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ABSTRACT

The COVID-19 pandemic emerged against the backdrop of the longer-term climate change crisis and increasing global awareness of the imperative for climate action, disrupting the post-Paris trajectory of climate policy and media coverage of climate change. We examine news media coverage from Canadian legacy newspapers and answer three questions. First, did the COVID-19 pandemic work as a critical event in its impacts on news media coverage of climate change, and if so, in what ways? Second, did media framing of climate change shift in response to this critical event, and if so, in what ways? Third, are there notable differences between national and subnational media frames? We find that COVID-19 is a critical event linked to a period of reduced media coverage of climate change. However, this critical event also opened new spaces for news framing that connects environmental and economic dimensions of sustainability.

The COVID-19 global pandemic brought abrupt and far-reaching impacts around the world, and was a "cascading crisis" (Walby, 2015) that has rippled out from a public health crisis to an economic crisis. But it was set against the backdrop of the longer, and perhaps more consequential climate crisis. Before COVID-19 was declared a global pandemic, media audiences were captivated by images of Australian wildfires, news about Greta Thunberg and the Fridays for the Future Movement (Murphy, 2021; Stuart et al., 2020), and there was a growing mainstream acceptance of climate emergency discourse and other framing of climate change as the ecological crisis of the twenty-first century.

Media scholars have shown that media have a limited "carrying capacity" for issues and information (Jang & Pasek, 2015; McCombs & Zhu, 1995). Given the abrupt nature of the pandemic, COVID-19 arguably became a competitor for media and broader public attention. In this paper, we set out to see whether the COVID-19 pandemic can be considered a "critical event" that disrupted the post-Paris trajectory of climate change media coverage. Drawing from social movements scholarship, critical events may be defined as sudden and widespread social-political changes that re-shape the context of contention for a social movement or issue (Ramos, 2008; Staggenborg, 1993). They are disruptive as they "reorder institutions [and] social relations," while they also create possibilities for change (Kay & Ramos, 2018).

In exploring these issues, we draw upon the critical events, agenda-setting, and framing literatures to better understand if COVID-19 has been a critical event altering the media attention and framing of climate change. We do so by examining media coverage from September 2019 to

August 2020 from two Canadian national legacy newspapers (*Globe and Mail* and *National Post*), as well as legacy newspapers from across the eastern Atlantic Canadian region (*The Chronicle Herald*, Halifax, Nova Scotia; *The Guardian*, Charlottetown, Prince Edward Island; *The Telegram*, St. John's, Newfoundland and Labrador; *The Telegraph Journal,* St. John, New Brunswick). Our analysis addresses three research questions. First, building on the critical events literature, did the COVID-19 pandemic work as a critical event in its impacts on the volume of media coverage for climate change, and if so in what ways? We expect that COVID-19 has displaced media attention from climate change and we seek to confirm this, rather than taking it as an assumption.

Second, drawing on a framing perspective, we ask whether media framing of climate change shifted in response to this critical event, and if so, in what ways? As we are still within the COVID-19 pandemic, these research questions help us take the first exploratory steps in learning about how climate coverage shifts and evolves in the context of other crises and critical events. This is important for helping us better understand how issue framing can be transformed by critical events, even if there is a context of lower media visibility overall. Studying the conjuncture of climate change and COVID-19 media framing is also useful in relation to broader social trends towards the politicization of science that often characterize climate change media coverage and political debate (Kukkonen & Ylä-Anttila, 2020).

Third, are there notable differences between national and subnational media framing? As Canada is a federalist and decentralized society, it is important to attend to national–subnational social dynamics related to climate change impacts, responses, and news media frames (Dusyk et al., 2018; Lijphart, 2012).

While social media might play a prominent role in shaping public conversations about COVID-19 and climate change, in this analysis we focus on legacy news media coverage. Legacy media outlets, including the national and provincial news outlets we examine here, continue to play an important role in shaping public conversations about environmental and health issues and reach attentive media audiences that include policy makers (Castells, 2009; Hansen, 2010; Hutchins & Lester, 2015; Lester & Hutchins, 2012; Painter et al., 2018). Rather than seeing legacy media as completely displaced by social media, we consider legacy media as an important part of a still-emerging hybrid media environment marked by a profusion of news platforms, wherein legacy media continue to play an important agenda-setting role even within a fragmented media landscape (Bentivegna & Artieri, 2020; Casero-Ripollés, 2020; Harmer & Southern, 2020; Taneja et al., 2018). Legacy news outlets adapt to the affordances of social media "to distribute news, to market stories, to establish relationships with new consumers, and … as a tool for reporting" (Harmer & Southern, 2020, p. 2237). Legacy media also serve as sources of content that get distributed and recirculated through social media platforms like Twitter and Facebook (Bastos, 2015; Bodrunova et al., 2018). Audience research further suggests that attentive news consumers make regular use of both legacy and social media (Casero-Ripollés, 2020; Taneja et al., 2018). Furthermore, both legacy and social media usage typically increases during health crises or disasters, with legacy media often seen as more reliable news outlets, while social media are sources of emerging information (Casero-Ripollés, 2020; Hua & Shaw, 2020; Ruiu, 2020). As such, legacy news media continue to be an important focus for analyses of climate communication and how it evolves in response to critical events like COVID-19.

The paper begins by offering a review of the literature on environmental media coverage in the post-Paris Agreement context, critical events, agenda-setting, and news framing. This is followed by a discussion of our research methods and analytic strategy, followed by results and contributions to discussions of climate change in the post-COVID-19 context.

Crisis, critical events, agenda-setting and news framing

The 2015 Paris Agreement ushered in new attention and urgency to climate change (Murphy, 2021; Stuart et al., 2020). This can be seen through increasing acceptance of climate change as driven by

human actions, global attention to the Fridays for the Future Movement (student climate strikes) led by Greta Thunberg, as well as decisions by news organizations to include sections on the environment or climate change (e.g. *New York Times*) or to adopt the language of "climate crisis" (e.g. *The Guardian*) to frame the urgency of climate change. Before March 2020, addressing climate change appeared to be the crisis of the twenty-first century and increasingly drove the political agenda. Yet, the declaration of a global pandemic by the World Health Organization on 11 March 2020 altered the news cycle with a competing crisis vying for public attention.

