

# **Multi-Dimensional News Diversity during Social Unrest: U.S. vs. Canadian Coverage of COVID-19 Protests**

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## **Abstract**

**Background:** News content diversity is crucial for democracies, offering varied journalistic perspectives. Yet defining and measuring this diversity is debated, often focusing on single dimensions.

**Analysis:** Our study uses a multi-dimensional approach, examining 12,907 news articles on pandemic-induced protests in Canada and the United States (2020–2022) through computer-assisted content and multivariate analysis.

**Conclusions and implications:** We found more balanced topic coverage in Canadian outlets and a broader emotional range in U.S. articles. Corporate media tends to show polarized sentiments, highlighting differences between independent and conglomerated media. These findings emphasize a comprehensive approach to news content diversity and challenge simplistic country-based media system categorizations.

**Keywords:** news content diversity, comparative research, COVID-19, protest, computer-assisted content analysis

## **Introduction**

A diversified marketplace of ideas is indispensable to functional democracies (Ferree et al., 2002). In such a marketplace, news reports play a vital role by producing and disseminating information, setting the agenda for public discussions, holding other entities accountable, and beyond. This makes the role of news content particularly critical: the degree to which it offers varied opinions, sources, and perspectives on pressing issues affects social engagement with democratic processes (Denis, 1992; Sjøvaag, 2016). From Brexit to the 2016 U.S. presidential election, the consumption of homogenous news content has contributed to polarization in democratic societies. These effects are amplified during times of societal crises such as the COVID-19 pandemic (Baden & Springer, 2014; Elcheroth & Drury, 2020; Wallaschek et al., 2020). This necessitates understanding how news content diversity varies across organizational and societal contexts. However, traditional studies of content diversity mostly adopt a unidimensional view, focusing primarily on one aspect such as topic diversity (Joris et al., 2020). This may obscure other important dimensions, such as emotion diversity, leading to mixed findings especially when a media outlet is diverse in one aspect but not in others. Moreover, this narrow approach limits our comprehension of the breadth of news provided by different media outlets and the factors that influence this variation. Structural factors such as media ownership concentration and media policies may influence different aspects of news diversity in distinct ways that a one-dimensional approach cannot fully capture.

To address this issue and explain how news content diversity is contingent on organizational and national contexts, our study explores the multi-dimensional nature of news content diversity, examining topic, tone, and emotion during times of societal unrest. Apart from the most studied

topic diversity, we also emphasize the importance of tone and emotion diversity in news reports, as many argue that journalists' use of tone and emotions has become more diverse and pronounced (Gluck, 2021; Kotisova, 2019; Kristensen, 2021). Media performances, such as the strategic use of tone and emotional content, can reaffirm core values (Luengo & Ihlebæk, 2019), form communities (Wahl-Jorgensen & Pantti, 2021), and influence public opinion (Brader et al., 2011). Taking a comparative lens, our analysis focused on news articles from Canadian and U.S. news outlets that covered protests against the COVID-19 pandemic responses. We utilized Structural Topic Modeling (STM) and dictionary-based sentiment analysis to gauge diversity in topic, tone, and emotion. Then, we used a multivariate analysis of covariance (MANCOVA) to discern the impacts of media ownership and country of origin on news content diversity.

Our findings highlight the intricacies of news content diversity in news reporting. We observed that both the country of origin and media ownership exert nuanced influences on content diversity. For topic diversity, Canadian news media presented a more balanced range of topics, especially covering protesters' experiences, police measures, public life disruptions, and healthcare workers' experiences. Independent Canadian media showing greater diversity than conglomerated ones, unlike in the United States, where diversity levels were more similar across ownership types. Regarding tone diversity, corporate media exhibited less diversity and demonstrated a propensity for polarized sentiments, particularly in Canada, where independent media had a higher tone diversity. For emotion diversity, U.S. reports showed a richer emotional spectrum, particularly in regard to negative emotions, with media ownership exerting a subtle influence. Both countries' media expressed similar positive emotions.

By adopting this multi-dimensional approach, our study offers a deeper understanding of news content diversity, enabling researchers to uncover nuanced differences in similar reports. This work underscores the need to look beyond country classifications in news diversity, highlighting the significance of an intricate analysis that explores the dynamics of media ecosystems. Moreover, our novel methodology paves the way for future research endeavors, promoting a robust assessment of news content diversity across various dimensions. Our approach also provides an opportunity for future studies to critically assess the normative assumption that news diversity supports democracy, particularly as different dimensions may have complex and conflicting effects on civil discourse. This is especially relevant in the post-truth age, amid ongoing debates over whether and how alternative information and radical viewpoints should be included in the name of diversity.

## **Theoretical background**

Understanding news content diversity: A multi-dimensional approach

The robustness of democracy depends on the pluralism of perspectives, and media plays a critical role in this context. As Keane (1991) suggests, different interests compete for space in the central sphere of public debate, primarily through the media, aiming to convert ideas into political actions. Therefore, ensuring news diversity is regarded as essential in public discourse to foster robust debates and discussions, for “pluralism is an overall democratic aim, whereas diversity is how that aim is achieved” (Sjøvaag, 2016, p. 171). News diversity refers to the variety of media messages produced and disseminated through various structural and communicative dimensions of the media system, including ownership, production,

representation, and reception (Hendrickx et al., 2020). Drawing upon McQuail's (1992) conceptualization, news media are expected to show society's diversity of viewpoints and interests by (1) reflecting existing differences in society, (2) giving equal access to different points of view, or (3) offering a wide range of choice for individuals. Furthering this conceptualization, Sjøvaag (2016) offers a typology that encompasses structural, organizational, production, output, and reception diversity. Our study anchors its emphasis on the 'output diversity' of news, which pertains to the content delivered to audiences.

News content is critical in shaping public discourse and mirroring reality, ensuring a wide spectrum of information and pluralist viewpoints (Karppinen, 2013; Van Cuilenburg, 2007). At the concept level, it has been widely acknowledged that news content should be diverse, represent different views, and offer a wide range of choices (Denis, 1992). Yet the operationalization of news content diversity in research is still evolving. Most studies choose to focus on one aspect of news content diversity, such as news topics, story tone, or sentiment (Joris et al., 2020). Topic diversity, the most studied dimension, refers to the richness of issues covered in news content. Ideally, news coverage should be comprehensive, representing noteworthy topics in the marketplace of ideas (Ferree et al., 2002) while emphasizing the most pressing issue (Magin et al., 2022). To gauge the effectiveness of news in offering such topic diversity, one method is to analyze its position within the journalistic sphere by examining if a media outlet sufficiently covers issues spotlighted by others.

