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Climate Change, Media & Culture: Critical Issues in Environmental Communication

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Abstract: Climate change is major global policy issue. The news media play a vital role in conveying information about climate change to the public, giving voice to a variety of perspectives as well as outlining policy responses to this issue. However, the growing distrust of news media could lead to dire outcomes on the public's knowledge and policy support related to climate change. This paper uses a mixed method approach (random digit dialing survey, content analysis of newspaper articles) to examine information sources used in learning about climate change, whose voices are presented in climate change discourse, and whose voices are trusted. While news media are the most popular source of information about climate change (n=1207), only half of respondents reported trusting the news media. Scientists are the most trusted source of information (n=1208) and most cited source in news coverage (n=48). Their messages focus on the sources of climate change and the seriousness of this problem. Scientists' messages about climate change are clouded by high levels of distrust in the news media, the primary venue through which their messages are conveyed. In this context, climate change knowledge, level of concern, and support for public policies may suffer.

Keywords: climate change, media trust, survey, content analysis, Canada

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Introduction

Climate change is one of the defining global issues of our time. As it becomes clear that climate change is a human-made problem that must be promptly addressed in order to avoid global crisis (Olausson, 2014; Stoddart, Tindall, & Greenfield, 2012), the issue has become more salient in the media (Midttun, Coulter, Gadzekpo, & Wang, 2015; Liu, Vedlitz, & Alston, 2008; Speck, 2010). The media play a vital role in conveying information about climate change to the public, giving voice to a variety of perspectives as well as outlining policy responses to this issue (Boykoff, 2013; Midttun et al., 2015; Stoddart & Tindall, 2015; Stoddart, Tindall, Smith, & Haluza-Delay, 2017). However, with growing distrust of news media, the information, voices, and policy responses presented in articles in the news media may also receive a lack of public support (Malka, Krosnick, & Langer, 2009; Sleeth-Keppler, Perkowitz, & Speiser, 2017).

This paper uses a mixed method approach to examine the voices and their messages presented in climate change news coverage, as well as survey results about information sources and levels of trust in these sources related to climate change. Using two large, random samples surveys of the province of Alberta (n=1200 each), we find that while mainstream news media are the most popular source of information about climate change, only half of survey respondents reported trusting the news media's coverage of climate change. Instead, respondents trust scientists as a source of information about climate change. After mainstream news media, scientists are the second most common news source for climate change information. Most news stories included scientists in their coverage of climate change; their messages focused on the causes of climate change and stressed the seriousness of this issue. Linking the findings across data sources, we argue that low levels of trust in media, which is a primary source of information

about climate change, may detrimentally affect scientists' messaging about the seriousness of this issue. As a consequence, citizens may express a lower level of concern about climate change, knowledge about climate change, and support for government action to address climate change (Malta et al., 2009; Sleeth-Keppler et al., 2017).

Our research focuses on Alberta, one of the western provinces in Canada. Alberta is important as a case study related to climate change discourse (Davidson & Haan, 2012). The province's economy relies heavily on the oil and gas industry, which includes the development of the controversial oil sands in Fort McMurray (Papineau & Deacon, 2017). Alberta is a global leader in the energy sector and as such, public policies around climate change in Alberta will have impact globally. How climate change is portrayed in the *Edmonton Journal* can provide pivotal insight into the public's knowledge, level of concern, and beliefs in the need for action on this issue. This journal is based in the capital city of the province and has widespread usage across the province. Since the province of Alberta is a major player in climate change, Albertans can influence the direction of global action on climate change. The Alberta government's policies on climate change also have importance locally, as the province faced one of the costliest natural disasters in Canadian history in May 2016.

Alberta has a strong and enduring right-wing orientation as implied by the forty years of government led by the Progressive Conservative Party (PCs). In 2015, a new, more left-wing party was elected to lead the province. In 2017, the PCs merged with Wildrose Party of Alberta, a party that is more right-wing than the original PC Party. In this context, understanding the influence of political ideology on using and trusting information sources is important.

Voice

The news media determine the *actors* who are given voice, or *standing*, and those who are kept silent (Boykoff, 2013; Stoddart & Smith, 2016). The variable of *voice* has been extensively coded in climate change content analysis and has led to various findings across different nations. Liu, Vedlitz, and Alston (2008) found that in the American publication the *Houston Chronicle*, voice was split between *interest group actors* categorized as industry, environmental, or scientific-professional and *governmental actors* such as the president, Congress, and federal agencies. Local governments were rarely given voice (Liu et al., 2008). Gkiouzepas and Botetzagias (2017) found a balance of government and research organization voices in Greek coverage of climate change, but different newspapers gave prominence to different sources. In Norway, news coverage most often cites the scientific community, a source that has become even more prominent from 2008 to 2010 (Midttun et al., 2015, p. 1286). According to Speck's (2010) Australian study, academics and politicians, as well as important US figures, are viewed as being the leaders of the "climate change debate within the media" (p. 130). In sum, the voices presented in news coverage of climate change vary cross-nationally, but government sources are popular across a variety of contexts.

There are several reasons that multiple voices are presented in climate change news coverage as well as why certain voices are dominant in news coverage. As for multiple voices, journalists strive to provide balance in coverage of political issues. To achieve balance, the news media need to ensure they give "standing" to both sides of a public issue (Ferree, Gamson, Gerhards, & Rucht, 2002; Gamson, 2007). Some journalists provide balanced coverage by giving voice to both climate change believers and deniers (Boykoff, 2013; Gunster, 2011; Midttun et al., 2015; Schmid-Petri, Adam, Scmucki, & Häussler, 2015; Speck, 2010). However, focusing on whether or not climate change exists can detrimentally affect coverage of solutions. In describing

BC coverage surrounding the Copenhagen summit, Gunster (2011) concludes that "in most mainstream media stories and reports, the political sphere appeared as little more than a space of endless bickering and intractable gridlock, with participants both unwilling and unable to deliver any effective action on climate change" (p. 490).