In her work on the 2008 global financial crisis, Sylvia Walby (2015) argues that a crisis is an event that has the potential to cause a large detrimental change to social systems with a lack of proportionality between cause and consequence. Walby argues that crises have the potential to "cascade" from one social sphere to another, for example, moving from economic crisis into political crisis and on to challenging the legitimacy of broader economic-social-political systems.

The COVID-19 pandemic fits Walby's theorization of crisis very well. The pandemic began as a health crisis but has cascaded into an economic crisis for many countries and sectors of the economy that have had to grapple with the costs of massive sudden lay-offs, rapid changes in consumption patterns, and a nearly unprecedented shut-down of travel and tourism. In some jurisdictions where public health measures have provoked resistance and protest, the COVID-19 pandemic led to a crisis of political legitimacy for ruling governments and public health agencies. The emergent research on COVID-19 highlights how the pandemic has already cascaded into an "infodemic" in the media sphere (Pulido et al., 2020). Health information from a wide range of national and international health agencies and government bodies is competing with a surplus of conspiracy theories to interpret the impacts of the crisis and attribute blame and responsibility for responding.

Walby further argues that crises are both "real," and socially constructed. This means narratives of a crisis might under- or over-state its magnitude and impact. Crisis narratives are also important for attributing blame, as well as for structuring responses and recovery plans (Walby, 2015, p. 14). Again, the COVID-19 pandemic is a good fit with this theorization of crisis. As Pleyers (2020) notes, a broad range of social justice movements have engaged in protest, scrutiny of decision-makers, and public education to counter the dominant COVID-19 crisis narratives offered by governmental and corporate actors that the goal is to return to a pre-crisis state of normalcy as soon as feasible. Various social movements have articulated counter-narratives that link the pandemic response with visions for more equitable, just, and sustainable futures, thereby treating the pandemic as a "battlefield" to assert possible "alternative futures" that may grow out of crisis recovery (Pleyers, 2020).

Conceptualized this way, the notion of crisis also relates to the key concept of "critical events." Based on social movement scholarship, critical events are conceptualized as national or global turning points that change political trajectories and tactics (see Ramos, 2008; Meyer & Staggenborg, 1996; Rogstad & Vestel, 2011; Staggenborg, 1993). Critical events – like crises – are transformative, but the two are not the same. Crises *can* be both acute critical events, but also ongoing and chronic. Climate change has features of both. Critical events alter the expectations and perceptions of opportunities and threats and as a result engender the emergence of new frames of understanding, new political tactics, or even new social movements. Because of such impacts, critical events can also provoke sudden changes in the media visibility of a movement or issue. For example, seeing the ongoing COVID-19 pandemic as a critical event leads us to examine whether it is derailing the climate change movement and its recent success in gaining media attention.

Critical events can change the volume of media coverage of social and political issues, including environmental issues (Chilton, 1987; Gamson & Modigliani, 1989; Stoddart et al., 2016). In their early research on environmental issue coverage in the news, Schoenfeld et al. (1979) argue that environmental issues are often ignored in the media because they did not easily fit into news genre conventions or rhythms of journalistic practices. However, the first U.S. Earth Day in 1970 was a critical event that helped make environmental issues comprehensible to news workers and magnified media attention to the environment (Schoenfeld et al., 1979). More recently, much research on media and climate change shows that news coverage increases in response to global

political events like the UN COP conferences and UNFCCC reports more than ecological change, extreme weather events, or seasonal news rhythms (Broadbent et al., 2016; Eide & Kunelius, 2012; Parks, 2020; Schmidt et al., 2013; Stoddart et al., 2016; Ylä-Anttila et al., 2018a).

Increased attention, however, may lead to crowding out space for media and publics to engage other issues. As the agenda-setting literature has long shown, as new issues emerge, they shrink remaining policy, public and media carrying capacity, as both media space and the amount of information people can engage, are finite. This is especially the case for traditional news media, which are constrained by time and space to offer information more so than most forms of social media. For instance, Shaw and McCombs (1977) showed that the public agenda typically includes no more than five to seven issues at a time. Hilgartner and Bosk (1988) and Zhu (1992), moreover, show that public agendas are also bound by time, memory, emotional span, and material resources. However, McCombs and Zhu (1995) show that the public agenda is characterized by an increased diversity and volatility of issues over the 40-year time span from 1954 to 1994. Since they wrote, these trends have been compounded with the internet and social media. Despite these changes, legacy news outlets continue to serve as sources of content that get recirculated through newer social media platforms like Twitter and Facebook (Bastos, 2015; Bodrunova et al., 2018). We contend that critical events may contribute to issue diversity and volatility, and that the COVID-19 pandemic shrinks the space for covering climate change.

Critical events not only change the volume of coverage; they also affect the ways in which issues are framed (Gamson & Modigliani, 1989). The framing perspective is well-established in environmental social science and social movements literature (e.g. Corrigall-Brown, 2016; Čapek, 1993; Dreher & Voyer, 2015; Foust & Murphy, 2009; Hestres, 2018; Knight & Greenberg, 2011; Nisbet & Lewenstein, 2002; Snow et al., 2014). In this literature, frames are the interpretive schema used by social actors, including the media, to make sense of the world and convey meaning to audiences (Entman, 1993). Frames are used by news sources and journalists to emphasize aspects of the "causes, consequences, and solutions to a policy problem" or issue (Nisbet & Lewenstein, 2002). Frames can be "prognostic" when they assert the meaning of a problem; they can be "diagnostic" when they assert a particular solution to a problem; and they can be "motivational" when they attempt to mobilize audience members to a particular course of action (Snow et al., 2007).