Tone diversity refers to the variation of negative, neutral, and positive sentiments and attitudes conveyed through news coverage (Fan et al., 2023). The study of tone diversity helps reveal the

news bias on particular news topics (e.g., pro-government reports, Fan et al., 2023) and news types (e.g., political news, Lengauer et al., 2012). A systematic examination of the tone diversity in media outlets also helps determine their position in the journalistic field (de Vries et al., 2022) and discover if these sources exhibit more or less diversity in the attitudes expressed compared to others (Möller et al., 2018).

Apart from topic and tone diversity, there is a growing interest in emotion diversity in journalism (Orgeret, 2020; Wahl-Jorgensen & Pantti, 2021), which investigates how news mobilizes various emotional styles to craft experiences of involvement. While related to tone diversity, emotion diversity is distinctive in that it examines how news mobilizes various discrete emotions (e.g., anger, joy, surprise) when covering a certain topic (Peters, 2011). News content is often tailored to the target audience's emotional style as a means for attracting and maintaining audiences (Beckett & Deuze, 2016; Gluck, 2021). An example is morning news shows using a sensitive, jovial, and conversational style that resonates with the private sphere of the home during morning routines to attract audiences. Adopting diverse emotional styles in news coverage can attract and engage disparate audiences, thus broadening the scope and impact of journalism (Peters, 2011).

Although news content diversity encompasses multiple dimensions, only a handful of studies have attempted to integrate them. In studies that consider more than one dimension, the authors found that different dimensions of content diversity are not consistent and may even exhibit a high-low variance at times. In a longitudinal investigation of news content diversity in Europe, de Vries et al. (2022) found that topic diversity does not predict sentiment diversity, which

means the potential always exists that they may conflict with each other. In a study examining the effects of various recommender systems on content diversity, Möller et al.(2018) found that topic diversity fluctuates more than sentiment diversity under the influence of recommendation algorithms. The lack of comprehensive consideration makes it hard to answer a critical question: what types of media provide more diverse news content and what causes these differences? Our study will take a multi-dimensional approach by looking at three aspects of news content diversity: topic, tone, and emotion, and investigate how they are shaped by external factors.

What shapes news content diversity?

*Organizational factor: Media ownership concentration*

A rich and pluralist ecosystem of news production allows different media outlets to generate diverse news stories and engage in public agenda-setting of important social issues, thus expanding the market of ideas for citizens to remain informed. In recent decades, however, economic pressure has forced news outlets to concentrate in the hands of a few owners (de Vries et al., 2022) who acquired media corporations due to economic and political interests (Picard, 2014). This has resulted in extensive media consolidation and the emergence of transnational media conglomerates (Baum & Zhukov, 2019), leading to a reduction in the number of media corporations while increasing their overall power in deciding media content. A growing body of scholarship investigates whether media conglomerates lead to news overlap and a reduction in news content diversity. Specifically, researchers have debated whether large media corporations exhibit lower levels of news content diversity compared with independent media. Existing literature nevertheless remains divided and shows mixed results about the relationship between media ownership types, media consolidation, and news content diversity.

Mainstream scholarship has frequently identified negative links between media ownership consolidation and news content diversity, raising concerns about its implications on democracy (e.g., Baum & Zhukov, 2019; Champion, 2015). Having observed increased content recycling across corporate news outlets, Hendrickx and Ranaivoson (2021) call for attention to newsrooms' share of resources and news content and small newspapers' dependence on ready-to-publish content made by the parent companies. Echoing Champion's (2015) study, they also discovered that media conglomerates showed lower levels of topic diversity. Van Aelst and colleagues (2017) argue that media ownership concentration in large corporations can cause narrow ideological debates regarding public issues and political communication. Along the same line, ownership consolidation can also result in the over-representation of particular opinions (Doyle, 2013), which can further contribute to the abuse of power (Champion, 2015).

However, there are studies finding no links and even positive links between media ownership consolidation and news content diversity. For example, Sjøvaag (2014) did not find media concentration and media type (newspaper and online news media) influence topic diversity. Garz, Ots, and Sjøvaag (2023) found that Swedish newspaper chains provided more political viewpoint diversity than single-owned independent papers, as monopolies offer incentives and means to produce various programs in competitive markets. Van der Wurff (2004) also underlines differentiation as a costly strategy, and suggests markets with more small suppliers would offer more standardized content, which reduces external diversity. The cross-nation comparative analysis of de Vries et al. (2022) further found higher degrees of topic diversity in corporate media. Given the mixed findings, the relationship between media ownership and news

content diversity continues to be debated, underscoring the need for continued research and nuanced understanding.

*National factor: media (eco)system*

Apart from organizational factors, many studies also take national factors into consideration to explore how different media systems shape news content diversity. According to Hallin and Mancini (2004), media systems are deeply influenced by the wider political, cultural, and structural context, and the development of media systems further impacts media content.

Scholars have examined how national-level differences shape the scope of media coverage and the capacity to frame, critique, or prioritize certain perspectives (Benson, 2010; Papacharissi & De Fatima Oliveira, 2008). For instance, comparative studies (e.g., Humprecht & Esser, 2018) have shown that nations with strong public media systems tend to exhibit greater news content diversity than those dominated by commercial-driven media outlets. This is because private media are often guided by profit imperatives and audience maximization (Dunaway, 2008), while public service media are more likely to emphasize professional norms and coverage of socially significant topics (Brüggemann et al. 2014).

Our study examines the cases of the United States and Canada, which have been perceived as highly similar, and in the few comparative studies, significant differences in news diversity between the two countries are rarely found. Both media systems fit in the Liberal Model (Hallin & Mancini, 2004), which features prosperous commercial media and little state involvement. Most studies comparing within the Liberal Model focused on the United Kingdom and the United States for the salient differences in their media systems (e.g., Neff, 2020), while Canada

is usually regarded as a unique case for being a ‘small’ country proximate to a much larger country (the United States) with the same dominant language (Hallin & Mancini, 2004). This pairing, however, offers an opportunity to uncover important intra-categorization differences that might otherwise be overlooked. For example, some studies on news diversity find Canada and the United States to be overall similar (Abdelmutti & Hoffman-Goetz, 2009; Dowler, 2004; Harraway & Wong, 2021; Murdoch et al. 2019). However, these studies lack the multi-dimensional variations of news content diversity that this study explores. Our study serves to fill the gap by investigating how the differences between Canadian and United States media systems impact their news content diversity. Moreover, as most existing literature fails to address how organizational and national factors shape news content diversity across various aspects, our study contributes to the scholarship of news content diversity by considering its multidimensional nature.

