newspapers addressed global warming as a serious issue 94.9% of the time, with 2.9% providing a skeptic opinion on the issue. Skeptic opinions were contained in the media of the Western newspapers (*The Independent* (New Zealand), *The*

Dominion (country of origin not mentioned in study), *The Mercury* (country of origin not mentioned in study), *The Toronto Star* (Canada) and the *Irish Times*) (Jones, 2006).

As with the U.S. newspapers examined by Jones (2006), international papers also used passive voice more than two-thirds of the time, indicating that the causes of global warming were not due to human activity but rather the activity itself (“the burning of fossil fuels,” and “the driving of vehicles,” for instance, signify a non-human agent as a cause of the problem). However, the *Irish Times*, *The New Straits* (Malaysia) and the *Straits Times* (Singapore) included more articles written in active voice rather than passive voice (Jones, 2006).

The most commonly reported cause of global warming in international media was fossil fuels, accounting for 26% of stories in the Jones study (2006). Carbon dioxide was the second most commonly reported cause, present in 23% of stories. Lifestyle (11%) and methane (eight percent) followed. Other causes mentioned by international media were capitalism (six percent), nitrous oxide, natural causes, deforestation, air pollution, fire, agriculture, CFCs, SF₆, cirrus clouds, urbanization, HFCs, black carbon, water vapor and air travel. Interestingly, the international sample included capitalism by industrial, capitalist economies as a cause six percent of the time. This cause was not present in U.S. news stories. The only three countries in the international sample that did not include this theme were from the Western, industrialized nations (*The Independent* (country of origin not mentioned in study), *The Dominion* (New Zealand) and *The Mercury* (country of origin not mentioned in study)) (Jones, 2006).

The most common effect of global warming in international media, according to Jones (2006), was the warming of the atmosphere, which comprised 23% of the sample.

Extreme weather phenomena (12%), rising sea levels (11%), beneficial/harmful socioeconomic effects (10%), threats/benefits to viability of species (nine percent), alteration of habitat/ecosystems (eight percent), increase in mortality from disease (seven percent), polar ice and glacial ice melt (six percent), decreases/increases in agricultural productivity (six percent), coastal erosion/inundation (five percent) and human displacement (environmental refugees) (three percent) (Jones, 2006).

According to Jones (2006), the most frequently mentioned solution to global warming in international media is the Kyoto Protocol (17% of stories within the sample), according to Jones. This is consistent with previous findings, which have shown that many international media give focus to international relations/policies (Dessai et al., 2001; Reis, 1999; Brossard et al., 2004). Jones (2006) found that state regulation (14%) and policy incentives for emitters (12%) followed as solutions.

Other solutions found by Jones (2006) included the following:

- technological improvements that enhance efficiency and reduce emissions
- adoption of renewable energy
- alteration of lifestyle
- reforestation (create new carbon sinks)
- reduce reliance on fossil fuels for transportation
- voluntary action, carbon sequestration
- economic devastation (if mitigation is attempted)
- reduce reliance on 'new' inputs in production process (recycle)
- conservation, alteration of infrastructure to reduce emissions
- adaptation (mitigation is possible)

- alteration of agricultural practices to lower emissions
- radical solutions not readily realizable
- geoengineering
- adoption of nuclear power as an alternative energy source
- sanctuary for environmental refugees
- adaptation through construction of defensive structures

According to Jones (2006), reforestation was described by non-Western news media as a means of allowing Western nations to continue emitting greenhouse gasses while participating in activities that would continue to improve their own economic viability. Non-Western news media said this would perpetuate underdevelopment in those developing countries where the reforestation process was to occur (Jones, 2006).

Conflicts or clashes between nations have been found in several studies on global warming coverage. Dessai et al. (2001) noted that articles that were written during the 1997 Kyoto Conference largely described the clash between the U.S. and the European Union. Most articles during that time were also policy-related and of international scope. A study on Brazilian newspaper coverage of the Earth Summit Conference in 1992 found that a significant amount of stories featured conflict between developing and developed nations (Reis, 1999). Although the study focused on two Brazilian newspapers, the most frequently cited region/nation was the United States, with appearances in 28.8% of stories (Reis, 1999). In both conferences, a U.S. opposition to international agreements was present (George Bush Sr. did not ratify an agreement at the Earth Summit Conference and the George W. Bush administration did not ratify the Kyoto Protocol), which may be correlated to the high reportage on the United States.

Another conflict between nations was noted by Jones (2006), with what was described as a North/South conflict. Reis (1999) also noticed this trend in Brazilian coverage of the Earth Summit conference. Northern (or commonly known as Western) nations were more likely to report on global warming with skepticism and present it as a non-issue for society (Jones, 2006). In addition, “capitalism” has emerged as cause of global warming, especially in Southern (or developing) nations (Jones, 2006). The conflict between North and South extends to the framing of solutions to global warming as well. Jones (2006) found that reforestation was framed by Southern media outlets as a way for Northern nations to continue to emit greenhouse gasses and profit economically while retarding economic progress in the Southern nations (the cost of reforestation).

In summary, international coverage of global warming has had an emphasis in international solutions, such as the Kyoto Protocol. A majority of the international sample framed global warming as a problem, with the leading cause being the emission of fossil fuels. Conflict between nations about global warming is a popular news frame in the international media. Conflict between Northern and Southern countries (or developed and developing) has also been a news frame in global warming coverage. Next, the Mexican press will be discussed.

A summary of the Mexican press

The previous sections discussed global warming, Mexico’s attempts to mitigate environmental risks and global warming, the Issue Attention Cycle and Framing theories, and global warming coverage and framing by the media. This study will focus on the Mexican newspaper, *Reforma*, so this section will discuss the Mexican news media.

To understand the current state of the Mexican press, one must first understand its history. For many years, the line between the press and the government was non-existent. Publishers would receive subsidies from the government, and reporters received bribes and favors for publishing certain information (Lawson, 2002). Newspaper reporters generally received three sources of income: a standard paycheck, commissions, and cash payments from the government. Earning a commission required the Mexican journalist to solicit their own advertising, while payments from the government often required a journalist to base news values upon the government (Lawson, 2002). It is important to note, then, that Mexico was controlled by a single party, the PRI (Partido Revolucionario Institucional), for more than 70 years. Only recently did the PAN (Partido Acción Nacional) gain control (in 2000), most likely due to pressure from the United States for Mexico to have a more diverse political system (Politics of Mexico, 2007).

Mexico is home to many established media outlets and has 236 television stations and 2,263,800 cable subscribers in the country (Press Reference, 2007). Also, Mexico allows media products from the United States and abroad to be imported into Mexico. Foreign television channels are allowed to broadcast in Mexico based on regulations set by the Secretary Transportation and Communications (SCT). Basic over-the-air services from the United States include ABC, CBS, FOX, PBS and NBC (List of Foreign, 2007). Foreign specialty channels include BBC World, Court TV, The Golf Channel, The Learning Channel, TV Japan, TV Polonia and The Weather Channel (List of Foreign, 2007). There are also many foreign digital channels available in Mexico including MSNBC, Muslim Television Ahmadiyya, Paris Première and NFL Network (List of Foreign, 2007).

Based on information from around the year 2000, Mexico produces 340 daily newspapers, as dailies are the most popular newspaper format. *El Universal* is a bilingual newspaper (English and Spanish) printed in Mexico City and is regarded as one of Mexico's most influential newspapers (Press Reference, 2007). Similar to the United States, newspaper readership among Mexican citizens is not very high. Mexican newspaper circulation is low, based on international standards (In the early 2000s Mexico City's largest dailies each sold only 100,000 copies daily) (Hughes, 2006). Mexico City (comprising the city's federal district only) has a population of around 9 million people (although the Mexico City metropolitan area has a population of about 34 million). However, newspapers are popular among the influential business class and important business leaders in the country (Lawson, 2002).

Mexico has a free press and freedom of expression is highly regarded, as no censors of Mexican newspapers exist (Palacio, 1999). However, Mexican journalists operate under several constraints. First, self-regulation becomes a problem, as murders of journalists are not uncommon (Pinsky, 1997, Palacio, 1999). One article in *The Quill* described journalism in Mexico as a deadly occupation, with more than 100 reporters, editors, columnists and publishers having been killed in the country since 1970, according to the Inter American Press Association report "Unpunished Crimes Against Journalists," (Pinsky, 1997). Secondly, the Mexican government greatly influences the Mexican press. As of 1999, 205 newspapers received much of their revenue from government funding. The government, in many cases, buys advertising space in the newspapers to publicize speeches and other actions (Palacio, 1999). Press-release

journalism is also common when it comes to reporting on the government (Lawson, 2002).

The Mexican press has become more independent and skeptical in recent years, however, especially Mexico City-based newspapers such as *La Jornada* and *Reforma*. These publications, according to Pinsky (1997) are often centrist to liberal, and have provided independent reporting and observations that are often quoted by press in the United States. This is partially due to what Lawson (2002), calls the “emergence of the fourth estate,” which will be discussed next.

Government control and the emergence of the Fourth Estate

Mexico is currently enjoying the emergence of a freer media and is in a transition stage into independence from the state. This can be attributed to several factors, including international pressure through trade agreements such as NAFTA, influence of incoming foreign media (the government has little control of satellite cable, which is quite popular among many Mexicans), and the journalists’ own desire for a more independent press (a government-led coup of the Mexico City newspaper *Excelsi6r* during the 70s may be a contributing factor for a desire to break away from the government) (Lawson, 2002).

The print media in Mexico are an excellent example of this transition into a more independent press. Currently, Mexico enjoys diversity of ideology and freedom within the print media, save a few constraints. There are a number of publications that still rely heavily on the government. However, these newspapers have very low circulation, and are considered “ghost papers.” On the other end of the spectrum are those publications such as *La Reforma*, *La Jornada* and *El Financiero* (all located in Mexico City), which

are completely independent of the government. These papers enjoy some of the highest circulation among any newspapers in the country. Somewhere in between lays those newspapers that are in transition from dependent to independent – papers like *El Universal* and *Unomásuno* (both located in Mexico City). Within each of the aforementioned groups lies a range of political ideologies from far-right to far-left (Lawson, 2002).

Diversity and autonomy of news coverage

Hughes (2006), found that although Mexican newspapers tended to show diversity in news coverage (between the government and oppositional forces), the papers rarely mixed these two elements in the same report. The Mexico-City dailies *Reforma*, *El Universal* and *La Jornada*, however, displayed more diverse coverage than other newspapers, with *Reforma* standing out the most. *Reforma* covered issues of opposition more frequently than the regime's views, and civil society and business as frequently as politicians (Hughes, 2006).

On measures of autonomy, these three papers again stood out by exhibiting civic behavior. When looking at the “civic journalism score” of these three papers, Hughes categorized *Reforma* and (to a lesser extent) *La Jornada* as following a civil model, and *El Universal* as following a mix of civic and authoritarian models, but leaning towards civic. Another Mexico City newspaper, *Excelsi6r*, followed a strict authoritarian model (Hughes, 2006).