There is a rich literature on media framing of climate change. In the US, and to a lesser extent in other Anglophone countries (including Australia, Canada, and the United Kingdom), the main focus is on diagnostic framing contests over the nature of climate change, with a "false balance" in news coverage between climate skeptic movements and think-tanks on one side and the scientific consensus on the other (Boykoff, 2011; Dunlap & McCright, 2015; Freudenburg & Muselli, 2010). This media framing has been associated with highly polarized public opinion and political debate in the United States (Bolin & Hamilton, 2018; Carmichael et al., 2017). Non-US cases are more often characterized by framing contests over prognostic frames, such as: what are the preferred policy responses to the issue, which social actors should take leadership or bear responsibility for addressing climate change, or the degree to which climate change should be interpreted through a climate justice lens (Allan & Hadden, 2017; Berglez, 2011; Billett, 2009; Evans, 2016; Grundmann, 2007; Stoddart et al., 2017b). These media framing contests often involve conflict over the economic or social acceptability of climate change responses, such as debate over coal phase-out in the Czech Republic (Černý & Ocelík, 2020), or debates between economic benefits and environmental protection frames related to oil pipeline development for the Alberta oil sands (Dusyk et al., 2018). By contrast, recent cross-national research suggests that ecologically oriented frames are gaining prominence in the media sphere, while purely economic arguments against climate action are declining in visibility (Ylä-Anttila et al. 2018b).

In the rest of the paper, we examine whether the Covid-19 pandemic was a critical event that impacted coverage of the ongoing climate crisis. We assess this by connecting the critical events, agenda-setting, and framing perspectives. In doing so, we address one of the most common criticisms of the framing perspective: that it treats frames as overly static and does not sufficiently

account for change over time (Conley, 2015). By drawing on the critical events perspective, we are better positioned to understand how frames evolve through time, particularly in response to sudden and cascading crises, such as COVID-19. As such, our research questions ask how the COVID-19 pandemic is playing out as a critical event in two senses: First, is the COVID-19 pandemic changing the volume of media coverage of climate change, and if so, in what ways? Second, is the media framing of climate change shifting in response to this critical event, and if so, in what ways?

Method

For this analysis, we examine two national legacy newspapers (*Globe and Mail* and *National Post*) and four subnational legacy newspapers from Atlantic Canada (Halifax *Chronicle-Herald,* Nova Scotia; Charlottetown *Guardian*, Prince Edward Island; St. John's *Telegram*, Newfoundland and Labrador; St. John *Telegraph-Journal*, New Brunswick). Table 1 provides an overview of these outlets, including circulation figures from the Canadian Newspaper Association. Legacy news outlets remain important data sources because they often provide content that is further circulated through social media outlets and they continue to play an agenda-setting role even in an increasingly hybrid and fragmented media landscape (Bastos, 2015; Bentivegna & Artieri, 2020; Bodrunova et al., 2018; Casero-Ripollés, 2020; Castells, 2009; Harmer & Southern, 2020; Hutchins & Lester, 2015; Taneja et al., 2018). As a rough indicator of the connectivity between these legacy news outlets and the social media sphere, we also provide the number of Twitter followers for each news outlet.

This research is connected to the international COMPON (COMParing climate change POlicy Networks) project, which examines climate change media discourse networks and policy networks, and the relationships across these spheres in 19 societies (Broadbent et al., 2016; Ylä-Anttila et al. 2018a). To date, COMPON case study teams have focused on national analyses and cross-national comparisons. Similarly, much research on Canadian news coverage of climate change takes a national focus (DiFrancesco & Young, 2011; Murphy, 2015; Stoddart & Tindall, 2015; Stoddart et al. 2017a; Tegelberg et al., 2014; Young & Dugas, 2011). However, an emerging line of inquiry for multiple COMPON cases is to turn attention to national–subnational dynamics of climate change communication. National-subnational comparisons are particularly important in federalist and decentralized polities such as Canada (Lijphart, 2012), where provincial actors and political spheres can have significant impacts on climate mitigation and adaption (MacNeil, 2019; Paehlke, 2008).

While an analysis of various regions of Canada would be productive for different reasons, we choose to focus on the Atlantic Canadian region for several theoretically relevant reasons. First, these four provinces adopted a successful "bubble" strategy with significant travel restrictions and two-week self-isolation requirements for those who enter the region. As a result, during the period of our analysis case numbers, hospitalization rates, and mortality rates stayed low relative to the rest of the country (Rastello, 2020; Rocha et al., 2020). As such, we might expect to see significant national-subnational differences in the ways in which COVID-19 works as a critical event in the different media spheres. Second, Atlantic Canada contains a mix of climate "leaders" that have adopted more ambitious action plans and which are less economically dependent on

Table 1. Overview of data sources.

News outlet	Total weekly circulation, print and digital (2015)[a]	# of Twitter followers
Globe & Mail (national)	2,018,923	1,800,000
National Post (national)	1,116,647	883,200
Telegraph Journal (New Brunswick)	161,100	17,100
Telegram (Newfoundland and Labrador)	171,054	66,900
Chronicle-Herald (Nova Scotia)	548,938	128,100
Guardian (Prince Edward Island)	86,261	31,100

[a]Source: Most recent newspaper-specific circulation data from News Media Canada (https://nmc-mic.ca/about-newspapers/circulation/daily-newspapers/).

entrenched fossil fuel interests (Nova Scotia and Prince Edward Island) and climate "laggards" that have been slower to engage in substantial climate action and which are more economically dependent on entrenched fossil fuel interests (New Brunswick and Newfoundland and Labrador) (Carter, 2020). As such, we may expect to see differences across the subnational media outlets in terms of how the COVID-19 crisis and climate change are framed. Third, the region is often overlooked in Canadian research, even though it includes four out of ten provinces (Kay & Ramos, 2018). Fourth, and relatedly, this analysis is also part of a larger ongoing project, *Future of Coastal and Ocean Infrastructures* (FOCI), which examines multiple dimensions sustainability in Atlantic Canada. Within this broader project, our work package looks at perceptions of climate change and social futures in terms of media framing, public perceptions, and policy networks, all of which are potentially impacted by the COVID-19 pandemic. A qualification of our analysis is that these results from Atlantic Canada should not be taken as representative of news coverage trends or framing related to COVID-19 and climate change in other regions of Canada. Rather, it would be valuable to extend this research to other regions of Canada to gain a more complete picture of national-subnational similarities and differences related to news farming of COVID-19 and climate change.