### Exploring multi-dimensional variations in news content diversity during social crises

When societies face crises, journalistic diversity becomes even more vital, as it can enable democratic debate, prevent dangerous misjudgements, maintain social stability, and strengthen social solidarity (Baden & Springer, 2014; Elcheroth & Drury, 2020; Wallaschek et al., 2020). A narrow focus on mainstream interpretations can overshadow alternative views that offer different causes or solutions to the crisis (Leach et al. 2010). Without comprehensive and diverse coverage, the media might deliver incomplete or even misleading reports. In a study examining news reports on shooting, Lipschultz and Hilt (2011) discovered that selective and biased descriptions of the shooting scene caused confusion among the audience and further reinforced

stereotypes about racial minorities. Partisan coverage represents another form of selective reporting: Motta and Stecula (2023), for instance, found that politically biased news narratives during the COVID-19 pandemic contributed to vaccine hesitancy among the public.

While the importance of news content diversity during crises cannot be understated, practical challenges often arise in its implementation. Some of these challenges are technical in nature, such as the lack of access to diverse sources (Lipschultz & Hilt, 2011). Others are influenced by value, organizational, and social constraints. In a study on the reporting of the 2019 Chilean social uprising, researchers found that journalists struggled with balancing competing framings of social order, political repression, and social justice (Orchard & Fergnani, 2023). Similarly, in climate crisis reporting, journalists debate whether to include voices that reject the scientific consensus in order to enrich news topic coverage and if they do, whether these alternative interpretations are to be given the same weight as mainstream content. There are also discussions on whether news coverage itself intensifies conflicts within the crisis, and if so, what tone should be used to describe these conflicts (Jacobsson, 2021).

The question of how to maximize news content diversity during an emerging crisis was prominently observed in the coverage of COVID-19 related protests. In response to the COVID-19 pandemic, governments around the world implemented restrictive measures, including stay-at-home orders, business closures, lockdowns, border controls, mask mandates, and vaccine mandates. However, as the pandemic prolonged, the tensions between governments and citizens intensified, leading to widespread protests. From April 2020, both the United States and Canada witnessed a surge in coronavirus restriction protests (Carothers & Press, 2020; Denis, 2020).<sup>1</sup>

This trend peaked in early 2022 with a series of cross-border protests and blockades known as the ‘Freedom Convoy,’ and gradually wound down in late 2022 as most restrictions were eased in both countries (Public Health Agency of Canada, 2022; CDC, 2023). The protests in the United States and Canada provide a tangible basis for comparison, given their similar timelines, appeals, and extensive media coverage in both nations. During this period, a significant challenge for the media was how to cover multiple perspectives emanating from governments, public health agencies, citizens, and dissenters. How can media outlets achieve content diversity in terms of topics, tone, and emotions? How is news content diversity influenced by the news organization’s structure, market positioning, and the broader media ecosystem? Given the similar media systems in the United States and Canada (Hallin & Mancini, 2004), how do their news outlets differ in terms of content diversity? With these considerations in mind, we explored the following research questions:

RQ1: How is the *topic* diversity of COVID-19-protest-related news influenced by the country of origin, media type, and media ownership?

RQ2: How is the *tone* diversity of COVID-19-protest-related news influenced by the country of origin, media type, and media ownership?

RQ3: How is the *emotion* diversity of COVID-19-protest-related news influenced by the country of origin, media type, and media ownership?

## **Methods**

## Data collection

We collected 12,907 English language news articles<sup>2</sup> from Canadian and U.S. news agencies from the LexisNexis database using a keyword combination of ‘covid OR pandemic AND protest.’<sup>3</sup> LexisNexis is one of the largest news databases online that includes more than four billion searchable documents from the last 40 years from over 36,000 sources, including newspapers, newswires, and other news organizations. We collected articles released between January 2020 and December 2022, as the U.S. Centers for Disease Control and Prevention (CDC) activated its first response on January 5 (CDC, 2023), opening the door for discussions and protests against it. In late 2022, both Canada and the United States lifted their anti-COVID measures and eased most restrictions (Public Health Agency of Canada, 2022; CDC, 2023), leading to a decreasing number of protests related to the measures.

## Measurement

To answer the research questions on how organizational and national factors interact with news content diversity, we first adopted computational methods of structural topic modelling and dictionary-based text analysis to measure the topic, tone, and emotion diversity. We then conducted a multivariate analysis of covariance to identify how media ownership and country of origin influence the topic, tone, and emotion diversity in the news.

### *Independent variables*

*Country.* We used the country information provided by the LexisNexis database to determine the country of origin of a news report. We dummy coded the variable into 0 = *U.S.* ( $n = 15,186$ ) and

1 = *Canada* ( $n = 61,286$ ).

*Media format.* We used the media format information provided by LexisNexis to determine if the article was released by *newspapers* or *news websites*. To understand how country and media ownership may impact the content diversity for both media formats, we used media format as a control variable.

*Media ownership.* The ownership types of news outlets were determined by their degree of profit orientation and their parent companies' corporate structure. Based on a typology developed by Picard and van Weezel (2008) and Humprecht and Esser (2018b), the news outlets in our collected data were dummy-coded into 0 = *corporate media*, that is, newspapers or news websites that are owned by a media chain or by a stock exchange-listed company, with a profit-oriented goal ( $n = 65,000$ ), and 1 = *independent media*, that is, newspapers or news websites with alternative ownership form with a moderate profit orientation or serve as non-profit public media ( $n = 11,472$ ).