Newspaper under study

The Mexico City-based newspaper, *Reforma*, was used to analyze global warming coverage in the Mexican press. This paper was chosen for several reasons. First, because it is independent of government control, *Reforma* enjoys some of the largest circulation numbers in Mexico (Lawson, 2002). Second, *Reforma* is located in Mexico City, which is not only the capital of Mexico and the location of many political and economic offices, but is also a location that has been known as a major polluter (there is a marked smog line above the Mexico City skyline). Third, *Reforma* has shown a favor for civic journalism and greater autonomy and diversity than other Mexico newspapers (Hughes, 2006). Lastly, *Reforma* has an accessible and searchable online database of archives, located on LexisNexis. Originally, *La Jornada* and *El Universal* were going to be included in the study. However, these papers had inconsistent archives; *La Jornada* had only one result in LexisNexis for the desired time period of 2004-2006, and *El Universal* was not found at all. When looking on each newspaper's online archives, *La Jornada* yielded inconsistent results and *El Universal*'s content would have required extensive work to find some of the variables under study. Although *La Jornada* and *El Universal* met the guidelines for being independent of government control, being located in Mexico City and showing favor for civic journalism, they were thrown out of the study because of the difficulty of collection a sample for each in the timeframe required for this study. However, using *Reforma* as a case study will still give a glimpse into the way major Mexico newspapers report about global warming.

Reforma was unveiled on November 20, 1983, on the anniversary of the beginning of the Mexican Revolution. Despite a collapse of a proposed partnership with the Dow Jones Corporation, the paper raised enough money to start on its own. Founder Alejandro Junco recruited most of its staff directly from universities, but also recruited some individuals from existing publications (Lawson, 2002).

Reforma is one of the few newspapers that have refused, from early on, the acceptance of coercive payments from government officials to run press releases disguised as articles. Even *La Jornada*, which is considered an independent newspaper (Lawson, 2002), has been known to accept payment for transportation, meals and accommodations from government officials. However, *Reforma* has been a leader in striking out against this practice by ordering its own newsprint (rather than newsprint provided by the government) and prohibiting reporters from accepting gifts from public officials (A Freer Press, 1997).

Reforma has shown favor for publications from the country's northern neighbor by featuring weekly translations of English articles from United States newspapers such as the *New York Times* and *The Wall Street Journal*. The paper also prints a weekly edition that gives readers the latest Hollywood and celebrity news.

Reforma has 276,700 readers in Mexico City and is part of the newsgroup Grupo Reforma, with a circulation of more than 400,000 (Pérez-Espino, 2002). Grupo Reforma includes the Monterrey-based *El Norte*, the Saltillo-based *Palabra* and the Guadalajara-based *Mural*. *Reforma* remains independent by being non-partisan and was formed in 1993. The paper has sometimes been accused of having a right-wing bias, however.

Reforma's critics have said that the paper favored northern business interests (Lawson, 2002) (the northern Mexican city of Monterrey is home to a large industrial area, and the Monterrey newspaper, *El Norte*, spawned *Reforma*). Critics said *Reforma* catered to commercial interests in its reporting, as the paper's editorial direction reflected the views of owners. However, for all its criticisms, *Reforma* changed Mexican journalistic standards. For example, *Reforma* touched on stories that were previously taboo – such as government scandals or electoral fraud – and ran them on the front page. Not only did this expose these issues to readers of *Reforma*, but it also influenced other newspapers, such as *Novedades* and *El Universal* to follow *Reforma*'s lead and upgrade their own newspapers (Lawson, 2002).

In a study on assertiveness in news reporting, Hughes (2006), found that *Reforma* set its own news frames frequently. The study found that *Reforma* established its own news frames in four out of ten cases. *La Jornada* and *El Universal* were moderately assertive in this particular measure, each setting their own agenda about 30 percent of the time (Hughes, 2006).

Research questions

To date, few studies have been done on Mexican journalism, and none were found examining the coverage of global warming in Mexico, although this country will likely be one of the first countries affected by extreme heat, because of its tropical location. In previous analyses, however, researchers found that coverage of global warming focused on certain frames, including economics, politics, consequences, international relations,

controversy/conflict and ecology/science. Hence, the following research question was tested for *Reforma*:

RQ1: *What frames will Reforma use in its coverage of global warming?*

Jones (2006) found that the Kyoto Protocol was the most popular solution to global warming among a sample of international newspapers. This follows evidence that non-U.S. countries tend to report more frequently on international topics when covering global warming (Dessai et al., 2001; Brossard et al., 2004) and when covering environmental conferences (Dessai et al., 2001; Brossard et al., 2004; Reis, 1999). Hence, the following research questions were asked:

RQ2: *What solutions to global warming will be present in Reforma?*

RQ3: *Will Reforma favor solutions to global warming that are global in scope?*

International media rarely focus on scientific conflict when reporting about global warming, and when they do, it is focused on the United States. However, several studies have noted a North/South conflict themes surrounding global warming. Although rapidly emerging industrially and economically, Mexico is considered to be a Southern, developing country. Hence, the following research questions were tested:

RQ4: *Will Reforma present frames of conflict between the North and South in their coverage of global warming?*

RQ5: *Will Reforma present frames of scientific conflict in their coverage of global warming? If so, will the conflict center around the United States?*

Several studies have indicated a cyclical pattern of media coverage of global warming. Further, those studies focusing on global warming coverage in non-U.S. countries have found that the peaks of coverage occur during international conferences (Dessai et al., 2001; Brossard et al., 2004). Hence, the following research question was tested:

RQ6: *Will Reforma's coverage of global warming peak during international conferences?*

By asking these research questions, this study does several things. First, this study adds insight to the framing of global warming by the media, a subject that is still in its early stages of research. By evaluating the framing of global warming by the media, it will become clearer what kinds of messages people are receiving about the issue and what they are likely to conclude about global warming. Further, this research adds to the knowledge of global warming coverage outside of the United States, and particularly to Mexico and Latin America. Many previous studies focused on global warming coverage within the United States; of the international research that was found, none occurred in a

Latin American country. Finally, this research helps give a better understanding of the Mexican media.

Summary

Global warming is a pertinent international issue today because of its global scope. While people throughout the world are already feeling the effects of a depleted ozone, and, in turn, global warming, those people living closest to tropical areas will naturally feel its effects sooner and harder than more temperate locations. Mexico lies in a tropical area (the Tropic of Cancer runs through the nation). It has also been suggested that Latin American countries, especially those in the Caribbean region, will be severely affected by the consequences of global warming (Ibarrarán & Boyd, 2006).

Mexico is also bordered by two oceans, the Atlantic and the Pacific. Scientists have predicted that water levels will rise as global warming continues to take effect. This will directly affect Mexico's coastal areas, including its fishing industry. The Central region of Mexico, including Mexico City is expected to be the most severely affected by global warming (Ibarrarán & Boyd, 2006).

With much to lose, Mexico remains the worst polluter among Latin American countries. Mexico City itself has a distinct smog line, and the city fails to meet air standard set by the World Health Organization for 300 days out of the year.

It is important, then, to investigate how Mexican journalists will cover a topic that will play a large role in the country's future. Analyzing the coverage of one of the top Mexico City newspapers – *Reforma* – gives a glimpse into how Mexicans are approaching this topic. This analysis aimed to find which frames Mexican journalists use

in their coverage of global warming and provides insight about what may be done to improve coverage, as well as offer new perspectives on the topic for other journalists throughout the world.

This chapter has looked at global warming and its coverage in the media throughout time. Global warming and its effects will have consequences for the global community. These consequences include a rise in global temperatures, sea-level increase, increase in catastrophic weather and human illness. Previous research on global warming media coverage has found that non-U.S. countries focus global warming coverage on international events and solutions rather than conflicts and controversies. Research has also found that global warming coverage outside of the United States follows a cyclical coverage pattern, with peaks of coverage during international conferences.

Because this study will focus on Mexico as a case study for the analysis of global warming coverage in the media, Mexico's attempts to mitigate global warming and the state of the Mexican press were also discussed in this chapter. Mexico is the worst polluter among all Latin-American countries, and the eleventh biggest polluter in the world, but the country has made attempts to reduce pollution and preserve energy. One example includes the Hoy No Circula policy adopted in Mexico City.

Mexico enjoys a free press. However, Mexican journalists work under several constraints, such as pressure from drug traffickers and government pressure. Nonetheless, the newspaper that will be used for this study, *Reforma*, enjoys complete freedom from the Mexican government.

As this study will employ framing analysis as a research method, this chapter also discussed framing theory. Framing has many definitions and little consensus has been

made as to whether framing is an extension of second-level agenda setting. In the next chapter, the methods of this study, including a detailed description of the frames that were used, will be discussed.

METHODS

Introduction

Global warming and its effects will have consequences for the global community. These consequences include a rise in global temperatures, sea-level increase, increase in catastrophic weather and human illness. A combination of literature has suggested that non-U.S. countries tend to focus global warming coverage on international issues and events rather than conflict and have found cyclical media coverage patterns surrounding international events. In the previous chapter, the background on global warming and how the media has covered global warming were addressed. Also covered in the previous chapter was the state of the Mexican press as well as Mexico's attempts to mitigate the effects of global warming. Because this study will employ the method of framing analysis, an overview of framing theory was also given.

Research methods will be covered in this chapter. An explanation of the sample and why it was chosen will be explained. The coding procedure, along with operationalizations of characteristics of interest, will be explained. Finally, this section will assess the reliability and validity of measurement.

Sample

Reforma was chosen for the sample because it enjoys some of the highest circulation among Mexico City newspapers. It was also chosen because of the availability of archives online. Two newspapers, *La Jornada* and *El Universal*, also prominent

Mexico City newspapers, were exempt from the study for the lack of consistency and reliability of their online archives.

An archive of global warming stories from *Reforma* were accessed through the LexisNexis database from January 1, 2004, to December 31, 2006. These years were chosen because of their availability in the online LexisNexis database (*Reforma* stories written before 2004 are not included in LexisNexis). The following parameters were used: the phrases “calentamiento global” (global warming) or “cambio climático” (climate change) must be present in the headline or first paragraph of the story to be included in the sample. Using these search parameters yielded 116 articles.

Coding procedure

A frame analysis of *Reforma* articles was conducted. Most content analyses include two to six coders (Wimmer & Dominick, 2003). Since the sample included 116 articles, which is a relatively small number, and because inter-coder reliability is often difficult with many coders, two Spanish-speaking coders were chosen and trained. The training procedure consisted of a formal explanation of the study, a discussion of each characteristic of interest, an introduction to the coding sheet, and two practice examples. (See Appendix 1 and 2 for coding instructions and coding sheet). A pilot test using 25 randomly selected articles from the sample was conducted. The pilot test confirmed that the research design and methodology were effective. Initially, both coders were of Latin-American descent. However, one of the coders was asked to leave the study because of not meeting deadlines for coding. The lead researcher took over as the second coder and completed the pilot test.

Reliability can be measured as consistency in frames that are found. The goal was to achieve inter-coder reliability of about .85. McComas & Shanahan (1999), however, have suggested that lower reliability scores are acceptable in studies dealing with themes (frames), and the lowest score that is generally acceptable in content analyses is .7. An overall inter-coder reliability of .88 was found, which is well above the acceptable value of .7. (See Appendix 3 for additional reliability scores). After the pilot study was completed, conflicts were resolved by discussion.

Frames studied were economic, political, ecology/science, consequences, scientific controversy/conflict, North/South conflict and other. Although not an exhaustive list of variables, this is a first attempt at determining frames present. Its weakness lies in the fact that it is extremely difficult to measure the possible values and norms of Mexican journalists, which may affect the frames that they choose to include in the news.

