

The News about Climate Change:
A Critical Analysis of Canadian Newspaper Coverage of Climate Change

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Abstract

This research involved an analysis of Canadian newspaper coverage of climate change between 2005 and 2010. Drawing on the theory of critical discourse analysis, and the method of content analysis, this research identified the major and minor subject themes, the most and least frequently cited information sources and the dominant ideological stances reflected in *The Globe and Mail*, *The National Post* and *The Toronto Star* reporting on climate change. Political figures were the primary information source, and politics, mitigation and economics were the major themes. Science was also a major theme in *The Post*, which emphasized scientific uncertainty, an emphasis not present in *The Globe* or *The Star*. Critical analysis revealed support for different values and political preferences, indicative of a neoliberal capitalist ideology in *The Post*, a social democratic ideology in *The Star*, and a swaying between the two ideological poles in *The Globe*.

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Chapter 1: Introduction

Climate Change and the Media

The Intergovernmental Panel on Climate Change identified with greater than 90% certainty that humans are responsible for most of the global warming that has occurred in the last 50 years (IPCC, 2007). Western society's enthusiastic embrace of industrialization is at the heart of the human impact on the climate. We place tremendous value on material advancement, economic growth and the freedom to consume without restriction, for which we have become dependent on burning fossil fuels. The side effect of our dependence is the accumulation of heat-trapping greenhouse gases in the atmosphere, mainly carbon dioxide, the principal contributor to climate change.

The impacts of climate change affect both ecological integrity and human well-being. Sea levels are rising due to melting glaciers and thermal expansion of warmer seawater, threatening coastal communities and wetlands (Parry, Canziani, Palutikof, van der Linden & Hanson, 2007). The frequency of severe weather events, including heat waves, drought, heavy rain and floods is increasing, impacting growing seasons and crop productivity (Parry et al., 2007). Species are at increased risk of extinction as changes in temperature impact their habitat and ability to survive and reproduce (Parry et al., 2007). For example, warmer seawater temperatures and ocean acidification are damaging coral reefs and other marine life and shrinking Arctic sea ice is changing the habitat for polar bears, seals, walruses and other sea mammals (Parry et al., 2007).

Poor and marginalized communities, ironically, those that bear the least responsibility for climate change, are especially vulnerable to the impacts of climate change (Parry et al., 2007). In particular, climate change is threatening the way of life of

many of the world's indigenous communities who are so dependent upon and have such a close relationship with the land on which they live (United Nations Permanent Forum, 2006). For example, in Canada the Inuit are facing the direct consequences of climate change. Traditionally dependent on hunting polar bears, walrus and seals as the basis of their cultural and social identity, melting sea ice is changing the availability of these traditional food sources and the ability of the Inuit to safely travel by ice (United Nations Permanent Forum, 2006). In the words of one Inuit leader, "...the trails have changed, the animals are changing, global warming is scaring people to go hunting because the land has changed" (as cited in Wadden, 2011).

Protecting ecological and human well-being will require fundamental changes to the value we place on material advancement and economic growth (Trumbo & Shanahan, 2000):

Climate change presents a problem that is beyond the capability of the physical sciences alone to address. The conditions that brought us climate change, as well as the conditions surrounding future options for dealing with it, are embedded in socioeconomic structures and value systems, embracing material advancement and fossil fuels – structures that are highly resistant to change. (Trumbo & Shanahan, 2000, p. 200)

Change will require shifts in everyday practices that Western society takes for granted, such as reducing power consumption, vehicle use and air travel and may therefore have unpopular personal and political effects: "Precisely because climate change is directly related to how we live, the issue strikes raw nerves" (Wilson, 2000a, p. 202).

The media is an important source of information about climate change for the general public and for policymakers (Antilla, 2005, Boykoff & Rajan, 2007; Carvalho & Burgess, 2005): “Communication will play a pivotal role in how governments and societies face this issue and the changes it may bring. The competing stakeholders [will] fight the public opinion war on the battlefield of the mass media” (Trumbo & Shanahan, 2000, p. 200). Competing stakeholders commonly represented in the media include politicians, scientists, environmentalists, industry and business representatives and independent think-tank representatives. Stakeholders present competing claims about climate change, which interplay in the media and provide information for people to draw on in constructing their own understanding of climate change (Shanahan & McComas, 1999; Stamm, Clark & Eblacas, 2000; Wilson, 1995, 2000a). The information presented by the media can serve to either promote or inhibit change to our socioeconomic structures and value systems.

Since climate change gained prominence on the global media agenda in 1988 (Shanahan & McComas, 1999a), scientific consensus has only increased (IPCC, 2007). However, a body of research reveals that news coverage has exaggerated the scientific debate and downplayed the scientific consensus (e.g., Boykoff & Boykoff, 2004; Gelbspan, 2004). Further, much mainstream news coverage has been bereft of social, political or economic context, has been ideologically constrained by particular worldviews and has been dominated by the voices of political and scientific authorities (Boykoff & Boykoff, 2004; Carvalho & Burgess, 2005; Dispensa & Brulle, 2003; Wilkins, 1993).

While media audiences are addressed as recipients of factual information about social, political, economic and environmental matters (Jensen, 1990), what they receive are social constructions of reality, “embedded with certain world views, judgments and preferences” (Carvalho, 2007, p. 225). Media do not just present facts or mirror reality; rather, they “constitute versions of realities in ways which depend on the social positions and interests and objectives of those who produce them” (Fairclough, 1995, pp. 103-104). As most people learn what they know about climate change from the media, understanding the way that media represent the issue is an important area of research.

Research Objective

The objective of this thesis is to contribute to a greater understanding of Canadian media representations of climate change. Most research on media coverage of climate change has been conducted in the United States and the United Kingdom, while there is a dearth of such research in Canada (Meisner, 2000; Smith, S., 2000). Given the role that media play in shaping public knowledge and perception of the issue and influencing policymakers (Bell, 1994; Corbett & Durfee, 2004; Dispensa & Brulle, 2003; Krosnick, Holbrook, & Visser, 2000; Weingart, Engels & Pansegrau, 2000; Wilson, 1995, 2000a), I identified Canadian media coverage of climate change as warranting more analysis. To this end, I analyzed three newspapers that represent a broad ideological spectrum, the conservative *National Post*, the liberal *Toronto Star* and the centrist *Globe and Mail* over the time periods of January, 2005 to June, 2007 and November, 2009 to January, 2010.

Between 2005 and 2010, national and international events and milestones have provided fodder for media coverage of climate change and elevated the issue on the agenda of the Canadian public. National milestones include the release of the Liberal’s

Project Green: Moving Forward on Climate Change - A Plan for Honouring our Kyoto Commitment in April, 2005 and the introduction of the Conservative's *Clean Air Act* into the legislature in October, 2006. International milestones include the *Kyoto Protocol to the United Nations Framework Convention on Climate Change* coming into effect in 2005, the release of *An Inconvenient Truth* and *The Stern Review on the Economics of Climate Change* in 2006, the release of the *Intergovernmental Panel on Climate Change Fourth Assessment Report* in 2007 and the *United Nations Climate Change Conference* held in Copenhagen in 2009.

Research Questions

The research questions addressed in this study were:

1. What are the major and minor themes in *The Globe and Mail*, *The National Post* and *The Toronto Star* coverage of climate change? What are the similarities and differences between the three newspapers?
2. Who are the most, and least, frequently cited sources of information in *The Globe and Mail*, *The National Post* and *The Toronto Star* coverage of climate change? What are the similarities and differences between the three newspapers?
3. What are the ideological standpoints reflected in *The Globe and Mail*, *The National Post* and *The Toronto Star* coverage of climate change? How do these standpoints appear to influence the major and minor themes and the frequently and infrequently cited voices in each paper?

Theoretical Framework

The theoretical framework used in this research is Critical Discourse Analysis (CDA). It is both a method and a theory. Through CDA, researchers study and analyze

discourse, that is the language used in speech and writing (i.e. newspaper texts, radio broadcasts, television broadcasts). CDA researchers are interested in the relationship between language use and the social exercise of power:

CDA is concerned with studying and analyzing written texts and spoken words to reveal the discursive sources of power, dominance, inequality, and bias and how these sources are initiated, maintained, reproduced, and transformed within specific social, economic, political, and historical contexts. It tries to illuminate ways in which the dominant forces in a society construct versions of reality that favor their interests. (McGregor, n.d., para. 5)

I was interested in the relationship between language use in media representations of climate change and the exercise of social power, as it relates to the ideological stances represented in Canadian newspaper coverage of climate change.

Reflexivity

One of the tenants of CDA is that it aims to reveal and change discursive sources of power, dominance, inequality, and bias. Critics argue that the desire of CDA researchers to effect social change interferes with the validity of the results (Haig, 2004; Scheuer, 2003). In addressing this critique, proponents argue that reflexivity is an important agenda for critical discourse analysts (Rogers, Malancharuvil-Berkes, Mosley, Hui & O'Garro Joseph, 2005). Reflexivity "requires an awareness of the researcher's contribution to the construction of meanings throughout the research process, and an acknowledgment of the impossibility of remaining 'outside of' one's subject matter while conducting research" (Larkin, n.d., para 1). Therefore, it is important that I share my own position as the researcher.

I identify as an environmentalist, having worked two years as an environmental educator in British Columbia and five years as an environmental activist in Nova Scotia, and am dedicated to making personal and political choices that promote a healthy environment and quality of life for all beings. I affirm the mainstream consensus climate science of the Intergovernmental Panel on Climate Change and advocate government intervention to bring about urgent and mandatory action to reduce Canadian sources of greenhouse gas emissions. Although I aimed to be as objective as possible in this research, my own experience and worldview inevitably influenced and informed this research. For example, as I lean towards a social democratic and away from a neoliberal capitalist perspective of the world, it was easier for me to critique the representation of climate change in *The Post*, which reflects a neoliberal capitalist ideology, than it was for me to critique the representation of climate change in *The Star* or *The Globe*.

Limitations of Research

Content analysis.

While the systematic sampling strategy was an effective way to narrow down the entire data set of 3,262 articles to a manageable sample size of 246 articles, it did not encompass the complete coverage of all news events by each newspaper. Therefore, it is possible that the sampling strategy used missed data that would have resulted in different conclusions, especially conclusions about each newspaper's view on a particular news event. However, the long time period – 39 months – to which the systematic sampling strategy was applied, increased the reliability and accuracy of the results and conclusions about the overall trends in each newspaper's coverage of climate change.

Despite narrowing the data set to a manageable size of 246 articles, coding the data involved extreme attention to detail and was time consuming. Given the lack of resources available for this research, it was not possible to recruit other coders to ensure inter-coder reliability. If I were to do it again, I would reduce the number of themes for the coding schedule or I would narrow the data sample by choosing two to three significant news events and analyzing the articles pertaining only to those particular events; for example, all of the articles about climate change printed by each newspaper prior to, during and after the 2009 United Nations Climate Change Conference.

Critical discourse analysis.

It was beyond the scope of this research project and the expertise of the researcher to conduct a linguistic analysis of the texts; however, such an analysis would have provided a deeper and more nuanced understanding of the ideological differences between each newspaper.

Contributions of Research

This thesis contributes to the growing body of analytical research on media coverage of climate change, particularly in the United States and the United Kingdom, but also in New Zealand, Australia, Germany and France (Boykoff & Boykoff, 2004, 2007; Carvalho, 2005, 2007; Dispensa & Brulle, 2003; Shanahan & McComas, 1999; Weingart, Engels & Pansegrau, 2000). Its primary contribution is in the focus on Canadian newspapers; few studies have analyzed the coverage of climate change in Canadian media, and fewer still have applied critical discourse analysis as an analytical research method.

Chapter 2: Literature Review

Public knowledge, opinions and attitudes about environmental issues are heavily influenced by the media (Allan, Adam & Carter, 2000; Anderson, 1997; Burgess, 1990; Hansen, 1991; Nelkin, 1995; Shanahan & McComas, 1999b; Weingart et al., 2000; Wilson, 1995). This is especially true for “unobtrusive or invisible” (Corbett & Durfee, 2004, p. 130) issues such as climate change, with which most people lack direct, everyday experience that would contribute to an individual’s understanding or opinion of the issue (Wilson, 2000a).

In turn, media coverage of climate change is influenced by many factors, including the current economic, political and social contexts, the internal demands of media organizations, professional values and information sources (Anderson, 1997; Boykoff & Boykoff, 2004; Dispensa & Brulle, 2003; Edwards, 1996). These factors can be thought of as ‘filters’ that reject some stories about climate change and allow others to pass (Boykoff & Boykoff, 2004; Dispensa & Brulle, 2003; Edwards, 1996). While unknown to the average reader, these filters act to limit the ideas to which the public has access to generate questions, make new understandings and connections, and discuss solutions in reaction to climate change (Edwards, 1996). For example, the media are a nexus for the interaction of competing stakeholders and their viewpoints on climate change, but certain groups and individuals have more power and means to access the media than others, and therefore have more control over what gets said about climate change (Cottle, 1993).

Given its influence on public knowledge and opinion about climate change, the media sector has tremendous power to direct policymaking and social change

(Fairclough, 1995). Public policy about climate change depends on public awareness, concern and opinion, which are influenced by the mass media (Yin, 1999). Conversely, media articulate public opinion and thus play an important role in policymaking (Nelkin, 1995). In Germany, extensive media coverage of climate change since the late 1980's has created public concern and a call for political commitment (Wiengart et al., 2000). In the United States, it has been argued that the informational bias in coverage of climate change in the United States, in which both the majority of scientists who have developed consensus on anthropogenic climate change and the climate skeptics are given equal coverage, has created space for the American government to shirk responsibility for, and delay action on, climate change (Boykoff & Boykoff, 2004, 2007). Thus, media coverage of climate change has been acknowledged for increasing public awareness and political attention, but also accused of putting the brakes on social change (Corbett & Durfee, 2004; Dispensa & Brulle, 2003; Hansen, 1991; Shanahan & McComas, 1999b; Wilkins, 1993).

In short, media have tremendous social power and play an integral role in public understanding of climate change, policymaking, and the advancement or inhibition of social change (Dispensa & Brulle, 2003; Trumbo & Shanahan, 2000). In this context, analysis of the content of Canadian media coverage on climate change is exceedingly important.

Media Coverage of Climate Change: Existing Research

There have been a number of studies on media coverage of climate change, predominantly focused on press coverage in the United States and the United Kingdom (Antilla, 2005; Bell, 1994; Boykoff, 2007a, 2007b; Boykoff & Boykoff, 2004, 2007;

Carvalho, 2005, 2007; Carvalho & Burgess, 2005; Corbett & Durfee, 2004; Dispensa & Brulle, 2003; Meisner, 2000; Shanahan & McComas, 1999; Shanahan, 2000; Trumbo, 1996; Weingart, Engels & Pansegrau, 2000; Wilkins, 1993)¹. Some of these have been snapshot studies, investigating media coverage of the issue in a short time period, while others have investigated the development of the issue in the media over time.

Research has revealed a number of recurring themes in media coverage of climate change: it has ebbed and flowed over time; it has been biased towards scientific debate and controversy; it has been strongly influenced by particular information sources, predominantly politicians and scientists; the major themes of coverage have been science, consequences, mitigation policies and economics; it has been event-centred, that is tied to science, political and severe weather events, and void of social, economic and political context; and it has been influenced by the ideological stances of each newspaper.

Ebbs and flows over time.

Studies have documented ebbs and flows in the quantity of newspaper coverage over time and corresponding changes in the dominant themes of coverage over time (Boykoff, 2007b; Boykoff & Boykoff, 2007; Carvalho, 2005, 2007; Carvalho & Burgess, 2005; Shanahan & McComas, 1999; Shanahan, 2000; Trumbo, 1996; Wilkins, 1993). From the early to mid- 1980's, references to climate change in the media were scarce. In

¹ Initially, my analysis covered January, 2005 to June, 2007 and did not include the period between November, 2009 and January, 2010. I completed the majority of my writing of this literature review in accordance with the initial period of analysis, therefore, I have included few references to studies that were published after 2007.

the articles that were published, the focus was on the scientific consensus of climate change, its causes and its consequences. Scientists and scientific journals were the main sources of information (Carvalho, 2005; Carvalho & Burgess, 2005; Shanahan & McComas, 1999; Trumbo, 1996; Wilkins, 1993).

Media coverage of climate change gained traction in the late-1980's, when the issue became increasingly politicized. There was a sharp rise in the coverage of climate change by British and American daily newspapers (Boykoff & Boykoff, 2007; Carvalho, 2005, 2007; Carvalho & Burgess, 2005; Shanahan & McComas, 1999; Trumbo, 1996; Wilkins, 1993). This was spurred on in the United States by the concurrence of the worst drought the country had experienced in fifty years and NASA scientist James Hansen's testimony to Congress that he was "99% certain...that warmer temperatures were caused by the burning of fossil fuels and not solely a result of natural variation" (Shabecoff, 1988 in Boykoff & Rajan, 2007). In Britain, the sharp rise in news coverage of climate change was catalyzed by then Prime Minister Margaret Thatcher's famous speech to the Royal Society in which she declared that "humanity had 'unwittingly begun a massive experiment with the system of the planet itself'" and in so doing, catapulted climate change from the scientific arena into the political arena (Carvalho, 2005, p. 4).

The rise in coverage was sustained between 1988 and the early 1990's. The focus shifted to political debate as the international efforts and economics costs required to solve the problem became more apparent (Shanahan & McComas, 1999). Political actors replaced scientists as the main sources of information (Carvalho, 2005; Carvalho & Burgess, 2005; Shanahan & McComas, 1999; Wilkins, 1993). Between 1991 and 1996 there was a sharp fall in press coverage of climate change due to competing issues, such

as the war in Iraq (Anderson, 2009). Coverage increased again in 1997, when the *Kyoto Protocol* mandated legally-binding targets for the reduction of greenhouse gases (Boykoff & Boykoff, 2007; Carvalho, 2005; Shanahan, 2000). Coverage then steadily increased between 2000 and 2006, with peaks in coverage corresponding to key political or scientific events, such as the release of *The Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report* in 2001, Al Gore's *An Inconvenient Truth* in 2006 and *The Stern Review on the Economics of Climate Change* in 2006 (Boykoff, 2007b; Boykoff & Boykoff, 2007; Carvalho, 2005; Carvalho & Burgess, 2005).

Over the years, the scientific consensus on climate change has only become more certain; the IPCC identified with greater than 90% certainty that humans are responsible for most of the global warming that has occurred in the last 50 years (IPCC, 2007). Yet, research has revealed that since the early 1990's there has been a heavy bias in the media towards scientific debate and controversy (Boykoff & Boykoff, 2004).

Bias towards scientific controversy.

Many researchers have found an informational bias in media coverage of climate change that emphasizes scientific debate and controversy and contradicts the growing international scientific consensus on anthropogenic climate change and the need for immediate and mandatory action (Antilla, 2005; Boykoff, 2007a; Boykoff & Boykoff, 2004, 2007; Carvalho, 2007; Dispensa & Brulle, 2003; Gelbspan, 2004; Wilson, 2000b). This is especially true in American newspaper coverage of climate change.

Boykoff and Boykoff (2004, 2007) studied the influence of journalistic norms on American newspaper coverage of climate change, demonstrating that journalists' adherence to the value of providing a balance of viewpoints when writing news stories on

climate change has actually resulted in a misrepresentation of the scientific consensus. Giving both sides equal attention is often a substitute for validity checks because the typical journalist does not have the time or the scientific understanding to verify the legitimacy of the different views on the climate change issue (Boykoff & Rajan, 2007; Smith, J., 2005; Wilson, 2000b). This can lead to unbalanced or biased reporting if the article gives undeserving attention to the views held by climate skeptics, which are a small minority of the climate science community.

In their 2004 research, Boykoff and Boykoff analyzed articles from *The New York Times*, *The Washington Post*, *The Los Angeles Times* and *The Wall Street Journal* between 1988 and 2002. Whereas the international scientific consensus is that human actions are contributing to climate change, 53% of the articles gave equal attention to the view that humans are contributing to global climate change and the view that it is a natural phenomenon, while only 35% of the articles emphasized anthropogenic contributions to global warming (Boykoff & Boykoff, 2004). In contrast to the consensus of the international scientific community that “immediate and mandatory actions are necessary” to mitigate climate change, 78% of the stories gave equal attention to the view that courses of action should be either cautious and voluntary or urgent and mandatory. Only 11% of the stories focused on the need for immediate and mandatory action (Boykoff & Boykoff, 2004, p. 131). To the public, this ‘balanced’ reporting creates an impression that there is a debate as to whether anthropogenic climate change is an issue (Corbett and Durfee, 2004).

Corbett and Durfee (2004) applied ‘controversy’ and ‘context’ treatments to newspaper articles about new scientific evidence that an Antarctic ice sheet was shrinking

and then measured readers' perceptions of the scientific certainty of climate change. In the articles treated with controversy, the researchers included a paragraph that presented the views of scientists who disagreed with the evidence, and in the articles treated with context, the researchers included a paragraph that placed the new evidence in the context of many previous studies that found Antarctic ice was thinning. The emphasis on scientific controversy decreased readers' certainty about whether climate change is occurring or human actions are contributing to climate change, while the provision of context increased readers' perceptions of scientific certainty.

Dispensa and Brulle (2003) found a similar trend to Boykoff and Boykoff (2004). They compared the economies, major industries and media coverage of climate change in the United States, Finland and New Zealand. Then they contrasted the media coverage of climate change in these three countries to the coverage of climate change in two international scientific journals. They found that in the United States the coverage systematically includes the opinion of climate skeptics and interprets the science of climate change as controversial, whereas the newspapers in the other two countries portray the story of scientific consensus that is found in the international scientific journals. Only 43% and 36% of the articles analyzed, respectively, in the *New York Times* and the *Washington Post* stated support of the theory of anthropogenic global warming, while 100% and 89% of the articles, respectively, in Finland's *Helsingin Sanomat*, and New Zealand's *Herald* stated support for the theory of anthropogenic global warming (Dispensa & Brulle, 2003). In the scientific journals *Nature* and *Science*, 88% and 73% of articles respectively stated support for anthropogenic global warming (Dispensa & Brulle, 2003).

The authors interpreted their findings as a reflection of the differences between the major industries in the three countries. Although Finland, New Zealand and the United States are all driven by free market economies, only the United States has a significant fossil fuel industry that would be impacted by efforts to mitigate climate change:

...the United States economy would have to undergo a major transformation, a shift away from reliance on petroleum and coal as its major energy source.

Therefore, there is a vested interest on the part of the petrochemical industries to extend the debate and to sow uncertainty regarding the overwhelming scientific consensus regarding global warming. (Dispensa & Brulle, 2003, p. 98)

Several researchers have examined how fossil fuel lobby groups have exploited the media to refute the IPCC consensus science on climate change (Anderson, 2009). Boykoff & Boykoff (2007) conclude that media bias towards balanced coverage has exaggerated controversy, failed to emphasize the scientific consensus of the IPCC and in effect has created a political space for governments to delay action regarding global warming.

Information sources.

There is tremendous competition among key stakeholders – fossil fuel industry, politicians, environmental groups, economic think tanks, scientists – to ‘control’ the issue of climate change as it is communicated through the media to the public. Journalists tend to rely on a few well-known information sources, whom they can rely upon to be available and whom they can trust to provide legitimate information (Wilson, 2000b). Social actors who enjoy privileged access to the news media are known as official

sources or primary definers (Allan, Adam & Carter, 2000; Anderson, 1997). In the case of environmental issues, these are most commonly scientists, government representatives, and interest group representatives (Allan et al., 2000; Anderson, 1997; Hansen, 1991). Generally, these actors enjoy privileged access to the news media over sources like environmental pressure groups, social scientists or laypeople (Allan et al., 2000; Anderson, 1997; Hansen, 1991).

Climate skeptics.

A number of researchers have shown that climate skeptics have gained privileged access to the media, especially in the United States (Antilla, 2005; Boykoff, 2007a; Dispensa & Brulle, 2003; Gelbspan, 2004). Antilla (2005) conducted a frame analysis of newspaper articles that contained scientific content relating to climate change from 255 newspapers across the United States. She found that articles, which framed climate change in terms of debate, controversy or uncertainty were abundant, and that many of the newspapers used climate skeptics, with known ties to the fossil fuel industry as key sources of information (Antilla, 2005). For example, representatives of the conservative think-tank Competitive Enterprise Institute, which has received contributions from Exxon Mobil for the development of its book, *Global Warming and Other Eco-Myths: How the Environmental Movement Uses False Science to Scare us to Death*, gained repeated access to the media. The United Kingdom's Royal Society and the United States Union of Concerned Scientists found that Exxon Mobil contributed millions of dollars to organizations that challenge the scientific consensus on climate change (Anderson, 2009).