For our first research question about how COVID-19 impacts the volume of media coverage of climate change, we did a keyword search for "global warming" OR "climate change" in the headline and lead paragraph of all six newspaper outlets. We recorded the number of hits for each outlet on an annual basis for the period from January 2015 through December 2020, which provides a longer-term overview of news coverage trends for climate change in our selected news outlets and provides a baseline for a closer examination of the immediate period before and after the emergence of the COVID-19 pandemic (see Figure 1). We also recorded the number of keyword hits on a monthly basis for the period from September 2019 through August 2020. Thus, we gauge changes in media coverage from approximately six months before and six months after the February 2020 appearance of the first news stories that address both climate change and COVID-19 (see Figure 2).[1]
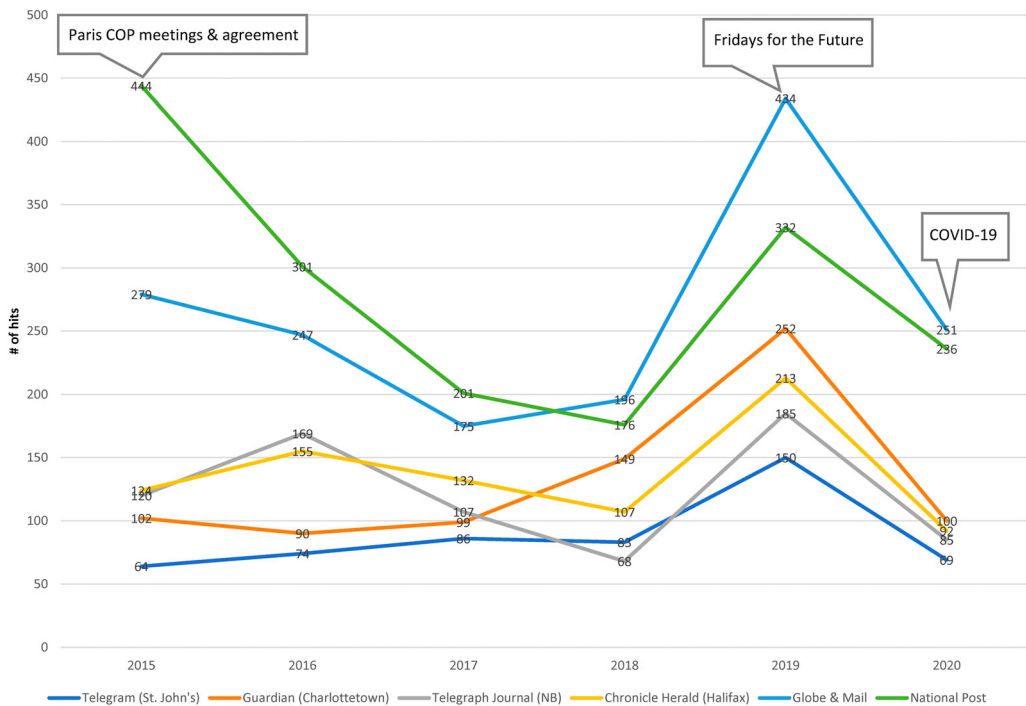

Figure 1. Climate change news cycle (annual), January 2015–December 2020, by news outlet.
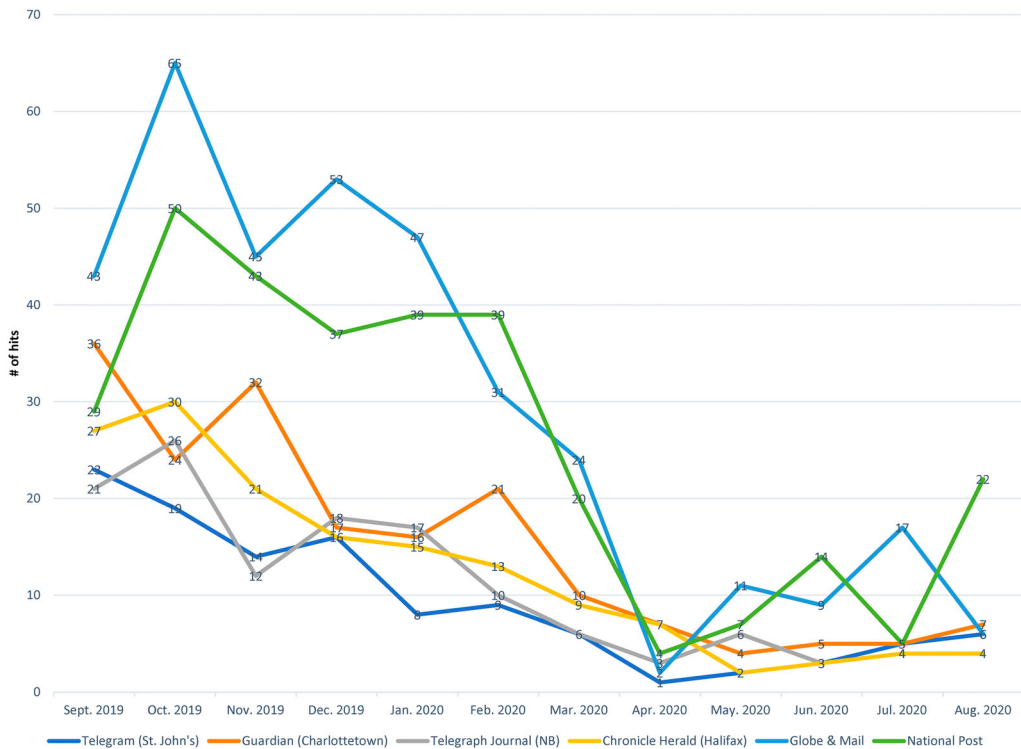
Figure 2. Climate change news cycle (monthly), September 2019–August 2020, by news outlet.