#### *Dependent variables*

*Topic diversity.* Topic diversity speaks to the degree to which specific news reporting covers diverse topics related to a certain issue (Walter & Ophir, 2019) (in this case, protests about COVID-19). In this study, we used structural topic modelling (STM) to estimate the extent to which a document engages with a group of topics, respectively. Structural topic modelling is a topic modelling algorithm to estimate topic and topic proportions in large-scale corpus with document-level covariates (Roberts et al., 2014). Scholars have used STM widely to examine and quantify topics and framings in newspapers (Barnes & Hicks, 2018; Kim, 2018), social

media (Bail et al., 2017; Li & Luo, 2020), and beyond (Nelson, 2020; Roberts et al., 2014). We chose STM instead of alternative topic modelling algorithms (e.g., latent Dirichlet allocation) so as to take covariates such as country into consideration (Roberts et al., 2014). It is noteworthy to point out that our unit of analysis is keyword-centred sentence extract (KCSE) document,<sup>4</sup> rather than individual article. We converted articles into KCSE documents to filter out irrelevant content and keep the analysis focused on reporting of protests. This procedure generated 76,472 documents for STM analysis. A 25-topic STM model was then selected and fit to the corpus. Then, we assessed quality of these topics and dropped five low-quality topics from further analysis.

Each document has a proportion score for each topic, ranging from 0.00 to 0.98. As each corpus is unique, there are no standard thresholds set for researchers to decide which probability will certify a document to contain an identified topic. Therefore, we calculated the average probability score for each topic across all documents and compared each document's score with the average to make sure each document was situated in the context of the entire corpus and was not taken out-of-context when deciding the cut-off probability for each topic. As such, for each topic, each document was dummy coded as 0 = no such topic if its probability score was lower than the average score and 1 = has the topic if the score was above or equal to the average. The summation of the dummy codes for the entire 21 topics represented the topic diversity score for a given document ( $M = 3.10$ ,  $SD = 1.68$ , range = 0–11).

*Tone diversity.* Tone diversity measures the sentimental expressions and attitudes conveyed through the news coverage, ranging from negative, neutral, to positive (Fan et al., 2023). To

quantify the positive/negative tone of each document, we integrated four widely used sentiment lexicons of English words: the National Research Council Canada Word-Sentiment Association Lexicon (hereafter, NRC) (Mohammad & Turney, 2013; Mohammad & Turney, 2010), the sentiment lexicon developed by Bing Liu and colleagues (Hu & Liu, 2004; Liu et al., 2005), the Synzhet lexicon (Jockers, 2017), and Finn Nielsen's lexicon of affective norms (Nielsen, 2011). These lexicons have been applied to quantify the polarity of attitudes in formal (Ghotbi et al., 2022; Lennox et al., 2020) and informal communication (Bose et al., 2020; Srivastava & Eachempati, 2023). Furthermore, this approach of combining multiple lexicons has been proven more accurate than relying on a single lexicon (Shapiro et al., 2022).

Similar to how we coded for topic diversity, we calculated the average sentiment score across all documents for each sentiment score produced by the four lexicons mentioned above and compared each document's score with the average to make sure each news document accounted for the entire corpus. Each document was dummy coded as 0 = no such sentiment if its sentiment score was lower than the average score and 1 = has the sentiment if the score was above or equal to the average. The summation of the dummy codes for the four sentiment scores represented the overall tone diversity for a given document ( $M = 2.06$ ,  $SD = 1.50$ , range = 0–4).

*Emotion diversity.* Emotion diversity measures the use of discrete emotions such as anger, joy, and surprise (Peters, 2011). To gauge emotion diversity, we used the NRC Lexicon, which is one of the most developed and widely used English lexicons with discrete emotions (Mohammad & Turney, 2013; Mohammad & Turney, 2010). NRC Lexicon specifies eight distinctive emotions: anger, anticipation, disgust, fear, joy, sadness, surprise, and trust. Researchers have used it to

quantify discrete emotions in newspaper headlines and articles (Gomaa & Elbasiony, 2020; Hossain et al., 2021), as well as in other media content (Kaur et al., 2021; Zuhanda et al., 2023). Similar to how we coded for the previous two types of diversity, we calculated the average score across all documents for each discrete emotion revealed by NRC and compared each document's score with the average to make sure each document accounted for the entire corpus. Each document was dummy coded as 0 = no such emotion if its score was lower than the average score and 1 = has the emotion if the score was above or equal to the average. The summation of the dummy codes for the eight emotions represented the overall emotion diversity for a given document ( $M = 3.54$ ,  $SD = 2.13$ , range = 0–8).

## Analysis

A multivariate analysis of covariance (MANCOVA) was conducted to identify how the country of origin, media ownership, and media type influenced the topic, tone, and emotion diversity. Due to the different metrics of the three dependent variables, we standardized them in the data analysis. Both main effects, as well as interactions, were examined to fully understand how different dimensions of news content diversity might be subject to different countries and media ownership while controlling for media types.

Because of the imbalanced cell sizes and the high risk of Type I error due to the overall large dataset, we conducted a power analysis (Faul et al., 2009) to determine the priori total sample size required to achieve a power 0.95 with a small effect size as normally observed in social scientific research (Cohen, 1988). Such a power analysis suggested a total sample size of 524. As such, a random sample of 131 data points out of each combination of the two independent

variables, i.e., country (United States vs. Canada) and media ownership (conglomerated vs. independent) was drawn, making the total sample size of 524.

## Results

A 2 (country) X 2 (media ownership) multivariate analysis of covariance (MANCOVA) with 5,000 bootstrapping was conducted controlling different types of news media (i.e., newspapers and news websites) on topic diversity, tone diversity, and emotion diversity of the news reports on protests. We first looked for main significant effects associated with the two main independent variables—country and media ownership—on topic, tone, and emotion diversity, and then focused on whether the two would interact together to impact the three dependent variables. This analysis revealed a significant main effect for the country (Wilks'  $\Lambda = .89$ ,  $F [3, 517] = 21.45$ ,  $p < .001$ , partial  $\eta^2 = .11$ ), a significant main effect for media ownership (Wilks'  $\Lambda = .99$ ,  $F [3, 517] = 2.62$ ,  $p = .05$ , partial  $\eta^2 = .02$ ), and a significant country X media ownership interaction (Wilks'  $\Lambda = .97$ ,  $F [3, 517] = 4.52$ ,  $p < .01$ , partial  $\eta^2 = .03$ ).