Balance can also be achieved by giving standing to actors with differing policy positions, especially in terms of climate change mitigation and adaptation policy (Nisbet & Myers, 2007; Speck 2010; Stoddart & Smith, 2016). These different policy perspectives are often depicted as government versus non-governmental policy positions, leading to a consistent presence of government voices in coverage of political issues. The preference for government voices also relates to other factors in news coverage. Reporting on government activities is part of the watchdog function of news media. In addition, because the government is viewed as an official and readily accessible source for news stories, the news media often give preference to government officials' voice in their coverage (Ferree et al., 2002). Giving voice to government, as opposed to covering debates on climate change between believers versus deniers, may result in more coverage of policy debates and proposed solutions (Stoddart & Smith, 2016, p. 319).

Canadian news media feature a variety of actors. However, as climate change becomes increasingly politicized (Young & Dugas, 2011; Gunster, 2011; Malka et al., 2009; Nisbet & Myers, 2007; Stoddart & Smith, 2016), voices of government officials are becoming increasingly prominent. In their content analysis of articles from the *Globe and Mail* and the *Toronto Star*, Ahchong and Dodds (2011) found that national leaders were more often included in news coverage than scientists (p. 54). They also found that government representation in the articles was predominantly from a federal or national standpoint (p. 54). Young and Dugas (2011) revealed several patterns in their content analysis of *The Globe and Mail* and the *National Post*

across a variety of time frames (1988-89, 1998-99, 2007-08). Across the different data collection periods, government employees and politicians are the dominant voices in climate change news coverage (p. 11). However, they noted a substantial decline in government employees' voices (p. 11), which they explain by Prime Minister Harper's decision to limit government scientists from discussing their research without approval. In a more recent analysis of news coverage in the *Globe and Mail* and *National Post* from 2006 to 2010, Stoddart et al. (2017) found that the federal government and agencies, such as Environment Canada, federal provincial parties, and provincial governments were most prevalent (p. 392). They found that the *Globe and Mail* was more inclusive of university-affiliated voices, compared to the *National Post* (p. 392).

In sum, the content analysis of news coverage in Canada, and across the globe, point to the dominance of government voices as sources of information about climate change. The role of academic or scientific voices remains an open question. The Harper government limited government experts from publicly discussing their research on climate change (Manasan, 2015). The deficit of scientific voices in the news could detrimentally affect knowledge of climate change, level of concern for this issue, and support for public policies to address climate change, if governmental voices are not providing scientific facts and information. Therefore, we ask:

RQ1) Which voices are given prominence in news coverage of climate change in Alberta?

News media use and trust in sources

Little research has been done about trust in different information sources related to climate change in Canadian news. Instead, comparative studies suggest that trust in news media (all topics) is approximately 49% in Canada, compared to 38% in the United States, 49% in Norway and 42% in Australia (Newman, Fletcher, Kalogeropoulos, Levy, & Nielsen, 2017; Public Policy

Forum, 2017). Furthermore, this research suggests that approximately 33% of Canadians use printed news sources and 70% use television as a source of news (Newman et al., 2017). One unique feature of Canadian news consumption is the popularity of foreign, particularly American, news sources. Thirteen of the top 20 news sources used by Canadians are foreign (e.g., Huffington Post, Yahoo, ABC News, Buzzfeed, and CNN) (Public Policy Forum, 2017). As such, views about climate change news coverage may follow American statistics.

According to PEW Research Center, approximately 54% of Americans obtain their science news from mainstream news organizations (Funk, Gottfried, & Mitchell, 2017). Only 10% of Americans report obtaining their science news regularly from government sources (Funk et al., 2017). While Americans' use of mainstream news for scientific information did not differ by political orientation, Americans' trust in these sources did differ, with Democrats offering more favorable evaluations of these sources than Republicans (Funk et al., 2017).

According to Malka et al. (2009), trust in information sources is of vital importance because it not only affects the public's intake of knowledge, but also their level of concern regarding climate change (p. 639). Sleeth-Keppler et al. (2017) extended this argument further and demonstrated that trust in different sources affects support for public policies to address climate change. In particular, trust in scientists as a source of information about climate change had a strong positive correlation with perceptions of the effectiveness of nine different policy solutions (Sleeth-Keppler et al., 2017). Brewer and Ley (2013) reported that average levels of trust in the US Environmental Protection Agency (EPA) as a source of information about the environment is higher than mainstream media, but lower than university scientists, science television and science magazines. This finding is important given President Trump's decision to drastically cut funding to the EPA and order the removal of climate change information from the

EPA website (Green, 2017). Pew research suggests that 67% Americans support the idea that climate scientists should have a role in public policy, but this support differs by almost 30 percentage points for Liberal Democrats as opposed to Conservative Republicans (Pew Research Center, 2016).

In the United Kingdom, Bickerstaff et al. (2008) found that environmental organizations were most trusted to "tell the truth about climate change" (p. 155) followed by scientists working for environmental groups and university-based scientists. In contrast, trust in national government was very low (p. 155). Stoutenborough, Liu, and Vedlitzet (2014) documented a decline in trust in various media sources, government, and environmental groups as sources of information on global warming (p. 29-30). Leiserowitz et al. (2015) found that climate scientists were trusted more than mainstream news media or political leaders, including Barack Obama and Jeb Bush (p. 26). Finally, Sleeth-Keppler et al. (2017) showed that scientists are trusted as a source of information about climate change, more than President of the United States.

