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The Stability of Cable and Broadcast News Intermedia Agenda Setting Across the COVID-19 Issue Attention Cycle

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ABSTRACT

In today's fragmented media environment, it is unclear whether the correspondence between media agendas that characterizes intermedia agenda setting persists. Through a combination of manual and computerized content analysis of 486,068 paragraphs of COVID-19 coverage across 4,589 cable and broadcast news transcripts, we analyze second and third-level attribute agenda setting, both in terms of central themes and aspects. Through the lens of the issue attention cycle, we assess whether relationships among media agendas change over time. The results show that even in a fragmented media environment, there is considerable evidence of intermedia agenda setting. The attribute agendas were largely similar across outlets despite the similarity slightly decreasing over time. The findings suggest that there was only modest evidence for the prominent perception of fragmented coverage for cable and broadcast news networks' attribute agendas concerning the COVID-19 pandemic.

KEYWORDS

intermedia agenda setting;
issue attention cycle;
COVID-19; cable and
broadcast news

Introduction

Agenda setting proposes that the more prominently issues are mentioned in the media, the more salient they will be in the minds of the public (McCombs & Shaw, 1972). The effect has received considerable support (Luo et al., 2019; Wanta & Ghanem, 2007). Yet questions have arisen about whether agenda setting operates in a fragmented media environment (Chaffee & Metzger, 2001; Shaw & Hamm, 1997). If outlets transmit varying agendas and public attention fragments, the public's agenda can subsequently fragment. There is undoubtedly disagreement here. Some scholars question the claims about the demise of agenda setting (M. McCombs & Valenzuela, 2021), with empirical evidence on the stability of agenda setting over time (Edy & Meirick, 2019; Tan & Weaver, 2013). Further, even if agenda setting weakens at the aggregate level, scholars have proposed that it will continue to hold, albeit at the individual level. Instead of comparing aggregated media and public agendas, one must compare the issues covered by specific outlets with the priorities of individuals who use them (M. McCombs & Stroud, 2014).

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Yet scholarship has not yet thoroughly addressed the implications of a fragmented media environment for intermedia agenda setting. The explanation made for traditional agenda setting – that the relationship still holds, you need only look at the individual level – cannot be made for intermedia agenda setting, where different media agendas, in totality, are expected to correlate. There are reasons to expect intermedia agenda setting to persist despite fragmentation. The commonalities in journalist training and routines and the broader social context (e.g., Shoemaker & Reese, 2013) can lead to convergence. There is some empirical evidence for convergence (Edy & Meirick, 2019; J. K. Lee, 2007; Maier, 2010). However, there are also reasons to expect divergence. Competition for audiences can lead outlets to attempt to differentiate their coverage (Gans, 1979). Empirical evidence of coverage distinctions is also plentiful (e.g., Feldman et al., 2012; Muddiman et al., 2014; Stroud, 2011).

Adding to this scholarship, we investigate whether intermedia agenda setting holds in a fragmented media environment. We draw from the issue attention cycle to examine whether the correspondence across outlets changes over time as issues become more established and political elites carve out distinct stances. By examining prime-time week-night coverage of COVID-19 from the United States broadcast (ABC, CBS, and NBC) and cable (CNN, Fox News, and MSNBC) news programs between January 21 and June 12, 2020—a dataset of 486,068 paragraphs of text across 4,589 transcripts—we uncover evidence of intermedia agenda setting, yet also find evidence of some differentiation across outlets over time.

Three Levels of Intermedia Agenda Setting

Agenda setting has been examined at three levels, all of which apply to the study of intermedia agenda setting. Although we focus on the latter two levels because we confine our analysis to a single issue, we describe the first level as it informs our approach.

First level intermedia agenda setting compares the salience of issues in one media type to the salience of issues in another. Numerous scholars have found strong correlations among media issue agendas across countries and during different time periods (e.g., Atkinson et al., 2014; M. McCombs & Valenzuela, 2021; Sweetser et al., 2008; Vliegenthart & Walgrave, 2008).

The second level of agenda setting, known as attribute agenda setting, looks at the attributes used to describe issues (M. McCombs & Reynolds, 2009; Takeshita, 1997). Scholars have studied both substantive and affective attributes (Lopez-Escobar et al., 1998). Important for our study, M. E. McCombs (2005) distinguished between two types of attributes: aspects and central themes. Kim and Min (2016) described an aspect as “a micro attribute with a lower level of abstractness” and a central theme as a “macro-level attribute” that “describes a more abstract conceptual category” (p. 134; see also Tan & Weaver, 2010). We look at (a) aspects by examining the phrases used (e.g., hospital, mask, White House, Republican) and (b) central themes by investigating bundles of phrases corresponding to a particular issue (e.g., “healthcare,” including phrases such as hospital and mask or “government operations,” including phrases such as White House and Republican).

The third level of agenda setting, known as network agenda setting, investigates the linkages, or co-occurrences, among various issues and attributes (Guo, 2012). Scholars have

found significant intermedia network agendas among traditional media types (Vu et al., 2014), across countries (Guo et al., 2015), between digital and traditional media (Su & Hu, 2020; Vargo & Guo, 2017), and among different actors on digital media (Z. Chen et al., 2019). This third level has been examined both by looking at networks of issues (e.g., Guo & Vargo, 2015; Vargo & Guo, 2017; Vu et al., 2014) and networks of attributes, as we do in our study (e.g., Guo et al., 2015; H.-T. Chen et al., 2020; Su & Hu, 2020; Z. Chen et al., 2019).

How does agenda setting change in a fragmented media environment? Djerf-Pierre and Shehata (2017) propose that traditional media continue to set the public agenda despite increasing fragmentation. Various studies find evidence of enduring agenda-setting patterns over time (Edy & Meirick, 2019; Tan & Weaver, 2013). Others suggest that agenda setting happens at a more micro-level and is dependent on the sources used by each individual (Chaffee & Metzger, 2001; M. McCombs & Stroud, 2014; Shaw & Hamm, 1997). Consistent with this explanation, scholars have found evidence of first-, second-, and third-level agenda setting when looking at partisan media at the individual level (Camaj, 2018; H.-T. Chen et al., 2020; Hyun & Moon, 2016; Muddiman et al., 2014; Searles & Smith, 2016; Stroud, 2011).