Gelbspan (2004) exposed the public relations campaigns of the oil and coal companies, which funded climate change skeptics to refute claims of certainty about

climate change. For example, until 2000, a group of scientists funded by Western Fuels Corporation published a biweekly report, *The World Climate Report*, which criticized the consensus of the IPCC and was sent directly to hundreds of American journalists. The industry has been relentless in its efforts to control the public debate about climate change:

... during the early years of the 1990's, the fossil fuel lobby insisted that global warming was not happening. In the face of incontrovertible findings by the scientific community, the fossil fuel industry then conceded climate change is, indeed, happening but that it is so inconsequential as to be negligible. When new findings indicated that warming is, indeed, significant, the spokespeople for the coal and oil industries then put forth the argument that global warming is good for us. (Gelbspan, 2004, p. 23-24).

The efforts of the fossil fuel industry public relations campaigns are facilitated by professional journalistic practices. Through balanced reporting, the media has amplified the claims of uncertainty by climate skeptics without providing the context that these claims have been marginalized in the climate science community.

Political figures and government representatives.

Politicians and government officials have also played a powerful role in shaping the coverage of climate change by the press (Carvalho & Burgess, 2005; Wilkins, 2003). Three reasons have been suggested for the predominance of government officials as news sources: government sources are almost always available and can accommodate journalists' time and resource constraints; government sources are generally thought to be

credible; and government sources often have access to informed personnel, such as government scientists (Miller & Reichert, 2000).

In the early years of climate change coverage, scientists were the dominant sources of information for news coverage of climate change (Carvalho, 2005; Carvalho & Burgess, 2005; Shanahan & McComas, 1999; Trumbo, 1996; Wilkins, 1993). However, when political figures began paying attention to and debating the issue, it became politicized. Consequently, climate change became increasingly prominent in the media. Wilkins (1993) found that 51% of the climate change stories that she analyzed were connected to specific political events and that government officials were a top source of information; industry representatives and representatives of special interest groups, such as environmental organizations or auto manufacturers, were also cited frequently, but were secondary to political sources of information (Wilkins, 1993). Similar to Wilkins, Carvalho & Burgess found that the British press coverage of climate change was strongly linked to a political agenda and particularly to public announcements and discursive strategies of prime ministers and top government figures (Carvalho & Burgess, 2005).

Minor and absent sources.

Wilkins contends, "...one had to be in a position of power, be it scientific or political, to have a voice in the legitimate news coverage surrounding the greenhouse debate" (Wilkins, 1993, p. 79). In her analysis, social scientists were sourced in only 2% of the stories, and the "non-expert" voice was almost absent; the voices of "lay people" were only published in the opinion pages (Wilkins, 1993, p. 79). She argued that many important questions related to the global warming were not addressed in "legitimate" news coverage but were addressed in letters to the editor:

... letters to the editor from 'average' people were often lively, intelligent and spoke much more directly about the value questions surrounding [global warming] - distribution of resources, impact on the developing world, where money is most appropriately spent, the ethical implications of various political policies and technology choices ... values implicit in greenhouse choices ... were almost never raised in straight news and feature accounts. (Wilkins, 1993, p. 79)

Similarly, she argues that social scientists can add much to the debate about values and climate change, such as by asking questions about the social implications of scientific uncertainty, environmental risk and human choices. In his investigation of how news media organizations make decisions about reporting climate change risk, Smith interviewed news managers. One manager explained that social scientists are viewed as unreliable information sources: "[It's] seriously dodgy, they just add the word science on the end to seem more legitimate" (Smith, J., 2005, p. 1475). Sources, which are capable of explaining the broader political, economic and cultural contexts of environmental risks, have been shown to be "routinely displaced from journalistic hierarchies of credibility" (Allan et al., 2000, p. 9).

Major themes.

Over time the dominant themes in news coverage of climate change have included new scientific evidence and scientific controversy; the causes, consequences and implied dangers of climate change, such as severe weather events; domestic politics, international relations and policy measures to address climate change; and the economic impact of climate change mitigation (Carvalho, 2005, 2007; Jones, 2006; Meisner, 2000; Shanahan, 2000; Shanahan & McComas, 1999; Trumbo, 1996; Wilkins, 1993).

The major themes in news coverage of climate change have been integrally linked to the dominant sources of information. For example, in the mid 1980's, scientists and scientific journals were the dominant sources of information for media coverage of climate change, and the focus was on the scientific consensus of climate change, its causes and consequences. But by the late 1980's, politicians and interest groups replaced scientists as the dominant sources of information and the focus in coverage shifted to controversy over the scientific proof of climate change and political debates about the justification for action or inaction (Carvalho, 2005, 2007; Shanahan & McComas, 1999; Trumbo, 1996; Wilkins, 1993). Both Wilkins (1993) and Carvalho (2005) found that a majority of climate change stories were connected to specific political events and that politicians and government officials were prominent information sources. Also, as discussed in the previous section, the access of climate skeptics to the media largely contributed to the theme of scientific controversy in news coverage of climate change.

Event-centred.

News stories about climate change have generally been tied to events such as new scientific findings or reports, signs of consequences, i.e. severe weather, political speeches and major international conferences (Carvalho, 2005; Carvalho & Burgess, 2005; Shanahan & McComas, 1999a; Smith, J., 2005; Wilson, 2000a). Due to time and scheduling pressures, and competition for space within a newspaper, journalists have to be highly selective in their choice of story to ensure that it will be deemed newsworthy by the editors (Allan et al., 2000). In aiming for newsworthiness, journalists tend to cover environmental issues that are event-centred, novel and dramatic (Allan et al., 2000). In and of itself, climate change is not newsworthy, but novel and significant climate change-

related events are. For example, James Hansen testified before the American Congress three times previous to his testimony in 1988, but his testimony in 1988 coincided with a dramatic and severe weather event - the height of the worst drought the country had experienced in fifty years. Thus, Hansen's 1988 testimony ignited a blaze of media coverage about global warming, including front-page stories in *The New York Times* and *Washington Post* (Mazur, 1998; Shanahan & McComas, 1999a; Wilson, 2000a).

As media coverage of climate change has been largely tied to events, it has generally been void of social, economic and political context. Questions about the root of the problem – economic, social and political practices that generate greenhouse gases - were generally not emphasized or reported on (Wilkins, 1993). It has largely been interpreted as a technical problem, neglecting the fact that it is also a problem of human values and lifestyles (Meisner, 2000). Technological progress, such as increased vehicle efficiency, and policy and economic measures, such as mandatory or voluntary emissions reductions targets and emissions trading mechanisms, have been emphasized as solutions to climate change over changes to our values, lifestyles and economy (Dispensa & Brulle, 2003; Meisner, 2000; Wilkins, 1993). Further, an emphasis has been placed on the costs involved to address climate change and the subsequent risks to business and industry, (Nissani, 1999), rather than the potential of climate change mitigation to benefit the economy.

Despite these generalizations, media coverage of climate change is not generic; there are differences in the way climate change issues and events have been represented among newspapers (Brossard, Shanahan & McComas, 2000; Carvalho, 2005, 2007; Carvalho & Burgess, 2005; Dispensa & Brulle, 2003). Carvalho (2005, 2007) diverged

from most of the previous research on newspaper coverage of climate change by “systematically examin[ing] the differences between news organs” (Carvalho, 2007, p. 239). Carvalho argues, “Such differences are very significant as they correspond to particular worldviews that different audiences are continuously fed and go on subscribing to” (Carvalho, 2007, p. 239).

Influence of ideological stances.

Using critical discourse analysis as an analytical framework, Carvalho (2005, 2007) and Carvalho and Burgess (2005) compared simultaneous depictions of climate change in the British “quality press” and followed the evolution of climate change depictions in each newspaper over time (Carvalho, 2007, p. 223). They selected *The Times*, *The Independent* and *The Guardian* because they span the political spectrum and “have an important power of agenda-setting for the public, other media, politicians and decision-makers” (Carvalho & Burgess, 2005, p. 1460). In comparing the divergent ways that the three British newspapers interpreted science, politics and risk in relation to climate change, Carvalho (2005, 2007) and Carvalho and Burgess (2005) found that these interpretations were shaped by each paper’s ideological standpoint.

Carvalho defines ideology as “a system of values, norms and political preferences, linked to a program of action vis-à-vis a given social and political order” (2007, p. 225). She claims, “forms of filtering and reinterpreting information about climate change are rooted in and reproduce profoundly divergent value systems” (Carvalho, 2007, p. 239). In each of Carvalho’s studies, *The Times* reflected a neoliberal ideology, ‘voicing’ preference for a non-regulatory government, a free market and individualism. *The Guardian* reflected a social democratic ideology, ‘voicing’ preference

for a regulatory government, a precautionary approach to climate change, global equity and socially shared responsibility. *The Independent* swayed between the two poles (Carvalho, 2005, 2007; Carvalho & Burgess, 2005).

For example, Carvalho (2007) examined the role of ideology in the representation of scientific uncertainty by the British press between the years of 1985 and 2001. In the early years of her analysis, from 1985 to 1988, the press drew on scientists and scientific journals as the main sources of information and focused on the consensus of climate change science and its anthropogenic origins. However, as the range of necessary political, social and economic transformations to address climate change became evident, the issue became politicized and controversies about potential action or inaction in response to climate change were increasingly common in media coverage (Carvalho, 2007). Each paper interpreted scientific knowledge and uncertainty about climate change in a way that justified action or inaction according to its preferred ideology.

The Guardian used uncertainty to advocate a precautionary approach to climate change. Throughout time, the paper emphasized the risks of climate change, advocated the principles of socially shared responsibility in addressing climate change and demanded stronger political intervention. It described climate change as “a threat to the future of life on the planet” and advocated for policies and solutions to support “carbon taxes”, “cutting down on car journeys” and “different ways of generating electricity” in order to use less oil and coal (Carvalho, 2007, p. 235).

The Times used uncertainty to “de-legitimize” the scientific consensus on climate change, to construct and amplify a scientific debate, to “de-authorize” individuals and institutions that call for political intervention on climate change, and to advocate for

business-as-usual, using a lack of scientific certainty for justification of inaction (Carvalho, 2007, p. 238). Following the release of the *First Assessment Report* of the IPCC in 1990, *The Times* focused on contradicting mainstream scientific claims, describing climate change as the “latest scientific faddism” (Carvalho, 2007, p. 230). In covering the adoption of the *Kyoto Protocol*, *The Times* described scientists of the IPCC as “‘visionary hobbits’ who ‘avoid economic progress like the plague’” and dismissed any urgency to take action on climate change with headlines like “Calm Down, It Isn’t the End of the World” (Carvalho, 2007, p. 236).

The Independent generally used uncertainty to advocate for a precautionary approach, similar to *The Guardian*. Following the adoption of the *Kyoto Protocol*, *The Independent* promoted trust in scientists and advocated for stronger action (Carvalho, 2007). However, like *The Times*, sometimes *The Independent* also used scientific uncertainty to justify inaction. Following the release of the IPCC *Second Assessment Report* on climate change in 1995, *The Independent* made room for views of science skeptics and discredited the IPCC, arguing that it produces “waffle statements which don’t say anything” (Carvalho, 2007, p. 234). Based on her analysis, Carvalho concluded that the British press constructed science either as “an authoritative and trustable source of knowledge or as a dismissable endeavor”, and that the key factors to explain the variation in interpretation among the papers are ideological (Carvalho, 2007, p. 237).

In summary, research on media coverage of climate change has shown that ‘the story’ that is communicated about climate change to the public is not an objective reality, but a constructed reality that is shaped by many factors, including the journalistic norm of balance, the social actors who are able to gain privileged access to the media and the

ideological cultures of news organs. This thesis project was modeled after Carvalho's research; the ideological standpoints represented in Canadian newspaper representation of climate change are explored within a theoretical framework of critical discourse analysis.

Theoretical Framework: Critical Discourse Analysis

What is CDA?

The central theoretical framework for this research is critical discourse analysis (CDA). CDA is both a method and a theory, of which the central premise is the assumption of a relationship between language use and the production, maintenance and change of social power (Fairclough, 2001a, 2001b; Gough, n.d.; Janks, 1997; van Dijk, 2003). Researchers use CDA to address social problems and issues, such as racism, discrimination and globalization. They aim for political change through critical understanding of texts and the relationship between language use in text and power in social contexts (Fairclough, 2001a, 2001b; Gough, n.d.; Janks, 1997; van Dijk, 2003).

...critical discourse analysis is a political act itself, an intervention in the apparently natural flow of talk and text in institutional life that attempts to 'interrupt' everyday common sense. Such an analysis has the potential to destabilize 'authoritative discourses' and foreground relations of inequality, domination and subordination. (Luke, 1995, p. 12)

CDA researchers target the power elites who legitimate and sustain social inequality and injustice and work in solidarity with those who need equality and justice most (van Dijk, 2003). For example, van Dijk analyzed parliamentary debate in the British House of Commons as part of a larger project on "elite discourse and racism",

which demonstrated that elites in “politics, the media, academia, education and corporate business play a prominent role in the reproduction of racism... through the respective discourse genres to which they have access” (2003, p. 306).

Theoretical origins.

CDA stems from critical social theory, which is largely associated with the scholars of the Frankfurt School and the Centre for Contemporary Cultural Studies (Fairclough, 2001a; van Dijk, 2003). Critical theorists are particularly interested in the role of major institutions such as education, media, science and industry in producing ideological discourses that contribute to the reproduction, maintenance or change of dominant social power relations (Lindlof & Taylor, 2002). They focus on “ideology critique... trying to understand the circumstances that produce... different kinds of world views and maintain them, reproduce them and transform them” (Gough, 2002). All research that stems from critical social theory has an emancipatory intent, “...designed not to just explain or understand social reality but to change it” (Gough, 2002).

Jurgen Habermas, a successor of the Frankfurt School developed a communication-based version of critical theory. His work has influenced critical research in multiple fields, including education, language studies and media (Cherryholmes, 1993; Chouliaraki & Fairclough, 1999; Jensen, 2002; Lindlof & Taylor, 2002). Like his predecessors, Habermas sees an “unrealized emancipatory potential within social life as it is”, but unlike them, he sees this potential for emancipation in the field of communication (Chouliaraki & Fairclough, 1999, p. 84). Habermas’ theories informed the development of CDA.

Set of constructs for ‘talking’ about CDA.

Text and discourse.

In CDA, text is defined as written and spoken language; it is a product of society, such as a news article, notes from a meeting or a recorded conversation (Fairclough, 2001b; Gough, n.d.). Discourse is the way that language is conceptualized within the framework of CDA. The “discourse view of language” is “language as a form of social practice”, which implies a two-way or “dialectical” relationship between language and society (Fairclough, 2001b, p. 18). Rather than seeing language and society as “... two independent entities which just happen to come into contact occasionally”, CDA sees language as socially-determined, shaped by society and culture, but also constitutive of them (Fairclough, 2001b, p. 19). Discourse, therefore, contributes to the maintenance of the status quo or to social change. It is this view of language as a form of social practice that CDA researchers adopt.

Language as social practice is the broad definition of discourse. Discourse can also be used more specifically to describe “ways of representing aspects of the world”; for example, political discourse, media discourse or legal discourse (Fairclough, 2003, p. 215). Discourses operate “...at different levels of specificity. For example, the general category of political discourse has several distinctive yet affiliated versions: Republican discourse, Democratic discourse, and so forth” (Luke, 1995, p.15). While text is simply one product, one “meaningful stretch” (Gough, n.d., p.1) of spoken or written language, discourse “...consists of recurrent statements and wordings across texts” (Luke, 1995, p.15). These recurrent statements and wordings “...together mark out identifiable systems of meaning and fields of knowledge and belief, that in turn are tied to ways of

categorizing, knowing and believing the world and modes of action” (Luke, 1995, p.15). For example, the discourse of the federal Conservative government is reflected in recurring statements and wordings in individual texts, such as a media report, a political speech, or a government document.

The following example demonstrates the difference between text and discourse: “Nobody looks ugly at 2 am” (Gough, n.d., p. 2). This is a very short text found on a bumper sticker. When asked what it means, most people agree that “nobody” is a woman and 2 am signifies that the bars have closed and the “speaker” is drunk and interested in sex (Gough, n.d., p. 2). The bumper sticker is merely an object. Its full meaning is not spelled out in the text. The reason that most people interpret the meaning of the bumper sticker in a similar way is because the text “has traces of discourse” with which people are familiar and draw upon when reading and making meaning out of the text (Gough, 2002a, p. 2).

Ideology and power.

Power involves control, the power of one social group to exert control over another; for example, an ethnic majority may exert power over an ethnic minority. Or, in the case of this research, politicians and the fossil fuel industry exert control over the general public through their ability to access the media and define ‘what gets said’ about climate change. Power is based on privileged or special access to valued resources, such as, wealth, status and education, and to forms of discourse and communication, such as the media (van Dijk, 2003, p. 302). It can be achieved through coercion and consent (Fairclough, 2001b). The exercise of power through coercion is achieved through physical violence or deprivation. The exercise of power through consent is increasingly

achieved through ideology: "...in modern society, social control is increasingly practiced... through consent... discourse is the favoured vehicle of ideology, and therefore of control by consent" (Fairclough, 2001b, p. 30).

Ideologies "are representations of aspects of the world, which can be shown to contribute to... establishing, maintaining or changing social relations of power, domination and exploitation" (Fairclough, 2003, p. 218). Dominant ideologies can be 'found' embedded in discourses as natural, common-sense assumptions. CDA can be used as an analytic framework where the text, as the unit of analysis, is analyzed to find 'traces' of dominant ideologies that reproduce relations of power and dominance. For example, traces of male chauvinism, which stems from the dominant patriarchal ideology, can be identified in everyday text, like the bumper sticker described above, and these sexist assumptions can be passed off as mere common sense. CDA aims to denaturalize these common sense assumptions of everyday life through careful analysis of texts and entire discourses to trace ideologies that reproduce relations of power and dominance.

Application of CDA.

There are many different ways of applying CDA to research. However, common to CDA is the way that researchers move between analysis of the micro-level of the text and the macro-level of society and culture. They identify the non-obvious connections between linguistic choices at the micro-level of text, and the power relations these choices produce, maintain or challenge at the macro-level of culture and society (Fairclough, 2001a, 2001b; Gough, n.d.; Janks, 1997; Van Dijk, 2003).

Gough uses an archaeological metaphor to describe the application of CDA in research: “the text is the found object from a society and culture and we read the text for traces of that culture, for the values, beliefs and ideologies that are a part of the meanings we make and take for granted” (n.d., p. 2). Applying this metaphor to this research project, the newspaper articles in the data sample were the found objects, the ‘archaeological’ findings. The textual analysis revealed patterns of reporting on climate change that were particular to each newspaper and reflective of each paper’s ideological standpoint as well as the broader social, economic and political contexts in which the news is produced and consumed.

News discourse and CDA.

Fairclough argues, “the constant doses of ‘news’ which most people receive each day are a significant factor in social control” (2001b, p. 30). News discourse has been shown to be shaped by particular ideological standpoints, and to act to reproduce or challenge certain ideologies (Carvalho, 2007; Fairclough, 1995, 2001b). Media have been recognized for bringing public and political attention to social issues and at the same time accused of putting the brakes on social change (Fairclough, 1995).

A small number of researchers have applied CDA to analyze media communications about climate change (Boykoff, 2007a; Carvalho & Burgess, 2005; Carvalho, 2005, 2007). CDA relates textual features at the level of the newspaper article to the social, political and economic contexts in which the texts are produced and consumed. For example, in her analysis of British media coverage of climate change, Carvalho (2005, 2007) examined morphological characteristics, including size, page number and section; the structural organization of the articles - what is chosen for the

headline and lead paragraphs and what is left for the end; themes and actors represented in the text; and linguistic features of the text, including lexical choices and metaphors and other figures of speech used. Based on these textual features and their interactions, she inferred the discursive strategies, that is the “strategies of discursive manipulation of reality in order to achieve a certain goal or effect”, of the dominant social actors represented in the text and the dominant ideological standpoints of each newspaper (Carvalho & Burgess, 2005, p. 1461). Carvalho found that the “...quality press... remained within the broad ideological parameters of free-market capitalism” (2005, p. 21). That is, the media avoided a critique of the dominant ideological assumption that increasing consumption and growth are good, despite the international injustices associated with climate change.

Strengths.

Proponents of CDA argue that its strength is in its interdisciplinary approach that combines linguistic analysis of text with sociological analysis of social practice; and in its political intent to, not only engage in research, but to bring about social change by illuminating and changing patterns of discourse and power (Haig, 2004; Toolan, 1997). From a research perspective, because CDA has different dimensions of analysis, micro and macro, it has been lauded for providing the means both for producing research questions and for analysing data (Janks, 1997).

Weaknesses.

Ironically, what proponents argue is a strength of CDA, critics argue is a weakness. According to critics, the desire of CDA researchers to effect social change interferes with the validity of the results (Haig, 2004; Scheuer, 2003). Further, critics

argue that the interdisciplinary approach involving multiple dimensions of analysis lacks an adequate theory and methodological rigour: lack of an explanation of the social theory that supports the concept of social practice; lack of an explanation of how to incorporate data external to the text into analysis; and lack of a specific methodology, or set of criteria, to guide the interpretive work of making connections between the results of textual analysis with sociocultural practices (Haig, 2004; Scheuer, 2003). Critics conclude: “CDA is in danger of insisting on political agendas without simultaneously offering methods that adequately justify the analysis, independent of its political agenda” (Scheuer, 2003, p. 144).

In addressing the critique regarding validity, CDA proponents call for reflexivity in their research “where the analyst’s choices at every step in the research process are visible as a part of the... investigation, and critique does not stop with social processes... but rather extends to the analysis itself” (Rogers et al., p. 381). Regarding critics call for a specific set of criteria to guide CDA research, some proponents argue that CDA should be applied “more systematically and more rigorously”, while others argue that “there needs to be a diversity of approaches and that such diversity strengthens the framework and method” (Rogers et al., 2005, pp. 379-380).

Situating CDA in this research project.

In the context of this research project, CDA was used primarily as a theoretical framework in which to ground the results of the quantitative and qualitative analysis, described in the next chapter. CDA researchers commonly utilize tools, derived from the academic study of linguistics, to analyze text (Gough, n.d.; Janks, 1997). Using these tools was beyond the scope of this research project for two reasons. First and foremost, I

lack the training and background to be able to confidently apply the linguistic tools in analysis. Second, the level of detail which is required to analyze texts using these tools would have been too time consuming for the amount of data in the representative sample.

I used Carvalho's application of CDA as a guide for the analysis of my results, addressing both "texts and contexts" (Carvalho & Burgess, p. 1461). At the textual level, I examined the subject themes and information sources represented in the text through a quantitative content analysis and a close qualitative reading of the text. Based on the quantitative and qualitative analysis of the text, I inferred the dominant ideological standpoints reflected in each paper's portrayal of climate change. At the contextual level, I applied a comparative-synchronic axis of analysis, comparing simultaneous depictions of climate change in the different newspapers. Based on the results of the textual and contextual analysis, I discuss in Chapter 5 the connections between news discourse about climate change, and social power relations in the broader political, economic and social contexts of climate change.

Chapter 3: Research Methods

This research centres on a content analysis of climate change coverage in *The Globe and Mail*, *The National Post* and *The Toronto Star* between January 1, 2005 and June 30, 2007 and November 1, 2009 and January 31, 2010. Subject themes and information sources were coded and their frequency measured. The subsequent dataset was then analyzed, similarities and differences between the three newspapers were explored and inferences about the ideological stances represented in media coverage of climate change were made.

Content Analysis

Content analysis is a method commonly used in media research to measure the frequency of particular aspects, i.e. keywords in media content, including newspaper articles, radio broadcasts or television programs. It is “a research technique for making replicable and valid inferences from texts to the contexts of their use” (Krippendorf, 2004, p. 18). The purpose of content analysis is “to identify and count the occurrence of specified characteristics... of texts, and through this, to be able to say something about the messages, images, representations of such texts and their wider social significance” (Hansen, Cottle, Negrine and Newbold, 1998, p. 95).