Trust in scientists is a contentious issue on several fronts. Nisbet and Myers (2007) demonstrated that 24 percent to 27 percent of Americans report little or no trust in what scientists say about the environment (p. 454). More recently, the portion of Americans reporting "somewhat" or "strong" distrust of climate scientists remains at approximately 27 percent (Leiserowitz et al., 2015, p. 26). In the United States, various studies have found that ideology and partisanship affect trust in scientists (Brewer & Ley, 2013; Hmielowski, Feldman, Myers, Leiserowtiz, & Maibach, 2014; Malka et al., 2009; Sleeth-Keppler et al., 2017). Specifically, strong Republicans and right-wing conservatives are less likely to trust scientists, be knowledgeable about climate change, and view climate change as a serious issue (Brewer & Ley, 2013; Hmielowski et al., 2014; Malka et al., 2009; Sleeth-Keppler et al., 2017). The American

news media's continuing tendency to give voice to climate change skeptics has been cited as a factor in the public's (dis)trust of climate change science (Boykoff, 2013; Schmid-Petri et al., 2015; Speck, 2010).

However, the level of public trust in industry actors, government officials, and scientists is of little relevance if the institution that conveys their messages – the news media – does not itself inspire trust. Leiserowitz et al. (2015) reported that 56 percent of Americans express somewhat or strong distrust of mainstream media as a source of information about global warming. Stoutenborough et al. (2014) documented slight variations in trust in newspaper, radio, television, and the Internet as sources of information about global warming; radio is the least trusted and newspapers are the most trusted sources.

Our research questions are as follows:

RQ2) To what extent do Albertans use and trust mainstream news stories regarding climate change? Are there differences by partisanship?

RQ3) Are Albertans, who tend to be more conservative than other Canadians, as skeptical of scientists as Americans? Are there differences by partisanship?

RQ4) To what degree are government sources trusted to provide accurate information about climate change?

Methodology and Sampling

This study uses a mixed method approach to study information sources used in learning about climate change, whose voices are trusted and whose voices are presented in climate change discourse. The value of this mixed method approach is that we gain insights about the nature of news coverage about climate change, which can help explain citizens' levels of trust in news

media coverage of climate change as well as provide insights about messaging that could impact levels of knowledge, concerns, and policy support. First, we use survey data to assess people's information sources about climate change, then we examine their perceptions of trust in different sources. We supplement the results from these large, representative surveys with a content analysis of news stories about climate change. The content analysis offers a quantitative assessment about the frequency with which different voices are presented as well as a qualitative assessment of the messaging attached to these different voices. We use quotes to exemplify the messaging provided by scientists and government agencies around climate change. The combined sources contribute to two layers of understanding about what is the content and citizens' assessments of the source of this content. Each data source offers unique insights – one is about content (who is given voice, what do scientists say in news media); the other source about assessments of the source of this content (government, scientists, etc.). These two data sources are used in complementary design (Small, 2011).

To link survey data about news coverage to actual news coverage requires a more focused geographic area, compared to other Canadian studies. The *Globe and Mail* has an elite readership across Canada, whereas local newspapers have stronger market share in a specific geographic area, which makes them better at exploring linkages between survey data about a topic and news coverage of a topic. The *Edmonton Journal* is a local paper, but does have broad reach across the province. The newspaper has the largest circulation of the Edmonton newspapers (News Media Canada, 2015). Focusing on Edmonton, Alberta is important because it is the capital city for a province that is a global leader in the energy sector.

Survey Data

We have two large random sample surveys of the general population. The two separate surveys used random digit dialing sampling with interviewer-led telephone surveys. The surveys were conducted in June to July 2013 (n=1207) and in June to July 2015 (n=1208). The surveys were conducted as part of the University of Alberta's Population Research Lab *Alberta Survey* series. All data are freely available for download: https://dataverse.library.ualberta.ca/dvn/ The American Association of Public Opinion Research Response Rate #1 is approximately 9.2 percent in 2013 and 10.4 percent in 2015, which is line with response rates achieved by Pew Research Center, a global leader in public opinion research (Keeter, Hatley, Kennedy & Lau, 2017). Table 1 outlines the demographic profile of the sample. Approximately half of the respondents are female, representing census estimates for the province. Respondents are equally distributed across the province with 33 percent in each of Calgary, Edmonton, and other areas of the province, reflecting census estimates about the distribution of Albertans.

[Table 1 near here]

News Coverage

For sampling purposes, the Canadian Newsstand database was used. The search was first filtered by source type (*Edmonton Journal*), document type (news), language (English), and was limited to "full text". Articles had to contain the terms "climate change" or "global warming". Then the articles were selected through stratified sampling. Newspaper articles were then sorted to fit specific date ranges (year to year), with 12 articles being selected from each year: 2013 (N=351), 2014 (N=251), 2015 (N=482), and 2016 (N=403) for a total of 48 articles. Finally, articles were sorted based on relevance using the Canadian Newsstand database's function. As a further assessment of relevance, articles were only considered relevant if a minimum of 50 percent of

their content addressed climate change or global warming. This was attained by a manual assessment of the articles. The first 12 articles meeting the criteria, in each year, were included for analysis. Across four years, we gathered a total of 48 articles. These 48 articles are a subset of the 1487 news articles on this topic in this journal, representing a sampling ratio of 3.2 percent.

Reliability and validity are both paramount in ensuring accurate research results (Krippendorff, 2004; Neuendorf, 2002). Articles were coded manually. To ensure reliability in the coding, two undergraduate student researchers reviewed each article to verify the coding approach. Any disagreements were discussed until a consensus was reached. Because the coding relied on objective criteria, noting who is quoted, there were few disagreements between the coders. This reliability is a precondition for validity.