Intermedia Agenda Setting in a Fragmented Media Environment

Scholars have shown that first-level intermedia agenda setting can be multi-directional, with newer outlets influencing traditional media and vice versa (Gruszczynski & Wagner, 2017; Vargo & Guo, 2017). Critical for our purposes, some scholars have analyzed liberal and conservative-leaning media. Vargo et al. (2018) identified network agenda setting relationships between conservative and liberal partisan media and fake news. However, they did not look at the relationships between conservative and liberal partisan media, as we do in our analysis. Gruszczynski (2015) examined coverage of presidential campaign controversies, finding that liberal and conservative blog coverage predicted mainstream media coverage and vice versa. Overall, past research finds evidence of first-level intermedia agenda setting across media types.

Our project extends this work by looking at second- and third-level agenda setting – where there theoretically should be more divergence (Edy & Meirick, 2019; M. McCombs & Valenzuela, 2021) – and examining intermedia agenda setting across outlets and over time. More divergence is expected because whether and how much something gets covered (first-level) is largely determined by external circumstances like events, while that's less relevant for the particular aspects of issues emphasized (second-level) or the linkages among issues (third-level). The limited related work is suggestive that fragmentation may change intermedia agenda-setting relationships; Meraz (2011) found that attribute agendas of left- and right-leaning blogs were not correlated for several issues like the Petraeus Report on the state of Iraq. Adding to this scholarship, we investigate whether issue attributes and networks of attributes are characterized by strong and consistently positive relationships in a fragmented media environment. Based on past work suggesting that fragmentation yields more agenda diversity for specific aspects than central themes (M. McCombs & Valenzuela, 2021; Stroud, 2011), correlations across media should be higher for central themes than for aspects.

News organizations may cover issues differently because they compete for audiences. As Gans (1979) chronicled, network news programs look for story takes that are distinct from

competitors. As economic pressures increase due to increased competition for news audiences, some evidence suggests that television news programs actively differentiate their content. The U.S. national news broadcasts on ABC, CBS, and NBC, for instance, have jockeyed for audience share by changing their mix of hard and soft news, as well as focusing more on foreign or domestic news (Hamilton, 2005). Hamilton (2011) describes that some outlets differentiate by targeting viewers based on their ideology. Left- and right-leaning partisan media cover issues differently in the U.S. (Baum & Groeling, 2008; Feldman et al., 2012; Stroud, 2011) and in other polarized media systems (e.g., Brandenburg, 2006; S. J. Lee, 2005; Çarkoğlu et al., 2014). Scholars observed content differences between partisan media (comparing Fox News to CNN and MSNBC) on various issues, including climate change (Feldman et al., 2012), national security (Muddiman et al., 2014), immigration (Nassar, 2020), partisan protests (Weaver & Scacco, 2013), and electoral politics (Project in Excellence in Journalism, 2012). Economic pressures have led television news programs to target niche audiences with distinct content, explaining the differences between cable and broadcast news documented by Bae (2000).

Alternatively, outlets may cover issues similarly. Gatekeeping influences, such as those outlined in the Hierarchical Influences Model, suggest that similarity in coverage is due to commonalities in journalist training and routines and the broader social context (e.g., Shoemaker & Reese, 2013). Indeed, early intermedia agenda-setting research highlighted the importance of these influences for yielding similarities across media (e.g., M. E. McCombs & Shaw, 1972). There is some empirical evidence showing significant first-level intermedia agenda setting for traditional media and online media (Maier, 2010), as well as traditional media and partisan blogs (J. K. Lee, 2007). Most related to our study, Edy and Meirick (2019) found strong correlations among the first-level issue agendas on Fox News and MSNBC, although they were slightly lower than the correlations among the broadcast networks. Although these studies suggest that outlets cover things similarly, at least at the first level of intermedia agenda setting, questions remain about whether this persists, particularly at the second and third levels.

Polarized Intermedia Agenda Setting Over Time

Intermedia agenda setting studies frequently incorporate a temporal element. For instance, scholars found that elite print and online news media have considerable influence in setting the agenda of other news outlets, although alternative news sources also can have an influence in some cases (e.g., Vargo & Guo, 2017; Vonbun et al., 2016). Elite news media have this influence because “journalists frequently observe – and subsequently copy – their peers’ news coverage” (M. McCombs & Valenzuela, 2021, p. 128). In a fragmented media environment, as previously noted, there are incentives to differentiate as opposed to copy. Over time jockeying may be particularly apparent for new issues where newsrooms haven’t carved out unique niches. Furthermore, past work suggests that partisan media serve a primarily reinforcing role for long-standing issues, but they more actively polarize their audiences for emerging issues (Levendusky, 2013). For these reasons, we focus on an issue as it emerges: COVID–19.

The issue-attention cycle provides a useful framework for analyzing intermedia agenda setting dynamically for emerging issues. Downs (1972) proposed five stages that form the issue-attention cycle: (1) the pre-problem stage, where there is little

public attention, but particular experts may express concern, (2) alarmed discovery and euphoric enthusiasm, where the public becomes aware and wants to try to solve the problem, (3) realizing the cost of significant progress, where people recognize the difficulties involved with solving the issue, (4) gradual decline of intense public interest, and (5) the post-problem stage where another issue has captured public concern. Our analysis period covers (2) through (4), eliminating (1) due to minimal coverage and (5) because it's debatable whether we had entered this phase at the time of our analysis.