### Topic diversity

The univariate analysis for topic diversity revealed a significant main effect for the country, with Canadian news media reporting significantly more balance on diverse topics ( $M = .34$ ,  $SE = .06$ ) than their U.S. counterparts ( $[M = -.34$ ,  $SE = .06]$ ,  $F[1, 519] = 59.77$ ,  $p < .001$ , partial  $\eta^2 = .10$ ). As shown in Figure 1, Canadian news media covered more topics than their U.S. counterparts, particularly on the presence (Topic 3) and experience (Topic 5) of protesters, police preparedness and de-escalation measures (Topic 18), the interruption of public life (Topics 6 and 7), and the

experiences of healthcare workers and patients (Topic 14).

[Figure 1]

The main effect of media ownership, on the other hand, was not significant ( $F[1, 519] = 1.68, p = .20, \text{partial } \eta^2 = .00$ ). This indicates that media ownership, by itself, has little impact on media topic diversity. In our analysis, we did not observe a significant difference in topic diversity between corporate media and independent media. However, the result becomes different if taking the country into consideration. The topic diversity was similar for conglomerated ( $M = -.40, SE = .09$ ) and independent news media ( $M = -.28, SE = .09$ ) in the United States, whereas in Canada, independent news media ( $M = .56, SE = .12$ ) was significantly more diverse than conglomerated media ( $M = .11, SE = .10$ ) in terms of the topics covered (Figure 2).

[Figure 2]

As detailed in Figure 3, both conglomerated and independent U.S. news media similarly addressed all 21 topics. However, Canadian independent news outlets exhibited more balanced coverage on diverse topics compared with their conglomerated counterparts. Specifically, Canadian independent media more extensively covered topics related to the presence (Topic 3) and experience (Topic 5) of protesters, tensions between protesters and law enforcement (Topic 4), and police preparedness and de-escalation measures for protests (Topic 18) than their conglomerated peers.

[Figure 3]

### Tone diversity

Univariate analysis of tone diversity revealed a significant main effect for media ownership, with conglomerated news media displaying significantly less diverse tonal variation. This was reflected in a narrower range of positive sentiments (e.g., ‘equity,’ ‘recovery,’ ‘opportunity,’ ‘well,’ ‘excited,’ ‘friend’) and negative sentiments (e.g., ‘ignore,’ ‘warning,’ ‘unruly,’ ‘inefficient,’ ‘blame’) in their coverage of COVID-19 related protests ( $M = -.17, SE = .08$ ), compared with independent media ( $M = .17, SE = .08, F[1, 519] = 5.84, p < .05, \text{partial } \eta^2 = .01$ ). The main effect for the country, however, was not significant ( $F[1, 519] = 2.58, p = .11, \text{partial } \eta^2 = .01$ ). This analysis also revealed a marginally significant country X media ownership interaction ( $F[1, 519] = 3.52, p < .10, \text{partial } \eta^2 = .01$ ). In the United States, tone diversity was similar between conglomerated ( $M = -.15, SE = .10$ ) and independent news media ( $M = .00, SE = .09$ ). However, in Canada, independent news media ( $M = .33, SE = .13$ ) exhibited significantly greater tone diversity than conglomerated media ( $M = -.18, SE = .11$ ) in their coverage of protests, as reflected in the range of positive and negative sentiments used (Figure 4).

[Figure 4]

### Emotion diversity

The univariate analysis for tone diversity revealed a main effect for country with marginal

significance, with U.S. news media reports expressing significantly more emotions on protests ( $M = .08$ ,  $SE = .06$ ) than their Canada counterparts ( $M = -.08$ ,  $SE = .06$ ,  $F[1, 519] = 2.78$ ,  $p < .10$ , partial  $\eta^2 = .01$ ). The main effect of country, however, was not significant ( $F[1, 519] = .00$ ,  $p = .96$ , partial  $\eta^2 = .00$ ). Likewise, this analysis also found the country X media ownership interaction for emotion diversity was not significant ( $F[1, 519] = .00$ ,  $p = .96$ , partial  $\eta^2 = .00$ ).

As indicated in Figure 5, U.S. and Canadian news media seemed to diverge the most when it comes to expressing anger, such that Canadian news reports on COVID-19 related protests contained fewer expressions of anger as opposed to U.S. news reports. The same trend also holds for disgust, sadness, and surprise. In contrast, news media from both countries expressed similar degrees of positively valenced emotions when reporting COVID-19 related protests, including anticipation, joy, and trust.

[Figure 5]

## **Discussion**

As we transition further into the digital age, the news industry faces unprecedented challenges. The rise of conglomerates and a decrease in independent media, fuelled by economic pressures and global deregulations, have led to greater media consolidation (Baum & Zhukov, 2019; de Vries et al., 2022; Picard, 2014). This shift potentially undermines news content diversity. While there is an abundance of information available to modern audiences, it does not necessarily translate to a broader spectrum of viewpoints and perspectives on critical social issues (Denis, 1992; Karppinen, 2013; Sjøvaag, 2016). This paradox of plentiful yet potentially homogenized

information has seen audiences struggling with challenges like information overload, misinformation, and heightened political polarization (Boczkowski & de Santos, 2007). Amid these pressing societal challenges, and especially during times of crisis like the COVID-19 pandemic, the question of what type of media best delivers diverse content to their audiences becomes increasingly important.

We investigate this question through the lens of multi-dimensional news content diversity and how external organizational and national factors shape these dimensions. We utilized articles from Canadian and U.S. news outlets focusing on coverage of protests against the COVID-19 pandemic responses. Structural topic modelling (STM) and dictionary-based sentiment analysis were employed to measure the topic, tone, and emotion diversity, followed by MANCOVA to estimate influences of media ownership and country of origin. Our findings reveal the complexity of content diversity in news reporting, wherein both country and media ownership intricately influence the breadth and depth of coverage. Regarding the topic diversity, Canadian news outlets provided more balanced coverage of diverse topics than their U.S. counterparts. Interestingly, while U.S. media—both conglomerated and independent—displayed consistent coverage, Canadian independent outlets showcased greater topic diversity than their conglomerated peers. When it comes to the tone diversity, we found that corporate media exhibited less tone diversity, skewing toward polarized, either positive or negative, sentiments. While the country did not play a significant role on its own, a marginally significant interaction effect existed. The U.S. conglomerated and independent media showed consistent tone diversity, while in Canada, independent news outlets demonstrated a richer variety of tones compared with conglomerated ones. Lastly, for emotion diversity, our finding shows that the U.S. news media

manifested a broader range of emotions in their reports than Canadian sources. Media ownership, in this dimension, appeared to exert no significant influence.