In media research, the aim of content analysis has been to examine how news, advertising, entertainment and other media genres, “reflect social and cultural issues, values and phenomena” (Hansen et al., 1998, p. 92). For example, George Gerbner and his colleagues are well known for their cultural indicators program, which used detailed content analysis of television entertainment programs combined with surveys of public

beliefs, opinions and attitudes to examine the role of media in cultivating public consciousness (Hansen et al., 1998).

Common critiques.

The method has been criticized for its quantitative nature, for its claim of objectivity and for its lack of a theory of meaning (Hansen et al., 1998). However, more recent developments in content analysis refute these criticisms. Krippendorff (2004) argues that content analysis cannot be purely objective because analyzing texts is essentially a qualitative process: “the analyst is a reader of the meanings of a text, someone who is not merely engaged in extracting content from the data as if it was objectively contained in them... meanings are always relative to a communicator” (Jensen, 2002, p. 104). In all stages of the research process, the researcher is interpreting: establishing analytical categories, developing rules for identifying and recording these categories and interpreting the significance of her findings. Thus, contemporary researchers in the field of content analysis make less of a distinction between quantitative and qualitative; they argue that while the results of a content analysis of text may be quantitative, the research process is fundamentally qualitative (Krippendorff, 2004). Further, traditional quantitative approaches, like content analysis, and traditional qualitative approaches, like discourse analysis, are complementary “in that they produce different analytical versions of reality” (Jensen, 2002, p. 104).

Grounding content analysis in critical discourse analysis.

Content analysis is a research technique and therefore lacks a theory of meaning. It does not offer the researcher guidance in figuring out what aspects of a text should be examined or how to interpret the results (Berg, 2004; Hansen et al., 1998; Jensen, 2002).

Therefore, proponents of content analysis acknowledge that the findings of any content analysis study need to be grounded in a theoretical framework that allows the researcher to articulate “the social significance and meaning of what is being counted ... in the form of a model of communication influence” (Hansen et al., 1998, p. 96). The theoretical framework applied in this research project was critical discourse analysis (CDA).

Research process.

The process of content analysis applied to media research can be broken down into seven steps: defining the research problem; selecting the media type, (e.g. newspaper, television, internet), selecting a sample time period; defining analytical categories; developing explicit selection criteria in order to identify and record these characteristics (i.e. a coding schedule); piloting the selection criteria and checking reliability; and preparing and analyzing data (Hansen et al., 1998).

Media Selection

A content analysis of *The Globe and Mail*, *The National Post* and *The Toronto Star* coverage of climate change between the time periods of January 1, 2005 and June 30, 2007 and November 1, 2009 and January 31, 2010 was conducted to contribute to a greater understanding of Canadian media representations of climate change. Canadian newspapers were chosen as a site of media analysis over television programs or radio broadcasts because: Canadian newspaper archives are more readily accessible and affordable than of television or radio archives; the press is able to cover climate change stories in more depth, and to stay with the stories for a longer time than Canadian broadcast media (J. McMullan, personal communication, July 11, 2007); and almost half (47%) of all Canadian adults read a daily newspaper on the average weekday and almost

three-quarters (73%) read a daily newspaper once a week (Newspaper Audience Databank Inc., 2010), indicating that newspapers are still an important source of information for Canadians.

The Globe and Mail, *The National Post* and *The Toronto Star* were chosen for analysis because these papers are the three-largest English circulation papers in Canada. The average daily readership of these three papers combined is 1.11 million people (Canadian Newspaper Association, 2007); and together, they represent a range of editorial positions along the political spectrum.

The National Post was founded by Conrad Black, modeled on *The Financial Post*, a business-oriented Toronto newspaper, and is now owned by Canadian-based Postmedia Network Inc. (Wikipedia, 2011a). It is considered a right wing, conservative newspaper that caters to the political and corporate elite (Greenburg, 2000; Soderlund, Lee & Gecelevsky, 2002).

The Toronto Star is considered a left wing, progressive newspaper (The Toronto Star, 2011; T. Richards, personal communication, July 20, 2007). Founded by Joseph Atkinson, who built the newspaper based on editorial principles now known as the Atkinson Principles, it is owned by Torstar Corporation, an independently owned Canadian-based media company named after *The Toronto Star*, its principal holding (Wikipedia, 2011b). The Atkinson Principles are: “A strong and united Canada, civic engagement, individual and civil liberties, a necessary role for effective government and the rights of working people” (The Toronto Star, 2011, para. 6). The core mission of the newspaper, as defined by *The Star* itself, is “...to focus public attention on injustices of all kinds and on reforms designed to correct them” (The Toronto Star, 2011, para. 7).

The Globe and Mail is considered a centre to centre-right newspaper and sits in between *The Toronto Star* and *The National Post* along the political spectrum (Wikipedia, 2011c; T. Richards, personal communication, July 20, 2007). The Woodbridge Company owns 85%, and Bell Canada Enterprises owns 15% of the newspaper (Wikipedia, 2011c).

Time Period

The first time period, January 1, 2005 to June 30, 2007, was chosen because major political and scientific events in this time period resulted in heightened attention to climate change in the Canadian press (see pp. 10-11). The second time period, November 1, 2009 to January 31, 2010 was chosen to encompass media coverage leading up to and following the *2009 United Nations Climate Change Conference in Copenhagen*.

Data Set

The data set used in the research analysis was retrieved from Factiva Intelligence Database System for the time periods of January 1, 2005 to June 30, 2007 and November 1, 2009 to January 31, 2011 and consisted of 3,262 newspaper articles from *The Globe and Mail*, *The National Post* and *The Toronto Star*. Each article represents one unit of data. The data set was compiled by using Factiva's subject search engine for 'climate change' for the specified time periods. Factiva's criteria for coding newspaper articles for the subject of climate change is: "All stories about long-term fluctuations in temperature, precipitation, wind and all other aspects of the Earth's climate. Stories about global warming, the greenhouse effect and carbon dioxide emissions" (Factiva, 2007). The Factiva database searches for these articles through parent terms "environmental news", "global/world issues" and "weather".

Data Sample

To obtain a representative sample of newspaper coverage of climate change for *The Globe and Mail*, *The National Post* and *The Toronto Star*, a composite week sampling strategy was used (Hansen et al., 1998; Krippendorf, 2004), in which all articles from the three newspapers on January 1, 2005 and every 13th day following until June 30, 2007, and all articles from the three newspapers on November 1, 2009 and every 6th day following until January 31, 2010, were selected for analysis. Genres of content included news stories, special features, letters to the editor and editorial or comment articles. Any article that was less than one hundred words, or an article in which climate change was not the major focus of the article, was excluded. The final representative sample consisted of 246 articles, with a distribution of articles from each newspaper (Table 1).

Table 1: *Distribution of Newspaper Articles in the Representative Data Sample*

Year	The Globe and Mail	The National Post	The Toronto Star
2005	15	19	10
2006	19	25	22
2007	23	30	27
2009	14	14	23
2010	0	3	2
Total	71	91	84

Coding Categories and Criteria

I coded each of the 246 articles using identifier and analytical categories. The identifier categories included the headline, the newspaper in which it was published, the date, month and year of its publication, the author, the article length and the type of article (i.e. news story, feature article, editorial, or letter to the editor). The analytical categories were subject themes and information sources. To choose the categories for themes and information sources, I first drew on previous research (Boykoff & Boykoff, 2004; Jones, 2006; Shanahan, 2000; Shanahan & McComas, 1999a; Trumbo, 1996). Then, I added categories based on my own personal experience. For example, in my experience listening to radio broadcasts or reading newspaper articles about climate change, the reporters rarely addressed the connection between human ethics and climate change - the right or wrong of individual and collective actions as they relate to climate change. Therefore, I included 'ethics' in my list of subject theme categories to confirm or dismiss my informal observations. Finally, I read select articles from the representative data sample, and established additional categories by noting relevant themes and information sources that emerged (Berg, 2004).

Once the categories were chosen, I established coding criteria for each subject theme and information source category (Appendices A and B). Then, I conducted a trial analysis and revised the analytical categories and corresponding coding criteria as necessary. Regarding the reliability of the coding criteria, I tested it to ensure that I could apply the criteria consistently. When I was certain that I could code for the subject themes and information sources consistently, I coded each article in the representative

data sample (Appendix C). In future research, a further step that could be taken to increase reliability of the coding criteria would be to test for inter-coder reliability.

Subject themes.

The subject theme categories were: (a) adaptation; (b) advocacy; (c) awareness; (d) cause; (e) consequences (including environmental, economic and cultural consequences of climate change); (f) economics; (g) energy security; (h) ethics; (i) mitigation; (j) politics; and (k) science. I delineated selection criteria for each subject theme (Appendix A) and developed a colour coding scheme to identify and differentiate between subject theme categories in my representative data sample (Table 2).

A subject theme was recorded when it was a major focus of the article, according to the following criteria:

News article: a subject theme is present in the headline or the lead (first paragraph in articles with less than 300 words and the first three paragraphs in articles with more than 300 words) and is the predominant topic of at least one paragraph, three sentences or sub-sentences or six words or word groups (Appendix G).

Feature story or editorial piece: a subject theme is the predominant topic of at least two paragraphs, six sentences or sub-sentences or twelve words or word groups (Appendix G).

Letters to the editor: a subject theme is the predominant topic of at least two sentences or sub-sentences or four words or word groups (Appendix G).

Often, more than one subject theme was a major focus of an article. Sometimes, a particular passage or paragraph did not apply to any of the subject themes. In this case, I did not code the text. I left it 'blank'.

Table 2: *Color Code Scheme for Subject Themes*

Subject theme	Colour coding scheme and example
Adaptation	“Learn to adapt to climate change.” (Neilson, 2006, p. F07)
Advocacy	“...the Pembina institute ... appears before a parliamentary committee this morning to reveal its strategy for meeting the Kyoto target” (Martin, 2007b, p. A4)
Awareness	“...campaign, A Light Among the Nations, intended to raise awareness of global warming.” (Kay, 2006, p. A07)
Causes	“In terms of the greenhouse gases Canada generates... the transportation sector is responsible for a whopping 57 per cent...” (The Toronto Star, 2007, p. F06)
Consequences	“He has seen the early warning signs of climate change: massive spruce beetle infestations, extreme wildfire and fast spring floods.” (Beacom, 2006, p. A8)
Economics	“...big GHG progress could be had ... for just 1% of world GDP.” (Watson, 2007, p. FP19)
Energy security	“Global oil supply shock inevitable”(Crane, 2005, p. F02)
Ethics	“Climate ills, rights linked; Global warming endangering Inuit 'sentinels,'” (Zabarenko, 2007, p. A07)
Mitigation	“Leaders agreed on the need to... reduce worldwide emissions by 50 per cent below 1990 levels by 2020” (Reguly & McCarthy, 2009, p. A1).
Politics	“British MP puts Ottawa on climate hot seat.” (Curry, 2007, p. A1)
Public opinion	“...polls that show global warming is now top of mind for voters...” (Hume, 2007a, p. S1)
Science	“Let science debate begin.” (Corcoran, 2005, p. FP11)

Originally, I also developed criteria for recording a subject theme when it was a secondary or minor focus of the article. I coded and analyzed all of the data for major, secondary and minor themes. However, the results of coding for subject themes that were a secondary or minor focus did not yield any information that was significantly different than the results of coding for subject themes that were a major focus. In addition, presenting the data was cumbersome. Therefore, I chose to focus only on the results of subject themes that were a major focus.

Information sources.

The information source categories were: (a) government representatives; (b) environmental representatives; (c) industry and business representatives; (d) physical science representatives; (e) social science representatives; (f) reporters and other media; (g) the general public; and (h) other, for any information source that could not be represented by one of the former categories. Coding criteria for each information source was delineated (Appendix B). Sources were identified with green colour-coding (Table 3). I only coded for an information source when the discourse representation was direct (Table 3), that is when sources were quoted directly and their original wording was preserved (Fairclough, 1995). When the discourse of an information source was represented indirectly (Table 3), that is the actual words that were used by the source were reproduced, summarized, transformed or translated by the reporter and none of the original wording was quoted (Fairclough, 1995), I did not code for the information source. I chose to focus on direct representations of discourse because in the competition among stakeholders to gain access to the media, one of the best indicators of successful access is the direct quote (Trumbo, 1996).

Table 3: *Discourse Representation of Information Sources*

Discourse representation	Information source
Direct	“...they’ve presided over an increase in pollution,” Layton said... (Campion-Smith, 2005, p.A14)
Indirect	Business leaders warn the opposition’s approach would wreak economic havoc... (Curry, 2007, p.A1)

Data analysis and Interpretation

Once coding was complete, I tabulated the frequency of each subject theme and information source for each newspaper (Appendix D, Tables D1 and D2). Then, I calculated the relative frequency, as a percentage, of each theme and information source for each newspaper (Appendix D, Tables D3 and D4). The major and minor themes and the most and least frequently cited voices arose from the data; that is they became apparent when comparing the relative frequencies with which each theme and information source was present in the data sample.

Using Carvalho’s (2005, 2007) application of CDA as a guide for the analysis of my results, I addressed both “texts and contexts” (Carvalho & Burgess, p. 1461). The textual analysis involved examining the “themes” (subject themes) and “actors” (information sources) represented in the text through content analysis and a close qualitative reading of the text (Carvalho & Burgess, p. 1461). Based on my analysis of these textual features, I inferred the dominant ideological standpoints reflected in each paper’s portrayal of climate change. I addressed “contexts” through reference to key

events in climate change science and policy over the period of analysis (Carvalho & Burgess, 2005). Contextual analysis involved a comparison of the simultaneous depictions of climate change in the different newspapers (Carvalho, 2005, 2007).

Chapter 4: Results

This chapter is a presentation of the results of the content analysis, including the relative frequency, as a percentage, of the coded themes and information sources for each newspaper. In addition to the quantitative results, this chapter includes a brief discussion of each theme and information source, highlighting some of the similarities and differences in the way each newspaper portrayed particular subject themes and information sources. The implications of these similarities and differences, as they relate to the ideological stances reflected by each newspaper's reporting on climate change, are discussed in Chapter 5.

Major Themes

Politics was by far the most prevalent theme (Figure 1); it was a major theme in 39% of *The Globe and Mail* data (Figure E1, Appendix E), 35% of *The Toronto Star* data (Figure E2, Appendix E), and 32% of *The National Post* (Figure E3, Appendix E) data. Mitigation and economics were also prevalent themes in the newspaper coverage of climate change (Figure 1).

The most noticeable thematic difference between the three newspapers was that there was an emphasis on scientific controversy in *The National Post* that was not present in *The Globe and Mail* or *The Toronto Star*. In *The National Post*, science was a theme in 15% (Figure E3, Appendix E) of the data, almost as prevalent as economics and

mitigation (Figure 1). Science was a theme in only 3% of *The Toronto Star* (Figure E2, Appendix E) and 4% of *The Globe and Mail* (Figure E3, Appendix E) data.

Overall, *The Globe and Mail*, *The National Post* and *The Toronto Star* devoted 70% of their communication about climate change to politics, mitigation, and economics (Figure 2).

Figure 1: *Relative frequency of themes - comparison between the three newspapers*

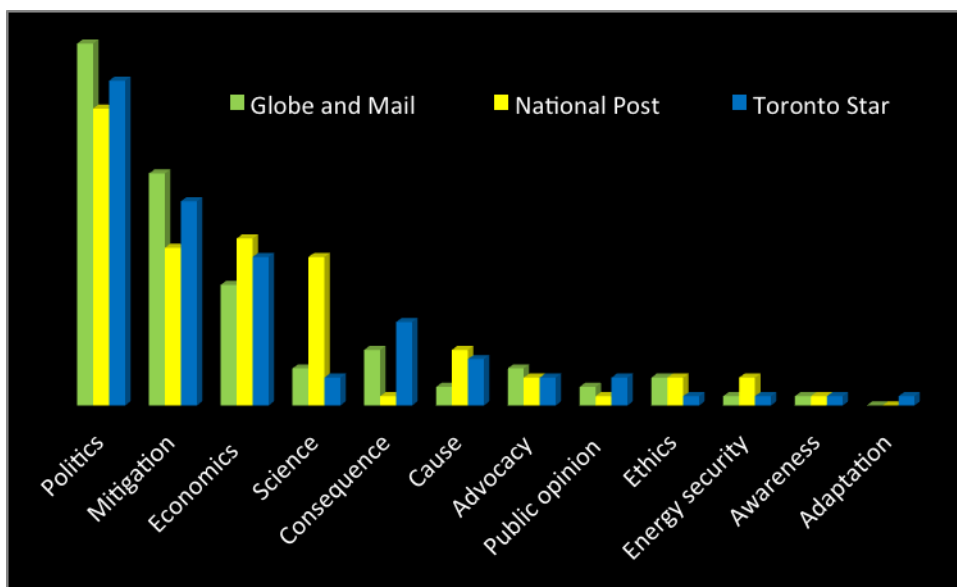


Figure 2: *Thematic weighting*



Politics.

Generally, when politics was one of the major themes in an article, the focus was on Canadian or international targets, policies, plans and investments and related criticism or support from the journalists and their information sources. These information sources were most often politicians of Canadian opposition parties or leaders from other countries. Political announcements, i.e. Liberal Finance Minister Ralph Goodale's 2005 presentation on Kyoto budget spending to the House Environment Committee, or political events, i.e. the 2007 G8 meeting in Germany to discuss climate change, were most often the catalyst for coverage.

The context for the political-themed coverage was similar among the three newspapers. Between 2005 and 2007, the focus was on Canada's commitment to the *Kyoto Protocol*, or lack thereof, for example "Ottawa lacks credibility on Kyoto" (Bramley, 2005, p. A19); and whether or how Canada would achieve its greenhouse gas

emission targets under the Protocol: “Canada will almost certainly pay poor countries to be greener so the federal government can meet its domestic emission targets under the Kyoto Protocol” (Calamai, 2005, p. A14). Between 2009 and 2010, the focus was the United Nations 2009 Climate Change Conference in Copenhagen and related critique; for example, “This week’s Copenhagen summit was billed as the best, last chance for world leaders to finally rally their citizens to fight man-made global warming... [the] proceedings did not bode well for anything substantive” (The National Post, 2009, p. A24).

While the context for the political-themed coverage was similar among the three newspapers, each newspaper presented different perspectives on the politics of climate change. *The Toronto Star* was supportive of government intervention to regulate greenhouse gases demonstrated by its support of the Kyoto Protocol and the negotiations in Copenhagen. For example, in 2005, a *Star* editorial congratulated Prime Minister Paul Martin on “standing up to the U.S. on Kyoto” by signing the protocol and playing a significant role at the Montreal conference on post-Kyoto action (McQuaig, 2005), p. A24). *The Star* further demonstrated its support of government intervention through its criticism of government inaction, particularly that of the Conservative government. For example, in 2006, *The Star* referred to Environment Minister Rona Ambrose as a “dart” for “failing to act on climate change” in its annual list of “darts and laurels” for Canadians who made the news. *The Star* declared, “Rona Ambrose buried her head in [the] tar sands” (The Toronto Star, 2006, p. F06).

In contrast to *The Star*, *The National Post* was critical of Canada’s commitment to the Kyoto Protocol and mandatory government regulations. For example, in 2005, while

The Star congratulated Martin for standing behind the Kyoto Protocol, *The Post* published a comment article in which the journalist argued against Kyoto: “False first step: In environmental, legal and political terms, the world would be better off with no international greenhouse gas agreement” (Pardy, 2005, p. FP15).

Also in contrast to *The Star*, *The Post* often demonstrated support of the Conservative government for taking a cautious approach to mitigation; for example, “...Harper’s Conservative government opposes the extension of the Kyoto accord... Naturally, environmentalists are up in arms. But the Conservative position is absolutely correct... our participation in Kyoto will neither help fight climate change, nor advance Canada’s international status” (The National Post, 2006, p. A14).

Similar to *The Star*, *The Globe* portrayed support of government regulation of greenhouse gases, including commitment to the Kyoto Protocol and negotiations at the climate summit in Copenhagen. For example: “In seven months... Canada’s performance in addressing climate change will be under a powerful international spotlight. To avoid facing embarrassment... the government of Canada must fix the serious flaw in its Kyoto plan” (Bramley, 2005, p. A19). However, while expressing this support of government regulation, *The Globe* also made space for criticism of regulation, similar to *The Post*. For example, one *Globe* journalist questioned the need for Kyoto: “Instead of setting our hair on fire, why don’t we have a royal commission or the like to study the science and economics of this *alleged* [emphasis added] Kyoto need to turn our economy inside out?” (Gibson, 2005, p. A15).

Mitigation.

Mitigation was a major theme in 25% (Figure E1, Appendix E) of *The Globe and Mail* data, 22% of *The Toronto Star* data (Figure E2, Appendix E) and 17% of *The National Post* data (Figure E3, Appendix E). It was largely discussed in the context of government targets, plans and policies, both federal, i.e. “Project Green proposals include a \$2,000 tax credit for purchases of ethanol or hybrid fuel-cell/gas vehicles that are very fuel efficient” (Chase, 2005, p. A4), and international, i.e. “...the U.S. [and] Australia... are among the six members of the Asia-Pacific Partnership or AP6, a group formed last year to help develop and build technology aimed at curbing carbon emissions” (Vieira, 2005, p. A6). Industry and business initiatives, for example, carbon capture and storage projects, were also a focus when mitigation was a major theme in the data, but less frequently when compared to government plans and initiatives.

A combination of technology and market-based solutions were the most commonly profiled mitigation measures by each of the three newspapers. Technology-based solutions that were commonly reported on include clean coal technology, renewable energy, biofuels and fuel-efficient vehicles, carbon capture and storage and energy efficient light bulbs. Discussion of market-based solutions focused heavily on emissions-trading systems, as in the following headline for a piece about Governor Arnold Schwarzenegger’s plan for California: “Counting on capitalism to save the planet. An emissions-trading system will be the centerpiece of the state’s effort to implement its global warming strategy” (McCarthy, 2006, p. B12). Tax measures to incentivize emissions reductions or penalize emission increases were also frequently discussed: “The Ontario government... will introduce a variety of tax and regulatory

measures to encourage a move away from gasoline... as fuel in cars and trucks...
Proposals for a carbon tax... are... still under discussion” (Campbell, 2007, p. A8).

In contrast, individual behaviour and societal lifestyle changes were rarely discussed as part of the solution to climate change, with a few exceptions found in *The Star*. For example, an editorial in *The Star* asserted the need for individual behaviour changes that go beyond technological and market solutions:

The world must kick our carbon habit and we'll have to change our lifestyle...

The era of flights that cost less than the taxi ride to the airport is drawing to a close. We will have to shop, eat and travel more intelligently. We will have to pay more for our energy, and use less of it. (The Toronto Star, 2009a, p. A01)

One difference between the three newspapers was that *The Star* emphasized a need for urgent and time-limited action on climate change, not present in *The Globe* or *The Post*. For example, “The world is... on the brink of runaway global warming... But the worst can be avoided... provided massive cuts in... emissions are started immediately. We have only 10 years to get it right...” (Smith, C., 2006b, p. F04)

The Globe at times expressed a level of urgency required: “Years of inaction have resulted in our emissions... rising to 24 per cent above 1990 levels... our Kyoto target... can still be met but only through the *urgent implementation* [emphasis added] of adequate mandatory targets, strong financial incentives and infrastructure investments” (Bramley, 2005, p. A19). However, unlike *The Star*, *The Globe* did not consistently express an imperative time frame in which action had to be taken.

By contrast, *The Post* either questioned the need for action altogether or tempered any need for immediate action on climate change. For example, in one article, *The Post*

described the appropriate response to climate change as “...more akin to buying fire insurance and installing sprinklers and new wiring in an old, irreplaceable house than to fighting a fire already raging” (Cosh, 2007, p. A16).

Economics.