Prior work has found that media coverage and agenda setting vary across the issue attention cycle (e.g., Shih et al., 2008; Wang & Guo, 2018). Furthermore, how coverage varies across the cycle depends on the topic and culture (Brossard et al., 2004; Shih et al., 2008). We predict that media agendas will vary over the course of the COVID-19 issue-attention cycle. The pattern of variation will shed light on how fragmentation plays out in the modern U.S. media environment. If, for instance, the correlations are moderate and constant across the issue-attention cycle, this suggests that news outlets have defined perspectives that prompt different coverage patterns. This could follow from Hamilton's (2005) suggestion that economic pressures motivate outlets to identify distinct coverage niches. Alternatively, news organizations could have similar coverage in the alarmed discovery stage. Gruszczynski (2020) found higher levels of congruence across television news when an issue suddenly captured the media agenda. The finding supports what Boydston, Hardy, and Walgrave (2014) proposed: imitation across media outlets during media storms. Coverage may diverge in the realizing-the-cost phase when divergent opinions are staked out. This follows from Kim and Min (2016), who found greater fragmentation in the later stages of the issue-attention cycle for the issue of nuclear weapons in South Korea. As another alternative, news networks may initially diverge because there are no standard ways of covering the issue, and then converge once they learn how others are covering the issue (M. McCombs & Valenzuela, 2021) – building a shared understanding of how the issue should be covered. The pattern of results is revealing in terms of how media operate in a fragmented environment.

COVID-19 and Partisan Media in the U.S

The context of our investigation is U.S. television coverage of COVID-19. This context is important. From a health perspective, the U.S. had one of the highest infection rates and more deaths than other countries in the early phases of the pandemic. From a theoretical perspective, COVID-19 was a novel issue allowing us to examine intermedia agenda setting in the early phases of the issue-attention cycle. The U.S. also has high levels of polarization among the public (Iyengar et al., 2012) and in the media (Baum & Groeling, 2008; Feldman et al., 2012; Stroud, 2011).

We are particularly interested in television coverage because of its popularity, the competition among broadcast news programs, and the presence of partisan outlets with known links to COVID-related attitudes and behaviors. In the U.S., television remains an important source of news, with 68% of Americans saying that they get news from television “often” or “sometimes” (Shearer, 2021). Network news broadcasts on ABC, CBS, and NBC have engaged in a decades-long competition that involves differentiating their content to gain viewers (Gans, 1979; Hamilton, 2004). Cable news outlets have added competition and

distinct partisan perspectives (Feldman et al., 2012; Jamieson & Cappella, 2008; Levendusky, 2013; Stroud, 2011).

Analysis from the U.S. shows that beliefs about COVID-19 were related to the channels people used for news. Those whose main source of news was Fox News, for instance, were more likely to say that the media exaggerated the risks of coronavirus than those relying on MSNBC and CNN (Jurkowitz & Mitchell, 2020) and were less likely to wear masks and follow stay-at-home orders (Gollwitzer et al., 2020; Simonov et al., 2020). Content analyses also suggest differences. Studies of newspaper and network broadcast coverage of COVID-19 suggested that the issue was polarized, with local-level Democrats pitted against national-level Republicans (Hart et al., 2020). Our theoretical focus on intermedia agenda setting in a fragmented media environment extends this research. Classic intermedia agenda setting proposes strong correlations across outlets' agendas. Yet a fragmented media environment could lead to divergences. Our hypotheses and research questions are:

RQ1: How do the COVID-related (a) central theme attribute agendas, (b) aspect attribute agendas, (c) central theme network attribute agendas, and (d) aspect network attribute agendas vary across television networks?

RQ2: How do COVID-related (a) central theme attribute agendas, (b) aspect attribute agendas, (c) central theme network attribute agendas, and (d) aspect network attribute agendas across television networks vary across different stages of the issue-attention cycle?

H1: Differences in COVID-related (a) attribute agendas and (b) network attribute agendas across television networks will be greater for aspects than for central themes.

Materials and Methods

We used the dataset of television COVID coverage made available by Budak et al. (2021). This dataset covers all U.S. prime-time cable shows (six programs from CNN, seven programs from Fox News, and seven programs from MSNBC) and broadcast news programs (ABC World News Tonight, CBS Evening News, and NBC Nightly News). All transcripts are provided to LexisNexis from the publishers of each network. The dataset includes 449,482 paragraphs (distinct speakers and thoughts as indicated by paragraph breaks in the transcripts) from 2,152 cable news transcripts and 36,586 paragraphs from 2,437 broadcast news transcripts between January 21 and June 12, 2020. Each paragraph is marked as either related or unrelated to COVID-19 coverage based on a highly accurate automated classifier. This classifier was built using training examples provided by experts who labeled a subset of paragraphs stratified across programs and time as (i.) directly related, (ii.) indirectly related, or (iii.) unrelated to COVID-19. The experts were highly reliable (Direct COVID-19: Krippendorff's $\alpha = .87$; Indirect COVID-19: Krippendorff's $\alpha = .85$). The authors built various supervised learning models using these labels. Here we use the labels generated by the best performing model – DistilBERT (Sanh et al., 2019), which has an accuracy of 0.897, a recall of 0.865, a precision of 0.889, and an F1 score of 0.873. Further details of this classifier and a descriptive analysis of the COVID

–19 content are provided by Budak et al. (2021). We restrict all of the following analysis to the 202,449 paragraphs classified as related to COVID–19.

Researchers have categorized the networks examined in our work variously. For cable networks, Fox News audiences are more right-leaning than CNN and MSNBC audiences (Jurkowitz & Mitchell, 2020) and Fox News content is more right-leaning than other outlets (Jamieson & Cappella, 2008; Nassar, 2020). Some group CNN and MSNBC together as left-leaning cable news (Feldman et al., 2012; Muddiman et al., 2014; Stroud, 2011), while others find content differences (Holtzman et al., 2011; Weaver & Scacco, 2013). Broadcast news programs, alternatively, have less partisan audiences (Jurkowitz et al., 2020) and less partisan content (Fico et al., 2008) than cable news. However, there is empirical research suggesting differentiation among the three major broadcast news programs (Fico et al., 2008; Groeling, 2008; Padgett et al., 2019). Based on this prior work, we (a) group networks based on a predicted relative partisan lean (i.e., broadcast networks as more centrist, MSNBC and CNN as more left-leaning, Fox News as more right-leaning) but also (b) compare each network to every other network (e.g., ABC to CBS, CNN to MSNBC) to determine whether there are differences within these categories.