Codes were chosen based on variables studied in previous research. By using previously established variables, we aim to build on the existing body of research from a different perspective – one gained from analyzing content obtained from a localized newspaper (*Edmonton Journal*). Voice was coded based on who is speaking about climate change and climate change policies in the media (see Table 2). To exemplify each voice code, Table 2 includes a direct quote from the articles pertaining to that actor type.

[Table 2 near here]

Findings

Survey Data

Approximately 54.3 percent of respondents (n=1207) indicated that they turn to mainstream news media to gather information about climate change (Table 3). Scientists were the next most

popular sources (22.4 percent). Government was one of the least popular sources of information about climate change (3.2 percent).

[Table 3 near here]

However, when it comes to trusting information sources about climate change, scientists were the most trusted of the three sources (Table 4). The average level of trust was 3.08 (SD=.829). Specifically, approximately 21.1 percent of respondents reported distrusting scientists as a source of information about climate change (4.8 percent strongly distrust and 16.3 percent somewhat distrusted). In contrast, 33.6 percent of respondents "strongly" trusted scientists with the remaining respondents (45.3 percent) reporting being "somewhat" trusting of scientists.

[Table 4 near here]

Respondents were evenly split in terms of trusting (52.2 percent) versus distrusting (47.8 percent) media. The average level of trust was 2.45 (SD=.860), which is lower than the average level of trust reported for scientists. Indeed, only 8.6 percent of respondents (n=1197) strongly trusted mainstream news media.

For the last source, municipal government, we focus on respondents from a single city so that the responses would refer to a single government (Edmonton). As such, our sample size decreases. Of the three sources, municipal government leaders were the least trusted. The average level of trust was 2.25 (SD=.829). Only 3.0 percent of Edmontonians (n=395) strongly trusted municipal government leaders. In sum, the survey research suggests news media and scientists are prime sources of information about climate change, but these sources have highly variant levels of trust among citizens.

Support for a right-wing party was a consistent predictor of sources and levels of trust in sources related to climate change. Those who supported the Wildrose party (Alberta's most right-wing party) were less likely to use mainstream news media, less likely to use scientific sources, and less trusting of both mainstream media and scientific sources (Table 5). Ideology offers the most consistent findings, but demographic variables also influenced the use of different sources and levels of trust in different sources. Those with higher levels of education were more likely to use and trust scientific sources and less likely to use mainstream news media. Females were more trusting of mainstream news media and scientific sources, compared to males, but used scientists as sources of information less than males. Older people were less trusting of mainstream news media and scientists in relation to climate change, compared to younger people. Those living in Edmonton were less likely to use news media and instead opted for scientists as a source of information.

[Table 5 near here]

News Coverage

Scientists and Academics

Scientists and academics were the most popular voice on the subject of climate change in the *Edmonton Journal*, but government officials were almost as popular. Throughout the four years, scientists and academics appeared at least once in 68.8 percent of all articles, specifically 33 of the 48 articles. Indeed, within these 33 articles, a total of 52 separate scientific voices were identified. Scientific voice came from a variety of different sources including intergovernmental organizations such as the Intergovernmental Panel on Climate Change (or IPCC -given voice a total of 5 times) as well as national data centers and meteorological associations. While the blanket term "scientists" was often used in the introduction of the article, the quotes that

followed were most often from individual scientists attached to various institutions around the globe. For example, in 2013, a US-based scientist commented about the connection of extreme weather and climate change. As reported in Table 2, this scientist stated that "all events have a global warming component to them" (*Edmonton Journal*, May 4, 2013:A17). In another article, a local scientific expert was cited as saying:

> The province's climate faces warming by at least two degrees caused by heat-trapping greenhouse gas emissions, says the report written by University of Alberta biologist Richard Schneider. (*Edmonton Journal,* August 28, 2013:A4).

In 2016, scientists weighed in on the link between climate change and the Fort McMurray wildfire that forced the evacuation of a city of 90,000: ""There's no doubt El Nino played a role in Fort McMurray, " Flannigan said, but added, "That doesn't mean that climate change isn't playing a role in more intense, frequent fires."" (*Edmonton Journal*, May 20, 2016:A2).

[Table 6 near here]

The second most prominent voice was that of government officials (Table 6). Of the 48 articles, 33 articles cited at least one government source (66.7 percent). The federal government voice was coded at least once in 17 of 48 articles. Notable actors include US President Barack Obama, as well as various Canadian federal politicians. While Obama "vowed to make global warming a political priority" (*Edmonton Journal*, June 10, 2014:A11), other political leaders questioned the prioritization of climate change and the effectiveness and potential economic impact of possible mitigation strategies. Specifically:

> The political leaders of Canada and Australia declared on Monday they won't take any action to battle climate change that harms their national economies and threatens jobs. Prime Minister Stephen Harper and his Australian counterpart, Tony Abbott, made the statements following a meeting on Parliament Hill. (*Edmonton Journal*, June 10, 2014:A11)

At the very end of 2015 and into 2016, new Canadian Prime Minister Justin Trudeau's voice became the dominant federal government voice. For example:

> All provinces and territories will be obliged to set a minimum price of $10 per tonne of carbon emitted in 2018, Prime Minister Justin Trudeau told the House of Commons Monday, rising $10 each year to $50 per tonne in 2022 (*Edmonton Journal*, October 4, 2016:N1)

Provincial/state government voices were found at least once in 12 of the 48 articles, representing an incidence rate of 25.0 percent. For example:

> Of course, in the feds' absence the biggest provinces have gone ahead with their own plans, whether the carbon tax that British Columbia has already implemented and Alberta says it will, or the cap-and-trade schemes that Ontario and Quebec are at various stages of introducing. (*Edmonton Journal*, September 22, 2016:N1)

The least dominant voice in the *Edmonton Journal* is that of municipal governments, appearing in only two out of 48 articles. As noted in Table 2, "Calgary Mayor Naheed Nenshi questioned whether the carbon levy in 2017 will make the country uncompetitive" (*Edmonton Journal*, December 26, 2016:B7).