Economics was a major theme in 18% of *The National Post* (Figure E3, Appendix E), 16% of *The Toronto Star* (Figure E2, Appendix E) and 13% of *The Globe and Mail* (Figure E1, Appendix E) data. When economics was a major theme, the focus was on industry or business initiatives to mitigate climate change, i.e., “Swedish power company Vattenfall AB... is building one of the first coal-fired power plants that will attempt to bury the thousands of tons of carbon dioxide it emits...” (Abboud, 2007, p. B17); government and industry negotiations and relations, for example, “...private interests will determine whether American climate-change legislation has teeth sharper than a baby’s...” (Yakabuski, 2009, p. A11); and most frequently, the impact of mitigation on big industry and the economy, for example, “Buzz Hargrove, head of the Canadian Auto Workers union... said Mr. Layton’s call for regulations that would require more environmentally friendly cars will kill jobs” (Galloway, 2007, p. A6)

The major difference between the papers was in how each one expressed the impact of mitigation on the economy. *The Star* most often portrayed the position that climate change mitigation and economic growth are congruous and that the current concept of growth, which relies on a carbon-based economy, has to change. For example, “... the solution to both global warming and to lasting economic recovery is the same: leading the next industrial revolution in retooling the world economy to go carbon free...” (McEachern & Price, 2010, p. A11).

In contrast to *The Star*, *The Post* more often portrayed the position that reducing greenhouse gases, especially through mandatory and absolute emission reduction targets, is harmful to the economy. For example, in response to Environment Minister John Baird's 2007 report on the costs of meeting Canada's Kyoto commitments, *The Post* journalist argued, "...emitted carbon dioxide is a crucial part of almost every economic activity. Completely retooling an economy is an immensely arduous, painful and expensive undertaking... It might be good for the environment. It isn't good for the economy" (Watson, 2007, p. FP19).

The Globe and Mail made space for both the view that reducing emissions would cause harm to the economy and that emissions reductions would benefit the economy. For example, following the conference in Copenhagen, *The Globe's* Marcus Gee implied massive disruptions to Canada's economy in the face of reaching emission reduction targets: "Canada would have to make economic changes that would shave billions of dollars off its potential economic output and mean a significant slowing in job growth in the coming years. The commitment would require a massive disruption to many industries..." (Gee, 2009, p. M3). In contrast, *The Globe* also portrayed the possibility of emissions reductions benefiting the economy. Another journalist argued that profitable emissions reductions are possible:

The weakness of the targets proposed for industry cannot be justified on economic grounds. The plan requires a total emissions reduction of 36 megatonnes from heavy industry... the Petroleum Technology Alliance Canada, believes there are 29 megatonnes of profitable emission-reduction opportunities in Canada's oil-and-gas sector alone. (Bramley, 2005, p. A19)

Science.

Science was a major theme in *The National Post*; it was a primary focus in 16% of *The Post* data (Figure E3, Appendix E). Science was only a minor theme in *The Globe and Mail* and *The Toronto Star* data; it was a primary focus in 3% of *The Star* data (Figure E2, Appendix E) and 4% of *The Globe* (Figure E1, Appendix E) data.

The Post placed an emphasis on scientific controversy, not present in *The Globe* or *The Star*. For example, in 2007, *The Post* hosted a series called *The Deniers*, about “scientists who buck the conventional wisdom on climate science” and do not believe the consensus science of the United Nation’s IPCC (The National Post, 2011). Some articles denied any evidence supporting the theory of man-made climate change; for example: “There is still zero empirical evidence that anthropogenic production of CO₂ is making any measurable contribution to the world’s present warming trend” (Cockburn, 2007, p. FP15). In total, *The Post* published thirty-eight articles in *The Denier* series.

By contrast, *The Star* embraced the science of anthropogenic climate change as settled, and *The Globe* contained a mix of perspectives, generally demonstrating support of the science of anthropogenic climate change but making space for journalists to express criticism and skepticism of the science.

For example, in the 2009/2010 data, *The Post* devoted more newspaper space to the Climategate controversy² than to the conference in Copenhagen, which was the focus

² In 2009, prior to the climate summit in Copenhagen, over 1,000 emails and 3,000 research files were hacked from the computers of the Climate Research Unit at East Anglia University, one of the premier sources of climate data for the IPCC. Some claimed that the e-mails and files contained evidence of manipulating climate data and suppressing criticism (Foster, 2009). The controversy was dubbed by the media as “Climategate” and brought the integrity of climate change science under question.

of coverage in *The Globe* and *The Star* 2009/2010 data. *The Post* claimed that the e-mails: “...indicate extensive scientific chicanery to support the warmist cause” (Foster, 2009, p. FP13); “...show climate science to be a battleground of conflict and uncertainty” (Corcoran, 2010, p. FP15); and make it clear that “... the integrity of the scientific evidence on which the countries of the world, through the [IPCC], claim to base far-reaching and hugely expensive policy decisions has been called into question” (Lawson, 2009, p. FP15). In *The Star* data, Climategate was merely mentioned in a sentence (The Toronto Star, 2009a). *The Globe* offered more scrutiny with two comment columns, but balanced its criticism of the scandal with articles that expressed support for the IPCC theory of climate change (Homer-Dixon & Weaver, 2009; Murphy, 2009; Wentz, 2009).

Minor Themes

The Globe and Mail, *The National Post* and *The Toronto Star* devoted 30% of their communication about climate change to the themes of cause, consequence, science, advocacy, awareness, public opinion, ethics, energy security and adaptation (Figure 2). Of these nine themes, science (8%) was the most prevalent, because it was so central a theme in *The Post*, followed by consequence (5%) and cause (5%), then followed by advocacy (3%), ethics (2%) and public opinion (2%), then by energy security (1%) and awareness (1%), and finally by adaptation (0.2%) (Figure 3). The similarities and differences in each paper’s presentation of these themes are discussed below.

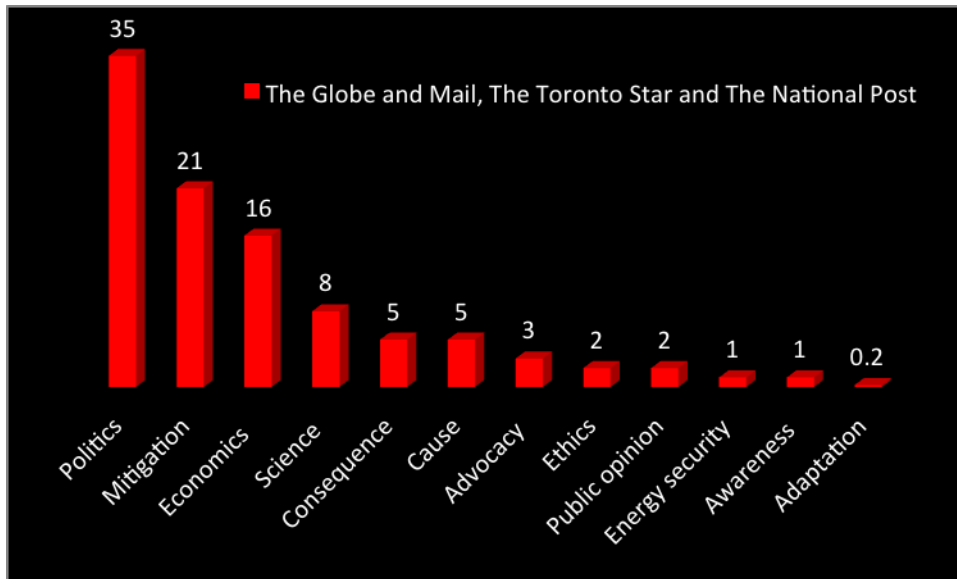
Consequence.

Consequence was a major theme in 9% of *The Toronto Star* (Figure E2, Appendix E), 6% of *The Globe and Mail* (Figure E1, Appendix E) and 1% of *The National Post* (Figure E3, Appendix E) data. The consequences most often discussed were extreme

weather events, i.e. heat waves, hurricanes, droughts, wildfires, flooding; general changes to the weather, i.e. more rain, less snow; melting ice caps and glaciers, and rising sea levels. Also covered, but more rarely, were the impacts of climate change on the global economy, on human culture, recreation and livelihoods and on the habitat and survival of other species.

The Star portrayed the consequences of climate change most dramatically. This was in keeping with the way it emphasized the need for urgent action on climate change. *The Star* used words like “doom”, “dangers” and “ravage” to describe a future world in the face of unmitigated climate change, and used alarming language to described worst-case scenarios. For example, in an article titled “Too late on global warming?” journalist

Figure 3: *Relative frequency of themes - average of the three newspapers*



Cameron Smith opened with, “Has climate change pushed the world passed its tipping point – the stage at which melting of the Greenland ice cap becomes irreversible and oceans eventually rise 6.5 metres?” (2006a, p. F04).

In contrast, and in keeping with its portrayal of scientific controversy, *The Post* paid little attention to the consequences of climate change in its news coverage of the issue. ‘Consequences’ was a primary focus in only one article in *The National Post* data sample, and that article was from a newswire; it was not written by one of the newspaper’s own journalists. Aside from this one article, consequences were only mentioned in passing, and usually in a way that downplayed the consequences by, for example, emphasizing the benefits of climate change: “Consider how many non-catastrophic views are available to a person who is completely, utterly convinced that the Earth is warming. He could conclude for starters that is a good thing on balance; perhaps it’s no coincidence that the Medieval Warm Period coincided with the intellectual and economic fertility of the High Middle Ages” (Cosh, 2007, p. A16).

The Globe and Mail sometimes presented the consequences of climate change as serious; for example: “...global warming, if not confronted, will grow worse and cause costly disruption, such as inundating coastal cities and environmental refugees in countries that will no longer be habitable” (Mittelstaedt, 2007, p. A3). Sometimes, however, *The Globe* made light of the consequences: “Some people here think all the rain and wind is the fault of global warming. Poor global warming. It’s being blamed for everything these days. Mix talk of climate change with perpetually grey skies and it’s enough to make you want to stay under the covers all day” (Mason, 2006, p. A13).

Cause.

Cause was a major theme in 6% of *The National Post* data (Figure E3, Appendix E), 5% of *The Toronto Star* data (Figure E2, Appendix E) and 2% of *The Globe and Mail* (Figure E1, Appendix E) data. The most commonly stated causes of climate change were

greenhouse gas emissions and fossil fuels; for example: "...greenhouse gas emissions, which are believed to contribute to global warming and are largely caused by the burning of fossil fuels" (Chase, 2005, p. A4). Other causes commonly described were transportation, the oil and gas sectors, coal-fired power plants, deforestation, heating buildings and homes, agriculture and natural factors, like solar radiation.

Humans were attributed little agency as contributors to climate change. Rather, the cause of climate change was more commonly described as a commodity, a nation or an industrial sector. For example: "...the most urgent problem... is increasing levels of carbon dioxide... Cars and trucks account for almost half of all transport-related CO₂ production..." (Malloy, 2005, p. G08). In this example, cars and trucks are described as a cause of climate change through the use of the words "account for". The fact that people drive these cars and trucks is not mentioned. A few journalists expressed human agency for climate change in their writing, for example, "The evidence that *our heavy use of oil, and coal* [emphasis added], is doing major long-term damage to the climate is now accepted by most of the scientific community" (Crane, 2005, p. F02). However, this was rare.

The Post was the only paper to discuss natural causes of climate change, supporting its focus on scientific controversy. For example: "Looking back through the full history of our planet and solar system, it is quite obvious that various earthly, solar and/or cosmic factors have played an enormously greater role on... Earth's temperature than can remotely be attributed to mankind..." (Stockman, 2005, p. FP15).

Overall, there were few articles which highlighted the link between climate change and human behaviour and societal values. Cause was mostly described as a result of specific commodities, industries or countries.

Advocacy.

Advocacy was a major theme in 4% of *The Globe and Mail* data (Figure E1, Appendix E), 3% of *The Toronto Star* data (Figure E2, Appendix E) and 3% of *The National Post* data (Figure E3, Appendix E). When advocacy was a major theme, the most common topics were the political lobbying and advocacy initiatives of environmental groups and activists. With one or two exceptions, *The Globe* and *The Star* covered the initiatives of environmental groups and activists in a constructive and positive light. For example *The Globe* covered the efforts of the Save Kyoto coalition, created by Greenpeace, Bloc Quebecois and Parti Quebecois to “...fight for the funds needed to honour the protocol and to mobilize Quebecers to fight for it... to... call on Mr. Harper to honour the accord” (Charette, 2006, p. A8). *The Star* profiled the campaign – “A Light Among the Nations” - of a Jewish environmental coalition, intended to raise awareness about climate change (Kay, 2006, p. A07).

The Post, by contrast, often mocked and criticized activists and environmental groups. Apart from one positive reference to the Pembina Institute for its 2007 recommendations to government for meeting the Kyoto target – “The... institute is actually one of those green-deed doers worth monitoring...” (Martin, 2007b, p. A4) - *The Post* generally expressed an attitude of disdain for activists and environmentalists, describing them as “...ship-ramming, tree-spiking, effigy-burning fanatics” (Martin,

2007b, p. A4), "...eco-extremists..." (The National Post, 2009a, p. A28) and "environmental Chicken Littles" (Salter, 2006, p. A17).

The Globe data contained some mocking references to activists or environmentalists, for example, "... did the multitude of posturing environmental groups think to offer Mr. Mugabe... one of their ludicrously overhyped fossil-of-the-day awards?" (Murphy, 2009, p. A25). However, these were balanced by *The Globe's* constructive coverage of the initiatives of activists and environmental groups.

Ethics.

Ethics was a major theme in 3% of *The Globe and Mail* data (Figure E1, Appendix E), 3% of *The National Post* data (Figure E3, Appendix E) and 1% of *The Toronto Star* data (Figure E2, Appendix E). The focus in this data was on human rights; our moral responsibility to act on climate change; the ethical implications of mandated emissions cuts; and questioning the integrity of climate change science. For example, *The Star* covered the efforts of Sheila Watt Cloutier, an Inuit born in the Canadian Arctic, to increase public awareness of the link between human rights and climate change:

Inuit people around the Arctic Circle are... running out of the hard-packed snow they need to build igloos. And falling through melting ice when they hunt... these circumstances are the actual results of global climate change, according to... Sheila Watt Cloutier... who maintains this constitutes a violation of human rights for indigenous people in low-lying areas throughout the world. (Zabarenko, 2007, p. A07)

The Globe and *The Star* argued that we have an ethical responsibility to act on climate change. For example,

...our involvement [in Kyoto] does not hinge on the question of our own economic benefit. Rather our choice to participate is rooted in questions of global citizenship and responsibility... We need to get far more serious about shaping long-term foreign policy in which Canadians are honourable global citizens.

(Marshall, 2006, p. A14)

The Post mostly questioned the ethics of climate change scientists; for example:

“The scientists... have an obligation to declare their political and value assumptions and how much they have affected their selection and interpretation of scientific evidence”

(Klaus, 2007, p. FP15).

The Post also used ethical arguments to condemn compulsory cuts on greenhouse gas emissions. One contributor compared environmentalism to Communism and implied that environmentalists who want to “do something about the weather” are against the moral principles of “freedom, democracy, the market economy and prosperity” (Klaus, 2007, p. FP15).

In short, while ethics was rarely a primary theme, when it was, there was a significant difference in the way that each paper portrayed ethical questions related to climate change mitigation. *The Post* questioned the ethical foundations of climate change science and used ethical arguments to denounce compulsory cuts to emissions. *The Globe* and *The Star* argued that we have a moral responsibility to act on climate change, which includes committing to compulsory emissions reductions.

Public opinion.

Public opinion was a major theme in 3% of *The Toronto Star* data (Figure E2, Appendix E), 2% of *The Globe and Mail* data (Figure E1, Appendix E) and 1% of *The*

National Post data (Figure E3, Appendix E). When public opinion was a major theme in the data, it was most often to convey the results of public opinion polls. For example, *The Globe* covered the results of an Ipsos-Reid poll in British Columbia:

British Columbians are in a dark mood these days. According to a recent poll, two-thirds believe the world will end in two to three generations unless something drastic is done to end global warming... In the same... poll... fewer than 10 per cent of respondents said they are doing all they can to help reduce the impact they are having on the environment. (Mason, 2006, p. A13)

Similarly, *The Post* covered the results of a tri-national poll, which surveyed Canadians, Americans and British:

Angus Read surveyed people in all three countries in November and December, before and after Copenhagen. The drop off in public support for the idea that global warming is a fact mostly caused by human activity looks most pronounced in Canada. In November, 63% of Canadians supported global warming as a man-made phenomenon. By Dec 23, that support had fallen to 52%. (Corcoran, 2010, p. FP15)

The article's focus was the implication of the poll's results for political action on climate change.

One article, in which public opinion was a theme, focused on public knowledge or public emotion in relation to climate change. *The Star* addressed the stress that media reports of global warming were creating among students:

... when they are confronted with predictions of species dying, of drought, starvation, devastation of forests, rising oceans, disease and the end of life as we

have known it, and there is nothing available to offer context and a measure of hope, then there is... cognitive dissonance... the crying, the anger, the sleepless nights and the depression... Green jitters are growing rapidly on this blue planet. (Smith, C., 2007, p. F04)

This article was unique among the data in its focus on public emotion.

Energy security.

Energy security was a major theme in 1% of *The Globe and Mail* data (Figure E1, Appendix E), 1% of *The Toronto Star* data (Figure E2, Appendix E) and 3% of *The National Post* data (Figure E3, Appendix E). Topics discussed include rising demand for energy, specifically in developing countries such as China and India, soaring oil prices, political instability and nuclear power as a stable source of future energy. For example, *The Globe* reported on a warning from the International Energy Agency: The world is facing an energy future that's "Dirty, insecure and expensive" unless governments promote alternatives such as nuclear and renewable energies... Global demand is expected to swell 53 per cent by 2030..." (Grant, 2006, p. B12).

The Star chided G-8 leaders for their lack of attention to curbing "our appetite for oil" (Crane, 2005, p. F02):

Given our vulnerability to a disruption in world oil supplies, with such a large part of world reserves concentrated in the Middle East, it would have been reasonable to expect... the G-8 leaders to have agreed to strong action to reduce our need for oil. National security considerations alone would surely warrant such action... there were two other... reasons... climate change... [and]... the risk that oil

production cannot keep up with rising demand... [in] China, India and other advancing economies... (Crane, 2005, p. F02)

The Post also referred to political instability in the Middle East as it relates to energy security: “Soaring oil prices and fears about the developed world's dependence on Middle Eastern oil have combined with concerns over global warming to spur a resurgence in interest in nuclear energy...” (Catan, 2005, p. SR1).

Awareness.

Awareness was a major theme in 1% of *The Globe and Mail* data (Figure E1, Appendix E), 1% of *The Toronto Star* data (Figure E2, Appendix E) and 1% of *The National Post* data (Figure E3, Appendix E).

For example, *The Post* covered an environmental media challenge called Flick Off, sponsored by Virgin Group billionaire Richard Branson: “...Branson promised a music festival prize yesterday to the Canadian community that does the most to cut its greenhouse gas emissions in an environmental challenge called Flick Off” (Reuters, 2007, p. A6).

The Globe profiled Vancity Credit Union’s chief executive officer for his climate change presentation to the Vancouver Board of Trade: “Using a short selection of the slides from An Inconvenient Truth... Mr. Mowat gave what he called a “More Gore” presentation. He urged the audience to... take action in their own personal and corporate lives...” (Hume, 2007b, p. S1).

Only one article in the data sample addressed awareness in the context of formal education. Concerned with student reactions to the predictions of dire consequences of

climate change, a journalist for *The Star* emphasized the importance of education about climate change in the school system:

What's required is context. If students were able to develop a constantly expanding awareness of how ecosystems operate, they would be able to deal with the horror stories... Professor Tom Puk at Lakehead University in Thunder Bay has been training teachers to include ecological literacy in courses as disparate as science, history, health, geology, economics, language, arts and mathematics... what we need is for Queen's Park to... follow Puk's lead by changing the curriculum to incorporate ideas such as his. (Smith, C., 2007, p. F04)

Adaptation.

Adaptation was a major theme only once, in one article in *The Toronto Star*. It was a letter to the editor titled "Learn to adapt to climate change", in which the contributor argued that global warming is a cycle that will be repeated again and again so we should learn to adapt rather than trying to stop it:

Rather than wringing our hands and trying to stop the inevitable, perhaps our leaders should develop a strategy to deal with the consequences (coastal flooding, changing environments), and even the opportunities... Global warming is real. History tells us that. Learn to deal with it. We humans adapt. (Neilson, 2006, p. F07)

Aside from this one article, adaptation was only mentioned in passing. For example, in 2009, each of the newspapers mentioned the commitment of developed countries to aiding developing countries in adapting to climate change, similar to this reference in *The Globe*: "Wealthy nations have committed to provide ... \$100 billion by 2020 to assist

developing countries to reduce emissions and *adapt* [emphasis added] to climate change” (McCarthy, 2009, p. A18).

Information Sources

Government representatives, particularly politicians and political parties, were the primary source of information on climate change, for all three newspapers (Figure 4).

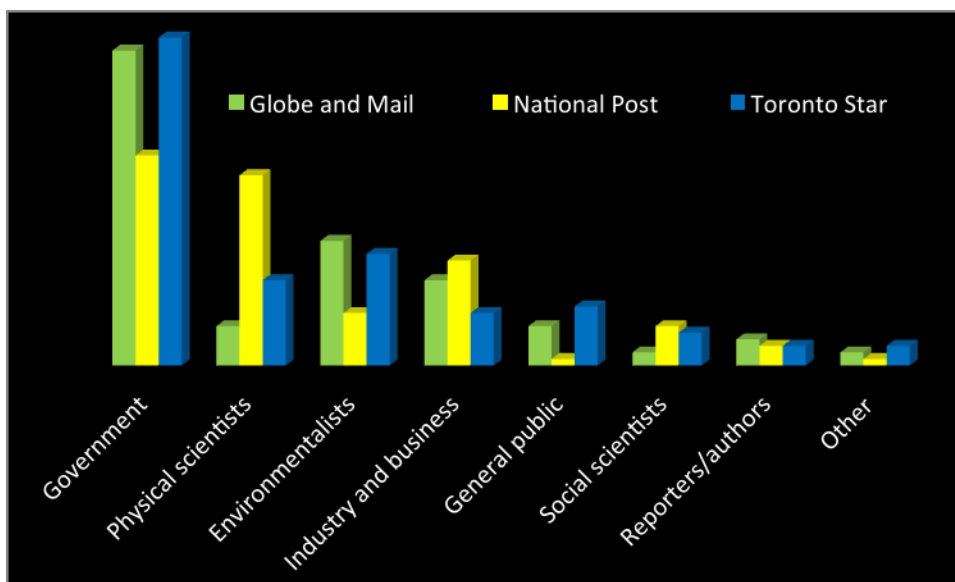
This supports previous research, which demonstrated that press coverage of climate change was strongly linked to a political agenda and that government officials were a top source of information (Carvalho, 2005; Carvalho & Burgess, 2005; Wilkins, 1993).

Following government representatives, physical scientists were the most frequently cited information source in *The Post*, which commonly drew on climate skeptics as “experts” to debate the IPCC consensus on climate change. By contrast, activists and representatives of environmental organizations were the second most frequent information source for both *The Globe* and *The Star* (Figure 4). The third most frequent information source in *The Globe* and *The Post* was industry and business representatives. The third most frequent information source in *The Star* was physical science representatives.

Government representatives.

Government representatives comprised 48% of the information sources in *The Globe and Mail* data (Figure F1, Appendix F), 50% in *The Toronto Star* data (Figure F2,

Figure 4: *Information sources for The Globe and Mail, The Toronto Star and The National Post*

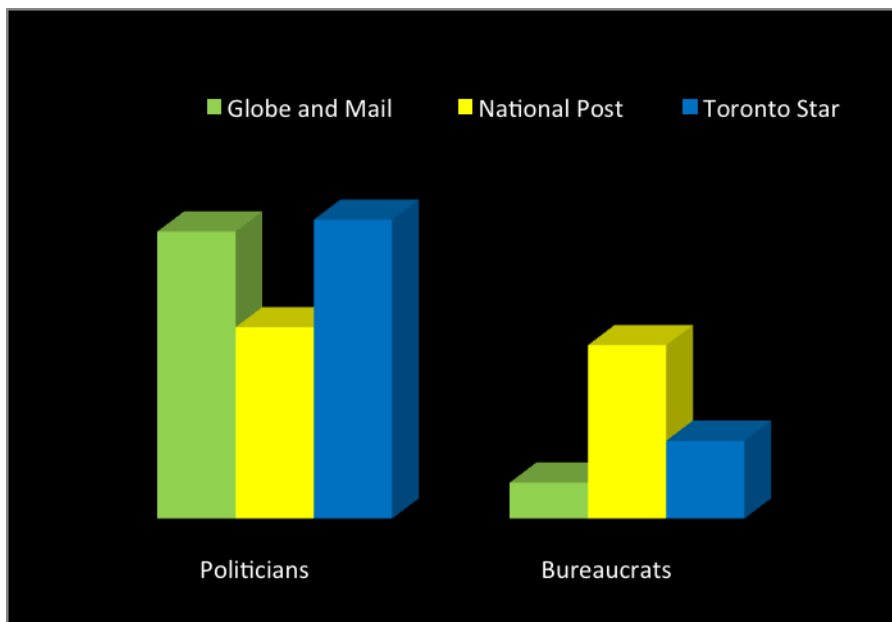


Appendix F) and 32% in *The National Post* data (Figure F3, Appendix F). Government sources were most often politicians from Canada, the United States and Europe, i.e., Prime Minister Stephen Harper and European Union Environment Commissioner Stavros Dimos; but also bureaucrats from government departments and agencies, including the United Nations, i.e., Andrea Marre, spokesman for Environment Minister Stephane Dion and Claude Mandil, Executive Director of the International Energy Agency and Yvo de Boer, head of the United Nations Climate Change Secretariat (Figure 5). When the papers covered international events, politicians and bureaucrats from developing countries, for example, Lumumba Di-Aping, a Sudanese diplomat, were rarely quoted.