Identifying Issue-Attention Cycle Stages

Based on the dynamics of COVID–19 (see supplemental materials), we identify (i.) the pre-problem stage as January 21, when the first U.S. case was publicized, to February 24, (ii.) the alarmed discovery stage as February 25, following a CDC warning about community transmission, to March 11, (iii.) realizing the cost stage as March 12, following the declaration of COVID–19 as a pandemic, to April 28, and (iv.) the decline of intense public interest stage as April 29 – May 31. While COVID–19 is still a relevant public interest several years after the onset of the pandemic, April 2020 was the month with the largest fraction of Americans identifying it as the most important U.S. problem, with the numbers starting to decline in May 2020 (Brenan, 2022). As noted before, we do not specify the fifth stage as it is debatable whether we had entered it as of June 2020. While the automated classifier developed by Budak et al. (2021) is highly accurate, it is less accurate for earlier and later parts of the data collection (see Supplementary Materials). As such, we limit our analysis to March 1, 2020 through May 31, 2020 and only examine stages 2 through 4. Note that we use data from the entire time period to compute phrase similarity, even though we limit our temporal analysis to March 1, 2020 and May 31, 2020. As the dates delineating various stages are somewhat arbitrary, we performed robustness checks to verify that small perturbations (changing the transition between stages by one, two, or three days or setting the transitions to correspond to different momentous events) do not affect the substantive findings (see Supplementary Materials).

Identifying Policy Words and Phrases

Initial Dictionary Pre-Processing

To identify attributes of COVID–19 news coverage identified through the classifier approach described above, we started with the preexisting Lexicoder Topic Dictionaries (Albugh et al., 2013). These dictionaries were created to capture topics in news content, legislative debates, and policy documents and aimed to capture the major topic codes from

the Comparative Policy Agendas Project (Baumgartner et al., 2019). Although these dictionaries are a great starting point, they have two important shortcomings. First, as the authors also noted, these dictionaries were meant to be preliminary. There are 1,375 phrases across 28 topics. Furthermore, many of these phrases are rarely used in news coverage, especially for our dataset. As such, using these dictionaries would limit our ability to categorize much of the news coverage. Second, these dictionaries were intended to capture cross-national content and were primarily focused on Canada. Therefore, some topics and phrases do not apply to U.S. policy discourse. Regardless, they provide an excellent starting point. Consequently, we start with these dictionaries and make edits to fit the U.S. context (e.g., removing the aboriginal category; more details are provided in the supplemental materials).

To expand the Lexicoder dictionaries, we perform computer-aided labeling where new phrases are added to the dictionaries according to their similarity and the accuracy is evaluated by expert labelers. We describe the details below.

Iterative Dictionary Update and Evaluation Step

Dictionary Evaluation: Each iteration of the dictionary expansion was evaluated by trained experts. A hundred phrases were randomly sampled from the set of phrases classified as belonging to at least one policy. The phrases were then presented to the experts (masking the machine-assigned policy label), who coded whether the phrase was associated with a given policy for all policies. The experts were highly reliable at this task (Krippendorff's $\alpha = 0.84$ calculated in the first round). We then compared the machine and human labels to determine recall of the current dictionaries. Recall is a commonly used measure in information retrieval literature. Here, recall of an issue topic is the fraction of all phrases that the trained expert identifies as related to the topic that is currently included in the corresponding dictionary. Our strategy was to optimize for recall and to perform a final step where we removed the irrelevant phrases from the dictionaries to reach perfect precision (the fraction of the phrases in the dictionary that is relevant) after sufficient recall (0.85) had been reached. The experts were highly reliable at this stage as well (Krippendorff's $\alpha = 0.82$).

Dictionary Update: At each iteration, we have a set of dictionary phrases – phrases that have already been added to our dictionary – and candidate phrases – phrases we will inspect to determine whether they should be added to our dictionary. To determine the candidate phrases, we began by identifying the set of unigrams (words) and bigrams (pairs of consecutive words) that occurred at least 100 times in COVID-19 coverage across all networks between January 21 and June 12, 2020. This list included 6,207 phrases. Next, we used a word embedding model to find the similarity of each such candidate phrase to each dictionary phrase. This similarity measure, when aggregated across dictionary phrases of a particular topic, helped us determine whether the candidate phrase should be assigned to that topic. Note that our original dictionary included 1,375 phrases, generating more than 8 million similarity scores to consider. To reduce this size and remove mappings to topics with minimal similarity, we only considered the top-10 most similar candidate phrases for each dictionary phrase. We also filtered out pairs of phrases with a similarity smaller than 0.4. We selected this threshold based on a qualitative inspection during the first iteration. We then selected a candidate topic match for each candidate phrase as follows: 1) select the top-2 dictionary phrases (based on word embedding similarity) and the corresponding

topics and 2) find the top–2 topics with the largest aggregate similarity across all dictionary phrases in that topic. This approach can produce a maximum of four topics for each candidate phrase. This results in new candidate dictionaries to inspect for quality. Our iterative approach finished in three steps. The accuracy numbers in each step were 0.71, 0.78, and 0.93.

Measuring Attribute Agendas

We measured attribute agendas in two levels: (i.) central themes and (ii.) aspects. Aspects corresponded to the words and phrases in our policy dictionaries. Central themes correspond to groups of phrases related to a particular policy topic, again defined through the constructed dictionaries.