Next, the remaining 91 articles were distributed to the coders. Coders coded each article using precedents from previous studies (McComas & Shanahan, 1999; Brossard et al., 2004; Jones, 2006). For story frames: a coding of present/not present was used to assess the following categories: economics, politics, controversy/conflict, consequences, international relations/conferences, ecology/science and other. Conflict/controversy was coded as present/not present for both the presentation of scientific conflict and North/South conflict. The coders also added any additional frames they encountered during coding (a space was provided for “other” in each respective section). Three commonly occurring frames were found based on responses written in space provided in the “other” frame. Common frames within the “other” frame included the following:

United States conflict, alternative energy/technology and entertainment. Because of the frequency of these frames, they were operationalized and added to the analysis. Solutions to global warming were coded as present/not for international relations, national policies, individual call to action and another solution. Each of the above attributes was coded within each of the following categories: headline, first paragraph, second paragraph, third paragraph, and fourth paragraph and below.

Data

The following data was examined:

- 1) Page number of the story.
- 2) The date of publication of the article.
- 3) Number of words in the story.
- 4) Sex of the reporter.
- 5) Section of the newspaper where the story appears (ie: opinion, news, feature).
- 6) Inclusion of the words “calentamiento global” (global warming) or “cambio climatico” (climate change) in:
 - Headline
 - First paragraph
 - All other paragraphs (excluding headline and first paragraph)
- 7) The frame of the news story:
 - Inclusion of the economic frame
 - Inclusion of political frame
 - Inclusion of ecology/science frame

- Inclusion of consequences frame
- Inclusion of international relations frame
- Inclusion of scientific controversy/conflict frame
- Inclusion of the North/South controversy frame
- Inclusion of the United States conflict frame
- Inclusion of the alternative energy/technology frame
- Inclusion of the entertainment frame
- Inclusion of other frame

8) Mentioned solutions for global warming.

- Inclusion of international treaties as a solution
- Inclusion of national policies as a solution
- Inclusion of individual call to action as a solution
- Inclusion of another solution

9) Events surrounding story (conferences, world events, national events)

Story intensity scores

A story intensity formula was created to determine the intensity of coverage in global warming within each story. Story intensity takes into consideration the following variables: page number, number of words, whether the phrases “calentamiento global” or “cambio climático” were found in the headline, whether the phrases “calentamiento global” or “cambio climático” were found in the first paragraph, whether the phrases “calentamiento global” and “cambio climático” were found in both the headline *and* the first paragraph, and whether the phrases “cambio climático” and “calentamiento global”

were found below the first paragraph. This equation, along with a detailed explanation, can be found in Appendix 4.

The purpose of this equation is to assign a number to each story that would identify how intensely it focused on global warming: the higher the number, the higher the focus on global warming. Although the formula does not yield perfect results, it accurately portrays the intensity of coverage in each story by giving more points to lower numbered pages numbers, higher numbers of words within stories, the presence of key phrases in the headline or first paragraph, the presence of these phrases in both the headline and first paragraph, and the presence of these phrases below the first paragraph.

Frame intensity index

A formula was created to determine frame intensity within each of the frames. Assuming the journalistic norm that the most relevant information is included in the beginning of a news story (inverted pyramid), the following parameters were used: present in the headline, five points; present in the first paragraph, four points; present in the second paragraph, three points; present in the third paragraph, two points; and present in the fourth paragraph or below, one point. A frame intensity score provides a way to examine the intensity of each frame by high intensity (11-15 points), medium intensity (6-10 points) and low intensity (0-5 points).

Solution intensity index

The solutions intensity index is similar to the frame intensity index. Solution intensity was calculated using the following parameters: solution present in the headline, five

points; solution present in the first paragraph, four points; solution present in the second paragraph, three points; solution present in the third paragraph, two points; and solution present in the fourth paragraph or below, one point. Solution intensity scores provide a way to examine the intensity of each frame by high (11-15 points), medium (6-10 points) and low (0-5 points).

Operationalizations of characteristics of interest:

The following definitions and examples of the characteristics of interest and the words that coders looked for when coding are in English. Their Spanish counterparts were used during training and coding.

Section: The section that the articles are found in could affect the way global warming is portrayed. Sections will be operationalized by the section labels found in the LexisNexis. They will be divided into the following categories, which group together similar or identical contents:

- Internacional (International)
- Estados (State)
- Negocios (Business)
- Moda (Style)
- Nacional (Nacional)
- Ciencia (Science)
- Ciudad y Metrópoli (City and Metro)
- Cultura (Culture)
- Opinión y comentario (Opinion and commentary)

- Other

Date of publication: Certain events occurring on different dates may have an impact of the coverage of global warming, so date of publication was examined. The date of publication will be operationalized as the month, day and year that the article appeared in the newspaper.

Inclusion of economic perspective: Previous studies have found the frame of economic perspective. Inclusion of economic perspective was operationalized as the inclusion of information that pertains to economic benefits, economic perils or changes in the economy due to global warming. For example, a story that mentions an increase in wine production and sales in Europe as a result of global warming is an example of inclusion of economic perspective.

Inclusion of political perspective: The political frame has also been found in previous studies on global warming coverage. Inclusion of political perspective was operationalized as the inclusion of information that centers on political figures or entities (such as world leaders, presidents or political branches within a government), policies or perspectives. An article talking about an emissions-cutting policy proposed by the U.S. Senate would be an example of inclusion of political perspective. Coders looked for words including, but not limited to “political,” “politics,” “government,” “president,” “leader,” and “prime minister.”

Inclusion of ecology/science perspective: Many global warming stories focus on the impact that the warming will have on ecological processes, or the science of global warming. Inclusion of ecological perspective was operationalized by the inclusion of information regarding changes in the natural environment due to global warming or the actual science of global warming. This could include, but is not limited to, loss of species, changes in weather patterns, ice melts, changes in terrain, and explanation of how global warming affects the earth. Coders looked for words/phrases including, but not limited to, the following: “ice melt,” “glaciers,” “temperature change,” “catastrophic weather,” “increase in hurricanes,” “drought,” and “increase in dramatic weather.”

Inclusion of consequences perspective: Inclusion of consequences perspective was operationalized by the inclusion of information about the consequences that global warming have, will have or could have on the earth, people, species or natural processes. Coders looked for terms such as “effects,” “consequences.” “species loss,” “ice melts.”

Inclusion of international relations perspective: Inclusion of international relations perspective was operationalized by the inclusion of information relating to international treaties, agreements or dialogue. Coders looked for key words such as “treaty,” “accord,” “Kyoto.”

Inclusion of the scientific controversy/conflict perspective: The inclusion of controversy/conflict perspective was operationalized as inclusion of information that depicts conflict or controversy between any entities about the validity of the science of

global warming. Coders looked for phrases such as “clash,” “uncertainty,” “controversy” and “conflict.” An article was included in this category if it mentions the possibility that global warming is not occurring, or that man-made processes are not causing it.

Inclusion of the North/South conflict perspective: The inclusion of the North/South conflict perspective was operationalized as the inclusion of information that shows a conflict or clash in ideas or perspectives between an industrialized country (or countries) and a developing country (or countries). For the purposes of classification, developed countries included the following, as classified by the United States Central Intelligence Agency (CIA):

Andorra	Australia	Austria	Belgium
Bermuda	Canada	Denmark	Faroe Islands
Finland	France	Germany	Greece
Holy See	Iceland	Ireland	Israel
Italy	Japan	Liechtenstein	Luxembourg
Malta	Monaco	Netherlands	New Zealand
Norway	Portugal	San Marino	South Africa
Spain	Sweden	Switzerland	Turkey
United Kingdom	United States		

(Central Intelligence Agency, 2007). The most powerful economies in the world comprise the G8 (Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States). For this reason, Russia was added to the 34 developed countries listed above. An example of the North/South controversy would be an article depicting

the United States as being responsible for global warming. Another example would be an article proposing that the G8 nations have more stringent carbon cuts than other nations. Coders looked for terms including, but not limited to, the following: “G8 nations,” “developed countries,” “Northern countries,” “developing countries,” “Southern countries,” as well as a mention of any of the countries listed above in relation to a conflict with a nation not listed above.

Inclusion of the United States conflict perspective: The inclusion of the United States conflict perspective was operationalized as the inclusion of the following topics: the United States’ failure to sign the Kyoto Protocol, the United States not doing their part to combat global warming, or the United States’ failure to comply with or aid in the progression of international treaties. Key phrases included the following: “United States unwilling to sign Kyoto,” and “United States contributes more pollutants than other countries.”

Inclusion of the alternative energy/technology perspective: The inclusion of the alternative energy/technology perspective was operationalized as the inclusion of information regarding alternative energies such as wind energy, solar energy, clean energy/fuel, or new technologies that have been devised to combat global warming. The following types of phrases constitute the inclusion of the alternative energy/technology perspective: “clean energy,” “new technology,” and “alternative energy.”

Inclusion of the entertainment perspective: The inclusion of the entertainment perspective was operationalized as the inclusion of topics such as sports, music, literature, movies, television, or similar topics. Information on movies, actors/actresses, singers, television shows, fashion, books or literature, and sporting events/stars, are included in this frame. For example, a story mentioned the movie Ice Age, or what an actor/actress is doing about global warming would fit into the entertainment perspective.

Story length: Story length is the amount of space devoted to an article, which may affect the framing of an issue. This was operationalized by number of words in the story and will be found on the master list and the story itself.

Solutions: Solutions was operationalized as the inclusion of any information regarding solutions to global warming or to any of the consequences of global warming, and was coded in the following groups: international treaties or agreements, national policies, individual call to action, other. Coders looked for phrases including, but not limited to “emission cuts,” “carbon trading,” “solutions,” “policy,” and “plan.” International treaties or agreements were solutions that focused on a multi-nation level, such as the Kyoto Protocol. National policies were policies meant to curb global warming on a national level from within Mexico. An individual call to action was a solution encouraging the individual reader to participate in the solution process. An example would be encouraging a citizen to carpool or use clean energy.

Statistical methods

Story, frame and solution intensity were calculated for each story, using the formulas created by the lead researcher (See Appendix 4). In addition, frequencies were run for each characteristic of interest, as well as for story, frame and solution intensities. Cross-tabulations were run to determine if there was a significant relationship between gender and frames and solutions. These were 2 X 4 cross-tabulations, with gender categories of male, female, unknown, and both male and female.

Strengths and limitations

This research has several strengths. First, there was a relatively high inter-reliability of .88. This means that it is unlikely that coder bias was responsible for the results of the study.

Another strength of this research is that both coders were Spanish speaking, and one of them was from Mexico. A Mexican coder is likely to understand certain phrases that may be used in Mexico, but not used in another Latin-American country. The other coder was not of Mexican descent, but had spent an extended amount of time in Mexico, which may have also served as an advantage when making interpretations about news frames.

There are also limitations. One limitation lies in inconsistencies in the LexisNexis database. *Reforma* is only available on the LexisNexis database beginning in 2004, and there is a seven-month period in 2005 where LexisNexis contains no stories for *Reforma*. While this likely means that the sample is missing some stories (it is impossible to say how many, but if these months were consistent with the rest of the sample one could

estimate that approximately 15 stories are missing), with a sample of 116, missing stories are unlikely to greatly affect the results. Nonetheless, the 2004-2006 sample will still provide an important glimpse into the way *Reforma* reports about global warming.

Another limitation of the study is that one of the coders was the lead researcher. Initially, two Latin-American coders were trained and given the pilot test. One of the coders was asked to leave the study for not completing work within an acceptable time frame, and the lead researcher became the second coder. There is a possibility that this may have introduced coder bias, but with a .88 overall inter-coder reliability, this is highly unlikely to have had a significant effect on the results of the study.

Summary

A frame analysis was done for *Reforma* to determine how the newspaper frames global warming. This publication was chosen for the study because of its large circulation in Mexico City and its online availability. Spanish-speaking coders underwent training and inter-coder reliability was tested to ensure validity.