Environmental representatives.

Environmental representatives were information sources in 19% of the *The Globe and Mail* data, (Figure F1, Appendix F), 17% in *The Toronto Star* data (Figure F2, Appendix F) and 8% in *The National Post* data (Figure F3, Appendix F).

Figure 5: *Weighting of politicians and bureaucrats as information sources.*



Examples of environmental representatives ranged from individuals who work for environmental non-governmental organizations such as the World Wildlife Fund, the Pembina Institute, Climate Action Network and the Coalition on the Environment and Jewish Life, to individual activists such as David Suzuki and Sheila Watt Cloutier, nominated for a Nobel Peace Prize for her advocacy to raise awareness of the impact of climate change on the human rights of Inuit peoples.

When environmental representatives were sourced, it was most commonly to respond to government plans or policies. For example, in an article about the Asia-Pacific Partnership on Clean Development and Climate, *The Globe* asked director of the World Wildlife Fund to comment:

...environmentalists already are warning that the... [partnership] will further undermine the Kyoto accord... “It sounds like a trade deal, and that’s not a substitute for an agreement to cut emissions of greenhouse gases,” said Hans

Verolme, the director of the World Wildlife Fund's climate-change program.

(Sallot, 2005, p. A2)

In contrast to their relative prominence as sources to comment on government plans or policies, environmental representatives were rarely drawn upon to tell the story of their own initiatives. There were a few exceptions. *The Star* covered an energy conservation campaign of the Coalition on the Environment and Jewish Life (Kay, 2006) and *The Globe* covered the activist campaign of "CO₂ man" (Tafler, 2007, p. A8), which targeted Stephen Harper's government for not taking a stronger position on reducing emissions.

Industry and business representatives.

Industry and business representatives comprised 16% of the information sources in *The National Post* data (Figure F3, Appendix F), 13% in *The Globe and Mail* data (Figure F1, Appendix F) and 8% in *The Toronto Star* data (Figure F2, Appendix F). Examples of industry representatives include Joe Sparano, president of the Western States Petroleum Association, Mark Nantais, president of the Canadian Vehicle Manufacturers Association and Exxon Mobil chief executive Rex Tillerson. Examples of business representatives include Luc Bertrand, President and Chief Executive of The Montreal Exchange and Ken Johnston, president of Vancouver company Novex Couriers.

Physical scientists.

Physical scientists or science institutions comprised 29% of the information sources in *The National Post* data (Figure F3, Appendix F), 13% in *The Toronto Star* data (Figure F2, Appendix F) and 6% in *The Globe and Mail* data (Figure F1, Appendix F). For example, the Goddard Institute of Space Studies, Georg Kaser, a glaciologist at the University of Innsbruck in Austria, Rajendra K. Pachauri, energy expert and chairman of

the UN's Intergovernmental Panel on Climate Change and Tim Flannery, Australian scientist and author of *The Weather Makers*. *The Post* drew more on physical scientists, as information sources than the other two newspapers. Many of the scientists sourced by *The Post* were skeptical of the consensus on anthropogenic climate change.

Social scientists.

Social scientists were poorly represented in the newspapers coverage of climate change. They comprised 3% of the information sources in *The National Post* data (Figure F3, Appendix F), 5% in *The Toronto Star* data (Figure F2, Appendix F) and 4% in *The Globe and Mail* data (Figure F1, Appendix F). Most of these sources were actually economists, for example Sir Nicholas Stern, who commented on the impact of climate change policy on the economy or the consequences of unmitigated climate change to the economy. There were a few exceptions. *The Toronto Star* sought comments from a sociology professor on the “expanding awareness of environmental issues by religious institutions” (Dec. 17, 2006, TS) and a professor of the Women and Gender Program at the University of Toronto on the relationship between climate change and depression among university students (Mar. 31, 2007, TS).

General public.

Members of the public comprised just 1% of the information sources in *The Toronto Star* data (Figure F2, Appendix F), 2% in *The Globe and Mail* data (Figure F1, Appendix F) and 0% in *The National Post* data (Figure F3, Appendix F). The percentages represent a total of three people: one teenage boy in Victoria, B.C., one fisherman in Mwanza, Tanzania and the parents of Sahar Jafrani, a young teenager who wrote one of the articles in *The Star's* special feature *Planet*.

Letters to the editor.

Letters were the only real way in which members of the public were given ‘voice’ to express their opinions about climate change. In the data sample, *The Star* published more letters to the editor than *The Globe* or *The Post*. 27% of the articles in *The Star*’s data sample were letters to the editor; only 14% of *The Globe*’s data sample and 12% of *The Post*’s data sample were letters to the editor. *The Star* also published a special feature called *Planet*, which featured articles about climate change by young teenagers. One note of interest is most of the letters to the editor in the data sample were written by men. *The Globe* data contained 10 letters to the editor, all of which were written by men; *The Post* data contained 11 letters to the editor, 10 of which were written by men and *The Toronto Star* data contained 23 letters to the editor, 19 of which were written by men. So, of 38 letters to the editor in the entire data sample, only three were written by women.

Reporters and authors.

Reporters from other newspapers and authors comprised 7% of the information sources in *The National Post* data (Figure F3, Appendix F), 5% in *The Toronto Star* data (Figure F2, Appendix F) and 5% in *The Globe and Mail*. Writers for *The Globe and Mail*, *The National Post* and *The Toronto Star* sometimes quoted directly from other newspapers or magazines such as *The Economist*; on-line publications such as *Grist.org*, an American non-profit online magazine that publishes environmental news; reporters from other papers, such as *The New York Times*’ Andrew Revkin and *The Guardian*’s George Monbiot; and authors of books, such as Ronald Wright and Jared Diamond.

Other.

‘Other’ information sources included those that did not ‘fit’ under the chosen categories. For example, celebrities like singer Sheryl Crow or Princess Takamodo of Japan; independent think-tanks like the Tennessee Centre for Policy Research or the Competitive Enterprise Institute, and polling companies like Ipsos Reid.

Summary

In summary, the major themes in climate change reporting among all three newspapers were politics, economics and mitigation. By comparison, the subject themes science, consequence, cause, advocacy, ethics, public opinion, energy security, awareness and adaptation were relatively minor in focus. The notable exception was the predominance of science as a major theme in *The National Post*, which placed an emphasis on scientific debate and controversy not present in *The Globe and Mail* or *The Toronto Star*.

The dominant information sources were government representatives, particularly politicians and political parties. Physical scientists were also a dominant information source in *The National Post*, a reflection of *The Post*’s emphasis on the subject theme of science in its climate change reporting. Social scientists and members of the public were infrequently drawn upon as information sources.

Chapter 5: Discussion

This research set out to answer three questions, (1) what are the major and minor themes, (2) who are the most and least frequently cited sources of information, and (3) what ideological standpoints are reflected in *The Globe and Mail*, *The National Post* and *The Toronto Star* reporting on climate change. The focus of this chapter will be a discussion of the ideological standpoints that were reflected in *The Globe and Mail*, *The National Post* and *The Toronto Star* reporting on climate change, as the major and minor themes and information sources were addressed in chapter four.

Ideological Stances

The comparative analysis of *The Globe and Mail's*, *The Toronto Star's* and *The National Post's* representation of climate change revealed support for different values and political preferences, indicative of each newspaper's leaning towards a particular ideological standpoint (Carvalho, 2007). The difference in ideological standpoints was especially striking between *The National Post* and *The Toronto Star*. *The Post's* representation of climate change was couched in a neo-liberal capitalist ideology that values the free market, individual choice and freedom, and preservation of the status quo and prefers minimal government intervention (Carvalho, 2005, 2007; Carvalho & Burgess, 2005, Giroux, 2005; Larner, 2000). *The Star's* representation of climate change was couched in a social democratic ideology that values social responsibility, social justice, a precautionary approach to mitigation and supports government intervention (Boix, 1998; Carvalho, 2005, 2007; Carvalho & Burgess, 2005). *The Globe's* representation of climate change shared some views with *The Star* and some with *The Post*.

The difference in ideological standpoints was reflected in the way each newspaper interpreted scientific knowledge about climate change, emphasized or de-emphasized the consequences and urgency of action required, expressed preferences regarding the regulatory role of government and challenged or maintained the social and economic status quo, as well as in the predominant information sources drawn on by each newspaper and the way each newspaper represented the views of particular actors in the climate change debate.

Expression of scientific knowledge.

Through her examination of news articles in climate change, Carvalho (2007) found three dimensions of climate science representation to be interlinked with ideology. First, “the reliability” attributed by the papers to certain “‘truth’ claims” and the quantity of media space dedicated to a given scientific claim (Carvalho, 2007, p. 237). Second, the selection of “experts” and “counterexperts” as information sources (Carvalho, 2007, p. 237). And, third, “the goals associated with the knowledge”; for example, “The direct or indirect implications for individual or governmental action that are drawn from scientific claims result from views of the status quo and contribute to consolidating or challenging it” (Carvalho, 2007, p. 237).

As demonstrated in chapter four, *The National Post* drew heavily on physical scientists as information sources and dedicated a significant amount of space to the subject theme ‘science’; the newspaper used this space to portray scientific controversy and debate about climate change. *The Post* selected scientists who contradict the mainstream consensus of the IPCC as the “experts” on climate science. Accordingly, in its coverage of climate science, *The Post* attributed reliability to truth claims that

contradicted the scientific consensus. By contrast, *The Star* and *The Globe* dedicated relatively little space to the subject theme ‘science’ and generally, with exceptions in *The Globe*, affirmed the consensus of the IPCC. This is significant because, as Carvalho argues, “Modes of interpretation and discursive reconstitution of scientific uncertainty are one of the most telling indicators of ideological standpoints” (2005, p. 238).

Hockey stick graph.

In 2005, *The Post* profiled a new study in *Geophysical Research Letters*, which demonstrated that the ‘hockey stick graph’, a primary piece of scientific evidence used by the IPCC, contained major flaws (McIntyre & McKittrick, 2005). This claim received considerable attention from *The Post* – a news article and a special two-part commentary. In the first part of the commentary, the journalist described the study as “*a full challenge* [emphasis added] to the dominant theme of the entire climate and global warming movement”, one that “threatens to *rock the foundations* [emphasis added] of climate science” (Corcoran, 2005, p. FP11). In the second part of the commentary, the journalist claimed that the study undermines any justification for the Kyoto Protocol:

Geophysical Research Letters... acknowledges a serious problem with prevailing climate reconstruction... this *undercuts... supposed proof* [emphasis added] that human activity has been responsible for the warming of the earth’s atmosphere... and the ability to place confidence in the findings and recommendations of the influential [IPCC]. The political implication is *a serious undermining of the Kyoto Protocol* [emphasis added] with its worldwide agreements on reducing emissions of carbon dioxide and other greenhouse gases. (Crok, 2005, p. FP11)

Contrary to the prominence given this study in *The Post* and the emphatic linguistic choices made by the journalists to describe the contradictory evidence presented in this study, – “a full challenge”, “rock the foundation”, “undercuts supposed proof”, “serious undermining of the Kyoto Protocol” – there was absolutely no mention of the study in *The Globe* or *The Star* data, which implies that neither newspaper viewed it as significant.

Climategate.

There was a similar difference between the newspapers in the reliability attributed, and the quantity of media space allotted, to the “Climategate” scandal. *The Post* contributed significantly more space to the issue than *The Globe* or *The Star*. It published seven articles about Climategate, one of which was 3,372 words long, compared to *The Globe*’s two articles and the sentence, which was devoted to the issue in *The Star*.

The Post used the ‘space’ it allocated to Climategate to discredit the integrity of the IPCC science and the scientists involved and refute any justification for political regulation to mitigate climate change. For example, columnist Lawrence Solomon, who wrote *The Denier* series, accused the scientists of “cooking the books”, recording false information, “to make the last century seem dangerously warm” and of practicing a dogma: “...the Climategate transcripts provided an unvarnished look at the struggles that the climate practitioners underwent before settling on their scientific dogma” (2009b, p. FP19). Terence Corcoran described these scientists as captive to an authoritative plan of the IPCC: “...the scientists seem to have become captive of that organization's [IPCC] objectives, which was to find ‘the hand of man’ in climate records to justify plans to

change the climate in the future” (Corcoran, 2009b, p. A16). Corcoran implied that the IPCC had a predetermined objective to find humans guilty of causing climate change, whether or not there was science to prove it.

A similar accusation was made by other *Post* journalists. For example, Peter Foster labeled the IPCC scientific process as “manifestly biased” and “blatantly ideological”:

How and why, did virtually every government on earth buy into what might turn out to be bogus science and potentially disastrous policy? How was a manifestly biased IPCC process able to sell the line... that the science was "settled." What was the UN-based system's role in promoting radical environmental NGOs and allowing them into the policy process? How did NGOs manage to scare the public, and threaten and co-opt Big Business? What was the role of government bureaucracies in pushing obviously self-interested plans to erect massive new programmes to control the weather and dictate industrial activity? How were the vast majority of democratic politicians sucked into this blatantly ideological process without issuing so much as a peep of dissent? (Foster, 2009, p. FP13)

In his battery of questions, Foster uses a number of strategies to undermine the science. First, by affirming that the IPCC process was “manifestly biased” and “blatantly ideological”, he attributes reliability to those who hacked the e-mails and implies a kind of scientific conspiracy by the IPCC. Second, by describing environmental NGO’s as “radical” and accusing them of co-opting “Big Business”, he positions environmentalists as villains and Big Business as the victim. In this way, he discredits the social agents – environmentalists – that emphasize the severity of climate change, and protects the social

agents – big business – whose activities, i.e. oil production, contribute to the problem. Third, he accuses bureaucracies of being “self-interested”, issuing programs to “control” and “dictate”, conjuring up images of dangerous politics with references to communism and state-controlled economies, and promoting distrust in governments. At the centre of *The Post*'s emphasis on scientific uncertainty is a preference for neoliberal ideology that values market liberalism and is averse to government intervention.

In full contrast to *The Post*, *The Toronto Star* interpreted Climategate as insignificant in the face of the “mass of evidence” on which proposals for action are based (The Toronto Star, 2009, p. A1). Moreover, *The Star*'s reference to Climategate was made in its front page editorial, which was a united call, with 56 other newspapers worldwide, for action from political leaders at Copenhagen. The editorial issued a fundamentally different message than *The Post*:

In scientific journals the question is no longer whether humans are to blame, but how little time we have left to limit the damage... The science is complex but the facts are clear. The world needs to take steps to limit temperature rises to 2C, an aim that will require global emissions to peak and begin falling within the next five to 10 years. A bigger rise of 3-4C – the smallest increase we can prudently expect to follow inaction – would parch continents, turning farmland into desert. Half of all species could become extinct, untold millions of people would be displaced, whole nations drowned by the sea. The controversy over emails by British researchers that suggest they tried to suppress inconvenient data has muddied the waters but failed to dent the mass of evidence on which these predictions are based. (The Toronto Star, 2009a, p. A01)

Evidently, *The Star* attributed little reliability to the “truth claims” of the Climategate scandal, and focused the reader’s attention on the certainty of the science and the global crisis that future generations will bear if aggressive and immediate action is not taken. The prominence of this editorial, on the front page of the newspaper and delivered in conjunction with 56 other newspapers from around the world, indicates a strong institutional endorsement by *The Star* of the certainty of climate science and the need for aggressive political action on climate change.

The Globe gave more scrutiny to the Climategate issue than *The Star*, yet it dedicated far less space to the issue than *The Post*. *Globe* Columnist Rex Murphy criticized the Copenhagen conference for the lack of attention it gave to the issue and implied that the science may be more akin to advocacy: “Has the science been tainted, is the question of our time... That question is not being asked with the rigour we should expect... If we are to reorder our economies at so critical a time, then first things first. Determine if the science is science, not a partnership with advocacy” (Murphy, 2009, p. A25). Columnist Margaret Wentz claimed that Climategate: “... gives a pile of ammunition to those who believe global warming is a giant boondoggle” (2009, p. A23). The questions raised about the validity of the IPCC science in the articles by Murphy and Wentz were balanced by an article, in the same month, by guest columnists who countered the claims of skeptics: “Despite wide agreement among scientists on the basic facts of global warming... the vigorous efforts of skeptical commentators have raised doubts about the scientific consensus. These skeptics use four arguments most commonly. Here we offer a short refutation of each” (Homer-Dixon & Weaver, 2009, p. A15).

Thus, in response to Climategate, *The Globe* allowed space for both journalists to express skepticism towards mainstream climate science and guest contributors to advance an image of scientific consensus. This was true throughout *The Globe* data, although, given that science was a minor theme in the newspaper, there were still relatively few expressions of skepticism in *The Globe* data.

Climate skeptics.

The Post consistently presented the science of skeptics as a reliable and trustworthy source of information and regularly mocked the consensus science of the IPCC. *Post* journalists used words like “orthodoxy” (Solomon, 2007a, p. FP15), “religion” (Solomon, 2007b, p. FP15), and “dogma” (Cash, 2007, p. A16) to describe the mainstream scientific consensus and “fearmongers” (Cockburn, 2007, p. FP15) and “high profile campaigners” (Crovitz, 2009, p. A17) to describe the scientists of the IPCC.

The Denier series was written by Lawrence Solomon, a regular *Post* columnist and known climate skeptic. It was later published as a book subtitled “The world-renowned scientists who stood up against global warming hysteria, political persecution, and fraud” (Solomon, 2008). The book title gives a flavour of the dichotomy *The Post* creates between climate skeptics – rational, intelligent, respected scientists with impressive credentials and awards to their name - and IPCC scientists – fearmongering campaigners who are trying to scare the world into action by making up false evidence of global warming.

In each article, Solomon built the respect for the skeptics by describing their accomplishments, honours and respected reputations, while discrediting the ideas and research of the IPCC. For example, in the article about Dr. Reid Bryson, climatologist,

the title was “Open mind sees climate clearly”, implying that the mainstream scientists are not open-minded and do not see the climate clearly (Solomon, 2007b). Bryson receives accolades from Solomon in the introductory paragraphs: “... the world’s most cited climatologist... the fifth-most-cited physical geographer in the world... the 11th most cited among all geographers... he has written some 230 articles and five books... he’s a member of the United Nations Global 500 Roll of Honour...” (Solomon, 2007b, p. FP15). Then, once he has praised the “denier” in question, he devotes the article to discrediting the mainstream scientific consensus. In this case, he quotes Dr. Bryson, who, referring to “man-made global warming” said:

‘...that is a theory for which there is no credible proof... There is very little truth to what is being said and an awful lot of religion... It’s almost a religion where you have to believe in anthropogenic global warming or else you are nuts.’

(Solomon, 2007b, p. FP15)

Similar to the institutional endorsement implied by the front page editorial of *The Star* emphasizing the certainty of the science and calling on political leaders for action, the prominence of the *Denier* series as a regular column indicates a strong institutional endorsement by *The Post* of the views expressed by the climate skeptics (Carvalho, 2007).

Neither *The Star* nor *The Globe* endorsed the views of climate skeptics. *The Star* gave voice to scientists who affirmed the consensus, like Australia’s Tim Flannery – “As Flannery says, there are unheralded signs of change that simply have not been seen in the past. They persuade him... that the debate on climate change is well and truly over. ‘The science is solid and the effects are there for everyone to see’, he says” (The Toronto Star,

2006b, p. A22). *The Globe* allowed space to contest mainstream scientific viewpoints, however, unlike *The Post*, it also contained claims that affirmed the IPCC consensus; for example, "...mounting evidence suggests that the UN's [IPCC], much maligned for its alarmist language by climate change skeptics, behaved far too cautiously" (Jaccard, 2006, p. A15).

If the accumulated evidence against anthropogenic climate change was so substantial and the voices of skeptics were so credible, all three newspapers would likely have published articles similar to those in *The Post's Denier* series. But the story that each newspaper told about climate change was not based on objective reality. It was a constructed version of reality, reflective of the interests and objectives of the producers, reflective of each newspaper's ideological standpoint. As Carvalho and Burgess argue:

Media build particular images of scientific knowledge and uncertainty on climate change, and emphasize or de-emphasize forecasts of impacts, in order to sustain their political preferences regarding the regulatory role of the state, individual freedom, and the general economic and social status quo. (2005, p. 1467)

Different stories were told about the science on climate change in each newspaper. *The Post* advanced an image of scientific uncertainty and disagreement about anthropogenic climate change. *The Star* and, for the most part, *The Globe*, advanced an image of scientific consensus about anthropogenic climate change, implicit in the relative lack of space that each newspaper devoted to the theme of science.

Emphasis of consequences.

The Star constructed an image of crisis and conveyed a sense of urgency by dramatizing the consequences of climate change and emphasizing the risks to human

welfare. It used this strategy to advocate for a regulatory role by government and aggressive cuts to greenhouse gas emissions. For example, in the 2006 data, *The Star* contained two articles, one almost 2,000 words in length, about NASA scientist James Hansen's theory of the tipping point at which "melting of the Greenland ice cap becomes irreversible" and "really dangerous climate change is likely to be unstoppable", and his calls to keep global temperature increases to one degree Celsius to avoid the tipping point (Smith, C., 2006a, p. F04). James Hansen called for global caps on emissions by 2016 to keep global temperature increase to one degree Celsius, which differed from the majority of scientists at the time who said that an increase of two degrees Celsius was safe (2006, p. 9). Neither *The Post*, nor *The Globe* made space to cover Hansen's message, implying that these newspapers did not view his claims as significant.

The Star, however, used Hansen's message to advocate immediate action, deep cuts to emissions and government intervention:

We are running out of time: Evidence of the potentially devastating effects of global climate change keeps accumulating. With the time to move fast approaching, governments will need to be prodded into taking action... The world is... on the brink of runaway global warming that will have devastating consequences. But the worst can be avoided, and the world can remain prosperous and habitable, provided massive cuts in carbon dioxide and methane emissions are started immediately. We have only ten years to get it right... (Smith, C., 2006b, p. F04)

Note the journalist's strategy of conveying an image of crisis – "the world is... on the brink of runaway global warming..." – and conveying a sense of urgency – "we are

running out of time”, “we have only ten years to get it right” – in order to urge immediate and aggressive action – “... massive cuts in carbon dioxide... started immediately” – and a role for government intervention – “governments will need to be prodded into taking action” (Smith, C., 2006b, p. F04). This strategy, conveying a sense of crisis and urgency in order to sustain its preference for aggressive emission cuts and a strong regulatory role by government was used several times by journalists and contributors of *The Star* (Lin, 2007, p. P03; Jafrani, 2007, p. P01; Ross, 2009, p. A04; The Toronto Star, 2006b, 2009a, 2009b).

In contrast, *The Post* tended to deride dramatic interpretations of the consequences with descriptions such as “global warming hysteria”, “propaganda” (Klaus, 2007, p. FP15) and “climate catastrophism” (Foster, 2007, p. FP15). In one editorial, journalist Colby Cosh (2007) emphasized the benefits of climate change: “...a person... could conclude... that it is a good thing on balance; perhaps it’s no coincidence that the Medieval Warm Period coincided with the intellectual and economic fertility of the High Middle Ages” (p. A16). In another editorial, the author admitted to more serious consequences - “Climates are changing across the world... some crops will fail, some species will be pressed to extinction and some low-lying territories will be flooded” – but argued that the consequences could not “...be used to justify any form of remedial action” (The National Post, 2009a, p. A28). Instead, the journalist focused the readers’ attention on the dangers of political intervention by accusing activists of “...exploiting concern over climate change to justify the creation of state-managed green economies – socialism with a Gaian face” (The National Post, 2009a, p. A28). In this passage, the author expressed an aversion to political control of greenhouse gases and discredited the

social agents, in this case activists, who emphasize the severity of the problem and the need for action.