For central themes, we constructed the following vector representation to characterize the agenda of a particular network i at stage s : $C_{i,s} = [c_{i,s,healthcare}, c_{i,s,governmentops}, c_{i,s,finance}, \dots]$, where $c_{i,s,healthcare}$ denotes the total frequency of healthcare-related phrases in coverage for network i during issue-attention cycle stage s . This was a 17-dimensional vector corresponding to the 17 policy categories.¹

For aspects, we constructed the following vector representation: $A_{i,s} = [a_{i,s,covid}, a_{i,s,lockdown}, a_{i,s,loan}, \dots]$, where $a_{i,s,covid}$ denotes the frequency of the word “covid” in coverage in network i during issue-attention cycle stage s (ranging from 2-to-4 in our analysis). This 834-dimensional vector corresponds to the dictionary phrases identified. We define similarities between networks i and j as the cosine similarity between their corresponding vectors. Cosine similarity varies between 0 and 1, with 1 indicating maximal similarity and 0 indicating maximal dissimilarity. Tracking this measure over time allows us to determine whether network agendas converge or diverge. We rely on bootstrap sampling to determine whether this measure varies significantly across outlet pairs and over time. In particular, we bootstrap sample 80% of the data ten times, construct the vectors described above on these subsamples, and use t -tests to determine whether the differences observed are significant.

Measuring Network Attribute Agendas

While second-level agenda setting assesses the salience of issue attributes, network agenda setting assesses the strength of associations among attributes. To compute these associations, past work (i.) constructed networks where nodes represent attributes and edges correspond to the degree to which two attributes are associated with one another by a news outlet, (ii.) computed eigenvector centrality of attributes in this network, and (iii.) compared the distribution of these centrality measures across news outlets to assess the degree to which they align (e.g., Vargo & Guo, 2017). Eigenvector centrality captures how connected an attribute is to other attributes, taking on higher values when the attributes the focal attribute is connected to are influential themselves. This provides a robust measure of connectedness in the network of ideas. Here, we also relied on eigenvector centrality and constructed daily networks for each outlet. Below we describe how we build these networks at the central theme level. The network construction at the word and phrase level is performed similarly.

We first identified the set of attributes mentioned for each speech turn (one or more consecutive paragraphs in a transcript from the same speaker) in each program on each

outlet. If multiple attributes are mentioned in a given speech turn, we denote them as being linked. For instance, suppose a speech turn mentioned healthcare, finance, and civil rights. This would yield the following three links: a tie between (a) healthcare and finance issues, (b) healthcare and civil rights, and (c) finance and civil rights. Let us further assume that healthcare was mentioned three times, finance was mentioned twice, and civil rights was mentioned once. This yields eleven associations made in this speech turn (3×2 , 3×1 , and 2×1), meaning that roughly 55% of associations pertain to the healthcare-finance relationship. All speech turns across all programs helped us determine how a particular outlet connected different themes to one another during each issue-attention cycle stage.² We again relied on bootstrap sampling to determine statistical significance. In particular, ten networks are constructed by bootstrap sampling phrases, and then *t*-tests are used.

Results

We started by examining the temporal trends in central themes in Figure 1. Changes in coverage are generally consistent across networks. For instance, coverage related to transportation drops sharply as we move from the alarmed stage to the realizing the cost stage. The initial focus on cruises that led to numerous infections explains this finding. We observe a similar trend for international affairs, as the focus moved away from other countries (e.g., China). We observe a U-shaped pattern for various topics, including for government operations, where attention decreases and then increases. Please refer to the

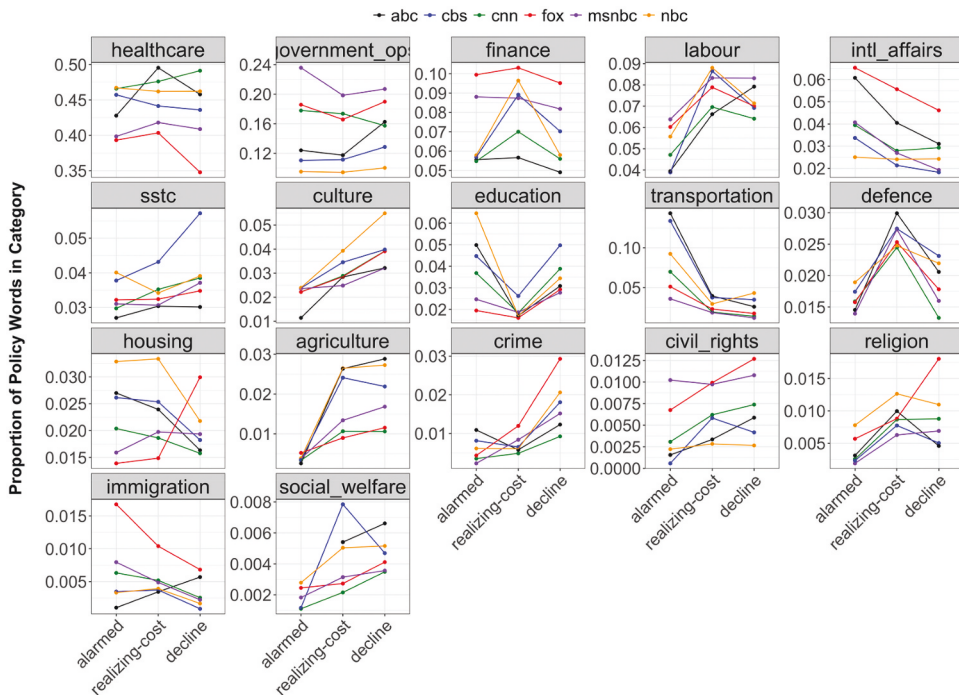


Figure 1. Attribute (at the central theme level) Importance across networks across stages. Attributes are ordered from most common to least common. Y-axis gives the proportion of all phrases that belong in the given category for that particular stage (given in the x-axis).

supplementary materials for more details about the overall central theme frequencies, top phrases for each central theme, and phrases with the highest variation over time.

While the patterns are generally similar across networks, there are notable exceptions, most commonly in Fox News coverage (e.g., housing, religion, and government operations). Inspecting the most frequently used phrases per network for central themes provides some insights. We find, for instance, that ideological terms such as Democrat and Republican are frequent in Fox News coverage, while these words are not observed in the top 10 for any broadcast network, and only the word Republican is in the top 10 for CNN and MSNBC. For more details, please see Table S3 in Supplementary Materials. Inspecting the most frequent phrases per stage of the issue-attention cycle provides additional insight. We observe that the divergence of Fox News for topics such as housing is driven primarily by the use of the words house and homelessness. In contrast, the divergence for religion is driven by the differential use of many dictionary words (e.g., event-driven words like easter and more generic religion-related words like church and God. See Table S4 in the Supplementary Materials).