This research has several strengths. First, there was a relatively high inter-reliability of .88. Another strength of this research is that both coders were Spanish speaking, and one of them was from Mexico. A Mexican coder is likely to understand certain phrases that may be used in Mexico, but not in another Latin-American country.

There were also limitations. First, coder bias was possible. However, because high inter-coder reliability was achieved, it is unlikely that bias plays a large role in the results of the study. Also, a limitation lies in inconsistencies in the LexisNexis database. Nonetheless, the 2004-2006 sample will still provide an important glimpse into the way

Reforma reports about global warming. Another limitation of the study is that one of the coders was the lead researcher, but with an overall inter-coder reliability of .88, this is highly unlikely to have had a significant effect on the results of the study. In the next chapter, results of the study will be presented.

RESULTS

Introduction

The previous chapter discussed the methods employed in this study. A frame analysis of 116 articles from the Mexican newspaper, *Reforma*, was conducted. Two Spanish-speaking coders completed a pilot test and Scott's Pi was used to determine an inter-coder reliability of .88. The previous chapter explained the definitions of each characteristic of interest as well as the coding procedure. Strengths and limitations of the study were also addressed.

In this section, the results of the study will be examined. Each research question will be addressed, as well as any additional pertinent data and comparisons. Frequencies were run for each characteristic of interest and index scores were also calculated for frame, solution and story intensity. Additional statistical methods were employed in some instances, and will be explained below.

RQ1:

RQ1: *What frames will Reforma use in its coverage of global warming?*

The ecology/science and consequences frames had the most stories receiving the maximum intensity score of 15 points, showing that these two frames were more intensely reported on than other frames. The ecology frame had 13 stories that received 15 points, while consequences had 19 stories that received 15 points. Furthermore, 19% of stories included the ecology/science frame with a high intensity, while the consequences frame earned high intensity scores in 19.8% of stories. (See Table 1.)

Table 1
Frame intensity scores by low, medium and high

Solution	Low 0-5 points	Medium 6-10 points	High 11-15 points	Total
Economic	(101)87.1%	(13)11.2%	(2)1.7%	(116)100%
Political	(103)88.8%	(7)6%	(6)5.2%	(116)100%
Ecology/science	(71)61.2%	(23)19.8%	(22) 19%	(116)100%
Consequences	(75)64.7%	(18)15.5%	(23) 19.8%	(116)100%
International relations	(96)82.8%	(13)11.2%	(7)6%	(116)100%
Scientific controversy/conflict	(114)98.3%	(2)1.7%	(0)0%	(116)100%
North/South conflict	(111)95.7%	(2)1.7%	(3)2.6%	(116)100%
United States conflict	(113)97.4%	(1).9%	(2)1.7%	(116)100%
Alternative energy/technology	(112)96.6%	(4)3.4%	(0)0%	(116)100%
Entertainment	(105)90.5%	(5)4.3%	(6)5.2%	(116)100%
Other	(100)86.2	(10)8.6%	(6)5.2%	(116)100%

The ecology/science frame had a mean intensity score of 4.91 (n=116, s.d.=5.3), and the consequences frame had a mean intensity score of 4.9 (n=116, s.d.=5.8). These mean scores are almost twice as high as the third-highest mean score (international relations had a mean score of 2.53 (n=116, s.d.=4.11). Most mean scores were below one. Table 2 shows mean intensity scores for each frame.

Table 2
Frame intensity scores

Frames	Min.	Max	Mean	SD.
Ecology/science	0	15	4.91	5.3
Consequences	0	15	4.9	5.8
International relations	0	15	2.53	4.11
Other	0	15	2	3.84
Political	0	15	1.68	3.5
Economic	0	15	1.63	3.2
Entertainment	0	15	1.25	3.65
North/South conflict	0	15	.72	2.5
United States conflict	0	15	.43	2
Alternative energy/technology	0	9	.4	1.7
Scientific controversy/conflict	0	6	.19	.92

Note: Mean scores include stories that did not contain each frame.

The ecology/science frame, which appeared in 76 of the stories (65.5%), and consequences frame, which appeared in 62 stories (53.4%), were also the most frequently reported on. These frames were the most frequently occurring, regardless of paragraph. (See Table 3.)

Table 3
Occurrence of Frames by percent

Frames	Story	Headline	First paragraph	Second paragraph	Third paragraph	Fourth paragraph
Economic	37.9	5.2	10.3	12.9	8.6	31
Political	30.2	8.6	12.1	12.9	9.5	20.7
Ecology/science	65.5	28.4	37.1	24.1	31	45.7
Consequences	53.4	30.2	37.1	27.6	29.3	37.9
International relations	46.6	12.1	20.7	14.7	18.1	31.9
Scientific controversy/conflict	6.9	0	0	2.6	2.6	6
North/South conflict	15.5	4.3	3.4	3.4	4.3	10.3
United States conflict	10.3	3.4	4.3	1.7	4.3	6.9
Alternative energy/technology	6	4.3	3.4	1.7	.9	1.7
Entertainment	12.9	9.5	8.6	6.9	6.9	8.6

The scientific controversy/conflict frame and the alternative energy/technology frame received the lowest intensity scores. Scientific controversy/conflict had a mean score of only .19 (n=116, s.d.=.92), and had no stories receiving the maximum of 15 points. The highest intensity score for scientific conflict/controversy was six (this accounted for 1.7% of stories that included the scientific controversy/conflict frame). In addition, the scientific controversy/conflict frame was never present in the headline or first paragraph of a story. The alternative energy/technology frame had a mean score of only .4 (n=116, s.d.=1.7), and also did not have any stories receiving the maximum of 15 points. The highest intensity score for alternative energy/technology was nine points, accounting for three stories. The scientific controversy/conflict and alternative energy/technology frames were also the least frequently occurring frames in the study. Scientific controversy/conflict was present in eight stories (6.9%), and the alternative energy/technology frame, was found in seven stories (6.7%).

Other frame frequencies were as follows:

- Economic frame, 44 stories: (37.9%)
- Political frame, 35 stories: (30.2%)
- North/South conflict frame: 18 stories (15.5%)
- Entertainment frame: 15 stories (12.9%)
- United States conflict: 12 stories (10.3%)

Entertainment, United States conflict and alternative energy/technology were all frames that emerged during the study. Other frames not fitting into any of the above categories were found in 38 stories (32.8%). Some of the frames listed in the “other” frame category include the following: the green movement, NGOs lack of interest and

proposals, policies in the United States, studies about pollution in Mexico City, community, protests, general weather, emissions reduction, wine production, prevention against cold weather and causes of global warming.

Frames were also analyzed by headline, first paragraph, second paragraph, third paragraph, and fourth paragraph and below. The consequences and ecology/science frames were the most frequently occurring frames in headlines; consequences appeared in the headline in 30.2% of stories, and ecology/science appeared in the headline in 28.4% of stories. Scientific controversy/conflict was not present in any of the headlines. Other frame frequencies in the headline were as follows:

- International relations: 12.1%
- Entertainment: 9.5%
- Political: 8.6%
- Economic: 5.2%
- North/South conflict: 4.3%
- Alternative energy/technology: 4.3%
- United States conflict: 3.4%

The most frequently used frames in the first paragraph were ecology/science and consequences (both found in 37.1% of stories). Scientific controversy/conflict was never mentioned in the first paragraph. Other frames frequencies in the first paragraph were as follows:

- International relations: 20.7%
- Political: 12.1%
- Economic: 10.3%

- Entertainment: 8.6%
- United States conflict: 4.3%
- North/South conflict: 3.4%
- Alternative energy: 3.4%

The most frequently used frames in the second paragraph were ecology/science (found in 24.1% of stories) and consequences (27%).

Other frame frequencies in the second paragraph were as follows:

- International relations: 14.7%
- Economic: 12.9%
- Political: 12.9%
- Entertainment: 6.9%
- North/South conflict: 3.4%
- Scientific controversy/conflict: 2.6%
- United States conflict: 1.7%
- Alternative energy/technology: 1.7%

The most frequently used frames in the third paragraph were ecology/science (found in 31% of stories) and consequences (29.3%). Other frame frequencies in the third paragraph were as follows:

- International relations: 18.1%
- Political: 9.5%
- Economic: 8.6%
- Entertainment: frame 6.9%
- North/South conflict: 4.3%

- United States conflict: 4.3%
- Scientific controversy/conflict: 2.6%
- Alternative energy/technology: .9%

The most frequently used frames in the fourth paragraph and below were ecology/science (found in 45.7% of stories) and consequences (37.9%). Other frame frequencies in the fourth paragraph and below were as follows:

- International relations: 31.9%
- Economic: 31%
- Political: 20.7%
- North/South conflict: 10.3%
- Entertainment: 8.6%
- United States conflict: 6.9%
- Scientific controversy/conflict: six percent
- Alternative energy/technology: 1.7%

RQ2 and RQ3:

RQ2: *What solutions to global warming will be present in Reforma?* and RQ3: *Will Reforma favor solutions to global warming that are global in scope?* With a mean intensity score of 2.22 (n=116, s.d.=3.93), international treaties received the highest intensity scores of any solution, and had four stories receiving the maximum intensity score of 15 points, showing that *Reforma* did favor solutions to global warming that were global in scope. (See Table 4.)

Table 4
Solution intensity scores

Solutions	Min.	Max	Mean	SD.
International treaties	0	15	2.22	3.93
National policies	0	15	1.46	3.3
Individual call to action	0	15	.72	2.22
Another solution	0	15	.72	2.24

Six percent of stories included the international treaties solution with a high intensity score (11-15 points). (See Table 5.)

Table 5
Solution intensity scores by low, medium and high

Solution	Low 0-5 points	Medium 6-10 points	High 11-15 points	Total
International treaties	(97)83.6%	(12)10.4%	(7)6%	(116)100%
National policies	(105)90.5%	(6)5.2%	(5)4.3%	(116)100%
Individual call to action	(111)95.7%	(4)3.4%	(1).9%	(116)100%
Another solution	(112)96.6%	(2)1.7%	(2)1.7%	(116)100%

The international treaty solution was also the most frequent solution, and appeared in 40.5% of stories. (See Table 6.)

Table 6
Occurrence of solutions by percent

Solutions	Story	Headline	First paragraph	Second paragraph	Third paragraph	Fourth paragraph
International treaties	40.5	38.8	16.4	13.8	12.9	32.8
National policies	30.2	11.2	7.8	11.2	7.8	25
Individual call to action	15.5	8.6	4.3	3.4	5.2	12.9
Another solution	16.4	4.3	5.2	4.3	5.2	8.6

National policies as a solution followed, appearing in 30.2% of stories. Two stories within this frame received the maximum 15 points. The national policies solution also had the second highest mean intensity score of 1.46 (n=116, s.d.=3.3). National policies earned high intensity scores in 4.3% of stories.

Individual call to action was mentioned in 15.5% of stories, while another solution was mentioned in 16.4% of stories. Individual call to action and another solution both had mean scores of .72 (n=116, s.d.=2.22) and (n=116.s.d.=2.24), and each had one story receive the maximum 15 points. Individual call to action scored a high intensity score (11-15 points) in only one story (.9%), while another solution only scored a high solution intensity score in two stories (1.7%). Some of the frames listed in the “another solution” category include the following: emissions reduction, local government, state policies, protest, scientific exploration, general government solutions, and coming to solutions based on values and conscience.

Solutions were also analyzed by presence in headline, first paragraph, second paragraph, third paragraph, and fourth paragraph and below. The most commonly mentioned solution in headlines was international treaties (found in 38.8% of headlines), followed by national policies (11.2%). Individual call to action was mentioned in 8.6% of headlines, and another solution was mentioned in only 4.3% of headlines.