The Factiva database was used for the two national news outlets. However, the provincial outlets were not available through Factiva. Instead, identical search strategies were used with the databases Nexis Uni (formerly Lexis Nexis) for the *Telegraph-Journal* and Eureka for the other three provincial outlets. Given the use of multiple databases, a qualification of our analysis is there may be subtle differences in the databases that result in minor inconsistencies across the different news outlets.

Across all news outlets, the first stories that connect COVID-19 and climate change appeared in February 2020. For our second research question on how climate change media framing has shifted in response to the COVID-19 critical event, we assembled an archive of all hits from the six newspapers (339 articles in total for the period from February to August 2020). We imported this data set to NVIVO software for qualitative analysis. We searched this data set for the terms "coronavirus" OR "COVID," which produced a subset of 109 articles that forms the basis for this analysis. The subset of 109 articles that connect COVID-19 and climate change represents 32% of all climate change-related articles published in our target news outlets during this period. However, this varies by news outlet from a low of 24% of all climate change articles in the *National Post* to a high of 48% of all climate change articles in the *Guardian*. This set of 109 articles includes those that take the intersection of COVID-19 and climate change as a central concern, as well as those that mention this in passing. This set includes news articles and several pieces published in the Business sections of the different news outlets. It also includes op-ed material, such as editorials, letters to the editor, and columns by authors affiliated with academia and research institutes, think tanks, business sector organizations, and environmental and other non-governmental organizations (NGOs). As such, this set of 109 articles reflects the breadth of types of coverage across the different news outlets, as well as framing by a diversity of actors. However, as a qualification, a comparative analysis of climate change framing in the non-COVID articles is outside the scope of the present analysis.

Once relevant articles were identified, they were manually coded in NVIVO by the Stoddart. Given the emergent nature of the COVID-19 crisis, we used an open-ended and inductive approach to thematic coding that is common practice in qualitative analysis (Hesse-Biber, 2017; Mason, 2002). Articles were coded with multiple frames as relevant (e.g. coding categories were not mutually exclusive). Once all articles were coded, the coding scheme was reviewed and restructured as necessary to combine redundant or overly similar thematic categories. This follows Ryan and Bernard's (2003) "cutting and sorting" approach to balancing the generation of new coding categories and consolidating or merging categories. As all articles were coded by a single coder (Stoddart), the coding categories are interpreted in the same way across all our material. As such, intercoder reliability is not an issue in the sense of coding across news outlets or periods of time. To help ensure face validity, the preliminary results were shared, discussed, and further refined in conversation with the research team, which has substantial prior research expertise in the areas of climate change and communication (e.g. Kukkonen & Ylä-Anttila, 2020; Stoddart & Tindall, 2015; Stoddart et al., 2016; Stoddart et al., 2017a; Ylä-Anttila et al., 2018b; Vesa et al., 2020). A full list of coding categories is included in Appendix 1.

We use discourse network analysis (DNA) to further analyze the connections between news frames and media outlets, which involves using tools from social network analysis to visualize relationships between news frames and media outlets (Leifeld, 2017, 2020). This is a two-mode network, where we are interested in the relationship between two distinct types of data. To generate the discourse network analysis, we use the matrix query function in NVIVO to identify coding co-occurrences between news frames (as one mode of data) and media outlets (as the second mode of data). We then import this matrix to Visone social network analysis software to visualize it as a network diagram and examine network characteristics such as the relative centrality of different media frames (i.e. how well-connected various frames are across multiple news outlets).

Our analysis is inductive and exploratory. As a form of rapid response research that aims to understand a still-unfolding situation, there are limitations and qualifications to bear in mind. Most notably, the COVID-19 pandemic continues to unfold, and our analysis possibly represents a narrow time slice in its lifespan. Also, the pandemic has shown a great deal of regional variation in Canada, including significant hot spots in Quebec, Ontario, and Alberta, with less obvious impacts in Atlantic Canada. Furthermore, with few exceptions, Canada has not seen the widespread protest against public health measures that have emerged in some other countries.

As an additional qualification, our frame analysis is limited to articles from national and regional newspapers and does not include data on news audience interpretations. As such, we must be cautious about the inferences we can draw about the effects of framing on audience beliefs or interpretations of media frames dealing with COVID-19 and climate change. As such, further research that examines these media frames in relation to public perceptions would be valuable.

Results

Climate Change News Cycle, September 2019–August 2020

To provide a sense of the baseline of climate coverage in our news outlets, we first look at the keywords "climate change" or "global warming" in the article leads (title or lead paragraph) from the period 2015 to 2020. Figure 1 shows the number of hits for articles with climate change in the lead for the national news outlets the *Globe and Mail* and *National Post*. For comparison, it also tracks the number of news hits in the four Atlantic Canada outlets: *The Chronicle Herald* (Halifax, NS); *The Guardian* (Charlottetown, PEI); *The Telegram* (St. John's, NL); and *The Telegraph Journal* (St. John, NB). As Figure 1 illustrates, there was a peak in national news coverage in 2015, which was the year of the Paris Conference of the Parties meetings (COP 21). The amount of national news coverage declined through 2016–2018 and then spiked again in 2019, which is the year that the Fridays for the Future movement emerged. We see another substantial decline in national

news coverage in 2020, the year of the COVID-19 pandemic, though coverage does not decline as much as it did in 2017–2018. This annual news cycle trend is consistent with our prior research on Canadian national news media that shows that spikes in media coverage tend to reflect significant national and international political events, such as the adoption of the Kyoto Protocol (1997), Canada's ratification of the Kyoto Protocol (2006), the launch of the 4th IPCC assessment report (2007), and the Copenhagen COP-15 meetings (2009) (Stoddart et al., 2016).

By contrast, provincial media coverage does not show a distinct spike in 2015, which suggests that the Paris COP meetings and agreements were not as important drivers of media coverage at the sub-national level. However, provincial media coverage does spike in 2019 in parallel to trends in national news coverage. Similarly, provincial media coverage declines substantially in 2020 in relation to 2019, to a level similar to pre-2019 levels.