Central Themes, Second-Level Intermedia Agenda Setting

Next, we assessed intermedia agenda setting at the central theme level by computing correlations of central theme attribute frequencies between pairs of networks. The results are given in Figure 2. Answering RQ1a, the similarity in central themes is high across all pairs, consistently exceeding .93. The similarity is lower for cable-broadcast and cable-cable pairs. The average similarity score for broadcast-broadcast pairs is 0.993. This number is

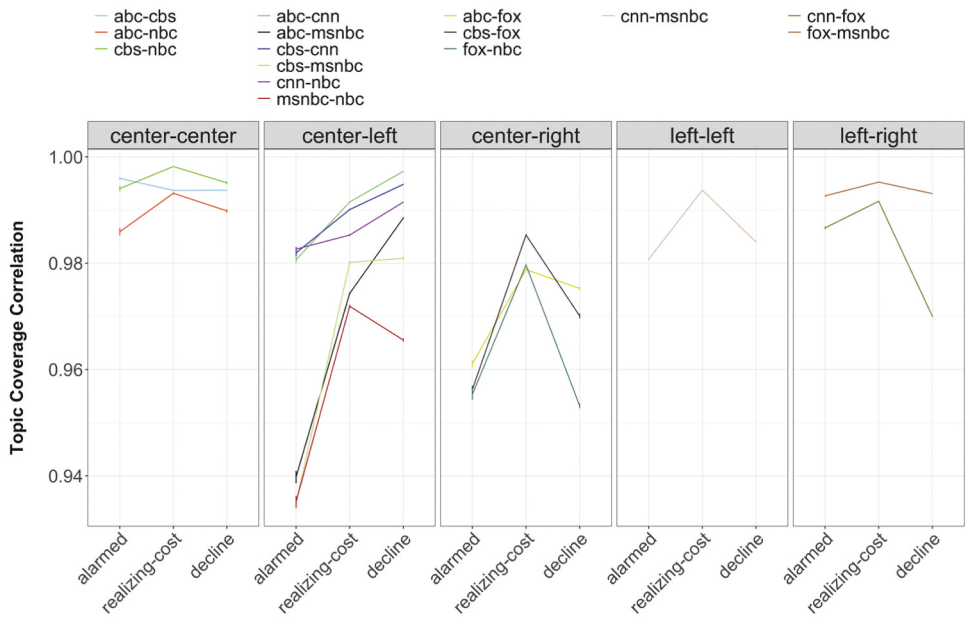


Figure 2. Cosine similarity for attribute agendas—at the central theme level—between pairs of networks computed across different issue-attention cycle stages. Error bars denote two standard errors computed across bootstrap samples.

0.973 for broadcast-cable pairs and 0.988 for cable-cable pairs. These numbers are higher than the correlations detected by past studies, including those that find evidence for intermedia agenda setting (e.g., Maier, 2010). As such, we conclude that a high level of intermedia agenda setting is observed for COVID-19 coverage across broadcast and cable news programs. Answering RQ2a, the similarity does change over time (Figure 2). For most pairs, the overall trend is an initial increase in similarity followed by a decline. Center-left pairs, particularly those involving CNN, do not align with these general trends, however. For these pairs, we observe an overall increasing trend.

Aspect Attributes, Second-Level Intermedia Agenda Setting

Next, we determined the alignment at the phrase, or aspect attribute, level. Answering RQ1b, there are differences across networks, with CNN and MSNBC having the highest alignment and the broadcast networks and Fox News having the lowest. The correlations are still largely comparable to past studies that conclude convergence (e.g., Maier, 2010), leading us to conclude inter-media agenda setting also holds at the aspect attribute level. The time series representing how alignment across pairs changes over time is given in Figure 3. Answering RQ2, aspect attribute agendas differ over time. Furthermore, we observe stronger misalignment for aspects than for central themes, as is evident from the y-axis scale in Figure 3 compared to Figure 2 (H1). Similar to the central themes finding, the least similar pairs are broadcast-cable pairs (0.851 average similarity). However, unlike central themes where broadcast networks show the highest similarity, here, cable pairs are more similar (0.939 average similarity) compared to the broadcast pairs (0.898 similarity). MSNBC and CNN were

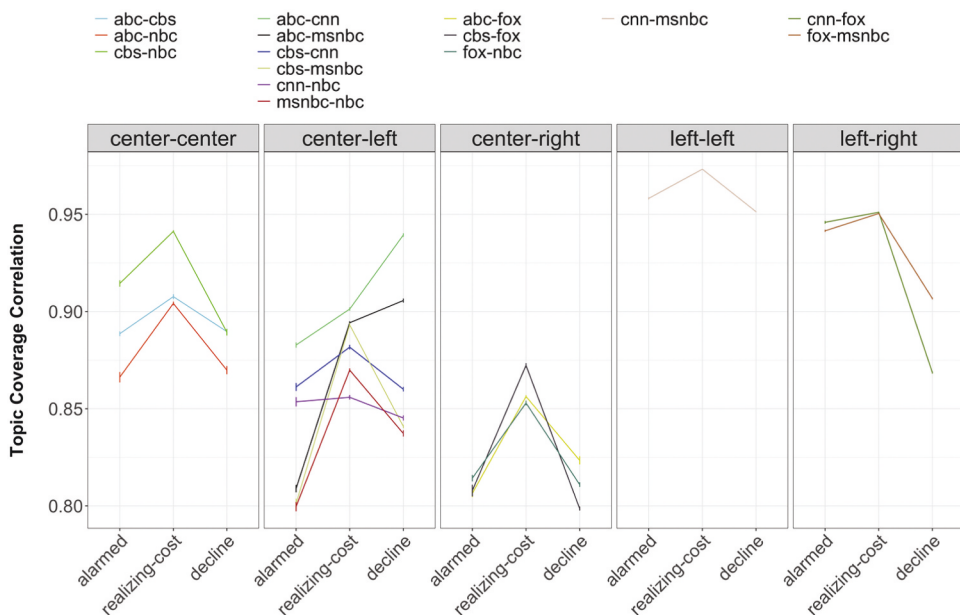


Figure 3. Cosine similarity for attribute agendas at the aspect level across issue-attention cycle stages. Error bars denote two standard errors computed across bootstrap samples.