The most commonly mentioned solution mentioned in the first paragraph of stories was international treaties, found in the first paragraph of 16.4% of stories. National policies followed (7.8%), along with another solution (5.2%) and individual call to action (4.3%).

International treaties were mentioned in the second paragraph as a solution in 13.8% of stories, while national policies were mentioned in 11.2% of stories. Another solution was mentioned in 4.3% of stories in the second paragraph, while individual call to action was mentioned in the second paragraph in 3.4% of stories.

The most commonly mentioned solutions in the third paragraph were international treaties (found in 12.9% of stories) and national policies (found in 7.8% of stories). Individual call to action and another solution were found in the third paragraph in 5.2% of stories.

International treaties were mentioned as a solution in the fourth paragraph or below 32.8% of the time, while national policies were mentioned 25% of the time. Individual call to action followed, appearing in the fourth paragraph or below 8.6% of the time, while another solution appeared 8.6% of the time.

RQ4:

RQ4: Will Reforma present frames of conflict between the North and South in their coverage of global warming? The North/South conflict was mentioned 18 times (15.5% of stories), with the most frequent location being the fourth paragraph of the story or below (10.3% of stories included the North/South conflict frame in the fourth paragraph or below). Less than three percent of stories received high intensity scores for the North/South conflict frame; almost 96% received low intensity scores.

RQ5:

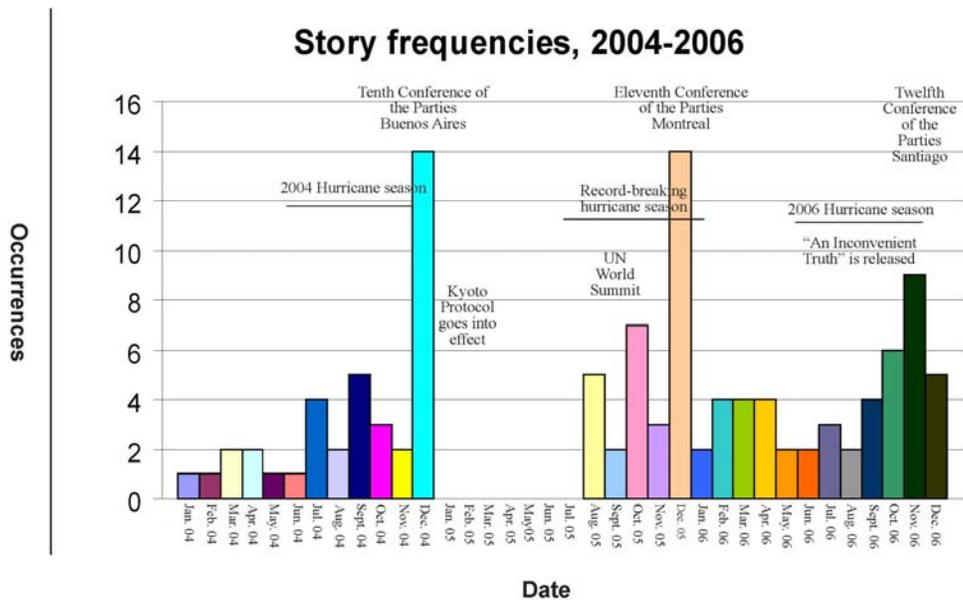
RQ5: Will Reforma present frames of scientific conflict in their coverage of global warming? If so, will the conflict center around the United States? Scientific conflict was mentioned eight times (6.9% of stories). The most frequent location was the fourth paragraph or below (six percent of stories), while this frame was never mentioned in the headline or first paragraph of a story. Scientific conflict/controversy earned high intensity scores in zero percent of stories, and earned low intensity scores 98.3% of the time. Of those stories that mentioned scientific conflict, two stories centered the conflict on the United States, with one of the two also focusing on the European Union.

RQ6:

RQ6: Will Reforma's coverage of global warming peak during international conferences? The stories were analyzed by month to look for any cyclical coverage periods and any correlations between current events and reportage of global warming. December 2004 and December 2005 had the most stories, with 14 each. In 2004, stories

started increasing in July, with the peak for stories in December. After December, stories declined significantly (zero stories from January-July 2005). Stories pick up again in August 2005, about two months after the beginning of the 2005 hurricane season. Again, the frequency peaks in December 2005 with 14 stories, and declines in January 2006, with two stories. In 2006, the month-to-month frequencies remain fairly steady with about two to four stories each month. Stories increase in October, and reach their peak of nine stories in November 2006. Story frequencies decline again in December 2006. Figure 1 shows story frequencies, along with current events that occurred between Jan. 1, 2004 and Dec. 31, 2006. Yearly peaks occur during the tenth, eleventh and twelfth Conference of the Parties. (See Figure 1.)

Figure 1. Story frequencies



For an enlarged version of Figure 1, see Appendix 5.

Most global warming stories occurred during the last few months of each year; 70.7% of global warming stories occurred during or after August. December stories accounted for 27.6% of the sample. There was no defined pattern for day of the month that a story occurred. However, 2006 had the greatest frequency of stories, with 48 (41.4%). Thirty-seven stories appeared in 2004, accounting for 32% of the sample, while 31 stories appeared in 2005, accounting for 26.7% of the sample. In addition to the above research questions, additional data were examined and will be explained below.

Location of story (page number)

The page number of each global warming story was examined. About 40% of stories were found in pages 1, 2 and 3. Pages 11 and above accounted for an additional 38.8% of stories, with 61.2% of stories occurring in the first 10 pages of the newspaper.

Section

Section was also analyzed. The most frequent section that stories appeared in was international (37.9%). Following were other and national (both 10.3%) business and first (both 8.6%). Other sections included the angel, travel, people, sports, health and wellbeing, magazine, cooking, interface, state, city and metro, culture, science, opinion and commentary, and fashion.

Gender

Cross tabulations were conducted to determine if gender of the reporter had any effect on frequency of frames. A 2 x 4 chi square test indicated that the relationship

between gender and the economic frame was significant, $\chi^2(3, N=116) = 9.13, p < .05$. Males were more likely to write stories with economic frames, with 50% of stories written by males having an economic frame. Only 22.7% of stories written by females, and 27% of stories with an author of unknown gender contained the economic frame. No significant relationships were found between gender and any of the other frames in the study (see Appendix 6 for outputs).

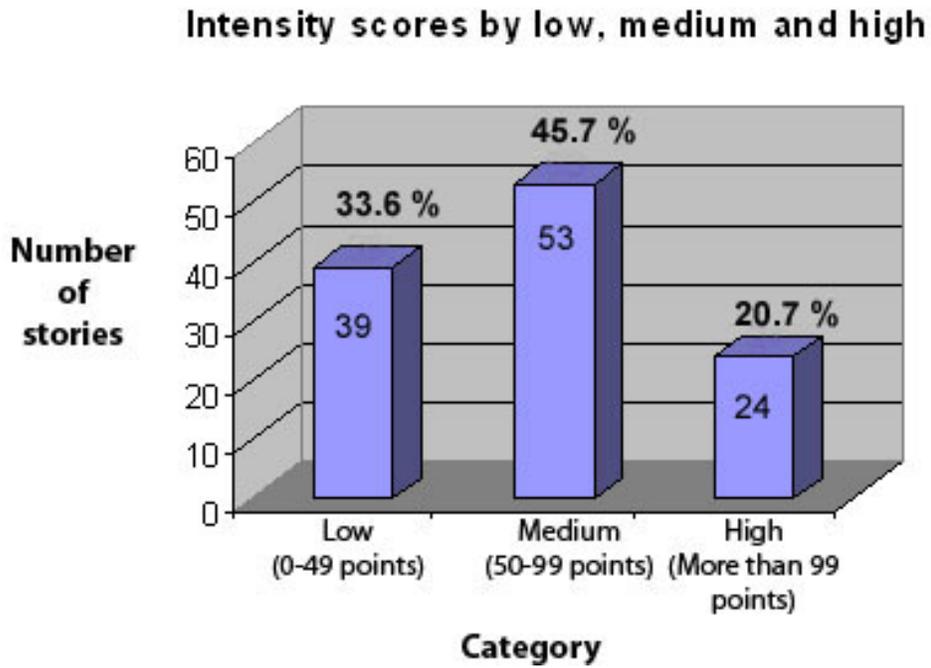
Cross-tabulations were conducted to determine if there was a significant difference in frequency of solutions and the gender of the reporter. A 2 x 4 chi-square test indicated that the relationship between gender and the international treaties solution was significant $\chi^2(3, N=116) = p < .05$. Males were more likely to report on the international treaties solution, including this solution in 51.8% of stories, while females included them in only 18.2% of stories. Stories written by a reporter of unknown gender included the international treaties solution 37.8% of the time. There were no other significant relationships between frequency of solutions and gender of the reporter (see Appendix 6 for outputs).

Story intensity

Story intensity was determined for each story, based on a formula created by the lead researcher (See Appendix 4). The intensity scores were divided into high, medium and low categories by the lead researcher, and were defined as follows: a low intensity story scored from 0-49 points, a medium intensity story scored from 50-99 points, and a high intensity story scored 100 points or higher. These divisions showed that the majority of stories did not cover global warming with high intensity (high intensity stories

accounted for only 20.7% of the sample. Medium intensity was the most frequent, at 45.7%, followed by low intensity, at 33.6%. (See Figure 2.)

Figure 2. Intensity scores by low, medium and high



DISCUSSION AND IMPLICATIONS

Global warming and its implications have astounding consequences for the global community. Although some research has been done on the trends within environmental reporting, few studies have looked at the issue of global warming in particular.

Global warming is a troublesome issue for reporters for a number of reasons, and hence, it is important that we delve into how newspapers cover the topic. The first purpose of this study was to discover how a Mexico newspaper frames the issue of global warming. Another purpose of this study was to expand the current knowledge of global warming coverage by the media. The final purpose of the study was to expand on existing literature to discover how journalists outside of the United States communicate, to the public, the issue of global warming. Based on previous studies on global warming, this sought to ask how the Mexico City-based newspaper *Reforma* covers the issue of global warming. A frame analysis was conducted to explore the answers to these questions. This study identified that ecology/science and consequences are the most frequently occurring themes of coverage, while scientific conflict and North/South conflict are present, but in low frequencies and near the end of stories. This study also identified international relations as the most frequent solution to global warming, while global warming story frequencies peaked during international conferences. These results confirm previous research, which has found that news media outside of the United States tend to emphasize international relations and de-emphasize conflicts and controversies.

RQ1: What frames will Reforma use in its coverage of global warming? Overall, the most popular frame in *Reforma* is the ecology/science frame. The consequences frame is the second most popular, followed by international relations. Conversely, the least popular frames in *Reforma* were the alternative energy/technology and scientific controversy/conflict frames. Consequences and ecology/science remain the two most popular frames, and receive thorough coverage throughout the news stories in which they are found. These frames also receive the highest intensity scores of any other frames, suggesting that reporters at *Reforma* think that ecology/science and consequences are the most important topics to address when covering global warming.

These findings show that *Reforma* is unique in the way its reporters cover global warming. Previous studies have found that the United States tends to focus on frames of conflict, for example, while studies in non-U.S. media have found that media tend to focus on international relations. Perhaps *Reforma* focuses more on consequences and ecology/science because Mexico is fairly susceptible to many of the consequences of global warming; the country has two coastlines, and the Gulf of Mexico produces many hurricanes and tropical storms each hurricane season, with many of these affecting Mexico and its citizens. In 2005 alone, Mexico had six Atlantic hurricanes, and much of the content within *Reforma*'s ecology/science and consequences frames was related to an increase in catastrophic weather as a consequence of global warming. Coverage of global warming increased each year near the official beginning of hurricane season in June.