Industry was quoted less frequently than non-governmental organizations. While industry voices were present at least once in 20.8 percent (10 of 48 articles), non-governmental organizations (NGOs) were given voice in 31.3 percent of all articles (15 of 48 articles). In terms of industry, the content was exemplified by the following quote: "Ten major energy companies declared their support for a global deal to prevent climate change" (*Edmonton Journal*, October 17, 2015:C10).

Most often, the NGO voices were pushing governments for climate change mitigation. For example: "Climate Action Network Europe ranked Canada among the worst of 58 countries in the industrialized world for its failure to combat climate change" (*Edmonton Journal*, May 30, 2015:F12). In another example, "Dale Marshall of Environmental Defence said the carbon price

needs to rise at the same rate beyond 2022 - a point on which Trudeau was mute" (*Edmonton Journal*, October 4, 2016:N1).

Discussion

In sum, the mixed method approach revealed that citizens look to the news media for information about climate change. More than half of respondents (n=1207) indicated that they turn to mainstream news media to gather information about climate change, which is similar to the portion of Americans consuming scientific news through traditional news media (Funk et al., 2017). But only half of Alberta respondents trusted mainstream news media. These findings fit with other work about levels of trust in news media (in general) in Canada (Brin, 2017). In terms of trust in climate change news coverage, the survey question and response options are identical to that used in the *Climate Change in the American Mind* project (Leiserowitz et al., 2015). In the American survey, 56 percent of respondents reported distrust of mainstream news media related to climate change. In contrast, in Alberta, 47.8 percent of respondents reported distrust of mainstream news media related to climate change. Albertans are more trusting of mainstream news media than Americans, which is an important finding considering the widespread use of American news sources in Canada (Public Policy Forum, 2017).

Scientists/academics and government officials are the most popular sources cited in media coverage of climate change. However, scientists' assessments about climate change may be distorted, because only half of citizens surveyed reported trusting the news media's coverage of climate change. When we combine the survey data with the content analysis of news coverage, we see that the scientists' messages focus on the cause of climate change and the seriousness of this issue. As such, distrust of media, the instrument through which this

messaging is conveyed, may impact perceptions of the seriousness of this problem as well as knowledge of this issue.

Compared to mainstream news media, Albertans are more trusting of scientists' information about climate change. However, approximately 21.1 percent of respondents reported distrusting scientists as a source of information about climate change, which is slightly lower than American estimates (Leiserowitz et al., 2015, p. 26; Nisbet & Myers, 2007). Albertans are more trusting of scientists than Americans, but Albertans who identified with right-wing parties were more distrusting of mainstream news media and scientists, compared to those who identified with left-wing parties (Brewer & Ley, 2013; Funk et al., 2017; Hmielowski et al., 2014; Malka et al., 2009). Ideology was the most consistent predictor of preferences for different news sources and trust in different sources. The findings suggest that those who prefer the most right-wing party do not use or trust scientists or news media. This raises questions about what sources they are using, if any, in constructing their opinions about climate change. The consistent role of ideology is interesting as we had expected that education would be the strongest and most consistent predictor, given the ties between advanced education and exposure to scientific sources. We do see a preference for scientific sources for those with higher levels of education. We also observed gender differences in trust in sources and education differences in use and preferences for scientific sources, compared to mainstream news sources. Females' lower use of scientific sources, but higher trust of these sources, points to issues in accessibility of knowledge for this segment of the population.

We postulate that distrust of scientists' voices could impede knowledge acquisition on climate change and result in under-estimating the seriousness of climate change as an issue (Malka et al., 2009) as well as undermine support for public policies (Sleeth-Keppler et al.,

2017). While we cannot make this connection directly, this relationship has been established by other research (Malka et al., 2009; Sleeth-Keppler et al., 2017).

The survey data suggests that few respondents look to government as a source of information about climate change. However, government sources are quite popular in news coverage. The federal government was most often quoted, compared to the provincial or local government. The *Edmonton Journal* is a localized newspaper, compared to the *Globe and Mail*, which has been the focal point for other Canadian research on this topic (Ahchong & Dodds, 2011; Stoddart et al., various works; Young & Dugas, 2011). As such, the lower incidence of provincial representation and near absence of local municipal leaders is surprising. However, this finding fits with existing research. For example, research on the *Houston Chronicle* found that the president, Congress, and federal agencies were given much more prominence in this local newspaper, compared to local or state governments (Liu et al., 2008).

The current study uses two data sources offering a multi-layered view about this topic. The survey findings are that government sources are distrusted, but nonetheless, news media rely on government as a source of information. They cite government sources almost as much as scientists, but it is scientists who are the preferred/trusted sources from citizens' perspective. This is clear disconnect between what citizens want for sources (scientists) and what news media seem to be offering (balance of scientists and government sources).

The province of Alberta and Canada, more generally, have also experienced major shifts that could affect climate politics. In May 2015, Alberta ousted the Progressive Conservative party that had run the government for more than forty years and voted in a more liberal, environmentally-conscious NDP government. In October 2015, Trudeau's Liberals were elected to lead the federal government. With new federal leadership, Canada may return to its role as an

environmental leader. These two changes may mark a turning point in climate change discourse and action in Canada. However, we would also propose there should be greater attention to the role of municipal governments in climate change discourse and policies. Our research suggests that this level of government is rarely given a voice, even in localized newspapers. Given the limited coverage, the policies proposed by municipal government are not presented to the public, nor are they discussed in the media. In this context, it would be difficult to garner public support for climate change action or hold municipal governments accountable for their lack of public policies to address climate change.