Next, we take a closer look at the same keywords on a monthly basis over one year beginning in September 2019 (see Figure 2). This period starts six months before the first articles that link climate change and COVID-19 in our data set. We can draw several observations about the climate change news cycle during this period. Media attention was relatively high in September and October 2019. This was partly driven by coverage of Greta Thunberg and Fridays for the Future, which is consistent with other protest cycle research that shows that peak periods of protest activity are drivers of media coverage for various social movements and issues (e.g. Oliver & Maney, 2000). Media coverage was already declining somewhat during Fall 2019 before the COVID-19 pandemic, a period that includes the lead-up to the last Canadian federal election. By contrast, climate change news coverage drops off very steeply through March and April 2020 in the early period of the COVID-19 pandemic. News attention to climate change recovers somewhat over summer 2020. It has not yet returned to its high pre-pandemic levels but rather resembles the ebb period following the 2015 Paris Agreement (recall Figure 1).

Based on our available data, we should be wary of ascribing the decline in coverage solely to COVID-19. It is possible that climate change coverage would have declined regardless of COVID-19 due to other media dynamics. However, the news cycle trends show that climate coverage dropped as media attention to COVID-19 ramped up. At the very least, these results suggest that COVID-19 coverage was a likely part of the explanation for waning media coverage for climate change. At the same time, these trends also likely reflect declines in coverage from a peak period that was driven by other national and global critical events like the intense mobilization of Fridays for the Future (Murphy, 2021; Stuart et al., 2020). As such, COVID-19 only partially explains the declining coverage for climate change after the peak period around September–October 2019, though it appears to be largely responsible for the sharply accelerated decline beginning in February 2020.

COVID-19 and climate change news frames

Our data show a decline in news media attention to climate change at both the national and provincial levels during the COVID-19 pandemic. However, we are also interested in how COVID-19 and climate change are discussed together in order to better understand how COVID-19 works as a critical event that impacts the media framing of climate change. The first occurrences of combined climate change and COVID-19 news coverage appear in February 2020, and as part of our analysis, we categorized them thematically. Table 2 shows the frequencies of the most prevalent frames that appear across all media sources from February to August 2020 (national and Atlantic Canadian news outlets).[2]

We can draw several observations from this analysis. Two main frames connect COVID-19 and climate change in different ways. The most prevalent is a "prognostic frame" (e.g. asserting a remedy for a problem) that COVID-19 requires a green recovery (Snow et al., 2007). Here, the pandemic is re-framed by news sources as an opportunity for climate action. A somewhat more radical version of this prognostic frame goes further and explicitly states that the fossil fuel sector must be

Table 2. COVID-19 frames in climate change news stories, February–August 2020.

Frame	# of coding references	# of articles
COVID-19 green recovery is opportunity for climate action	32	29
COVID-19 and climate change as parallel crises	23	20
COVID-19 response displaces climate attention & action	17	13
COVID-19 crisis amplifies disruption in fossil fuel sector	14	11
COVID-19 impacts = reducing global GHG levels	9	8
COVID-19 green recovery should exclude oil and gas sector	5	5
COVID-19 response demonstrates potential for rapid global action on climate change	5	4
COVID-19 economic recovery should not be tied to climate action	5	4
COVID-19 and climate change concern are both exaggerated	5	3
COVID-19 disrupting climate science research	4	4
COVID-19 threat more important than climate change (climate skepticism)	4	4
COVID-19 lifestyle changes have climate co-benefits	3	2
public support for COVID-19 green recovery is unproven	2	2
COVID-19 amplifying economy vs environment public polarization	2	1

Note: threshold of 2+ coding references; total $n = 109$ articles.

excluded from any green recovery plan. By contrast, the second most prevalent frame is a "diagnostic frame" (e.g. defining what the problem is) that COVID-19 and climate change should be interpreted as parallel crises with potentially similar causes – in terms of unsustainable human intervention in the natural world – and impacts (Snow et al., 2007). This frame also resonates with Crossley's (2020) analysis of social media communication that reveals a common "eco-anxiety" that connects the COVID-19 crises to the climate change crisis. The prevalence of both top frames shows that the COVID-19 crisis is indeed working as a critical event that is re-shaping media framing of climate change.

Beyond these two most common frames, the idea that the COVID-19 pandemic is displacing public and political attention from climate change is itself a frame in media coverage. Interestingly, this frame essentially points to the declining news cycle trends shown in Figure 2. There is also significant attention to the ways in which COVID-19 is amplifying the financial uncertainties and risks within the Canadian and global fossil fuel sector, which have already been weathering price declines and volatility since 2014 (Stoddart et al., 2020). In these stories, COVID-19 is seen as exacerbating uncertainties in the oil sector that were triggered by climate concerns and the potential that policy responses would curtail oil extraction and consumption (also see Carter, 2020). Relatedly, the emerging research on COVID-19 and energy transitions focuses on how the pandemic may work as a "landscape shock" with the potential to disrupt recent trends towards renewable energy consumption and decarbonization (e.g. Sovacool et al., 2020). In the Canadian context, where oil extraction remains a core part of the national political economy with a great deal of regional significance, we see the inverse view emerging: COVID-19 may work as a critical event that amplifies disruption in the oil sector and potentially accelerates the decline of fossil fuel economies.

Finally, there are a few recurring frames that can be considered skeptical frames. Climate skepticism is most pronounced in the U.S. media sphere, but it has also been present in Canadian climate news coverage, though to a lesser extent (Dunlap & McCright, 2015). Skeptical frames found in our analysis include that climate change and COVID-19 are both exaggerated threats, essentially the inverse of the parallel crises diagnostic frame. Other skeptical frames include that any economic recovery plan should *not* be tied to climate action, which is the inverse of the green recovery prognostic frame. There are also claims that there is little (or unproven) public support for a green recovery. Elsewhere, there are arguments that COVID-19 presents a *real* threat, in contrast to climate change, which is dismissed as insubstantial. The frames that resist attempts to connect climate change and COVID-19 are much less prevalent than the frames that make these connections. As such, we see that the framing connections between climate change and COVID-19 are mostly tied to a pro-climate action perspective.