In *The Globe* some journalists outlined the severity of the consequences, with language similar to that in *The Star*, e.g. “devastating temperature increase”, “effects that are nothing short of scary”, and “higher temperatures would have potentially catastrophic results” (McCarthy, 2009, p. A18). However, in some of its comment columns, *Globe* journalists downplayed the consequences in a similar way to *The Post*. For example, *Globe* columnist Margaret Wentz argued, “Nobody can agree how big the problem is, or might become, or who might be affected and when, or what the human contribution really is...” (2006, p. A21). Wentz downplayed the “problem”, and thus the consequences of climate change in order to question whether cutting emissions would make a difference, in contrast to journalists in *The Star*, who emphasized the consequences to justify high cuts to emissions.

Regulatory role of government.

The Post took advantage of scientific “events” like Climategate and the research that exposed flaws in the “hockey stick” graph to contradict the consensus science and the corresponding basis for government intervention. For example, one month prior to the Copenhagen climate conference, *Post* journalist Lawrence Solomon asserted: “There is no scientific consensus on climate change. There is no basis to undertake the radical economic changes that... western leaders propose” (Solomon, 2009, p. FP19). In the same month, in one of *The Post*’s articles about Climategate, journalist Lorne Gunter wrote: “There appears to be evidence... of attempts to prevent scientific data from being released... [this] should... cause the public to question the need for any expensive, big-

government solutions such as Copenhagen, Kyoto, cap and trade [and] carbon tax...” (Gunter, 2009, p. A22). *The National Post* built an image of scientific uncertainty in order to sustain its preference for a free market uninhibited by “big government solutions”.

Compare this to *The Star’s* call on government leaders for aggressive action in its front-page editorial on the first day of the conference in Copenhagen:

Today 56 newspapers in 45 countries take the unprecedented step of speaking with one voice through a common editorial. We do so because humanity faces a profound emergency. Unless we combine to take decisive action, climate change will ravage our planet... We call on the representatives of the 192 countries gathered in Copenhagen... to seize opportunity from the greatest modern failure of politics... The politicians in Copenhagen have the power to shape history’s judgement on this generation: one that saw a challenge and rose to it, or one so stupid that we saw calamity coming but did nothing to avert it. We implore them to make the right choice. (The Toronto Star, 2009a, p. A01)

While *The Post* created an image of scientific uncertainty to question the need for “big-government solutions”, *The Star* declared a “profound emergency” and dramatized the consequences – “...climate change will ravage our planet...” - to attempt to mobilize political action (The Toronto Star, 2009a, p. A01). It drew on the ethics of making the right choice for future generations – “...we implore them to make the right choice”.

Expressed in a front-page editorial, this call for political action indicated an institutional endorsement of advocacy for social change. The newspaper’s editor, Michael Cooke affirmed,

It's a familiar place for The Star, on the front lines, demanding change... The Toronto Star has crusaded for more than a century for social justice... and what could be more important for our children and grandchildren than to fight for a clean and healthy planet? The Star is proud to add its voice to progressive newspapers around the world in demanding immediate and courageous action from our Prime Minister and other world leaders. (The Toronto Star, 2009b, p. A06)

Couched in a framework of social justice, Cooke used an ethical argument of maintaining a healthy planet for future generations to demand political action. Cooke's statement upholds the core mission of the newspaper, "...to focus public attention on injustices of all kinds and on reforms designed to correct them" (The Toronto Star, 2011, para. 7), and indicates a leaning towards a social democratic ideology, which values social justice (Boix, 1998; Carvalho, 2005, 2007; Carvalho & Burgess, 2005).

The Star's preference for strong political action on climate change was also expressed in the 2005, 2006, and 2007 data, in which the newspaper commended and made space for politicians that back Kyoto (Dion, 2006; McQuaig, 2005). As well, *Star* journalists repeatedly criticized the Canadian government for its lack of action on Kyoto. For example, *The Star* criticized Prime Minister Harper's voluntary approach to reducing emissions, describing his "laissez-faire approach... relying basically on voluntary efforts and technology changes" as "a Victorian", or outdated, concept (Cameron, 2006a, p. F04). *The Star* advocated deep cuts to emissions: "... the rich world... must now take a lead, and every developed country must commit to deep cuts [emphasis added], which

will reduce their emissions within a decade to very substantially less than their 1990's level..." (The Toronto Star, 2009a, p. A01).

Similarly, *The Globe* implied a preference for mandatory emissions cuts and a regulatory role by government. For example, the editors made space for articles about opposition parties, which demanded action on Kyoto and criticized the Harper government on Kyoto. For example, "PQ demands action on Kyoto; Quebec should turn back on Harper and comply with accord, Boisclair says" (Seuin, 2006, p. A4), "PQ, Bloc join Greenpeace to back Kyoto" (Charette, 2006, p. A8), and "Ignatieff slams Harper on Kyoto; PM has left a void in policies to cut greenhouse gas emissions" (Clark, 2006, p. A4).

While both *The Star* and *The Globe* expressed an overall preference for Kyoto and government regulation, *The Globe*, in contrast to *The Star*, also made space for a skeptical attitude towards Kyoto, "Is Kyoto so politically correct that anyone who opposes it is fair game?", and defense of the Harper government (The Globe and Mail, 2006, p. A24). For example, *Globe* columnist Margaret Wente actually mocked *The Star* for its criticism of the Tory plan: "The Tories' 'shameful strategy', pined the Toronto Star 'could spell disaster for the world as we know it today'. Whew. Who knew the fate of Earth was up to us?" (Wente, 2006, p. A21). In this article, Wente stood up for the Harper government, refuting its critics:

...the critics' other favorite accusation is that the government lacks the 'guts to act.' As if having guts were all it took... So, let's say we had the guts to act, and could figure out what to do. Everyone agrees that such action would require enormous government intervention... to create the necessary incentives and

markets. How many of us have such touching faith in governments to get it right?

Do you? If so, then I have a Soviet five year plan for you. (2006, p. A21)

Similar to the strategy used by many *Post* journalists, Wentz played on society's fears of communism by likening government intervention in climate change mitigation to the former state-controlled economy in the Soviet. While *The Globe's* articles more often expressed support for Kyoto and a regulatory role by government, the editors also made space for contesting the merits of Kyoto and regulation.

In contrast, *The Post* consistently expressed an aversion to government intervention through sharp criticisms of mandatory regulations on emissions, as prescribed in the Kyoto Protocol: "planned economic contraction" (Cash, 2007, p. A16), "a political bargain crafted by the devil" (Vieira, 2006, p. A6), "a massive wealth redistribution scheme" (Passalent, 2005, p. A21), and "a job-killing, GDP plunging prescription for economic suicide" (Martin, 2007a, p. A20). Instead, *Post* journalists expressed favor of voluntary-based measures to address climate change. For example, *The Post* created space for five articles about the Asia-Pacific Partnership on Clean Development and Climate, and stated a preference for the partnership because it focused on voluntary and technological remedies to climate change rather than Kyoto's mandated quotas for emissions reduction:

...the Kyoto Protocol begins by assuming that curbs on emissions are the only way forward. By contrast, the Asia Pacific Partnership recognizes the need to investigate more innovative approaches based on the use of new technologies... Much can be achieved by voluntary co-operation, whereas the Kyoto protagonists imply that coercion is necessary for innovation. (Kasper, 2006, p. FP21)

By comparison, there was one article in *The Globe* data set about the partnership. *The Star* data set did not contain any articles about the partnership.

The Post's aversion to mandatory regulations and support of a voluntary approach to mitigation is heavily influenced by its ideological preference for a neoliberal capitalism. The articles in *The Post* data created an image of a dangerous politics in which government intervention to mitigate climate change will result in state-controlled economies, with threats to economic growth and individual freedom. Several journalists compared government proposals to regulate climate change to communism. One, for example, described the Kyoto Protocol as a system of "...climate control... based on politically mandated quotas, the threat of penalties and other coercive means..." and argued that "Kyoto-style emissions planning" resembles "Soviet-style central planning" (Kasper, 2006, p. FP21). Another journalist suggested that the European Union's energy plan for a low-carbon economy is synonymous with a communist economy like Cuba's: "The EU's energy policy is intended... to make Europe the world's 'first post-industrial, low-carbon economy.' But isn't Cuba already there?" (Foster, 2007, p. FP15). *The Post* clearly focused on drawing the readers' attention to the dangers of government intervention.

Challenge or maintain status quo.

As found by Carvalho in her analysis of British press coverage of climate change, the Canadian newspapers generally avoided a sustained critique of the "broad ideological parameters of free-market capitalism". With few exceptions, primarily in *The Toronto Star*, the newspapers did not question the social and economic practices, including

individual freedom and choice to consume and continuous economic growth that generate greenhouse gas emissions.

The Post, in its aversion to political interference, reinforced the ideological parameters of free-market capitalism. It extolled the power of free markets to address climate change, defended the individual's freedom and choice to unlimited consumption and travel and criticized social actors who questioned either the power of free markets or individualism. *The Star* and *The Globe* afforded some critique, though limited, of the social and economic status quo.

The Post's journalists repeatedly applauded the power of free markets to solve any problems brought about by climate change and upheld the value of individualism. For example, in an article about the Asia Pacific Partnership, the journalist wrote:

History and economic theory have demonstrated that the only way of tackling any issue effectively is by respecting individual freedom of choice... and individual aspirations to a better life... the history of free societies inspires confidence that human creativity can be mobilized to facilitate adaptation and mitigation of undesirable climate change... In the past two centuries, market economies have provided the know-how for ever-improving environmental care... Prosperity drives technological change, which leads to cleaner development... and fewer environmental hazards. The rich countries have greatly improved environmental standards since the Industrial Revolution... Innovation and economic growth must never be taken for granted. (Kasper, 2006, p. FP21)

The journalist focused on the ability of human creativity, market economies, prosperity, technological change and economic growth to mitigate climate change. Values of

individualism and market liberalism emerged, reinforcing the social and economic status quo and expressing a neo-liberal capitalist ideology. Ironically, while he noted that environmental standards have greatly improved since the Industrial Revolution, he did not note that carbon dioxide has accumulated in the atmosphere as a result of the individual's freedom to consume, prosperity and economic growth brought on by the Industrial Revolution (IPCC, 2007).

By contrast, Margaret Wentz, a columnist in *The Globe*, admitted that prosperity is a climate change culprit and outweighs any technological advances we make: "...the energy efficiencies we've gained over the past 15 years, by redesigning our appliances and retrofitting our houses, have been wiped out by the new computers and big TVs and airplane trips we've bought. Unfortunately for our virtue, the biggest CO₂ emitter of them all is prosperity" (Wentz, 2007, p. A21). However, in the same article, she suggests that Canada will have little impact on mitigating climate change because of the rate of growth of China: "...did you read the prediction that at its current rate of growth, within 25 years China will be emitting twice as much CO₂ as the world's richest countries together", diluting the responsibility of industrialized nations and shifting the focus away from the impact of consumption and growth in developed countries on future climate change (Wentz, 2007, p. A21).

Perhaps the most blatant cry to maintain the economic and social status quo came from *The Post* in an article by guest contributor Vaclav Klaus, president of the Czech Republic. Writing from the perspective of someone who lived under communism for most of his life, he pronounced, "I see the biggest threat to freedom, democracy, the market economy and prosperity now in ambitious environmentalism, not in

Communism” (Klaus, 2007, p. FP15). In order to express his preference for the status quo, he criticized environmentalists for their lack of faith in markets: “The environmentalists ask for immediate political action because they do not believe in the long-term positive impact of economic growth and ignore... the fact that the higher the wealth of society, the higher is the quality of the environment” (Klaus, 2007, p. FP15). Klaus concluded: “Small changes do not demand far-reaching restrictive measure. Any suppression of freedom and democracy should be avoided. Instead of organizing people from above, let us allow everyone to live as he wants” (Klaus, 2007, p. FP15). Klaus implied that the changes to the climate are small and do not warrant the risks to freedom and democracy that government regulation on greenhouse gas emissions would pose. Compared to both *The Star* and *The Globe*, this is an extreme interpretation of the risks of government intervention.

In contrast to *The Post*, *The Star* data contained articles that challenged the power of free markets and the individual’s freedom to consume. For example, in an article titled “Too late on global warming”, which was about whether climate change has reached a tipping point where really dangerous consequences are unstoppable, the journalist implied that Canada needs to “severely regulate carbon dioxide emissions” and gave voice to Colin Challen, chairman of UK’s all-party parliamentary group on climate change, who said: “...the current concept of growth, which hasn’t significantly changed since Victorian times, needs to be radically altered. Growth should be governed by how much CO₂ society can afford to emit...” (Smith, C., 2006a, p. F04). This is a far cry from *The Post*, which denied any reason to change the current economic paradigm: “Remember the good old days when using more energy, importing oil and gas and

emitting more CO₂ were all synonymous with economic growth and increasing wealth? Well, those days are still with us...” (Foster, 2007, p. FP15) Another *Post* journalist expressed resistance to changes in the economic status quo by arguing that even if the reader accepts the scientific consensus, s/he does not have to accept that we need to change our economies:

The greatest error in the current conventional wisdom is that, if you accept... that most of the modest global warming in the last quarter of the century... was caused by man-made carbon emissions, then you must also accept that we have to decarbonize our economies. Nothing could be further from the truth... a warmer climate brings benefits as well as disadvantages. Even if there is a net disadvantage... it is far less than the economic cost... of decarbonization.

(Lawson, 2009, p. FP15)

While *The Post* resisted any changes to the current economic paradigm, *The Star* made space for journalists and contributors to write about the opportunities of retooling the economy: “...the solution to both global warming and to lasting economic recovery is the same... leading the next industrial revolution in retooling the world economy to go carbon free...and in the process decoupling our currency from the price of oil” (McEachern & Price, 2010, p. A11). Most significant was the editorial on the first day of the conference in Copenhagen, in which the writer challenged both the economic and social status quo, by advocating a low-carbon society and changes to our lifestyles:

The world must kick its carbon habit and we'll have to change our lifestyle... The era of flights that cost less than the taxi ride to the airport is drawing to a close.

We will have to shop, eat and travel more intelligently. We will have to pay more

for our energy and use less of it. But the shift to a low-carbon society holds out the prospect of more opportunity than sacrifice... embracing the transformation can bring growth, jobs and better quality lives. (The Toronto Star, 2009a, p. A01)

This challenge to our current lifestyle and our dominant economic paradigm is significant because of its placement on the front page and because of its endorsement by the editor. *The Star* was the only paper to seriously challenge the social status quo of individual choice and freedom to consume and travel.

The Globe occasionally reinforced the economic status quo; for example: "All we know is that the only way to slow the growth of carbon emissions in the short term is to shut down the economies of the entire Western world... And that's probably not on" (Wente, 2006, p. A21). Wente implied an incompatibility between economic growth and climate change mitigation, reinforcing the economic status quo of continual growth. However, *The Globe* also contained an article which exposed the power of the fossil fuel lobby to restrain progress on climate change legislation:

...to be at all effective, any agreement would have to overcome the slick manoeuvring of the financially flush entrenched interests that have bathed Washington in lobbying dollars at record rates this year. The oil and gas companies... that pay big bucks to buy access on Capitol Hill are intent on making sure they end up winners under any bill the President signs. How that could even be possible, when fossil fuels are the principle climate-change culprits, only makes sense in the minds of the lobbyists for whom there is no such thing as a public interest that is more than the sum of competing private interests...

(Yakabuski, 2009, p. A11)

The journalist in this article challenged the power of the American oil and gas companies, the lobbying efforts of which serve to reinforce the economic status quo of carbon based economic growth.

Similarly, articles by guest contributor Environmental Defence in *The Star* challenged the power of oil companies by critiquing the touted economic benefits of the tar sands and outing the federal government's strategy on the tar sands: "...protect the tar sands, no matter who it hurts... Harper's draft climate plans leaked during the Copenhagen summit show his intention to let the tar sands triple in size by giving that sector special treatment when compared to other industries" (McEachern & Price, 2010, p. A11). The guest contributors from Environmental Defence argued that "... hitching our economy to dirty oil production turns our dollar into a petro-loonie. This hurts manufacturing by pricing our products out of international markets as our currency follows the price of oil ever upward over time" (McEachern & Price, 2010, p. A11). The tar sands are generally touted as "Canada's economic engine" and in critiquing this argument, the writers challenged the status quo (McEachern & Price, 2010, p. A11).

By contrast, *The Post* framed the oilsands in a more positive light: "Oilsands could ease effects of greenhouse gases: Role seen for carbon capture in Western Canada... a new study by PricewaterhouseCoopers has concluded that Alberta's oil sands could play a key role in saving the planet from the effects of climate change" (De Souza, 2006, p. A8). Rather than focus on the negative impact of the oil sands on the environment, *The Post* journalist chose to frame the oil sands industry as a key contributor to "saving the planet" from climate change. *The Post* repeatedly used this strategy, defending big industry and free markets with arguments that espoused the power

of industry and markets to overcome the challenge of climate change. In so doing, *The Post* sustained its support for the economic status quo.

Information sources and representation of social actors.

The differences in the most frequently cited information sources and the way particular social actors – IPCC scientists, environmentalists, politicians – were represented in each newspaper reflect each newspaper’s preference for the role of government in climate change mitigation and the tendency to challenge or maintain the status quo. Climate skeptics were a frequently cited information source in *The Post*, which credited skeptics as ‘experts’ on climate change. This enabled *The Post* to build an image of scientific uncertainty and debate and to justify its opposition to government intervention in climate change mitigation. *The Post* repeatedly discredited social actors, including scientists, politicians and environmentalists, who emphasized the severity of climate change and advocated mandatory emissions reductions. For example, *The Post* criticized bureaucrats and environmentalists who attended the 12th session of the United Nations Conference of the Parties to the Kyoto Protocol in Nairobi:

If participants are genuinely concerned about the impact of the burning of fossil fuels on the environment, why don’t they hold their damn meeting by teleconference?... But bureaucrats and the Kyoto lobby love to travel and they love expense accounts. Most of all they love to delude themselves that they are doing something useful. (Foster, 2006, p. FP23)

Through discrediting the knowledge and actions of the bureaucrats and activists involved with Kyoto, *The Post* built its case against regulatory measures to reduce emissions.

By contrast, *The Star* and *The Globe* gave more space and credit to environmental representatives; they were a frequent information source for both *The Globe* and *The Star*. In contrast to the way *The Post* discredited social actors who advocated mandatory emissions reductions, *The Star* made fun of politicians who did not have a plan for mandatory emissions reductions. For example, one article criticized Bush for not signing on to Kyoto, “Has global warming overheated Bush’s brain” (Barclay, 2005, p. E01), and another article criticized Harper’s plan on climate change:

One thing that’s very reassuring is that under the government’s new proposals, greenhouse gas emissions will be allowed to continue to grow every year, but at a slower rate. This is such an encouraging approach one can only expect the nation’s police chiefs to follow suit: ‘We’re pleased to announce that we expect more murders next year than this year, but that the rate at which homicides are increasing will go down slightly!’ (Barclay, 2006, p. F01)

Additionally, there were significant differences between the guest columnists of each newspaper, which reflected the preferences of each paper for action on climate change, the government’s regulatory role and maintaining or changing the status quo. *The Toronto Star* data set contained two articles by staff of Environmental Defence, a Canadian non-profit environmental organization that “inspires change by connecting people with environmental issues that affect their daily lives in their homes, workplaces and neighbourhoods” (Environmental Defence, 2010, para 1). The contributors labeled the tar sands as “dirty oil” and challenged the paradigm that the tar sands are “Canada’s economic engine” (McEachern & Price, 2010, p. A11). Rather, the contributors argued that “hitching the economy to dirty oil production... hurts manufacturing” and

“...could... prevent many regions from recovering from the recession” (McEachern & Price, 2010, p. A11).

The Star published opinion articles by Liberal Leader Stephane Dion and Laurel C. Broten, Ontario’s Minister of the Environment, each of whom were in support of tough action on climate change. Finally, *The Star* included a special section called *Planet*, in which teenage contributors wrote about the consequences of climate change and how individuals can take action on climate change. This is notable because members of the public, especially youth, were so rarely given power to contribute to the debate on climate change in newspaper reporting, outside of letters to the editor. The articles in *Planet* were reflective of *The Star*’s tendency to dramatize the consequences of climate change: “Global warming is endangering our lives on earth, threatening to wipe out every species if we don’t do anything about it” (Jafrani, 2007, p. P01). As well, they were reflective of the newspaper’s emphasis on the need for aggressive and immediate action – “Stop global warming before it’s too late!” (Lin, 2007, p. P03).

By contrast, *The Post* hosted articles by guest columnists from right-wing think tanks. Contributors from the Competitive Enterprise Institute and Probe International critiqued the mechanisms of the Kyoto Protocol. The principles of each of these organizations fall in line with the ideological stance of *The Post*. The Competitive Enterprise Institute is “a non-profit public policy organization dedicated to advancing the principles of limited government, free enterprise, and individual liberty” (Competitive Enterprise Institute, n.d., para 1), and has received funding from Exxon Mobil for its book: *Global Warming and Other Eco-Myths: How the Environmental Movement Uses False Science to Scare us to Death* (Antilla, 2005). Probe International is a division of

Energy Probe Research Foundation, an independent think tank, which works for environmental sustainability "...by promoting property rights... markets... economic efficiency, competition, consumer choice, and an informed public" (Probe International, n.d., para 2). Of interest is that Lawrence Solomon, author of *The Deniers* series for *The Post*, is one of its executive directors.

The Post data, like *The Star*, also contained comment columns by politicians Vaclav Klaus, president of the Czech Republic, and Nigel Lawson, former Chancellor of the Exchequer under Margaret Thatcher's government. In contrast to the positions of the politicians published in *The Star*, Klaus and Lawson both contradict the consensus on anthropogenic climate change. Klaus lived under communist rule and is a staunch defender of the free market and minimal government intervention. Lawson, founder of the Global Warming Policy Foundation, which states in regard to the science of climate change, "...we are of course aware that this issue is not yet settled", (Global Warming Policy Foundation, 2009, para 6). Lawson debated against Elizabeth May and George Monbiot in the 2009 Munk Debate, arguing against the statement: "Be it resolved climate change is mankind's defining crisis and demands a commensurate response" (Munk Debates, n.d., para 1).

The Globe published an article by the Pembina Institute's Matthew Bramley, "one of Canada's best known advocates for effective government policies to address climate change" (Pembina Institute, n.d., para 1). In the article, Bramley urged Ottawa to restore its international credibility on Kyoto, a stance that sustains *The Globe's* support for Canada's commitment to Kyoto and for the government to play a regulatory role in climate change mitigation. Staff members of the Pembina Institute were also sourced in

The Star and *The Post*. Interestingly, the Pembina Institute was the only organization to receive some note of credibility from *The Post*: “The Alberta-based institute is actually one of those green-deed doers worth monitoring...” (Martin, 2007b, p. A4). Other guest columnists included Mark Jaccard, professor in the Faculty of Environment at Simon Fraser University, Thomas Homer Dixon, professor in the Faculty of Environment at the University of Waterloo and Andrew Weaver, professor in the school of Earth and Ocean Sciences at the University of Victoria. Both Mark Jaccard and Andrew Weaver are contributing authors to the IPCC, reflecting *The Globe’s* affirmation of the IPCC consensus on climate change.

Summary

At the root of the climate change problem is the dominant worldview that unlimited economic growth and individual acquisition of material goods is the key to human progress and prosperity. These require our growing energy use, for which we currently depend upon burning fossil fuels, resulting in an accumulation of carbon dioxide emissions in the atmosphere and climate change. The variations in *The Post’s*, *The Globe’s* and *The Star’s* reporting on climate change reflected different ideological standpoints, which served to challenge or reproduce the dominant worldview and the social power-holders who naturalize this worldview.