While our research focuses on Alberta, we argue that Alberta is important as a case study related to climate change discourse, following arguments by others (Davidson & Haan, 2012). Understanding how climate change is portrayed in the *Edmonton Journal* can provide pivotal insight into Albertans' knowledge, level of concern, and their beliefs in the need for action on this issue. This insight is important as these citizens can demand stronger government policies and hold government accountable for their lack of appropriate climate change policies. Alberta is a global leader in the energy sector and Alberta's policies around climate change will have global impact.

Our research employed mixed methods approach combining a large representative sample survey with content analysis of news articles for one newspaper in the province. The objective of the content analysis was to offer context to the survey data and describe the messaging attached to different voices. We also estimated the frequency of appearance of different voices, but our sample size limits conclusions about the prevalence of different voices. A larger sample of news article from a broad range of media sources would be an ideal source for estimating the prevalence of different voices in climate change discource.

As a concluding point, we noted that the news coverage of climate change was often in the context of extreme weather events (see Olausson, 2014). This is likely due to the tendency of journalists to exploit dramatic subject matter to gain readership (Hannigan, 2006; Young & Dugas, 2011) but may also be because discussion of climate change tends to be instigated by specific events including natural disasters (Young & Dugas, 2011). The most significant example of a natural disaster thread appears after May 2016 when Alberta faced one of the most significant natural disasters in its history: the Fort McMurray wildfire. According to Statistics Canada (2017), the Fort McMurray wildfire burned a patch of land equal to the size of Prince Edward Island, "was the most expensive natural disaster in Canadian history for insurance providers" (costing $3.7 billion), and destroyed 8 percent of all private dwellings in the area (Statistics Canada, 2017). Gunster (2011) writes that:

> Descriptions of climate change impacts are much more compelling if they are contextualized in geographic and/or human terms (p484)…. the specificity of these impacts packs a powerful rhetorical punch, both in responding to the arguments of skeptics and in making the case for action (p485)

Further research might examine whether linking the two (climate change, disaster) creates support for government action and the extent to which the public believes there is such a connection (Haney & McDonald-Harker, 2016). This research has implications beyond Alberta, as hurricanes linked to climate change have caused flooding of coastal and island areas (e.g., Texas, Puerto Rico). In this context, it is important to understand how media coverage of these disasters and scientists' views about the events impact knowledge, levels of concerns, and policy support regarding climate change.

References

Ahchong, K. & Dodds, R. (2011). Anthropogenic Climate Change Coverage in Two

    Canadian Newspapers, the *Toronto Star* and the *Globe and Mail*, From 1988 to 2007.

    Environmental Science and Policy, 15, 48-59.

Bickerstaff, K., Lorenzoni, I., Pidgeon, N.F., Poortinga, W., & Simmons, P. (2008). Reframing

    Nuclear Power in the UK Energy Debate: Nuclear Power, Climate Change Mitigation and

    Radioactive Waste. *Public Understanding of Science, 17,* 145-169.

Boykoff, M. T. (2013). Public Enemy No. 1? Understanding Media Representations of

    Outlier Views on Climate Change. *American Behavioral Scientist, 57,* 796-817.

Brewer, P. R., & Ley, B. L. (2013). Whose Science Do You Believe? Explaining Trust

    in Sources of Scientific Information about the Environment. *Science Communication, 35,*

    115-137.

Brin, C. (2017). *Canada, Digital News Report, 2017.* Reuters Institute for the Study of

    Journalism, University of Oxford, p. 108-109. Retrieved from

    https://reutersinstitute.politics.ox.ac.uk/sites/default/files/Digital%20News%20Report%2

    02017%20web_0.pdf

Davidson, D., & Haan, M. (2012). Gender, Political Ideology, and Climate Change Beliefs in an

    Extractive Industry Community. *Population & Environment, 34,* 217-234.

Funk, C., Gottfried, J., & Mitchell, A. (2017). *Science News and Information Today*. Pew

    Research Center, September 20. Retrieved from

    http://www.journalism.org/2017/09/20/science-news-and-information-today/

Ferree, M. M., Gamson, W., Gerhards, J., & Rucht, D. (2002). *Shaping Abortion Discourse: Democracy and the Public Sphere in Germany and the United States*. Cambridge, UK: Cambridge University Press.

Gamson, W. (2007). Bystanders, Public Opinion, and the Media. In D. A. Snow, S. A. Soule, & H. Kriesi (Eds), *Blackwell Companion to Social Movements* (pp. 242-261). Malden, Massachusetts: Blackwell.

Gkiouzepas, G., & Botetzagias, I. (2017). Climate Change Coverage in Greek Newspapers: 2001–2008. *Environmental Communication, 11,* 490-514.

Green, M. 2017, May 4. *Trump's EPA: Cuts, Infighting and No Talk of Climate Change*. *CNN*, May 4. Retrieved from http://www.cnn.com/2017/04/29/politics/trump-epa-cuts-infighting-climate-change/index.html

Gunster, S. 2011. Covering Copenhagen: Climate Change in BC Media. *Canadian Journal of Communication, 36,* 477-502.

Haney, T., & McDonald-Harker, C. (2016). 'The River is Not the Same Anymore': Environmental Risk and Uncertainty in the Aftermath of the High River, Alberta, Flood. *Social Currents,* 4, 594-612.

Hannigan, J. 2006. *Environmental Sociology* (2nd ed.). New York: Routledge.

Hmielowski, J. D., Feldman, L., Myers, T. A., Leiserowitz, A., & Maibach, E. (2014). An Attack on Science? Media Use, Trust in Scientists, and Perceptions of Global Warming. *Public Understanding of Science, 23*, 866-883.