COVID-19 frames linked to news outlets

The next part of the analysis connects the key COVID-19 and climate change frames to the news sources where they appear. Figure 3 uses discourse network analysis to visualize the relationship between frames and news sources.[3] The six news outlets (two national and four provincial) are represented by white triangular nodes. The media frames are represented by gray circular nodes. The size of each node reflects the degree of centrality, or how well-connected a node is to other nodes. The line thickness connecting the nodes reflects the frequency with which each frame appears in that news outlet.

This analysis provides a more nuanced look at how prevalent the COVID-19 frames are across different news outlets. Here, we see that the main prognostic frame that the green recovery is an opportunity for climate action is slightly more visible in national news outlets than in provincial outlets. By contrast, the diagnostic frame that COVID-19 and climate change are parallel crises is slightly more visible at the provincial level.

Other key frames appear more unevenly across the different news outlets. The focus on disruption to the fossil fuel sector due to COVID-19 and climate change is most prevalent in the *Globe and Mail*. Similarly, national news outlets give more attention to the notion that COVID-19 is displacing climate attention and action. Overall, however, there does not appear to be a significant national–provincial divide thematically, or a substantial divide among provincial news outlets. The main thematic divide among news outlets is rather the difference between the *National Post*, which provides more space for various skeptical frames, versus the other five national and provincial news outlets. This is consistent with our prior research on national news discourse in Canada, which also finds that the *National Post* provides more visibility for climate skepticism than the *Globe and Mail*, and more closely resembles the "false balance" model of climate communication associated with the U.S. media sphere (Stoddart & Tindall, 2015). Notably, even though the provincial flagship news outlets are based in provinces that include both climate leaders and laggards (Carter, 2020), provincial media framing does not show obvious differences that reflect these diverging political orientations towards climate action.
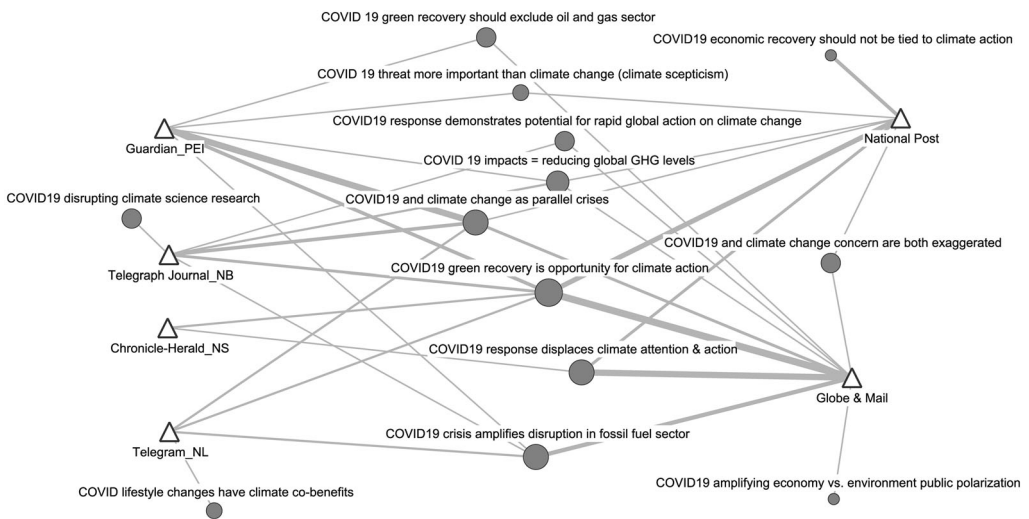

Figure 3. Two-mode network of COVID-19 frames by news outlet, February–August 2020.

Note: triangular nodes: news outlet; circular nodes: thematic category; node size: degree centrality; line thickness: frequency of coding co-occurrence; threshold: 2+ coding references.

Discussion and conclusion

Our first research question was whether the COVID-19 pandemic was a critical event in its impacts on the volume of media climate change coverage. Our analysis shows that the volume of climate change coverage was at a peak in September and October 2019, reflecting the attention gained by Swedish youth climate activist Greta Thunberg and the Fridays for the Future movements (Murphy, 2021; Stuart et al., 2020). This is consistent with prior research on climate change and media issue attention cycles, which has demonstrated that climate media coverage tends to respond predominantly to national and international political events, more than to ecological changes (Broadbent et al., 2016; Eide & Kunelius, 2012; Parks, 2020; Schmidt et al., 2013; Stoddart et al., 2016; Ylä-Anttila et al., 2018a). Media attention for climate change was in gradual decline from this peak period before COVID-19. However, while COVID-19 took up an increasing amount of media space in the early months of 2020, climate change coverage declined to levels similar to the 2017–2018 ebb period between COP21 and the Paris Climate Agreement and the emergence of Fridays for the Future. We are mindful that our available data make it difficult to ascribe a clear causal relationship between increasing COVID-19 coverage and declining climate change coverage. Nevertheless, our results suggest that while COVID-19 has taken some media attention away from climate change, it is only a partial explanation for changes in coverage.

To fully understand periods of crisis, it is essential to examine how causes and proposed solutions are narrated (Walby, 2015). As such, our second research question was: Has media framing of climate change shifted in response to this critical event? In news stories that connect COVID-19 and climate change, the main frames were that the response to COVID-19 presents an opportunity for climate action through a green recovery and that COVID-19 and climate change should be interpreted and treated as parallel crises that deserve a coordinated response. These dominant frames show that most of the framing that connects COVID-19 and climate change are aligned with pro-climate perspectives, while skeptical frames are largely reactive to more frequent arguments about the need for a green recovery and the interconnectedness of the two crises. The prevalence of these dominant frames is consistent with Pleyers' (2020) argument that a range of social movements are responding to the COVID-19 pandemic as an opportunity to articulate alternative futures in contrast to "return to normal" crisis narratives. Our third – and related – question was: are there notable differences between national and subnational media frames? Here, we do not see a substantial difference in framing between the national and subnational media spheres. Instead, we see differences between the *National Post*, the more right-leaning national legacy news outlet that gives greater space to skeptical news frames, and the other five news outlets used in our analysis.