Prior research has primarily grounded its conclusions on a singular dimension of news content diversity (Joris et al., 2020), which may not capture the intricate nature of content diversity (Voakes et al., 1996). Our study provides a more comprehensive understanding, revealing nuanced differences regarding different dimensions of news content diversity. With this approach, we revealed that two countries that share great similarities in their media systems, such as the United States and Canada, can exhibit noteworthy disparities in their news content. Our findings indicate that Canadian outlets, particularly independent ones, exhibited greater topic and tone diversity than their U.S. and conglomerated counterparts, aligning with longstanding scholarship suggesting that national environments with strong public service media can foster greater diversity (Humprecht & Esser, 2018a). However, this influence appeared to have little impact on emotion diversity. This insight not only challenges the presupposed homogeneity within the Liberal Model but also foregrounds the need for a more granular analysis that goes beyond mere country classifications and breadth of topics as a measure of news content diversity. Furthermore, our innovative mixed-methods measurement technique facilitates a robust assessment of multi-dimensional news content diversity concerning its topic, tone, and emotion, enabling future research to investigate the nature of news content and the intricate interplay of factors shaping it.

As with all research endeavours, this study has its limitations. First, our investigation focused predominantly on news content. In the digital age, how this content is delivered and consumed

by the audience becomes equally vital. Issues such as algorithmic curation, selective exposure, and the rise of echo chambers are of growing concern. Regarding the recipients of diverse news, scholars have highlighted the potential drawbacks of too much diversity. Exposure to a broad array of topics, tones, and emotions, especially when they conflict, could foster societal divisions (Helberger, 2019). The influence of digital contexts and audience behaviours on news content diversity and its wider effects require further exploration. Existing research has analyzed how audiences are affected by single dimensions of content diversity, such as exposure to different journalistic framings and topics (Baum, 2013), tones and sentiments (Damstra, 2019), and emotional expressions (Zillmann et al., 1999), and how these elements shape audience perceptions. Future research could explore how different dimensions of news diversity interact, which is a more realistic scenario, and how intricate patterns, such as news with a low level of topic diversity combined with a high level of tone diversity, could influence audience perceptions of news events. Second, our analysis primarily relied on computational and quantitative methods. While these techniques are effective, they may not fully represent the nuances in journalistic narratives and styles and capture their effect on news content diversity. Employing qualitative methods in future studies could provide a deeper understanding of the intricate aspects of news content diversity. Lastly, although our study identifies variances in news content diversity and links them to media ownership and the overarching media ecosystem, the underlying mechanisms need to be explored. For instance, future research could examine how the media system contributes to overall news diversity in a given country, and whether its impact varies across different dimensions of content diversity. Our findings, as an example, showed that Canadian news media were more diverse in terms of topic and tone diversity but less diverse than their U.S. counterparts in emotion diversity—an outcome that warrants further

investigation. We encourage subsequent research to investigate how various sociopolitical landscapes affect multidimensional news content diversity, seeking to pinpoint the causal factors.

Finally, while our study adopts the normative position that news content diversity benefits democracy, we acknowledge that this assumption warrants critical reflection. In the post-truth age, journalism is increasingly challenged for excluding fringe viewpoints, information that contradicts established evidence, or even hate speech and disinformation released by government officials, under accusations of bias. This raises difficult questions about whether such content should be included in the name of diversity and, if so, how it should be reported and to what extent it constitutes fair representation. On some occasions, such inclusivity or diversity can be unwanted and even detrimental to the societal good (Hirschfeld, 2022; Imundo & Rapp, 2022). How might different dimensions of content diversity in topic, tone, and emotion, and their combinations, influence democracy? As the boundaries between truth and opinion become increasingly contested, future studies should explore how these dimensions of content diversity interact with epistemic standards and the realization of democratic goals.

## **Notes**

<sup>1</sup> While the intensity of COVID-19 restriction protests differed, both the United States and Canada experienced significant public demonstrations over government mandates from 2020 to 2022. These protests shared common grievances around personal freedom and government overreach and were linked to broader political discontent. In many instances, the protests in the United States and Canada appeared to influence and inspire each other, with tactics and rhetoric sometimes crossing the border and resonating with similar groups in the other country (Williams

& Paperny, 2022). Despite differences in scale and response, the overall similarities in time range and themes make the two countries analytically comparable. This study focuses on how news media in each context reported on these protests to assess content diversity around a shared issue.

<sup>2</sup> English language content constitutes the majority of our dataset. Additionally, we excluded non-English content to facilitate comparison between Canada and the United States.

<sup>3</sup> The keyword combination was finalized by systematically testing different variations and comparing the search results. The chosen combination provides search results with adequate numbers for each category while being sufficiently specific for focused analysis.

<sup>4</sup> A KCSE document has a central sentence containing the keyword ‘protest.’ This sentence is flanked by two sentences preceding it and two sentences following it within the same paragraph.

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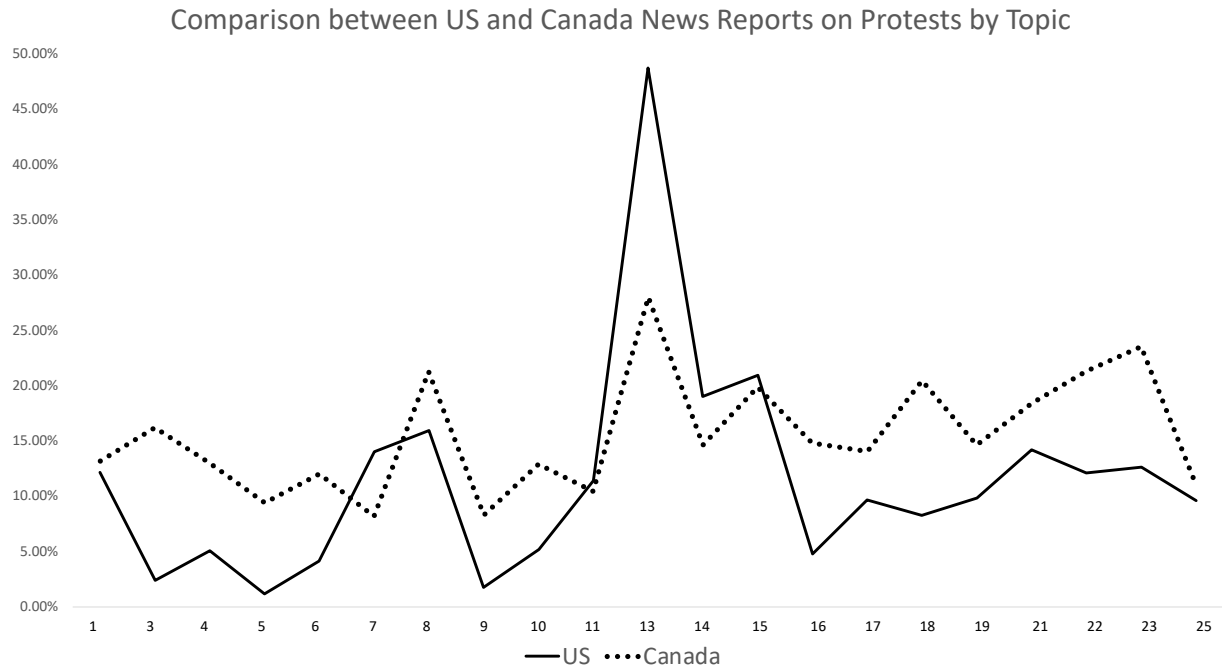
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**Figure 1**