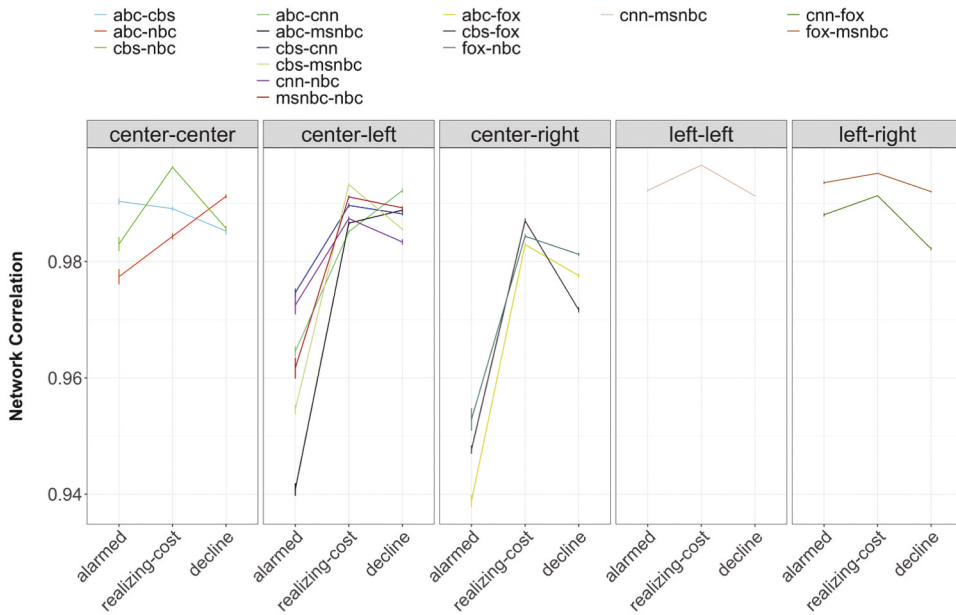


Figure 4. Cosine similarity for networked attribute agendas between pairs of television outlets. Error bars denote two standard errors computed across bootstrap samples.

consistently and strongly correlated with each other. These two outlets also were strongly correlated with Fox News, although there was variation over time, especially when comparing Fox and CNN. Adding more to RQ2, all but two pairs see a significant increase followed by a significant reduction in alignment when comparing the stages.

Central Themes, Third-Level Intermedia Agenda Setting

Answering RQ1c, we observe some dissimilarities across outlets, but, much like attribute agendas, the differences are small, with similarity measures exceeding .94 throughout the analysis period across all networks (Figure 4). The similarity is highest for cable-cable pairs (0.991 on average), followed by broadcast-broadcast (0.987) and broadcast-cable (0.975). This figure also shows a decline following an initial increase in alignment for most pairs, answering RQ2. The only exceptions are ABC-CBS (an overall slight decrease) and ABC-CNN (an overall slight increase).

Aspect Attributes, Third-Level Intermedia Agenda Setting

When examining network attribute agenda similarity over time in terms of aspects (Figure 5), as opposed to central themes, we again observe a stronger divergence, supporting RQ1d. In addition, we again observe that alignment changes over time, with an increase followed by a decrease (RQ2). The only exception is ABC-CNN, where there is an overall increase in similarity. Finally, as was the case for second-level agenda setting, the differences are more pronounced at the aspect level (H1).

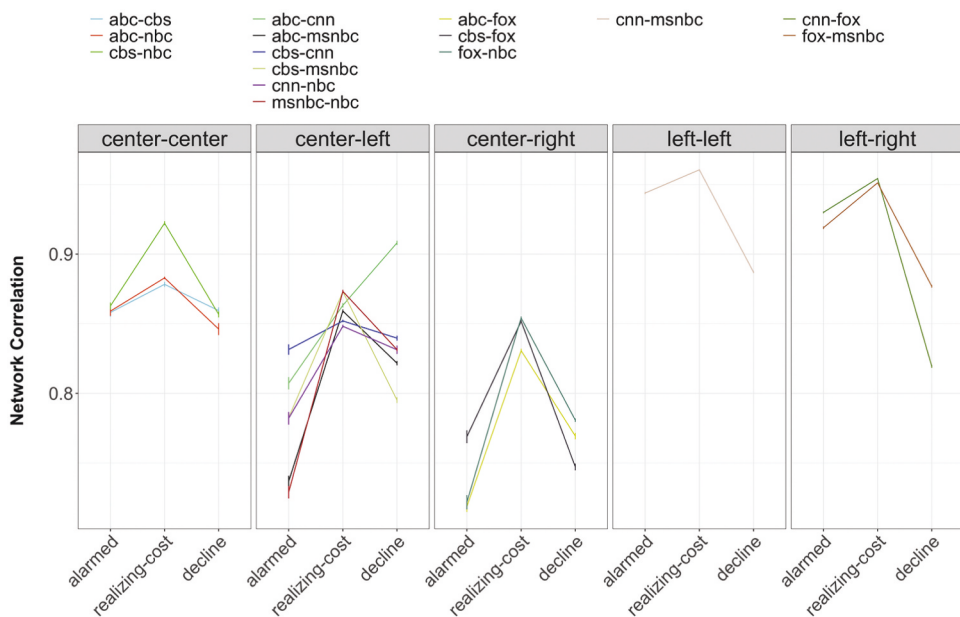


Figure 5. Cosine similarity for networked attribute agendas between pairs of television outlets computed over time. Attributes are words and phrases/aspects (e.g., covid, test, job). Error bars denote two standard errors computed across bootstrap samples..