Latin America, especially the Caribbean region, is considered to be extremely susceptible to the consequences of global warming, which could account for the popularity of the ecology/science and consequences frames. In addition, *Reforma* is

located in Mexico City. Mexico City is located in the Central region of Mexico, which has been predicted by the INE to suffer the worst consequences of any Mexican region due to global warming. This could account for why journalists at *Reforma* chose consequences and ecology/science to be the leading frames in global warming coverage.

The international relations frame is the third most popular frame, regardless of paragraph. This deviates from previous research on global warming coverage in non-U.S. countries. Previous framing research of global warming coverage in non-U.S. newspapers has pointed to international themes as the most popular frame of coverage, with science the second most popular frame and consequences the fourth most popular frame (Brossard et al., 2004). This deviation could be attributed to the location of Mexico. Mexico is part of North America, while previous studies have focused mainly on the European nations of Portugal and France. Those people in Europe may be more internationally oriented than people in other regions, and this may have an effect on European news coverage. This could be because Europe consists of many countries that are spatially close. Europe has even united itself with the creation of the European Union. While Mexico is likely more internationally minded than the United States, because it is part of the Americas, the country may be less likely to focus on international relations as a global warming news frame than European nations.

However, it is important not to forget that international relations still remained the third most prominent global warming news frame, which shows that *Reforma*'s reporters find international relations to be an important topic. In addition, most stories were found in the international section of the newspaper, showing that *Reforma* did regard most global warming stories as international in nature.

The least popular frames vary little from paragraph to paragraph; alternative energy /technology and scientific controversy/conflict are consistently the least popular frames. Perhaps alternative energy/technology is unpopular because Mexico does not have the means to support these endeavors. Although Mexico is emerging as a prominent economy, it is still recognized as a developing nation. Alternative energy/technology would likely be a more prominent frame if this study were to focus on a wealthy country, such as the United States or Canada.

The near absence of the scientific controversy/conflict frame shows that reporters at *Reforma* have accepted global warming as fact. The newspaper does not question the existence of global warming, but focuses on the science of global warming and the consequences of the phenomenon. This is markedly different than the approach taken by the United States media, which been found to focus on conflict within global warming stories. Perhaps *Reforma* writers are not compelled to write about scientific controversy/conflict because the United States media and leaders already report heavily on this frame. Rivard (2005) suggested that this was the case with Canadian reporters.

Brossard et al., (2004) found that controversy is the least present global warming frame in non-U.S. newspapers. This research confirms this finding; while the North/South conflict and the scientific controversy/conflict frames are both present in *Reforma*, they account for some of the lowest percentages within the sample, and are most frequently found near the end of stories rather than the beginning or headline.

However, one-tenth of stories mention the United States conflict frame, suggesting that Mexican journalists think that the failure of the United States to sign treaties such as the Kyoto Protocol, and the United States' failure to comply with other

global warming mitigation policies is a significant news story. This may also suggest tension between the United States and Mexico, because many of the stories containing the United States conflict frame characterize the United States' global warming policies in a negative way.

In summation, this research found that consequences and ecology/science were the most popular news frames for global warming coverage, with international relations as the third most prominent news frames. This likely reflects differences not only between the United States and Mexico, but also between Mexico and European countries. However, previous research has also found that not only is the international relations frame the most popular frame in global warming stories in non-U.S. countries, but that international treaties is the most popular solution to global warming/environmental coverage in non-U.S. media (Jones, 2006; Reis, 1999) This leads to the next research questions:

RQ2: What solutions to global warming will be present in Reforma? and RQ3: Will Reforma favor solutions to global warming that are global in scope? International treaties received the highest intensity scores of any frame. International treaties was also the most frequently occurring solution to global warming mentioned by *Reforma*, and was found in about 40% of all stories. This solution was also found in nearly 40% of headlines, which suggests that there is a perceived importance to the international treaties solution frame.

The national policies frame is found in about 30% of articles, but the highest frequency of occurrences is in the fourth paragraph or below of stories, which suggests

lower importance of this solution when compared with international relations. (The national policies solution frame is only found in about 11% of headlines, and less than eight percent of first paragraphs.)

These findings suggest that *Reforma* prefers international solutions for global warming more than other types of solutions, a finding that is consistent with previous studies of global warming coverage for newspapers outside of the United States (Jones, 2006). This also follows evidence that non-U.S. countries tend to report more frequently on international topics when covering global warming (Dessai et al., 2001; Brossard et al., 2004). Also, because Mexico is a developing nation that is extremely dependent on fossil fuels, perhaps *Reforma*'s journalists feel that Mexico must rely on richer, more powerful nations to help mitigate the effects and occurrence of global warming.

The low reportage of individual call to action or another solution shows *Reforma*'s preference of governmental and international bodies to take care of global warming. *Reforma* rarely empowers readers to do something about global warming, nor does it provide many alternative solutions other than those proposed by international and national bodies. *Reforma*'s failure to empower readers likely results in a helpless or apathetic view of global warming among readers, especially with consequences as one of the most popular frames of coverage.

RQ4 was *Will Reforma present frames of conflict between the North and South in their coverage of global warming?* The North/South conflict frame appears in 15.5% of stories, which suggests some importance as a frame. However, the frame is most popular in the fourth paragraph and below, suggesting that the frame is of marginal importance.

When looking at the intensity scores for the North/South conflict, only one story earns the highest intensity score of 15, while 99 do not address the North/South conflict at all, and six stories only score one point for intensity, meaning the frame was only mentioned in the fourth paragraph or below of the story. Almost 96% of stories obtain low intensity scores. When looking at these statistics, the North/South conflict appears to present, but of marginal importance as a frame in *Reforma*'s coverage of global warming. This is consistent with previous research by Brossard et al. (2004) that found non-U.S. media were less likely to report on controversies in comparison to other types of global warming frames.

RQ5 was *Will Reforma present frames of scientific conflict in their coverage of global warming? If so, will the conflict center around the United States?* Scientific conflict was one of the least popular frames found in the study. It was never mentioned in the headline or first paragraph, suggesting little importance of the frame. When looking at intensity scores for the scientific conflict/controversy frame, the highest score was six out of 15 points, accounting for two stories, and one score of five. All other stories in this frame received a one or zero, meaning they occurred in the fourth paragraph or below, or not at all. This suggests that *Reforma* does not place importance on the scientific controversy/conflict frame. Again, this supports previous research that has shown that non-U.S. media are less likely to report about controversies when it comes to global warming (Brossard et al., 2004).

Although two of the eight stories that mentioned the scientific controversy/conflict frame centered on the lack of consensus within the United States as

to the science of global warming, this is not enough to make any type of generalizations. A much larger sample would be needed to assess this frame, but at face value, it appears that *Reforma*'s coverage of scientific conflict does not focus on the United States.

RQ6 was *Will Reforma's coverage of global warming peak during international conferences? Reforma's coverage of global warming peaks each year during the Conference of the Parties. This is consistent with previous studies on global warming coverage in non-U.S. newspapers (Dessai et al., 2001; Brossard et al., 2004). The Tenth Conference of the Parties occurred Dec. 6-17, 2004, in Buenos Aires, Argentina. The number of stories present in Reforma goes from two in November to 14 in December, with most of the stories focused on events/issues surrounding the Buenos Aires conference. The Eleventh Conference of the Parties occurred from Nov. 28-Dec. 9, 2005, in Montreal, Canada. Again, coverage of global warming increases in December, (from three stories in November to 14 stories in December) and drops in January 2006 (two stories occurred in this time period). The Twelfth Conference of the Parties occurred Nov. 3-15 in Santiago, Chile. The number of global warming stories increased from six in October to nine in November, and then dropped back to five in December.*

Again, these findings suggest that while the international relations frame is not the most popular frame in *Reforma*, international relations are still very important in global warming coverage. Perhaps this reflects the newspaper's high reportage of international treaties as a solution to global warming. While *Reforma* does not regard international relations as the most important frame of coverage, it emerges as the most important solution to global warming.

Story intensities

This study also examined story intensities by assigning a formula and assessing the mean intensity scores. Dividing intensity scores into low, medium and high intensity categories showed that nearly half of stories scored within the medium story intensity category. Low intensity occurred in nearly 34% of stories, meaning only about 20% of stories had high intensity scores. This lack of high intensity scores suggests that while Mexican journalists find global warming to be of importance, they do not necessarily think it is the most important issue in the newspaper. Or, perhaps, because Mexico has many other important issues to deal with, such as the narcotics trade, immigration and economics, global warming must take a back seat to other issues.

It is also important to note that the Mexican presidential election occurred in July 2006, and campaigns for the presidency started in the preceding year. The presidential election likely affected the coverage of global warming, as space that was devoted to presidential candidates and the election probably caused a decrease in space available for other types of stories. The lead researcher was present in Mexico during the 2006 elections, and observed what she perceived as a high voter turnout and interest in presidential candidates among Mexican people, even among young Mexicans. In Mexico, elections are taken seriously, and are likely to have precedence over other issues.

Strengths and limitations

This study examined the frames used by a Mexican newspaper when covering global warming. The biggest strength of this study is that it focuses on a subject that is pertinent

to the times. Global warming has been receiving much attention lately from environmental groups, and although a few people still disagree, most scientists have reached the consensus that global warming will have dramatic effects on earth and its inhabitants. Understanding how the media frames this issue will help to make sense of what kinds of messages newsreaders are receiving, and in turn, how they may respond to these messages.

Another strength of this study is that little research could be found on Mexican journalism. What could be found was focused on the emergence of the media in Mexico as the “fourth estate,” or the dangers of being a journalist in Mexico. These are two very important topics; however, now that a freer press is emerging in Mexico, studies such as this one can focus on other aspects of the Mexican media. Moreover, although Latin America is expected to suffer extreme consequences from global warming, no research on global warming coverage could be found for any other Latin American countries. Thus, it is imperative that media studies focus on Latin American countries.

There were also some limitations. First, framing research is often a very subjective process, and what one person may deem as one frame may be considered to be a different frame to another person. However, each frame was clearly defined and understood by the coders, and the inter-coder reliability was fairly high.

Also, because the lead researcher is not of Mexican descent, it is difficult to purport the causes of *Reforma*'s coverage of certain frames. The lead researcher, who is from the United States, likely had insights that were influenced by the “American” worldview. Although the lead researcher attempted to carry as little bias as possible,

added insight about the Mexican media would likely be given if the lead researcher were of Mexican descent.

Another limitation of the study lies in the fact that only one newspaper was used, instead of the desired three. This study would be stronger if there were a wider variety of news sources available in the same database. It would also be stronger if a longer sample period were available to study the coverage of global warming over a longer time span.

Future research

Although this study was valuable in discovering trends within the Mexico City newspaper, *Reforma*, similar studies in other Mexico newspapers could be conducted to explore whether the same frames appear in global warming coverage. It would also be valuable to collect a sample that represented a longer time span, if possible. However, this would likely involve using the print editions of the newspaper of choice, as online archives are hard to find for many Mexican newspapers.

This research could also be expanded in other countries. This study was based on some of the framework laid out by studies in Portugal and France, as well as several countries studied by Jones (2006). This study, along with the studies in Portugal and France, points to an increase in global warming stories during international conferences. It would be valuable to see if this trend would be replicated in other countries as well.