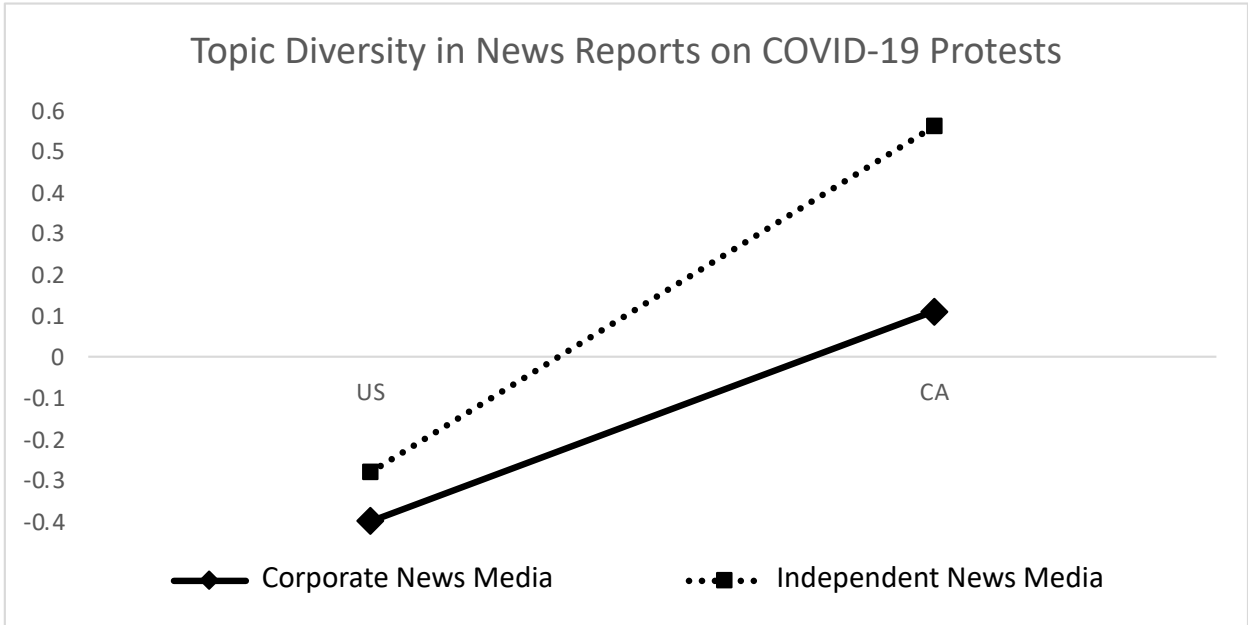
*The U.S. versus Canada: News Reports on COVID-19 Protests by Topics*



Note: The percentage (rather than the sheet count) of each topic in the whole documents of the U.S. and Canada was shown to account for the imbalanced number of total documents in the U.S. (n = 15,186) vs. Canada (n = 61,286)

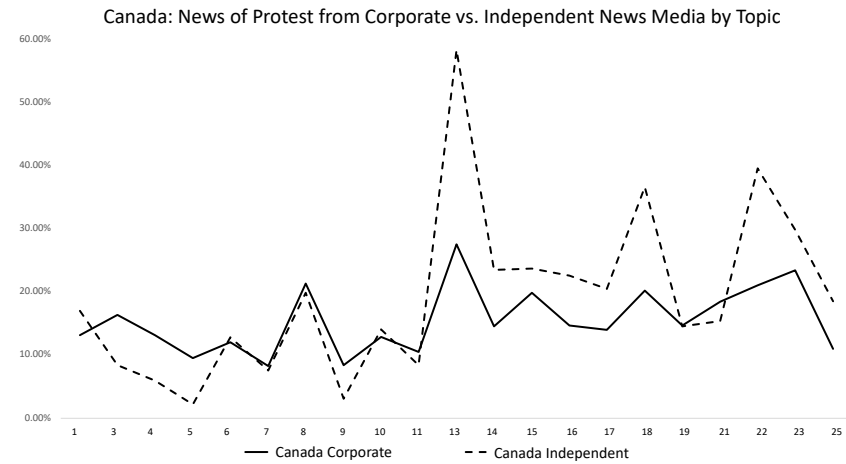
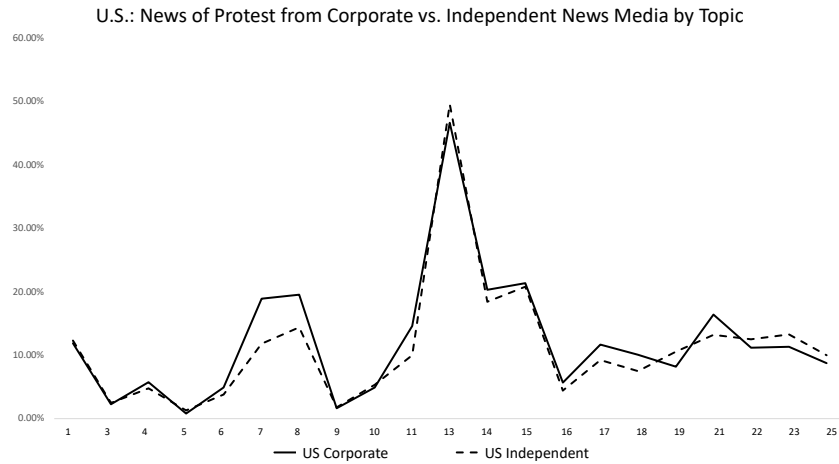
**Figure 2**