Keeter, S. Hatley, N., Kennedy, C., & Lau, A. (2017). What Low Response Rates Mean For Telephone Surveys. *Pew Research Center*, May 15. Retrieved from

http://www.pewresearch.org/2017/05/15/what-low-response-rates-mean-for-telephone-surveys/

Krippendorff, K. (2004). *Content Analysis: An Introduction to its Methodology* (2nd ed.). Beverly Hills: Sage Publications.

Leiserowitz, A., Maibach, E., Roser-Renouf, C., Feinberg, G., & Rosenthal, S. (2015). *Climate Change in the American Mind: March, 2015*. Yale University and George Mason University. New Haven, CT: Yale Project on Climate Change Communication.

Liu, X., Vedlitz, A., & Alston, L. (2008). Regional News Portrayals of Global Warming and Climate Change. *Environmental Science & Policy, 11,* 379-393.

Manasan, A. (2015). FAQ: The Issues around Muzzling Government Scientists. *CBC*, May 20. Retrieved from http://www.cbc.ca/news/technology/faq-the-issues-around-muzzling-government-scientists-1.3079537

Malka, A., Krosnick, J. A., & Langer, G. (2009). The Association of Knowledge with Concern about Global Warming: Trusted Information Sources Shape Public Thinking. *Risk Analysis, 29,* 633-647.

Midttun, A., Coulter, P., Gadzekpo, A., & Wang, J. (2015). Comparing Media Framings of Climate Change in Developed, Rapid Growth, and Developing Countries: Findings from Norway, China, and Ghana. *Energy & Environment, 26,* 1271-1292.

Neuendorf, K. A. (2002). *The Content Analysis Guidebook*. Thousand Oaks, CA: Sage Publications.

Newman, N., Fletcher, R., Kalogeropoulos, A., Levy, D.A., & Nielsen, R. K. (2017). *Digital News Report, 2017*. Reuters Institute for the Study of Journalism, University of Oxford. Retrieved from

https://reutersinstitute.politics.ox.ac.uk/sites/default/files/Digital%20News%20Report%20 2017%20web_0.pdf

News Media Canada. (2015). *Data from: 2015 Daily Newspaper Circulation Spreadsheet* (Excel dataset). Retrieved March 1, 2018 from https://nmc-mic.ca/about-newspapers/circulation/daily-newspapers/

Nisbet, M. C., & Myers, T. (2007). Twenty Years of Public Opinion about Global Warming. *Public Opinion Quarterly, 71,* 444-470.

Olausson, U. (2014). The Diversified Nature of 'Domesticated' News Discourse: The Case of Climate Change in National News Media. *Journalism Studies, 15,* 711-725.

Papineau, J.W., & Deacon, L. (2017). Fort McMurray and the Canadian Oil Sands: Local Coverage of National Importance. *Environmental Communication, 11,* 593-608.

Public Policy Forum. (2017). *The Shattered Mirror: News, Democracy and Trust in the Digital Age.* Ottawa, ON: Public Policy Forum.

Schmid-Petri, H., Adam, S., Schmucki, I. & Häussler, T. (2015). A Changing Climate of Skepticism: The Factors Shaping Climate Change Coverage in the US Press. *Public Understanding of Science, 26,* 498-513.

Sleeth-Keppler, D., Perkowitz, R. & Speiser, M. (2017). It's a Matter of Trust: American Judgments of the Credibility of Informal Communicators on Solutions to Climate Change. *Environmental Communication, 11,* 17-40.

Small, M. L. (2011). How to Conduct a Mixed Methods Study: Recent Trends in a Rapidly Growing Literature. *Annual Review of Sociology, 37*, 57-86.

Speck, D. L. (2010). A Hot Topic? Climate Change Mitigation Policies, and the Media in Australia. *Research in Human Ecology, 17,* 125-133.

Statistics Canada. (2017). *Infographic: Fort McMurray 2016 Wildfire -*

 Economic Impact. Ottawa: Government of Canada. Retrieved from

 http://www.statcan.gc.ca/pub/11-627-m/11-627-m2017007-eng.htm

Stoddart, M. C. J., Tindall, D. B. & Greenfield, K. L. (2012). 'Governments Have the

 Power?': Interpretations of Climate Change Responsibility and Solutions Among

 Canadian Environmentalists. *Organization & Environment, 25,* 39-58.

Stoddart, M. C. J., & Tindall, D. B. (2015). Canadian News Media and the Cultural

 Dynamics of Multilevel Climate Governance. *Environmental Politics, 24,* 401-422.

Stoddart, M.C. J., & Smith, J. (2016). The Endangered Arctic, the Arctic as Resource Frontier:

 Canadian News Media Narratives of Climate Change and the North. *Canadian Review of*

 Sociology, 53, 316-336.

Stoddart, M. C. J., Tindall, D. B., Smith, J., & Haluza-Delay, R. (2017). Media Access and

 Political Efficacy in the Ecopolitics of Climate Change: Canadian National News and

 Mediated Policy Networks. *Environmental Communication, 11,* 386-400.

Stoutenborough, J. W., Liu, X., & Vedlitzet, A. (2014). Trends in Public Attitudes toward

 Climate Change: The Influence of the Economy and Climategate on Risk, Information, and

 Public Policy. *Risks, Hazards, & Crisis in Public Policy,* 5, 22-37.

Young, N., & Dugas, E. (2011). Representations of Climate Change in Canadian National Print

 Media: The Banalization of Global Warming. *Canadian Review of Sociology, 48,* 1-22.