Future research regarding global warming coverage in the media should also be expanded to other forms of media, such as television, radio and magazines, similar to the study conducted by Jones (2006). Collecting and interpreting samples that comprise different forms of media may be difficult to do on an international level, but would give a

more comprehensive view of the news media's coverage of global warming in any given country.

This research could also be expanded to examine media effects. While this study adds critical information about how global warming is framed by the media, the question remains as to how these frames may affect readers.

CONCLUSIONS

Global warming is an issue of growing international importance. With a growing concern for such issues as global temperature rise, sea-level rise, increase in severe weather and increased droughts, the global community is beginning to focus on possible ways to mitigate the effects of global warming. Global warming is a troublesome issue for reporters for a number of reasons, and hence, it is important that we delve into how newspapers cover the topic. Analyzing the ways in which the news media portray global warming is a crucial step in identifying what type of information global readers are receiving about the issue. Very little research has been done concerning framing of global warming in non-U.S. countries. However, because global warming is a problem of global scope, it is imperative that media research addresses how media all over the world frames global warming.

Based on previous studies on global warming, this study sought to ask the following questions for the Mexico City-based newspaper *Reforma*: What frames will *Reforma* use in its coverage of global warming? What solutions to global warming will be present in *Reforma*? Will *Reforma* favor solutions to global warming that are global in scope? Will *Reforma* present frames of conflict between the North and South in their coverage of global warming? Will *Reforma* present frames of scientific conflict in their coverage of global warming? If so, will the conflict center on the United States? Will *Reforma*'s coverage of global warming peak during international conferences?

A frame analysis of 116 stories, taken from *Reforma* on the LexisNexis database, was conducted to explore these questions. Each story was coded for the presence of frames and solutions within each section of the story: headline, first paragraph, second

paragraph, third paragraph, and fourth paragraph and below. Story, frame and solution intensity scores were also calculated, using formulas created by the lead researcher. Frame and solution intensity scores were based on appearances in each section of the story, while the story intensity score was determined by page number, number of words, presence in headline, presence in first paragraph, and presence below the first paragraph.

This study identified that ecology/science and consequences are the most frequently occurring frames of coverage and also received the highest intensity scores. The scientific conflict and North/South conflict are present as frames, but in low frequencies and near the end of stories. This study also identified international relations as the most frequent and most intensely reported on solution to global warming, while global warming story frequencies peaked during international conferences. These results confirm previous research, which has found that news media outside of the United States tend to emphasize international relations and de-emphasize conflicts and controversies (Jones, 2006; Brossard et al., 2004; Dessai et al., 2001).

Some research has suggested that news media outside of the United States focus on international relations as a major frame in global warming coverage, with international solutions, such as the Kyoto Protocol, as the leading solution frame. This research has supported both of these assertions. The international treaties perspective was the leading solution in *Reforma*, while the top three frames were ecology/science, consequences and international relations (in that order).

This study also found that reportage of global warming peaked during international conferences on the issue. Coverage of controversies and conflict were present, but with low intensity scores, and these frames were often most prominent near

the end of stories, rather than near the beginning. Controversy and conflict frames also occurred in low percentages within stories.

In previous studies on global warming coverage in the media, the international relations frame was the most popular. This study shows that Mexico deviates from that trend, with ecology/science and consequences being the most popular frames. This might be because of Mexico's high vulnerability to the consequences of global warming. Previous studies have mostly focused on European countries, which might have also contributed to the deviation. European countries may be more likely to include international relations frames because Europeans may be more internationally minded; Europe consists of many countries that are close in proximity, and the nations have merged to form the European Union, an action that hints at an importance of international relations in Europe.

This study also found that global warming stories rarely received high intensity scores (which took into account high word count in a story, low page number within the newspaper, and the inclusion of the phrases "calentamiento global"(global warming) or "cambio climático" (climate change) in different parts of the story. Almost half of stories received medium intensity scores, however. Tentatively, one could conclude that while *Reforma* reporters perceive global warming as important, it is not the most important issue in the newspaper. The July 2006 Mexican presidential election might have played a role in this; stories about the campaign, election and candidates likely consumed space in the newspaper during the year preceding the election.

This study helped to identify how the media uses frames to explain a global issue, such as global warming. More than half of people rely on the media as their prime source

for information regarding global warming, but very few people have sufficient knowledge to participate in public policy about the issue (Wilson, 1995). The results of this study may help policy makers, scientists, activists, politicians and journalists understand the current trends of global warming coverage by the news media, and make deductions about what type of information the public is receiving about global warming. Although this study focused on a Mexican newspaper, the findings of this study can be used to inform studies of other news media across the globe.

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Appendix 1: Coding sheet

1. Coder:

- Andrea (1)
 Luis (2)

2. Story number: _____

3. Page number _____

Date of publication:

4. Month: _____

5. Day: _____

6. Year : _____

7. Story length: _____ words

8. Sex of the reporter listed in the byline

- Male (1) Female (2) Unknown (3)

Section:

9. Internacional (1)
 10. Estados (2)
 11. Negocios (3)
 12. Moda (4)
 13. Nacional (5)
 14. Ciencia (6)
 15. Ciudad y Metrópoli (7)
 16. Cultura (8)
 17. Opinión y comentario (9)
 18. Other (10)

19. Were the phrases “calentamiento global” or “cambio climático” in the headline?

- Yes (1) No (2)

20. Were the phrases “calentamiento global” or “cambio climático” in first paragraph?

- Yes (1) No (2)

21. Were the phrases “calentamiento global” or “cambio climático” present below the first paragraph?
 (Excluding headline and first paragraph)

- Yes (1) No (2)

What frames were present in the headline?

- | | Present (1) | Not Present (2) |
|-------------------------------------|--------------------------|--------------------------|
| 22. Economic | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. Political | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. Ecology/science | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. Consequences | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. International relations | <input type="checkbox"/> | <input type="checkbox"/> |
| 27. Scientific controversy/conflict | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. North/South conflict | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. Other (please explain below) | <input type="checkbox"/> | <input type="checkbox"/> |

What frames were present in the first paragraph of the article?

	Present (1)	Not Present (2)
30. Economic	<input type="checkbox"/>	<input type="checkbox"/>
31. Political	<input type="checkbox"/>	<input type="checkbox"/>
32. Ecology/science	<input type="checkbox"/>	<input type="checkbox"/>
33. Consequences	<input type="checkbox"/>	<input type="checkbox"/>
34. International relations	<input type="checkbox"/>	<input type="checkbox"/>
35. Scientific controversy/conflict	<input type="checkbox"/>	<input type="checkbox"/>
36. North/South conflict	<input type="checkbox"/>	<input type="checkbox"/>
37. Other (please explain below)	<input type="checkbox"/>	<input type="checkbox"/>

What frames were present in the second paragraph?

	Present (1)	Not Present (2)
38. Economic	<input type="checkbox"/>	<input type="checkbox"/>
39. Political	<input type="checkbox"/>	<input type="checkbox"/>
40. Ecology/science	<input type="checkbox"/>	<input type="checkbox"/>
41. Consequences	<input type="checkbox"/>	<input type="checkbox"/>
42. International relations	<input type="checkbox"/>	<input type="checkbox"/>
43. Scientific controversy/conflict	<input type="checkbox"/>	<input type="checkbox"/>
44. North/South conflict	<input type="checkbox"/>	<input type="checkbox"/>
45. Other (please explain below)	<input type="checkbox"/>	<input type="checkbox"/>

What frames were present in the third paragraph?

	Present (1)	Not Present (2)
46. Economic	<input type="checkbox"/>	<input type="checkbox"/>
47. Political	<input type="checkbox"/>	<input type="checkbox"/>
48. Ecology/science	<input type="checkbox"/>	<input type="checkbox"/>
49. Consequences	<input type="checkbox"/>	<input type="checkbox"/>
50. International relations	<input type="checkbox"/>	<input type="checkbox"/>
51. Scientific controversy/conflict	<input type="checkbox"/>	<input type="checkbox"/>
52. North/South conflict	<input type="checkbox"/>	<input type="checkbox"/>
53. Other (please explain below)	<input type="checkbox"/>	<input type="checkbox"/>

What frames were present in the fourth paragraph or below?

	Present (1)	Not Present (2)
54. Economic	<input type="checkbox"/>	<input type="checkbox"/>
55. Political	<input type="checkbox"/>	<input type="checkbox"/>
56. Ecology/science	<input type="checkbox"/>	<input type="checkbox"/>
57. Consequences	<input type="checkbox"/>	<input type="checkbox"/>
58. International relations	<input type="checkbox"/>	<input type="checkbox"/>
59. Scientific controversy/conflict	<input type="checkbox"/>	<input type="checkbox"/>
60. North/South conflict	<input type="checkbox"/>	<input type="checkbox"/>
61. Other (please explain below)	<input type="checkbox"/>	<input type="checkbox"/>

What solutions to global warming were mentioned in the headline?

- | | Present (1) | Not Present (2) |
|-------------------------------|--------------------------|--------------------------|
| 62. International treaties | <input type="checkbox"/> | <input type="checkbox"/> |
| 63. National policies | <input type="checkbox"/> | <input type="checkbox"/> |
| 64. Individual call to action | <input type="checkbox"/> | <input type="checkbox"/> |
| 65. Another solution | <input type="checkbox"/> | <input type="checkbox"/> |

If another solution was mentioned, briefly describe the solution

What solutions to global warming were present in the first paragraph?

- | | Present (1) | Not Present (2) |
|-------------------------------|--------------------------|--------------------------|
| 66. International treaties | <input type="checkbox"/> | <input type="checkbox"/> |
| 67. National policies | <input type="checkbox"/> | <input type="checkbox"/> |
| 68. Individual call to action | <input type="checkbox"/> | <input type="checkbox"/> |
| 69. Another solution | <input type="checkbox"/> | <input type="checkbox"/> |

If another solution was mentioned, briefly describe the solution

What solutions are present in the third paragraph?

- | | Present (1) | Not Present (2) |
|-------------------------------|--------------------------|--------------------------|
| 70. International treaties | <input type="checkbox"/> | <input type="checkbox"/> |
| 71. National policies | <input type="checkbox"/> | <input type="checkbox"/> |
| 72. Individual call to action | <input type="checkbox"/> | <input type="checkbox"/> |
| 73. Another solution | <input type="checkbox"/> | <input type="checkbox"/> |

If another solution was mentioned, briefly describe the solution

What solutions to global warming were present in the fourth paragraph or below?

- | | Present (1) | Not Present (2) |
|-------------------------------|--------------------------|--------------------------|
| 74. International treaties | <input type="checkbox"/> | <input type="checkbox"/> |
| 75. National policies | <input type="checkbox"/> | <input type="checkbox"/> |
| 76. Individual call to action | <input type="checkbox"/> | <input type="checkbox"/> |
| 77. Another solution | <input type="checkbox"/> | <input type="checkbox"/> |

If another solution was mentioned, briefly describe the solution

Appendix 2: Coding instructions

Coding instructions

Follow the following instructions to code each article:

1. Check the appropriate box next to **Coder** name.
2. In the spaces provided, write the three-digit **Story Number**.
3. For **Page Number**, write the page number of the story, which can be found under **SECTION** below the headline of the story. It will read as Pág. 3, Pág. 5, and etcetera.

Please write this in two digits: 01, 02, 10.

- 4-6. For Date of Publication, fill in the day, month and year that the article appeared in the spaces provided. Use two digits for each unit. For example, September 12, 2004 would be written as follows:

Month: 0 9

Day: 1 2

Year: 0 4

7. In the space provided, write the number of words in the story, which can be found under **LENGTH** below the headline of the story.
8. Check the box next to the correct response for **Sex of the reporter in the byline**. The choices are **Male**, **Female** and **Unknown**. Use Unknown for stories without a byline and in cases where you cannot be certain whether the reporter is male or female.