*Topic Diversity in News Reports on COVID-19 Protests: Country X Media Ownership Interaction*



**Figure 3**

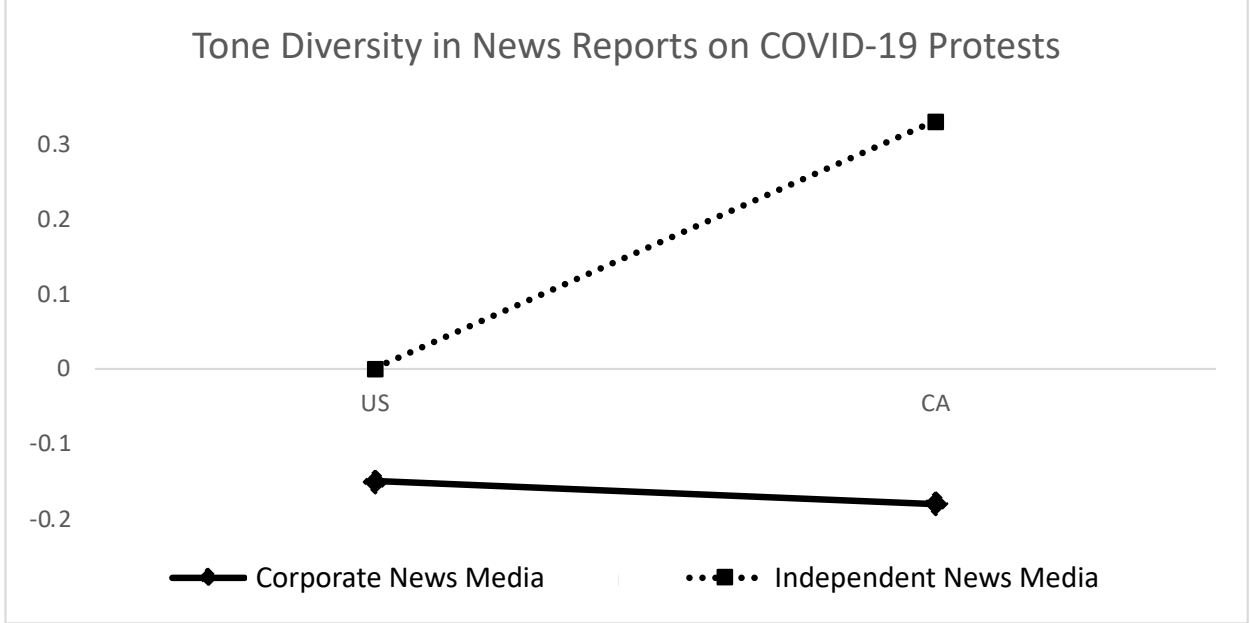
*The U.S. versus Canada: News Reports of Corporate News Media and Independent News Media on COVID-19 Protests by Topics*



Note: The percentage (rather than the sheet count) of each topic in the whole documents of the U.S. and Canada was shown to account for the imbalanced number of total documents in the U.S. (n = 4,689 for corporate media, n = 10,497 for independent media) vs. Canada (n = 60,311 for corporate media, n = 975 for independent media).

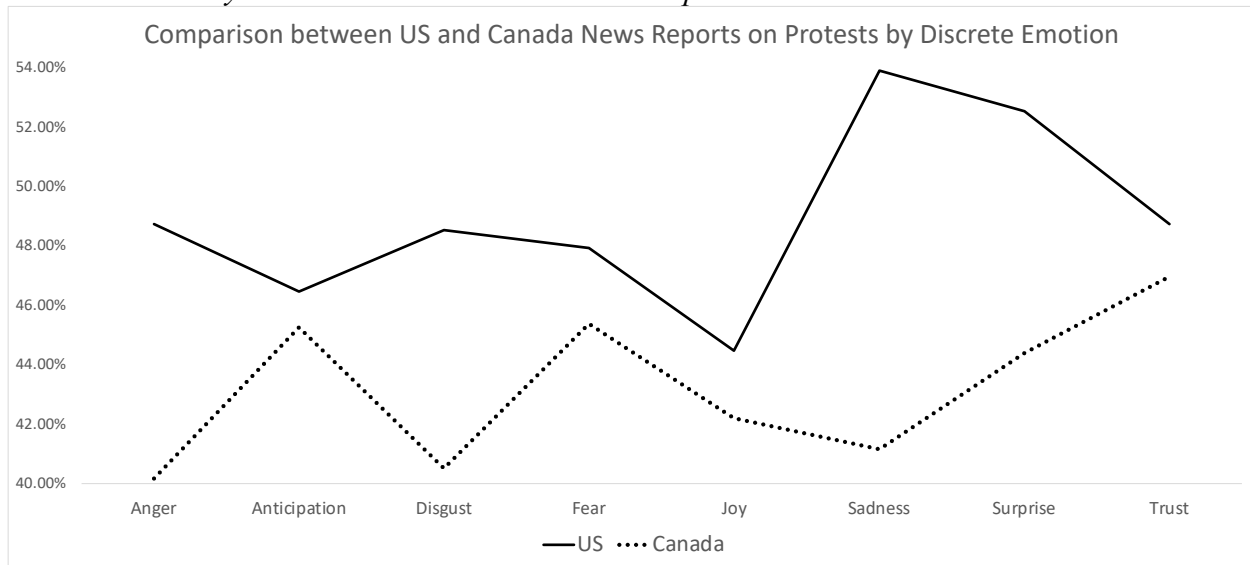
**Figure 4**

*Tone Diversity in News Reports on COVID-19 Protests: Country X Media Ownership Interaction*



**Figure 5**

*Emotion Diversity between US and Canada News Reports on COVID-19 Related Protests*



Note: The percentage (rather than the sheet count) of each emotion in the whole documents of the U.S. and Canada was shown to account for the imbalanced number of total documents in the U.S. (N = 15,186) vs. Canada (N = 61,286)