The Toronto Star discourse on climate change reflected a social democratic ideology and in comparison to the other three newspapers, acted to challenge the taken for granted assumption of unlimited economic growth and material advancement. While rare, *The Toronto Star* used language that directly challenged the social and economic status quo. It did so most avidly in its front-page editorial prior to the conference in

Copenhagen. This article was very significant because of its placement on the front page and its editorial status, an indication of the institutional endorsement of the views within the article by the newspaper. It advocated “a shift to a low-carbon society”, stressed the need for governments to “take decisive action” and for citizens to “change our lifestyles” (The Toronto Star, 2009a, p. A01). Language in *The Post* directly challenged the power of the economic elite: “apparently, those who want a safe climate for us and our children are supposed to be bought off and kept quiet” (McEachern & Price, 2010, p. A11). Thus, some language in *The Toronto Star’s* coverage served to challenge social power relations, and in so doing made space for policy options and individual action that require shifts in the economic and social status quo.

The National Post discourse on climate change was shaped by a neoliberal capitalist ideology and acted to reinforce the taken for granted assumption of unlimited economic growth and material advancement. In contradicting the IPCC climate science and reinforcing a debate about the cause of climate change, *The Post* created space for the Canadian government to shirk responsibility for, and delay action on, climate change. In building an image of the dangerous politics that would ensue government intervention and “climate control” (Kasper, 2006, p. FP21), *The Post* created space to reinforce the ideological parameters of neoliberal capitalism, in which “...markets are touted as the driving force of everyday life, big government is disparaged as either incompetent or threatening to individual freedom, suggesting that power should reside in markets and corporations, rather than in governments... and citizens” (Giroux, 2005). *The National Post’s* coverage served to reinforce social power relations, and in so doing annihilated

space for policy options and individual action that require shifts in the economic and social status quo.

The Globe and Mail discourse on climate change reflected some of the views of *The Toronto Star* and some of the views of *The National Post*. While *The Globe* implied an acceptance of the IPCC consensus science, and support of a regulatory role for government, it did not contain language, like *The Star*, that challenged the taken-for-granted assumption of unlimited economic growth and material advancement. In its ‘silence’, it reinforced social power relations that advance the social and economic status quo.

Chapter 6: Conclusion

Summary of Research and Findings

The objective of this research was to contribute to a greater understanding of Canadian media representations of climate change. Content analysis was used to identify the relative frequency of information sources and subject themes of climate change coverage in *The Globe and Mail*, *The Toronto Star* and *The National Post*. Combining the results of the content analysis with a close qualitative reading of the text was valuable in identifying differences in the way that social actors and subject themes were represented, and in inferring the dominant ideological stance of each newspaper.

As found by Carvalho & Burgess (2005) in their analysis of the British press, these research findings demonstrate that Canadian newspaper coverage of climate change is both defined by political and economic power-holders and constrained by each newspaper's ideology. The ideological standpoints "correspond to particular worldviews that different audiences are continuously fed and go on subscribing to" (Carvalho, 2007, p. 239). Given the media's key role in shaping public knowledge, attitudes and opinions about climate change, both the limited diversity of information sources and the ideological standpoints to which each newspaper adhered present a barrier to an open debate and discussion about climate change.

Information sources and subject themes.

Overall, there was a relative absence of diversity in the information sources that were given voice and in the themes that were addressed in newspaper coverage of climate change. The power to control what was 'said' about the issue was mainly in the hands of

the political and economic elite; in the case of *The National Post*, this power was also granted to climate skeptics, those scientists who contradict the IPCC consensus on climate change. In turn, there was a limited range of debate and discussion about climate change. The majority of reporting on climate change centred around the themes of politics, mitigation and economics: government targets, plans and policies to mitigate climate change, the party politics and international negotiations involved, and the potential costs of mitigation to industry and business and the overall economy. In *The National Post*, a significant percentage of newspaper space was also dedicated to scientific debate and controversy.

By comparison, the other subject themes coded for in the analysis – causes, consequences, advocacy, energy security, ethics, adaptation, public opinion and awareness – received relatively little attention, despite the many important questions and issues that can arise from these themes. For example, the social and economic practices that contribute to climate change, including the everyday practices that Western society takes for granted, such as power consumption, vehicle use and air travel; these practices were largely left unexamined as causes of climate change. As well, an exploration of the ethical implications of climate change, including the international injustices regarding the impact of climate change on developing countries and indigenous communities, was largely left unexamined.

Sources that could contribute to exploring these and other topics and expanding the discussion and debate presented in the media, including social scientists, citizens from developing countries, indigenous peoples, students, educators and activists were either not heard, or were rarely given the power to define the issue. For example, activists and

representatives of environmental organizations were frequently drawn on as information sources in *The Globe* and *The Star*, however, they were infrequently given the power to define the parameters of discussion about climate change. Often, they were listed at the bottom of articles, drawn upon to comment on political announcements and policies.

There were a few exceptions. For example, *The Star's Planet* section featured teenage youth who wrote about the consequences of climate change and how individuals can take action on climate change. This was notable because members of the public, especially youth, were rarely given power to contribute to the debate on climate change, outside of letters to the editor.

In general though, the limited diversity of information sources constrained the debate and discussion on climate change in the Canadian media. Fairclough argues, "...the balance of sources and perspectives and ideology is overwhelmingly in favour of existing power-holders. Where this is the case... we can see media power relations as... a mediated sort between power-holders and the mass of the population... the media operate as a means for the expression and reproduction of the power of the dominant class and bloc" (2001a, p. 43). Fairclough's argument was generally reflected in Canadian newspaper coverage of climate change. The voices of those who hold social power, mainly politicians and industry and business leaders, were prominent in the media, while the voices of those groups that are already marginalized in society, including indigenous peoples, children and youth and citizens of developing countries, were also marginalized in media reporting on climate change. Together, the three newspapers reproduced social power relations by giving the most space and prominence to the voices of political, economic and scientific elite to define the issue of climate change.

Ideological stances.

The comparative analysis of *The Globe's*, *The Star's* and *The Post's* representation of climate change revealed support for different values and political preferences, indicative of each newspaper's leaning towards a particular ideological standpoint. These leanings were especially transparent in *The Post* and *The Star*.

The Post's representation of climate change was couched in a neoliberal capitalist ideology that values a free market, individualism and preservation of the status quo and is averse to political control. *The Post* contradicted mainstream scientific claims that human activity is causing climate change, downplayed the consequences, discredited scientists and activists who affirm the mainstream consensus. *The Post* also allocated a significant amount of space to climate skeptics and contributors from right-wing independent think tanks. *The Post* forwarded sharp criticisms of the Kyoto Protocol and post-Kyoto negotiations, preferring a mitigation approach that relies on voluntary efforts and technological advances rather than government-regulated caps on emissions. It portrayed mandatory government regulation to reduce greenhouse gas emissions as resulting in negative consequences to individual and entrepreneurial freedom, comparable to state-controlled economies under communism. *The Post* espoused the power of the free markets to solve climate change and improve human welfare. In this way, *The Post* sustained its preference for the social and economic status quo and its aversion to political intervention in the market.

The Star's representation of climate change was couched in a social democratic ideology that values social justice, social responsibility, a precautionary approach to mitigation and supports government intervention. *The Star* affirmed the mainstream

scientific consensus, dramatized the consequences and allocated space to the scientists and environmentalists who emphasize the severity of the problem. It constructed an image of crisis and conveyed a sense of urgency in order to emphasize the need for immediate and aggressive action on climate change. It preferred government-regulated caps on emissions to voluntary efforts by industry, called for government commitment to the Kyoto Protocol and for strong leadership from our Canadian government at Copenhagen. It advocated a shift to a low-carbon or carbon-free economy and challenged the consumptive lifestyles of those in the developed world. In this way, *The Star* sustained its preference for government to play a regulatory role in mitigation efforts and for a change in the social and economic status quo.

The Globe's representation of climate change sometimes leaned towards the values expressed by *The Post* and sometimes towards those expressed by *The Star*. Generally, *The Globe* affirmed the scientific consensus of the IPCC, as expressed through the relative lack of space it devoted to controversy and debate. However, *The Globe* made space for articles and passages that contested the IPCC science in a tone similar to that of *The Post*. *The Globe* drew attention to the need for Canada to defend its international reputation by participating in the Kyoto Protocol and typically portrayed support of a regulatory role by government, but also made space for criticism of Kyoto and exploration of the dangers of government intervention. Unlike *The Star*, which contained articles that advocated a shift to a low-carbon or carbon-free economy, *The Globe* tacitly communicated its commitment to a paradigm of economic growth. In short, newspaper coverage of climate change was largely defined by the voices of the political and economic elite and shaped by the ideological stances of each newspaper.

Research Strengths

This research involved a close, thorough reading of a broad data sample, which drew from three newspapers, *The Globe and Mail*, *The National Post* and *The Toronto Star*, and two time periods, January 2005 to June 2007, and November 2009 to January 2010. This data set produced a rich, nuanced description of the ideological stances reflected in each newspaper. It combined a quantitative and qualitative analysis of the data, using content analysis to identify the relative frequency of the subject themes and information sources, and a qualitative reading of the text to identify differences in the way that social actors and subject themes were presented. It combined the method of content analysis with the theory of critical discourse analysis to provide an in-depth analysis of the ideological stances, both positioning them relative to each other and problematizing the pervasiveness of ideologies. Grounding the results of the content analysis in the theory of critical discourse analysis allowed for a richer interpretation of the results.

Research Contributions

This research project contributes to the many studies that have analyzed media coverage of climate change. Its primary contribution is in the focus on Canadian newspapers; few studies have analyzed the coverage of climate change in Canadian media. Additionally, this research project systematically examined the differences between three Canadian newspaper institutions; Carvalho (2007) identified the examination of differences between news institutions as a research gap in previous studies of media representations of climate change. Finally, this project explored the relationship between language, ideology and power, applying the theoretical framework

of CDA to news discourse about climate change. Few researchers have applied CDA in this context.

Future Research

Explorations of language and power.

Given the tremendous social power of the news to influence public understanding of climate change, policymaking and the advancement or inhibition of social change, further examination of the connections between Canadian media representations of climate change and the power relations these representations produce, maintain or challenge are necessary.

This research drew on critical discourse analysis as a theoretical framework. Future research could employ the methodological techniques of CDA to analyze and compare the ideological stances of each newspaper's representation of climate change. This would involve a linguistic analysis of text, drawing on the various grammatical tools employed by critical discourse analysts (Fairclough, 2001a, 2001b; Gough, n.d.; Janks, 1997). Such a micro-analysis of texts would reveal further evidence of the ideological stances represented in each newspaper's coverage of climate change and provide a deeper and more nuanced understanding of the differences between each newspaper, which may confirm or challenge the findings of this research.

Additionally, future research could compare the construction of the climate change problem by key stakeholders, including social power-holders such as the federal government, Canadian industry and the IPCC, and marginalized groups, such as environmental activists and indigenous peoples, to the construction of the problem in Canadian media in order to identify which views the media express and reproduce and

which views they contest. Finally, future research could compare readers' opinions and knowledge of climate change to the representations in Canadian media. Do readers' perceptions and opinions about climate change science, the necessity for action on climate change and the regulatory role of government reflect or challenge the ideological stances reflected in Canadian newspaper coverage of climate change?

Implications for Environmental Education.

The findings of this research revealed that Canadian newspaper coverage of climate change is largely defined by power-holders in society and is constrained by the ideological stances of each newspaper. The public had little power to enter the debate on climate change in the media. The findings highlight the necessity for critical media education at the middle school, high school and post-secondary levels of education to increase student awareness of the factors that influence media content and to empower students to challenge or resist messages that serve to reproduce social relations of power. Media education in the school system should be established, including changes to the curriculum and in-service and pre-service training for teachers. As argued by Stack & Kelly, "The media are a central, if not primary, pedagogue... the informal public pedagogies of... news and entertainment media may be surpassing the formal public pedagogies of schooling and postsecondary education in terms of where and how we form citizens..." (2006, p. 6).

Given the pervasive and central role of media in our lives, many organizations are founded with the purpose of increasing media literacy in children, youth and adults. Jane Tallim of the Canadian-based Media Awareness Network defines media literacy as:

...the ability to sift through and analyze the messages that inform, entertain and sell to us every day. It's the ability to bring critical thinking skills to bear on all media... It's about asking pertinent questions about what's there, and noticing what's not there. And it's the instinct to question what lies behind media productions— the motives, the money, the values and the ownership— and to be aware of how these factors influence content. (Media Awareness Network, 2011, para 2)

Stack and Kelly (2006) build on this definition arguing that in addition to engaging with and critiquing mainstream media messages, critical media education should empower learners to participate in media culture and create alternative stories.

With specific regard to environmental education, critical media literacy is relevant because so much of what people know about environmental issues, they learn from media's interpretations of environmental issues. This is especially true for climate change, because most people lack direct, everyday experience with its consequences.

One idea for the classroom is to ask students to collect articles on one specific climate change related event, i.e. a speech by government, a severe-weather event, or a conference, from a selection of different newspapers and to analyze and compare the articles. Who are the dominant sources of information? Whose voices are not heard? Why? What is talked about and what is left unsaid? What are the differences between the papers? What might account for these differences? Teachers need to design learning opportunities to help students examine the values and ideas portrayed by each newspaper and to make connections between these values and ideas and the social and economic practices that contribute to climate change. Additionally, students should be encouraged

to create their own “news” about climate change, including their own and other perspectives, not normally present in media’s representations. Stack and Kelly (2006) describe this as “democratizing media through creating media” (2006, p. 13), giving power to the public voice and creating counter-narratives to the mainstream messages.

In the future, communications, primarily media representations of climate change, will continue to play a pivotal role in how societies and governments respond to climate change. In the current media landscape, media ownership is concentrated in the hands of a few powerful corporations, limiting the ability of individual media outlets to challenge people in power, present a wide range of views on the issue or to encourage meaningful public participation in decision-making about climate change (Stack & Kelly, 2006). Students, citizens and voters should be armed with the ability to actively interpret media knowledge claims about climate change, to understand and critique the implications of these claims and to produce their own media discourses that resist and challenge those of the mainstream.

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Appendix A

Selection Criteria for Subject Themes

Adaptation.

Climate change adaptation refers to “initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects ... Examples are raising river or coastal dikes, the substitution of more temperature-shock resistant plants for sensitive ones, etc.” (Metz, Davidson, Bosch, Dave & Meyer, 2007, p. 809). I coded for the subject theme “adaptation” when the word “adapt”, or some derivative of it was stated explicitly in the context of adaptation to climate change, the costs or benefits of adaptation or human adaptive capacity; for example, “...human creativity can be mobilized to facilitate adaptation and mitigation of undesirable climate change” (Kasper, 2006, p. FP21).

I also coded for the subject theme “adaptation” when climate change adaptation was implied in the context of the article. For example, the following excerpt is from an article about climate change, melting permafrost and its impact on infrastructure in Dawson City, Yukon:

Spending thousands of dollars to dig up the street and fix a leaky water line or crushed sewer pipe is a short-term approach to dealing with a failing system... the municipality must continue to adopt long-term approaches to dealing with a shifting environment. (Beacom, 2006, p. A8)

I did not code for the subject theme “adaptation” when the word “adapt” or some derivative of it was stated explicitly but not in the context of adaptation to climate

change. For example, "... politicians like Mr. Gore don't adapt well to the complexity that scientists live with as a matter of course" (Cosh, 2007, p. A16).

Advocacy.

I coded for the subject theme "advocacy" when environmental groups or individual environmental activists were profiled and the following were discussed: policy recommendations or political advocacy by environmental groups or activists; initiatives of environmental groups or activists; and commentary on environmental groups or activists. For example:

- Policy recommendations by an environmental group: "... the Pembina Institute ... appears before a parliamentary committee this morning to reveal its strategy for meeting the Kyoto target without triggering an economic meltdown..." (Martin, 2007b, p. A4).
- Commentary on environmental groups: "The Alberta-based institute is actually one of those green-deed doers worth monitoring because it tries to research problems and advance solutions without sounding hopelessly radical" (Martin, 2007b, p. A4).
- Initiative of an environmental group: "...a Jewish environmental coalition is using the Festival of Lights - commemorating how one day's worth of ritual lamp oil miraculously lasted for eight days - to promote energy conservation" (Kay, 2006, A07).

Awareness.

I coded for the subject theme "awareness" when the word "awareness", "campaign", "education", "promotion", "teach", "curriculum" or "school" was explicitly

stated in relation to increasing public awareness and knowledge about climate change or when lectures, speeches, theatre or other public events that aim to raise awareness about climate change were described. For example:

- Awareness raising campaign: “These bracelets have proven an effective vehicle for raising awareness about global warming and raising funds... Roots has... surpassed \$100,000 in its... campaign for the... Stop Global Warming Fund” (Sarner, 2007, p. A23).
- Institutional awareness: "There is an expanding awareness of environmental issues by religious institutions as with other institutions" (Kay, 2006, p. A07).

Cause.

I coded for the subject theme “cause”, when one or more of the following sub-themes was explicitly identified as a cause of climate change or a source of greenhouse gas emissions, through the use of the word “cause” or words or phrases that imply cause, such as “comes from”, “contribute to”, “responsible for”, “account for”, “source of”, “emits” and “pollution-causing”:

- General human activity
- Individual behaviors and lifestyles
- Energy production and consumption
- Transportation
- Heating and electrical power
- Industry

- Agriculture
- Deforestation
- Economics
- Greenhouse gas emissions
- Fossil fuels
- Pollution
- Natural processes, i.e. earthly, solar, cosmic factors

Examples of text that I coded for the subject theme cause include:

- Natural processes: "...it is quite obvious that various earthly, solar, and/or cosmic factors have played an enormously greater role on our Earth's short century or so" (Stockman, 2005, p. FP15).
- Transportation: "Rail emits only 3 per cent of transportation greenhouse-gas emissions... Trucks account for 22 per cent of greenhouse gases..." (Jones, 2005, p. A19)
- Oil sands industry: "It is useful to note that the oil sands industry is the single biggest contributor to Canada's increasing greenhouse gas emissions" (Kohl, 2006, p. A19).
- General human activity: "Greenhouse-gas emissions from human activity have grown by 30 per cent in B.C. since 1990, an increase of almost one tonne a person between 2002 and 2004" (Mason, 2006, p. A13).

- Individual behavior and lifestyle: "...celebrity itself – a world of private jets, sprawling homes, and conspicuous consumption hasn't been easy on the environment" (Cotroneo, 2007, p. A10).

I also coded for the subject theme cause when one of the sub-themes was indirectly implied as a source of greenhouse gas emissions and cause of climate change. For example,

The cabinet is about to consider what by Conservative ... standards are radical policies based on market principles to get industries and consumers to limit emissions of carbon dioxide and other gases that cause global warming. Mr. Harper signaled the shift towards market-based policies ... then he said recently that polluters must pay. In this case, polluters are big energy-producing industries and, of course, consumers. (Simpson, 2007, p. A15)

Although the article does not explicitly state that industries and consumers are a cause of climate change, the coder can make this inference because of the earlier reference to getting industries and consumers to limit emissions of gases that cause global warming.

Consequences.

I coded for the subject theme "consequences" of climate change when one or more of the following sub-themes was explicitly stated to be a consequence of climate change through the use of the words "consequence", or words or phrases that imply consequence, such as "attributed to", "to blame for", "risks posed by", "because of" and "is endangering":

- Temperature changes
- Melting ice caps and glaciers

- Rising sea levels
- Increased frequency of extreme weather events, i.e. hurricanes, wildfires
- Melting permafrost and methane release
- Species endangerment or extinction, including humans
- Ecosystem damage, i.e. spruce beetle infestation
- Floods
- Infrastructure damage and land loss
- Energy security
- Lifestyle, recreation and culture consequences
- Economic consequences

Examples of text that I coded for the subject theme consequence are:

- Ecosystem damage: "... global warming is to blame for the mountain pine beetle infestation..." (Mason, 2006, p. A13).
- Infrastructure damage and land loss: "The warming of the active layer, because of climate change... will destabilize the ground and any infrastructure that it supports" (Beacom, 2006, p. A8).
- Species endangerment and rising sea levels: "Global warming is endangering our lives on earth... The melted glaciers will cause a dramatic increase in sea levels, which is predicted to allow large areas of exposed land to be swallowed underwater" (Lin, 2007, p. P03).

- Economic consequences: “A 700-page report ... predicted global warming could cause economic chaos if climate change is allowed to continue”

(Mittelstaedt, 2007, p. A3).

I also coded for consequences when one or more of the sub-themes were implied to be a consequence in the context of the article. For example, in the following quote, although hurricanes are not explicitly stated to be a consequence of climate change, the coder can make this inference because of the reference to climate change, heating ocean waters and hurricanes in the same sentence:

... president of the National Wildlife Federation said concern is growing in the United States about climate change, especially since hurricane Katrina.

‘Americans are discovering that you cannot heat up the Gulf of Mexico two degrees without a profound change in the ability of the waters to fuel intensive Category 4 and 5 hurricanes... (Canadian Press, 2005, pA5)

Economics.

I coded for the subject theme “economics” when particular industries were named, i.e. coal, oil, natural gas, renewable fuels, rail, auto manufacture, or when the following were discussed: economic impact of mitigation on industry and business, free market economics, industry or business initiatives, industry or business conferences or meetings, industry or business relations with government, and criticism or commentary on industry or business. I watched for the words “economy”, “industry”, “business”, “economist”, “economics”, “free-market”, “growth”, “industrial” and “corporation”. For example:

- Impact of climate change mitigation on industry: “Oil sands hit by climate politics; Industry fears impact of emission targets” (McCarthy, 2007, p. B1).
- Industry initiative: “At a pilot project in Schwarze Pumpe in Eastern Germany, the company is building one of the first coal-fired power plants that will attempt to bury the thousands of tons of carbon dioxide it emits in natural caverns deep beneath the Earth’s surface...” (Abboud, 2007, p. B17).
- Free-market economics: “...the current concept of growth, which hasn't significantly changed since Victorian times, needs to be radically altered. Growth should be governed by how much CO₂ society can afford to emit...” (Smith, C., 2006a, F04).

Energy security.

I coded for the subject theme “energy security” when global energy supply and demand, energy-related war, energy imports and exports and energy dependence or independence were discussed. I watched for the words “energy”, “security”, “supply”, “demand”, “war”, “power sources”, “energy capacity”, “blackouts” and “energy reform”. For example:

- Global demand is expected to swell 53 per cent by 2030 —sending crude oil prices to more than \$100 (U.S.) a barrel —unless governments manage to shift energy trends. Nearly three-quarters of increased demand will come from China, India and other developing countries... (Grant, 2006, p. B12)

- "...reserves of easily accessible oil and gas are running out. Consuming nations are having to compete for a diminishing pool of resources that are heavily concentrated in politically unstable parts of the world" (Catan, 2005, p. SR1).
- "...renewable energy generally has a positive effect on energy security, employment and on air quality" (Phillips, 2007, p. A19).

Ethics.

I coded for the theme ethics when the text referred to right and wrong of individual and collective actions as they relate to climate change: to human rights and the impact of climate change on future and current generations; to the fairness, or lack of fairness, of the impact of mitigation efforts on societies; and to our moral responsibility to take action, or not, on climate change. I watched for the words "right", "wrong", "fair", "unfair", "morals", "human rights", "sins" and "virtue". I used the following definition of ethics as a guide: "The branch of philosophy that deals with morality... with distinguishing between good and evil in the world, between right and wrong human actions, and between virtuous and non-virtuous characteristics of people" (ethics, n.d.). Examples of text that I coded for the theme ethics include:

- "I know, I know. It's not about the math. It's about doing the right thing, and the example we want to set for the world, and the kind of planet we want our children to inherit" (Wente, 2007, p. A21).
- "The scientists should help us and take into consideration the political effects of their scientific opinions. They have an obligation to declare their

political and value assumptions and how much they have affected their selection and interpretation of scientific evidence” (Klaus, 2007, p. FP15).

- “... Sheila Watt-Cloutier, an Inuit born inside the Canadian Arctic, who maintains this constitutes a violation of human rights for indigenous people in low-lying areas throughout the world” (Zabarenko, 2007, p. A07).

Mitigation.