Table 1: Descriptive Profile of Survey Samples

	Alberta Survey 2013 (n=1207)		Alberta Survey 2015 (n=1208)	
	Mean/ Percentage	Standard deviation	Mean/ Percentage	Standard deviation
Age in Years	52.44	16.35	55.22	15.64
Female	50.7%	n/a	49.7%	n/a
Married	59.2%	n/a	63.6%	n/a
Education in Years	15.43	3.33	15.52	3.47
Region				
-Calgary	33.3%	n/a	33.4%	n/a
-Edmonton	33.5%	n/a	33.3%	n/a
-Rest of Alberta	33.2%	n/a	33.3%	n/a
Household Income Group	$75,000 to 79,999	--	$80,000 to 84,999	--
Home owner	83.5%	n/a	84.4%	n/a
In 2013: if election was held today, would vote… Wildrose (right-wing party) In 2015: in last election, did vote… Wildrose (right-wing party)	23.7%	n/a	21.7%	n/a

Table 2: Voice Codes and Exemplars

Academics/Scientists	"scientist", "geographer", "researcher", "scholar", professor", "academic", "university", "college", "institute" "World Meteorological Association WMO" "IPCC", "National Oceanic Atmospheric Administration"	'Kevin Trenberth, senior scientist at the U.S. National Center for Atmospheric Research, says flatly "all events have a global warming component to them."' (*Edmonton Journal*, May 4, 2013:A17)
Government Official (jurisdiction unspecified)	"policy makers", "political groups"	"Governments care about the wording because they have to justify to voters why they're spending money to cut emissions when the pace of temperature increases has slowed since 1998" (*Edmonton Journal*, November 19, 2013:E2)
Municipal	"members of City Council", "City Councillors", "Mayor"	"Calgary Mayor Naheed Nenshi questioned whether the carbon levy in 2017 will make the country uncompetitive." (*Edmonton Journal,* December 22, 2016:B7)
Provincial/State	"Premier", "Senator", "province"	"I'm very pleased with the progress we're making," Prentice said Saturday. "I committed that we would renew the policies of the government relative to climate change (and) we're in the process of doing that." (*Edmonton Journal*, April 13, 2015:A6)
Federal	"federal officials" "Canadian officials", "Prime Minister", "President", "government agency"	"Canada's natural resources minister insists the federal government believes climate change is an urgent matter" (*Edmonton Journal,* April 17, 2013:A13)
Industry	"energy companies", "Enbridge", "Suncor", "Syncrude" "businesses"	"Ten major energy companies declared their support for a global deal to prevent climate change" (*Edmonton Journal*, October 17, 2015:C10)
Non-governmental Organizations	"Not-for-Profit", "Greenpeace", "Sierra Club", "Environment America", "environmental groups"	"The group Environment America, which is pushing policy-makers to take action to curb the release of greenhouse gases" (*Edmonton Journal*, April 13, 2013:A21)

Inter-governmental Organizations	"International Energy Agency", "UN" , "European Union"	"The United Nations has called for the world's governments to act to limit global temperature increases to two degrees " (*Edmonton Journal*, July 26, 2013:D2)

Table 3: Sources of Information about Climate Change

	Percentage
1 The mainstream news media	54.3
2 Alternative or independent media	10.8
3 Scientists	22.4
4 Religious leaders	0.5
5 Government	3.2
6 Other	8.8
Total	100.0

Survey Question: What information source do you turn to most often for reliable and accurate information about climate change? n=1207, Alberta Survey 2013, unweighted

Table 4: Trust in Information Sources

	Mainstream news media (n=1208)	Scientists (n=1197)	Municipal government leaders (n=395 Edmonton Metro only)
	Percentage	Percentage	Percentage
1 Strongly distrust	16.0	4.8	21.8
2 Somewhat distrust	31.8	16.3	34.2
3 Somewhat trust	43.6	45.3	41.0
4 Strongly trust	8.6	33.6	3.0
Average	2.45	3.08	2.25
Standard Deviation	.860	.829	.829

Survey Question: How much do you trust or distrust: …. as a source of information about climate change? Alberta Survey 2015, unweighted

Table 5: Logistic Regression of Sources of Information and Ordinary Least Squares Regression of Trust

	Alberta Survey 2013 Primarily use *mainstream news media* re: climate change		Alberta Survey 2015 Trust of *mainstream news media* re: climate change	
	B	SE	B	SE
Age in Years	.008	.006	-.005*	.002
Female	.326	.168	.168*	.066
Married	.038	.189	.055	.075
Education in Years	-.111***	.029	.004	.010
Region				
-Calgary (reference group)				
-Edmonton	-.845***	.201	.088	.080
-Rest of Alberta	.109	.203	-.005	.079
Household Income Group	-.017	.013	-.013*	.006
Home owner	.705*	.245	.012	.103
Vote Wildrose (right-wing party)	-.168*	.198	-.301***	.079
	Alberta Survey 2013 Primarily use *scientists* re: climate change		Alberta Survey 2015 Trust of *scientists* re: climate change	
	B	SE	B	SE
Age in Years	-.009	.007	-.009***	.002
Female	-.600**	.201	.144*	.061
Married	-.055	.220	-.043	.070
Education in Years	.110***	.032	.028**	.009
Region				
-Calgary (reference group)				
-Edmonton	.651**	.223	-.046	.074
-Rest of Alberta	-.252	.255	-.135	.073
Household Income Group	-.004	.016	-.007	.005
Home owner	-.278	.272	.125	.095
Vote Wildrose (right-wing party)	-.499*	.253	-.551***	.073

*** p-value < .001, ** p-value < .01, * p-value < .05

Table 6: Voice in *Edmonton Journal* News Coverage

	# ARTICLES	% ALL
Academic/Scientist	33	68.8%
Government (any)	32	66.7%
Government Official (jurisdiction unspecified)	3	6.3%
Municipal	2	4.2%
Provincial/State	12	25.0%
Federal	17	35.4%
Industry	10	20.8%
Non-Governmental Organization	15	31.3%
Inter-Governmental Organization	11	22.9%

The numbers don't add up to 100% because a single article has multiple voices. The 68.8% is calculated as 33/48. For government voices, many articles had more than one level of government represented.