9-18. Check the box next to the appropriate **Section** in which the article appeared.

This can be found under **SECTION** below the headline.

19-21. Select the checkmark next to **Yes** or **No** for each of the questions.

22-61. Questions 22-61 ask you to identify frames in the headline, first paragraph, second paragraph, third paragraph, and the fourth paragraph and below. Select the checkmarks for either **Present** or **Not Present** for each option in the frame questions. Each option must either be marked at **Present** or **Not Present**, and multiple frames may be present in the same story. If a frame in the story does not match any of the listed categories, check the box next to **Other**, and describe the frame in the space provided.

62-77. Questions 62-77 ask you to identify solutions in the headline, first paragraph, second paragraph, third paragraph, and the fourth paragraph and below. Select the checkmarks for either **Present** or **Not Present** for each option in the solutions questions. Each option must either be marked at **Present** or **Not Present**, and multiple solutions may be present in the same story. If a solution in the story does not match any of the listed categories, check the box next to **Another solution**, and describe the solution in the space provided.

Appendix 3: Inter-coder reliability using Scott's Pi

	Headline	First paragraph	Second paragraph	Third paragraph	Fourth and below	Average
Economic frame	0.95	0.8	0.91	0.95	0.73	0.87
Political frame	0.95	0.9	0.86	0.95	0.91	0.91
Ecology frame	0.75	0.71	0.91	0.77	0.73	0.77
Consequences	0.86	0.72	0.73	0.73	0.82	0.77
International relations	0.85	0.71	0.95	0.91	0.87	0.86
Scientific controversy/conflict	1	0.95	1	1	0.9	0.97
North/South conflict	1	0.95	1	0.95	0.86	0.95
Other frame	0.71	0.8	0.91	0.77	0.78	0.79
International treaties solution	0.75	0.8	0.85	0.87	0.82	0.82
National policies solution	0.85	0.9	0.95	0.95	0.86	0.9
Individual call to action solution	0.95	0.85	0.95	1	0.77	0.9
Another solution	1	0.95	1	1	1	0.99
Total	0.89	0.84	0.92	0.9	0.84	0.88

Appendix 4: Scoring index for story intensity, frame intensity and solution intensity

Story intensity index

Story intensity takes into consideration the following variables: page number, number of words, whether the phrases “calentamiento global” or “cambio climático” were found in the headline, whether the phrases “calentamiento global” or “cambio climático” were found in the first paragraph, and whether the phrases “calentamiento global” and “cambio climático” were found in both the headline *and* the first paragraph.

The following equation will determine story intensity:

$$\frac{100-10(p)}{2} + .06(w) + (h) + (g) + (b) + \frac{(hg)}{5}$$

p=page number

*page numbers 10 and above will be entered into the equation as 10

w=number of words

h=phrases present in headline

* if the phrases are found in the headline, h=20, if not, h=0

g=phrases present in first paragraph

* if the phrases are found in the first paragraph, g=10, if not, g=0

b=phrases present below first paragraph

The purpose of this equation is to assign a number to each story that would identify how intensely it focused on global warming. The higher the number, the higher the focus on global warming. Using this equation yields these results for the following examples:

Page 1, 900 words, calentamiento global present in headline and first paragraph = 169

Page 1, 100 words, calentamiento global present in headline = 71

Page 5, 500 words, cambio climático in first paragraph = 65

Page 5, 100 words, cambio climático in headline = 75

Page 9, 100 words, calentamiento global in headline = 48.5

Page 9, 500 words, cambio climático in first paragraph = 62.5

Although the formula does not yield perfect results, it accurately portrays the intensity of coverage in each story by giving more points to lower numbered pages numbers, higher numbers of words within stories, the presence of key phrases in the headline or first paragraph, and the presence of these phrases in both the headline and first paragraph. The above results show a logical portrayal of story intensities.

Frame intensity index

Frame intensity is much easier to calculate. For each frame, presence in headline will count for the most points. Presence in the fourth paragraph and below receives the least amount of points.

Presence in headline (5 points)

Presence in first paragraph (4 points)

Presence in second paragraph (3 point)

Presence in third paragraph (2 points)

Presence in fourth paragraph and below (1 point)

Solutions intensity index

The solutions intensity index is similar to the frame intensity index, with presence in headline being worth the most points, and presence in fourth paragraph and below earning the least amount of points.

Presence in headline (5 points)

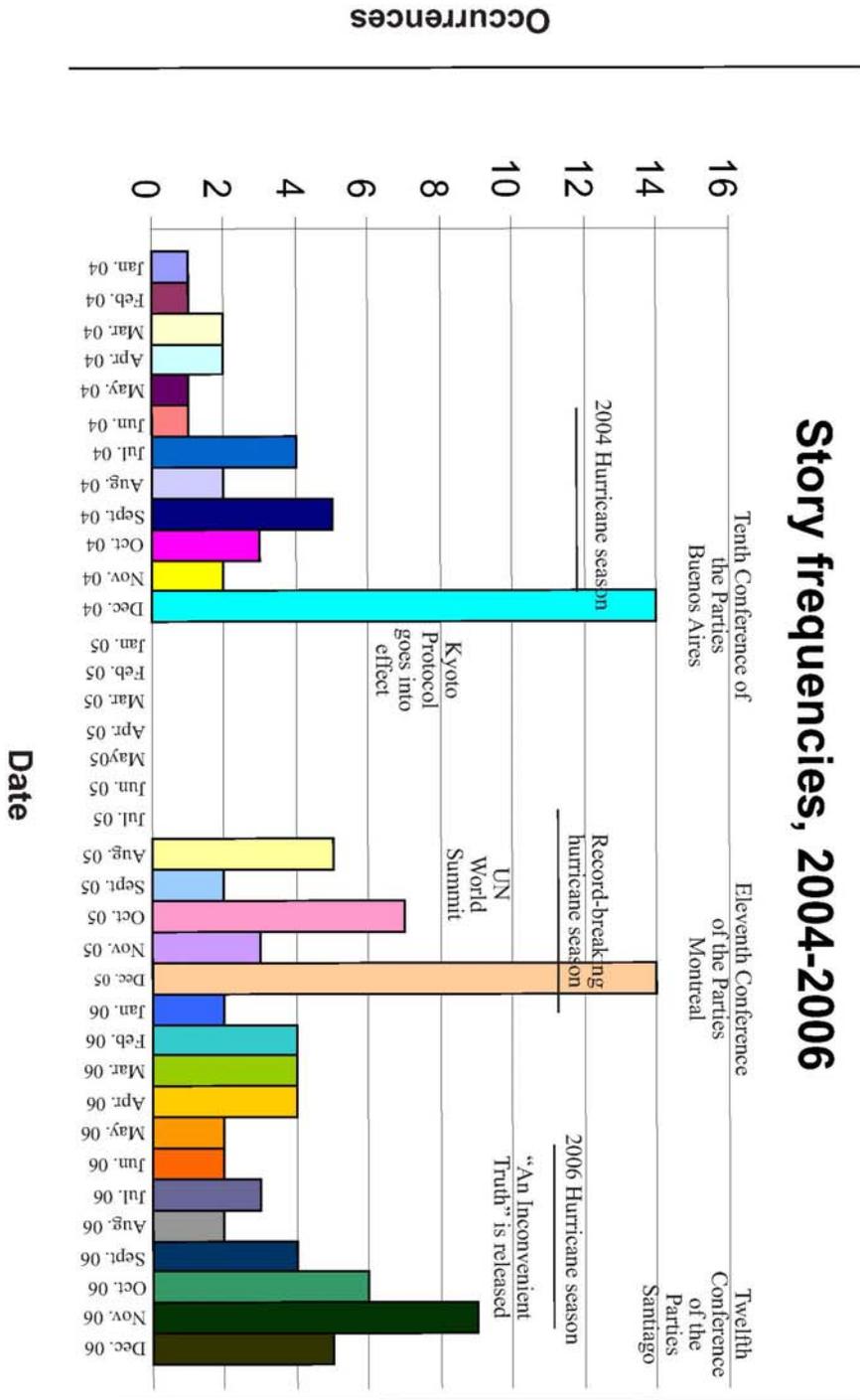
Presence in first paragraph (4 points)

Presence in second paragraph (3 points)

Presence in third paragraph (2 points)

Presence in fourth paragraph and below (1 point)

Appendix 5: Story frequency timeline



Appendix 6: Cross-tabulations between gender of reporter and presence of story frames/solutions

Presence of economic frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.130 ^a	3	.028
Likelihood Ratio	9.589	3	.022
Linear-by-Linear Association	4.065	1	.044
N of Valid Cases	116		

^a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .38.

Presence of political frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.069 ^a	3	.785
Likelihood Ratio	1.352	3	.717
Linear-by-Linear Association	.746	1	.388
N of Valid Cases	116		

^a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .30.

Presence of ecology/science frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.565 ^a	3	.464
Likelihood Ratio	2.801	3	.423
Linear-by-Linear Association	.212	1	.645
N of Valid Cases	116		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .34.

Presence of consequences frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.272 ^a	3	.518
Likelihood Ratio	2.656	3	.448
Linear-by-Linear Association	1.474	1	.225
N of Valid Cases	116		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .47.

Presence of international frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.036 ^a	3	.565
Likelihood Ratio	2.420	3	.490
Linear-by-Linear Association	1.562	1	.211
N of Valid Cases	116		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .47.

Presence of scientific controversy/conflict frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.548 ^a	3	.467
Likelihood Ratio	2.755	3	.431
Linear-by-Linear Association	2.393	1	.122
N of Valid Cases	116		

^a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .07.

Presence of North/South conflict frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.995 ^a	3	.392
Likelihood Ratio	3.181	3	.365
Linear-by-Linear Association	2.301	1	.129
N of Valid Cases	116		

^a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is .16.

Presence of the United States conflict frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.867 ^a	3	.276
Likelihood Ratio	4.089	3	.252
Linear-by-Linear Association	3.107	1	.078
N of Valid Cases	116		

^a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .10.

Presence of alternative energy/technology frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.306 ^a	3	.728
Likelihood Ratio	1.392	3	.707
Linear-by-Linear Association	.759	1	.384
N of Valid Cases	116		

a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .06.

Presence of entertainment frame and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.543 ^a	3	.672
Likelihood Ratio	1.718	3	.633
Linear-by-Linear Association	.731	1	.392
N of Valid Cases	116		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .13.

Presence of other frames and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.828 ^a	3	.281
Likelihood Ratio	4.059	3	.255
Linear-by-Linear Association	.935	1	.334
N of Valid Cases	116		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .33.

Presence of international treaties solution and gender

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.296 ^a	3	.040
Likelihood Ratio	9.108	3	.028
Linear-by-Linear Association	2.864	1	.091
N of Valid Cases	116		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .41.

Presence of national policies solution and gender

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.389 ^a	3	.708
Likelihood Ratio	1.700	3	.637
Linear-by-Linear Association	.410	1	.522
N of Valid Cases	116		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .30.

Presence of individual call to action solution and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.590 ^a	3	.899
Likelihood Ratio	.741	3	.863
Linear-by-Linear Association	.446	1	.504
N of Valid Cases	116		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is .16.

Presence of another solution and gender of reporter

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.718 ^a	3	.437
Likelihood Ratio	2.671	3	.445
Linear-by-Linear Association	.244	1	.621
N of Valid Cases	116		

^a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is .16.