“Mitigation” included actions by individuals, governments and industry, discussion of the pros and cons of specific mitigation measures and description of how a specific mitigation measure works. The theme mitigation often overlapped with other themes, such as politics and economics. I coded for the subject theme “mitigation” when the following subcategories were explicitly stated or referred to as a means to reduce greenhouse gas emissions:

- General, i.e. reduce greenhouse gas emissions
- Individual action
- Government regulations, standards and targets
- Industry regulations, standards and targets
- Technology
- Carbon capture and storage

- Energy efficiency, including sustainable transportation, urban design and land use, homes and buildings, fixtures and appliances, resource conservation and waste reduction
- Agriculture
- Renewable energy, i.e. wind, solar, tidal
- Clean energy, i.e. natural gas, nuclear, hydroelectricity, clean coal
- Renewable fuels, i.e. biofuels, ethanol, biodiesel, propane
- Market-based mechanisms, i.e. emissions trading
- Reforestation

I watched for the words “mitigation”, “action”, “reduce”, “limit”, “cut”, “cap”, “take action”, “solution”, “cleanup”. Examples of text that I coded for the subject theme mitigation are:

- Clean energy: “...strategic investments aimed at reducing greenhouse gas emissions... an east-to-west transmission grid that would deliver electricity produced from hydro dams across the country” (Vieira, 2005, p. FP5).
- Carbon capture and storage: “The process will have a significant impact on reducing emissions only if it can be used to effectively capture and store carbon dioxide produced at power plants that burn coal or natural gas” (Abboud, 2007, B17).

Politics.

I coded for the subject theme “politics” when the article included a discussion of a government’s (international, federal, provincial or municipal) climate change policies, plans, initiatives, investments, and targets for emissions reductions; a government’s record on climate change action; relations, deals, negotiations, or communications between two or more countries; international conferences, i.e. the 2009 United Nations Climate Change Conference in Copenhagen; and international agreements or partnerships, i.e. Kyoto Protocol, Asia-Pacific partnership. For example:

- Government investment: “Ottawa is eyeing billions of dollars in spending, including incentives to buy fuel-efficient cars like hybrid vehicles, as part of a scramble to plug major shortfalls in Canada's Kyoto emissions-reduction plan” (Chase, 2005, p. A4).
- Asia-Pacific partnership: “The United States unveiled a pact with a group of major Asian and Pacific countries yesterday that promotes the use of technology to cut greenhouse-gas emissions...” (Sallot, 2005, p. A2).
- International meeting: “The Group of Eight - Canada, France, Germany, Italy, Japan, United Kingdom, U.S. and Russia - is to address climate change in June at the German Baltic resort of Heiligendamm” (Gorrie, 2007a, p. A02).
- Kyoto Protocol: “With each passing day, Kyoto becomes mired in the lack of vision that plagues our politicians. What should Canadians think when they read about Kyoto issues buried in budget bills and proposals ...” (Sperdakos, 2005, p. F07).

Public.

I coded for the subject theme “public” when the words “public”, “opinion”, “attitude”, “behavior”, “knowledge”, “understanding” or “emotion” were stated explicitly in the context of climate change or when public opinion, attitude, behavior, knowledge or emotion was indirectly referred to in the article. For example:

- Public attitude: “... the high level of support for action on the environment suggests the public is ready to do its part” (Woods, 2007, p. A07).
- Public behavior: “While British Columbians are apparently worried about global warming ending the world, they don't seem to be doing a whole lot to solve the problem. In the... Ipsos-Reid poll... fewer than 10 per cent of respondents said they are doing all they can to help reduce the impact they are having on the environment” (Mason, 2006, p. A13).

Science.

I coded for the subject theme “science” when new scientific evidence, research or reports, general science background, scientific debate and/or scientific consensus were discussed in relation to climate change. I watched out for the words “science”, “scientific”, “scientists”, “study” and “research”. Examples of text that I coded for the subject theme science are:

- Scientific debate: “Why not simply state the fact that there really is no purely scientific consensus on the causes of climate change...?” (Salter, 2006, p. A17).

- New research: “A pivotal global warming study... contains serious flaws caused by... faulty methodology, according to new Canadian research” (Cowan, 2005, p. A1).
- Scientific evidence: “But Dr. Mote and his colleague are... scientists. And they believe they had a duty to set the record straight about Kilimanjaro since its Kibo ice cap has become the poster child of climate change” (Mason, 2007, p. S1).

Appendix B

Selection Criteria for Information Sources

The selection criteria, that I used to analyze the data for information sources was a list of sub-categories, with examples from the data, for each information source:

Government representatives.

- Heads of countries, states, provinces and cities (i.e. Australian Prime Minister John Howard)
- Ministers and commissioners (i.e. Patterk Netser, Nunavut Environment Minister)
- Members of parliament and members of legislative assemblies (i.e. Fran Pavely, State Assemblywoman)
- Political parties and political party leaders (i.e. Parti Québécois)
- Majority and minority governments (i.e. the Conservative government)
- Government spokespeople and officials (i.e. spokesman for Rona Ambrose)
- Government departments and civil servants (i.e. Bill Reynan, science and technology director, Natural Resources Canada)
- Government and intergovernmental agencies, federations or organizations (i.e. International Energy Agency)

Industry and business representatives.

- Industries (i.e. HydroQuebec)

- Industry representatives (i.e. Stephen McIntyre, mineral exploration consultant)
- Industry and business supporting organizations (i.e. Canadian Vehicle Manufacturers Association)
- Businesses, companies or corporations (i.e. Roots Canada)
- Business representatives (i.e. Richard Branson, Virgin Group business empire)
- Think-tanks (i.e. Competitive Enterprise Institute)

Environmental representatives.

- Environmental organizations (i.e. Climate Action Network)
- Representatives of environmental organizations (i.e. Paula Moore, People for the Ethical Treatment of Animals)

Physical science representatives.

- Physical scientists (i.e. Nigel Weiss, Professor Emeritus at the Department of Applied Mathematics and Theoretical Physics)
- Science groups (i.e. Intergovernmental Panel on Climate Change)
- Science organizations or institutes (i.e. Goddard Institute of Space Studies)

Social science representatives.

- Social scientists (i.e. Princeton philosopher Harry Frankfurt, Ross McKittrick, economics professor, Guelph University; Thomas Homer-

Dixon, director of the Trudeau Centre for Peace and Conflict Studies at the University of Toronto)

Members of the public.

- Authors of letters to the editor (i.e. Jim Reynolds, Niagara-on-the-Lake, Ontario, retired principal)
- Referenced in news, feature story or comment articles (i.e. George Mabareka, fisherman)

Reporters and other media.

- Reporters and columnists (i.e. Globe columnist Margaret Wente)
- Newspapers (i.e. The Independent)
- Media personalities (i.e. Rex Murphy)

Other.

- Any source that was not able to be identified in one of the previous categories; for example, California Public Employees' Retirement System; Princess Takamodo, Japan; and Rosie Stauncer, British Adventurer

Appendix C

Sample Coded Newspaper Article

NDP unveils plan for Kyoto; Steps to reduce greenhouse gases. Urges Ottawa to invest \$27.2 billion

The Toronto Star, A14

14 January 2005

Bruce Campion-Smith

469 words

News story

Sources: NDP Leader Jack Layton

Themes: Mitigation, politics

OTTAWA -- Massive investments in "green" cars, public transit and energy-saving retrofits to homes and offices are needed to help Canada meet its commitment to reduce greenhouse gases, NDP Leader Jack Layton says.

Accusing the federal Liberals of dithering as air pollution worsens, Layton yesterday urged Ottawa to invest \$3.4 billion a year over eight years to meet the Kyoto targets.

"We have been laggards under the Liberals when it comes to climate change," Layton told a news conference yesterday.

"They put our signature as Canadians on an international agreement to reduce pollution and then they've presided over an increase in pollution," Layton said as he unveiled his own party's proposals to achieve the Kyoto commitments.

Echoing a theme he used during last year's election, Layton is calling for a national retrofit program to help make buildings in Canada more energy efficient.

Under the program, homeowners would be given loan guarantees of up to \$5,000 to install solar panels, new windows and better insulation. Tax incentives and low-interest loans would be used to encourage corporations to refit offices.

"Why wouldn't we do it? It can create thousands of jobs, reduce the cost of owning and operating a building, can help out low-income Canadians who are having a tough time paying their fuel bills," Layton said of the renovation program.

Other proposals include:

setting mandatory targets for light-duty vehicles that would cut emissions by 25 per cent and offering GST rebates for alternative-fuel vehicles.

creating a national building code that would force new buildings to use 25 per cent less energy.

boosting support for renewable energy, including installing 100,000 roof-top solar panels and building 10,000 wind turbines to generate electricity.

offering financial incentives to help polluting industries to clean up and setting new regulations to ensure they do.

While the federal government has made repeated pledges to meet the international targets, Layton says Canada's environmental record lags behind most other industrialized countries.

And while Canada committed to a 6 per cent reduction by 2012, emissions have actually risen by about 20 per cent.

"There's a mouthing of the philosophy ... talk of sustainable economics. They amount to just more hot air," Layton said.

"What we're looking for is some significant action. We certainly haven't seen it," he said.

Layton said he wants to see the NDP's proposals included in the upcoming budget and hopes to pitch the ideas to Finance Minister Ralph Goodale and Prime Minister Paul Martin over the coming weeks.

Appendix D

Content Analysis Numerical Results

Table D1

Number of times each theme was a major theme in the representative data sample

Subject themes	Number of times as a primary focus			
	Globe & Mail	National Post	Toronto Star	Total
Politics	52	51	51	154
Mitigation	34	27	32	93
Economics	18	28	24	70
Science	6	25	4	35
Consequence	8	1	13	22
Cause	3	10	8	21
Advocacy	5	4	5	14
Public	3	1	4	8
Ethics	4	4	1	9
Awareness	1	2	2	5
Energy security	1	4	1	6
Adaptation	-	-	1	1
TOTAL	135	157	146	438

Table D2

Number of times each information source was quoted directly in the representative data sample

Information source	Number of times as a direct source			
	Globe & Mail	National Post	Toronto Star	Total
Government representatives	60	47	51	158
Environmental representatives	24	12	17	53
Physical science representatives	7	43	13	63
Industry and business representatives	16	24	8	48
General public	2	-	1	3
Reporters and other media	6	11	5	22
Social science representatives	63	54	55	16
Other	4	7	2	13
TOTAL	125	148	102	376

³ 2 economists, 1 school of business,

⁴ 3 economics professors, 1 energy policy analyst, 1 philosopher

⁵ 2 economists, 1 sociology, 1 women and gender studies, 1 peace and conflict

Table D3

Relative frequency of each theme in the representative data sample

Subject themes	Relative frequency as a primary focus			
	Globe & Mail	National Post	Toronto Star	Total
Politics	38.5%	32.4%	34.5%	35.2%
Mitigation	25.2%	17.2%	21.6%	21.2%
Economics	13.3%	17.8%	16.2%	16.0%
Science	4.4%	15.9%	2.7%	8.0%
Consequence	5.9%	0.6%	8.8%	5.0%
Cause	2.2%	6.4%	5.4%	4.8%
Advocacy	3.7%	2.5%	3.4%	3.2%
Ethics	3%	2.5%	0.68%	2.1%
Public opinion	2.2%	0.6%	2.7%	1.8%
Energy security	0.7%	2.5%	0.7%	1.4%
Awareness	0.7%	1.2%	1.4%	1.1%
Adaptation	-	-	0.7%	0.2%

Table D4

Relative frequency of each information source in the representative data sample

Information sources	Relative frequency as a direct source			
	Globe & Mail	National Post	Toronto Star	Total
Government representatives	48%	32%	50%	42%
Physical science representatives	6%	29%	13%	17%
Environmental representatives	19%	8%	17%	14%
Industry and business representatives	13%	16%	8%	13%
General public	2%	-	1%	1%
Social science representatives	4%	3%	5%	4%
Reporters and other media	5%	7%	5%	6%
Other	3%	5%	2%	3%

Appendix E

Frequency of themes in the *Globe and Mail*, *National Post* and *Toronto Star*

Figure E1

Relative frequency of themes in The Globe and Mail

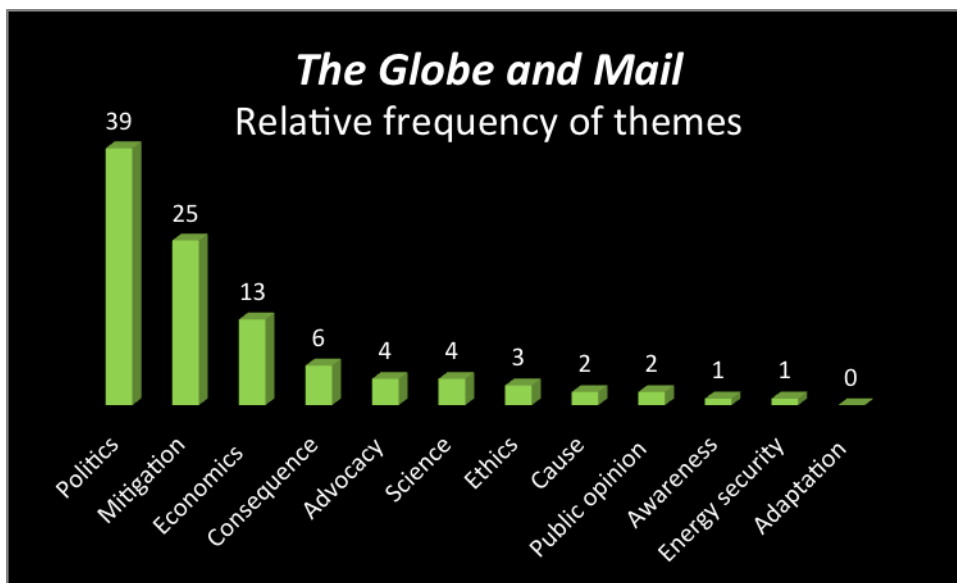


Figure E2

Relative frequency of themes in The Toronto Star

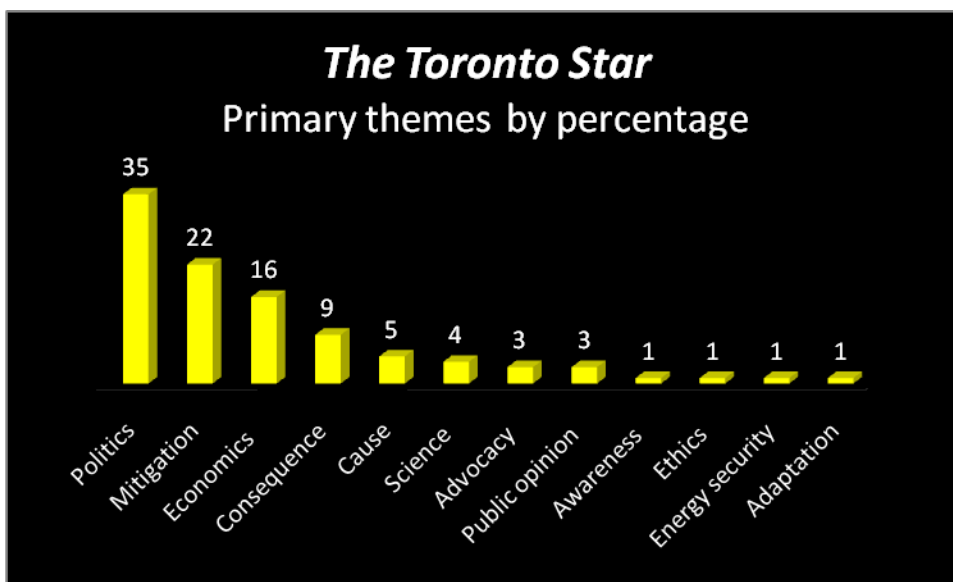
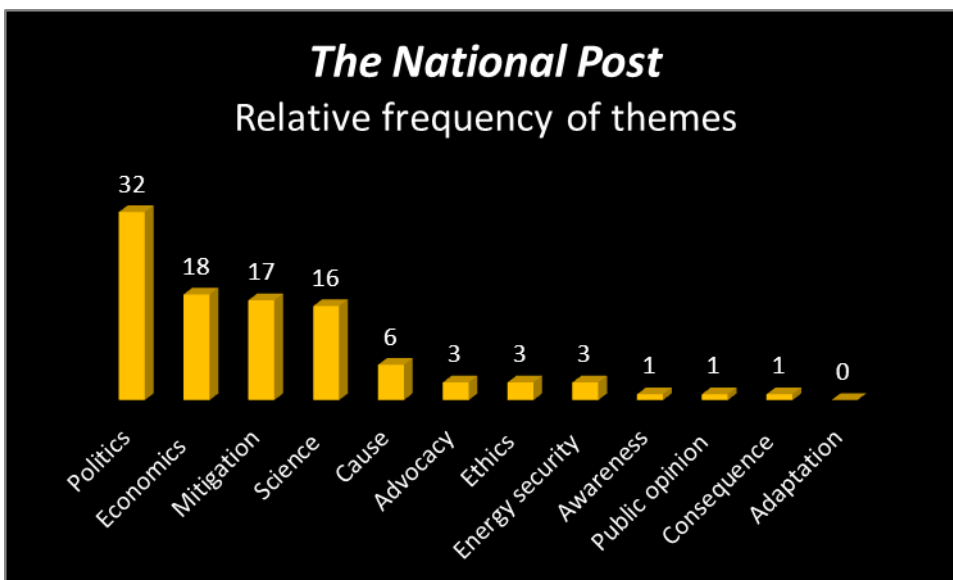


Figure E3

Relative frequency of themes in The National Post



Appendix F

Frequency of information sources in the *Globe and Mail*, *National Post* and *Toronto*

Star

Figure F1

Relative frequency of information sources in The Globe and Mail

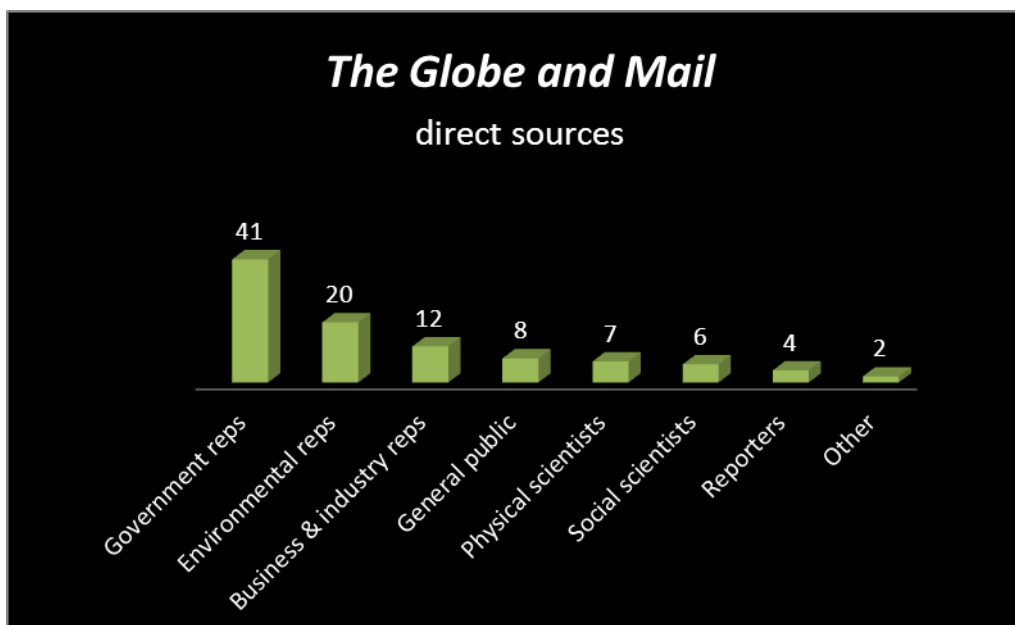


Figure F2

Relative frequency of information sources in The Toronto Star

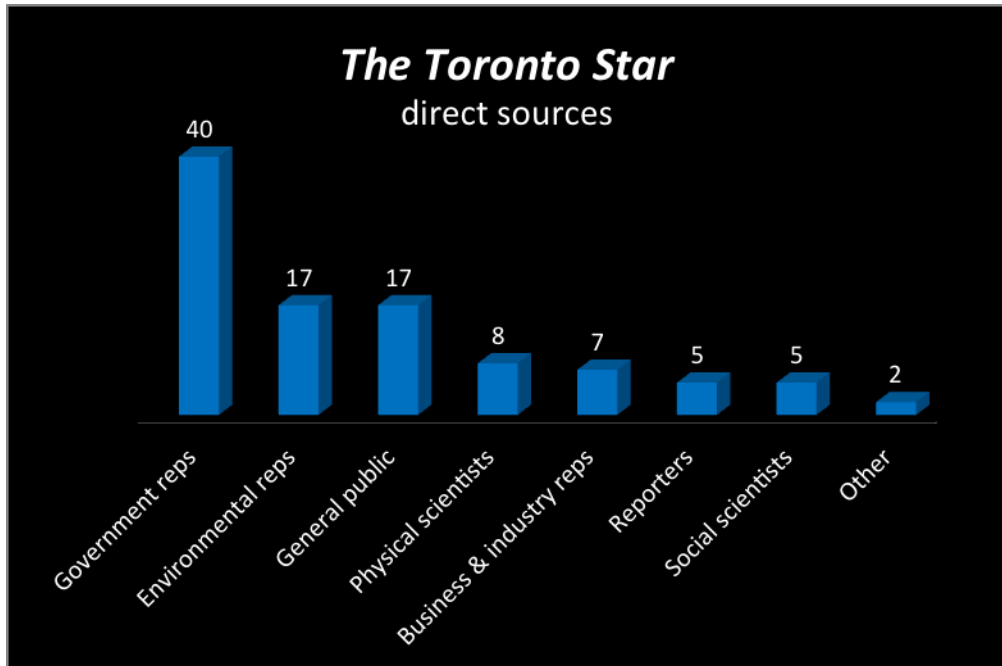
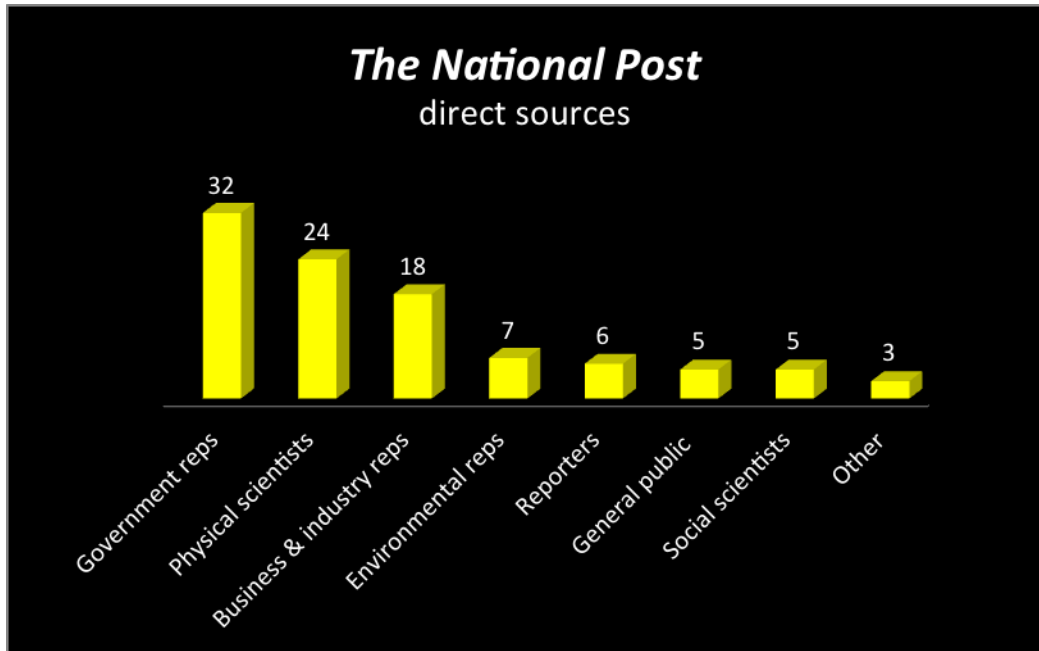


Figure F3

Relative frequency of information sources in The National Post



Appendix G

Definitions Used to Develop Coding Criteria for Subject Themes

Paragraph.

“A piece of writing that consists of one or more sentences, begins on a new and often indented line, and contains a distinct idea or the words of one speaker” (Halliday & Matthiessen, 2004, p. 6).

Sentence.

“Beginning with a capital letter and ending with a full stop” (Halliday & Matthiessen, 2004, p. 6).

Sub-sentence.

“Bounded by some intermediate punctuation mark: colon, semicolon or comma” (Halliday & Matthiessen, 2004, p. 6).

Word.

“Bounded by spaces” (Halliday & Matthiessen, 2004, p. 6).