Our results suggest that, at least in terms of media framing, crises that get linked with other crises (like climate change has been linked to COVID-19) can stay in the spotlight and maintain some degree of media coverage. Furthermore, media coverage of the debate over climate change policy responses has often positioned arguments about ecological wellbeing against questions of the economic costs of action (or inaction) (e.g. Stoddart & Tindall, 2015; Vesa et al., 2020). Other international comparative research has found the mainstreaming of ecological frames and the decline of economic arguments against climate action in media coverage (Ylä-Anttila et al., 2018b). However, instead of positioning ecological and economic frames as divergent alternatives, the green recovery frame works to bridge COVID-19 and climate change in ways that draw connections between ecological and economic dimensions of sustainability. Thus, we see how COVID-19 – as a critical event – may potentially help facilitate a transformation in how climate change is framed in the media. This demonstrates the theoretical value of linking the critical events and framing perspectives because it helps us understand how framing evolves over time in response to sudden and unpredictable events or crises.

Our analysis indicates that COVID-19 works as a critical event that reconfigures climate change communication and media framing. As a theoretical contribution, this demonstrates the utility of combining critical events and framing perspectives for a better understanding of how

environmental issue framing evolves over time. By attending to COVID-19 as a critical event, we see how it has disrupted climate news framing, creating both challenges in terms of reduced coverage, but also opportunities, such as generating space for advocates of climate action to make connections between economic and environmental dimensions of sustainability.

This analysis is still exploratory. Our results provide valuable early insight into how climate communication and media framing are being re-shaped by the still-unfolding COVID-19 public health crisis. This exploratory work provides an important analysis of the ways that issue framing can evolve in response to critical events, even while overall media visibility declines. As a qualification, any displacement of media attention by COVID-19 is likely not limited to climate change. As a global pandemic and critical event, COVID-19 took up a great deal of media space with the result that coverage for a range of other environmental and social issues probably also declined. At the same time, it may be the case that these two issues are conjoined in media framing because both COVID-19 and climate change are bound up with issues of science communication, trust in science, and the politicization of science (including anti-vax/anti-mask and climate skeptic discourse and movements, respectively). However, further research could undertake a comparative analysis to see how a variety of environmental and social issues were impacted in terms of media visibility and issue framing, including whether other issues were also reframed through a COVID-19 news angle. This would also help us better assess how the findings reported here are shaped by the broader context of news genre conventions and journalistic practices as news-workers make sense of COVID-19 as a critical event (e.g. see Callison, 2014).

Several further lines of inquiry are worth pursuing. Searching keywords in the headline and lead paragraphs is a pragmatic, if imperfect, tool that is useful for assessing trends in the volume of media coverage. More nuanced, but resource-intensive, assessments of media visibility for climate news stories could also draw on additional measures such as article word count or how prominently articles are placed (e.g. front page). Following Olausson and Berglez' (2014) overview of research challenges for media coverage of climate change, additional directions for further research on the intersections of COVID-19 and climate change include: (1) expanding the range of cross-national comparison of mainstream news framing, including attending to hardest-hit countries (e.g. Brazil, India, the United States) and countries that have been more successful at containing the virus (e.g. Iceland, Korea, New Zealand); (2) integrating comparisons of legacy media with climate communication through social media to better understand how the COVID-19 "infodemic" (Hua & Shaw, 2020; Pulido et al., 2020) is evolving through the interplay of both types of media in an increasingly hybrid media environment (Bentivegna & Artieri, 2020; Casero-Ripollés, 2020; Harmer & Southern, 2020; Taneja et al., 2018); and (3) extending the time period of analysis in order to better understand the interplay of the trajectories of COVID-19 and climate change news frames as they continue to evolve.

Notes

1. The analysis of level of media coverage presented in Figures 1 and 2 is based on hard codes (e.g., keyword searches). As such, coder reliability is not an issue (Krippendorff, 2018).
2. Using frequency counts of qualitative data — even for relatively small numbers — is a commonly applied and useful tool for frame analysis (for example, see: Dreher & Voyer, 2015; Hestres, 2018; Nisbet & Lewenstein, 2002). As the quantification of our data is based in inductive coding and qualitative data analysis, we do not undertake statistical analysis of these descriptive frequencies. Further, we are cautious about over-interpreting these small-number differences.
3. We acknowledge that much of the information visualized in this figure might also be represented in a table and that analyses of media outlets and themes has a long tradition in content analysis. However, discourse network analysis (DNA) is useful because it provides a high-level visual overview of multi-dimensional connections between two modes of data. DNA emphasizes relationality between cultural frames and social actors that may be less apparent when data are presented in either tabular or narrative form. Over the past several years, a growing number of media framing and policy network studies have adopted DNA as an approach. For

an overview see Leifeld (2017, 2020); for a prior application of DNA to climate change media coverage in this journal see Stoddart et al. 2017a.

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Appendix 1. Thematic coding categories.

- Adapting climate education to COVID context
- COVID 19 green recovery should exclude oil and gas sector
- COVID 19 impacts = reducing global GHG levels
- COVID 19 threat more important than climate change (climate skepticism)
- COVID lifestyle changes have climate co-benefits
- COVID19 amplifying economy vs environment public polarization
- COVID19 and climate change as parallel crises
- COVID19 and climate change concern are both exaggerated
- COVID19 changes nature of enviro advocacy & protest
- COVID19 crisis amplifies disruption in fossil fuel sector
- COVID19 disrupting climate science research
- COVID19 economic recovery should not be tied to climate action
- COVID19 green recovery is opportunity for climate action
- COVID19 response demonstrates potential for rapid global action on climate change
- COVID19 response displaces climate attention and action
- Post-COVID will return to normal for oil sector and climate politics
- Public support for green recovery is unproven