Discussion

When looking at COVID–19 central themes and aspect attributes across the major broadcast and cable news programs, we find strong and positive cosine similarity. The similarity measures for aspect attributes (.80 to .97) tend to be lower than for central themes (>.94). Consistent with our hypothesis, we find more variation in the words and phrases used compared to the overarching themes employed in the coverage (M. McCombs & Valenzuela, 2021). It is noteworthy that, at least in this context, similar results appear whether we look at second or third-level attribute agenda setting. This raises questions about when these two levels are empirically different, requiring additional analysis across more topics, media types, and time periods. What is most surprising is the magnitude of the similarity measures across the analyses. We observe high similarity even though various events changed the attribute focus over time, as can be observed from the relative importance of different central themes over time in Figure 1 and from the inspection of phrases with high coefficients of variation, as provided in Table S6. Although the importance of central themes changes, the themes change in a similar fashion across outlets and most commonly happen contemporaneously, even when analyzed at the daily level (see “Daily Cross Correlation Analysis” and Figure S12 in the supplemental materials). These patterns are in contrast to other studies showing more bi-directional influence (e.g., Gruszczynski, 2015; Vargo et al., 2018), which may be a function of our focus on television. The overall trend is clear. The high levels of similarity found in prior first-level intermedia agenda-setting research (e.g., Edy & Meirick, 2019; J. K. Lee, 2007; Maier, 2010) appear at the second and third

levels, at least for television coverage of COVID–19. Despite the fragmented television media landscape in the United States, intermedia agenda setting persists.

In reviewing the data, there are several noteworthy reasons for the extent of similarity across networks. First, all the programs covered elite figures and organizations. Statements from political leaders like President Trump and organizations like the CDC were repeated across programs. Even though the reporting and editorializing around the statements varied, the language used was based on elite statements. Future studies should measure other influences like elite speech alongside the media agenda to assess their influence in setting the agenda. Second, there's evidence that television networks monitor each other's content, particularly among cable news networks. We examined how often the networks cited each other in our dataset. Just looking at network mentions, CNN mentioned Fox News 75 times and MSNBC twice, MSNBC mentioned Fox News 168 times and CNN 25 times, and Fox News mentioned CNN 116 times and MSNBC 26 times. When referencing what another network has said, the similarity scores increase. These rates were lower for the broadcast networks. This is consistent with the perspective that television outlets keep tabs on competitors' coverage but inconsistent with the idea that they do so to distinguish their coverage (Bae, 2000; Gans, 1979; Hamilton, 2004). Instead, news outlets may monitor each other to respond to coverage on other outlets.

Although strong relationships characterize the results, there were differences in which news organizations were more similar to each other. At the second level, the nightly news programs on ABC, CBS, and NBC covered similar central themes over time, consistent with past research (Gans, 1979). Yet there were more differences when it came to the words employed (Groeling, 2008; Hamilton, 2004). Across the analyses, the network evening news broadcasts were most similar to CNN and least similar to Fox News, although even here, the cosine similarity was substantial.

Intermedia agenda setting was not constant over time; as a general trend, cable and broadcast news coverage of COVID–19 tended to become more similar first and then diverge as the pandemic wore on. A large number of network pairs experience an increase in similarity when comparing the second and third stages of the issue-attention cycle. This aligns with the increase in the number of cases and the increase in attention to healthcare as the central theme in COVID–19 coverage. Our findings suggest that significant real-world events can overwrite or at least temper partisan differences in news coverage. Although the significant differences across the three time periods we analyze suggest meaningful changes in how news organizations covered the pandemic, we note that future research may use different dates for distinguishing among the various stages of the issue-attention cycle.

The declining similarity between the third and fourth stages of the issue-attention cycle could be explained by the divergence in how elites responded to the pandemic. Green et al. (2020) document that U.S. political elites became polarized in their language early in the pandemic. Newsrooms could have followed suit over time, with Fox News adopting Republican language, MSNBC and CNN adopting Democratic language, and the networks falling somewhere in the middle. There's suggestive evidence. Green et al. note that Democrats discussed the outbreak "earlier, more frequently, and with more emphasis on public health and direct aid to affected workers," whereas Republicans emphasized "national unity, China, and businesses" (p. 4). In our data, Fox News was more likely to discuss international affairs and finance, whereas CNN was more likely to mention health-care. This explanation is less satisfying for the differences across network news outlets,

although perhaps as the issue became a more dominant one, they also sought ways to differentiate that were less related to partisanship.

Theoretically, the results provide important information about how agenda setting works. A recent review of the agenda-setting literature proposed that future researchers pay more attention to media beyond newspapers and Twitter, look across levels, and use more computational approaches (Su & Xiao, 2021), all of which we have done here. Scholars have debated how and whether agenda setting applies in a fragmented media environment (Chaffee & Metzger, 2001; M. McCombs & Stroud, 2014; Shaw & Hamm, 1997). The same debate has only just begun in analyses of intermedia agenda setting. At least for COVID-19 coverage, we observe some evidence of increased fragmentation over time. Despite this trend – even in the midst of the COVID-19 pandemic – we find considerable evidence that intermedia agenda setting at the second and third levels continues to define relationships across media.

Notes

1. We remove the following central themes: Forestry, Land water management, Energy, Foreign trade, and Environment due to a lack of sufficient data in our analysis. We also remove the phrases “kill” and “victim” from the Crime dictionary. These words were used to refer to the victims killed by the pandemic.
2. We performed this aggregation in two ways, both of which led to similar findings. Our first approach was to simply take an average across all speech turns across all programs for a given outlet to identify the relationship between two themes. As a secondary approach, we used a weighted average where speech turns that cue more themes were more heavily weighted. We include the weighted analysis in the main manuscript and share the unweighted results in the Supplementary Materials.

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