

Mask Mandates, Misinformation, and Data Voids in Local News Coverage of COVID-19

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Abstract

Local news sources in the United States have been dwindling for years. Although newsrooms are shrinking, the American public generally trust their local news sources. Crisis events like the COVID-19 pandemic are circumstances where people are actively searching for information and some of what they will find will inevitably be misinformation given the volume of misinformation being created and the affordances of social media services that encourage viral spread. It is critical to understand if local news is spreading misinformation or acting as a cross-cutting information source. This study uses local news data from a media aggregator and mixed methods to analyze the relationship between local news and misinformation. Findings suggest that local news sources are serving as cross-cutting information sources but occasionally reinforce misinformation. We also find a worrying increase of anti-mask stories and accompanying decrease of pro-mask stories after a mask mandate is enacted.

Keywords: COVID-19, Misinformation, Local News, Media

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Introduction

Unexpected events, breaking events, or crisis events are stressful times of confusion and heightened emotion. When disaster strikes, the media plays a critical role in disseminating timely and accurate information that can provide potentially lifesaving guidance to those most affected by the disaster (Sadri, et al., 2017), inform those not directly affected by a disaster about how they can provide assistance (Lobb, et al., 2012), and connect people to various outputs from government policy, civil society assistance, and private-sector initiatives (Williams and Schoonvelde, 2018). However, the media landscape over the past few decades has been transformed, first through the introduction of the internet and web search (van Cuilenburg, 1999), and then the creation and widespread use of social media (boyd and Ellison, 2007).

The information landscape is more diverse than ever before, but not all media sources, media formats, or social media applications serve the same informational purpose, equally cover the same breaking events, or are used identically by users. Society's construction of disaster risk affects both short-term and long-term public perceptions, civil society solutions, policy prescriptions, and private-sector initiatives that contribute to resilience. Risk is not an exogenous variable or objectively defined, but rather embedded in the social fabric of life where media are actors that play an important role (Stallings, 1990). Therefore, it is important to understand how media coverage affect our knowledge of disaster risk. A diversity of sources provides for many different avenues and social network ties for information diffusion, but the diversity is also a double-edged sword, with misinformation being the other edge of the blade. One factor that contributes to the rise of misinformation is the decline of local news sources. This paper asks the question: is local news media helping to spread coronavirus misinformation that contributes to risky behavior or is local media acting as corrective to other forces of misinformation? Available data on mask use behavior is combined with data on local news stories across a small group of

American states to determine the relationship between local media, coronavirus misinformation, and public health-related behavior.

Literature Review

Information is now more accessible, and production of information has been democratized, but the changes in the media environment have had consequences, especially for local news. Between 2008 and 2017, newspapers (both in print and digital forms) have cut approximately 45 percent of newsroom employees due to financial pressures stemming from the move to online information distribution and the associated loss of advertising (Sullivan, 2020). Furthermore, the effect of shrinking newsrooms has not been felt evenly across media outlets, with a few large, national newspapers like the *New York Times* or the *Wall Street Journal* staying successful, but many other smaller, locally focused newspapers dying out. The decline of local news has consequences for our political environment, including a nationalization of political news (Martin and McCrain, 2019), decreased political knowledge (Hayes and Lawless, 2018), and less political engagement (Hayes and Lawless, 2015). Americans trust local news more than national or mainstream news (Gallup and Knight Foundation, 2019), but the nationalization of news and the move to social media are undermining trust in news sources through increased polarization (Iyengar and Hahn, 2009) that contributes to the spread of misinformation.

The ongoing COVID-19 pandemic and accompanying “infodemic” (Fleming, 2020; Richtel, 2020) shows the importance of understanding the spread of misinformation during emergency events, as early research suggests that misinformation about the virus has deadly consequences (Bursztyn, et al., 2020). Consumption of news sources that downplay the risk of the novel coronavirus appears to correlate with riskier behavior (Jamieson and Albarracín, 2020). Social media is also a critical component in spreading COVID-19 misinformation

(Papakyriakopoulos, et al., 2020). Furthermore, misinformation will likely be a significant problem when a vaccine is developed and distributed (Cornwall, 2020). Early research by Simonov, et al. (2020) found a correlation between Fox News consumption and less social distancing, but although Fox News is popular, people do not have a mono-source news diet. Therefore, we should also consider if local news is acting as a cooperative or cross-cutting force to misinformation provided in other media. Other recent research suggests that when a rural resident has a local news source from a city that is harder hit by the pandemic, then the rural news consumers are more likely to engage in social distancing behavior (Kim, et al., 2020a). Adding to this body of research covering the importance of news in affecting public-health related behavior, we examine the role misinformation plays in the local news environment.

Information is critical for decision making, understanding government policy, and many other social interactions. However, there is a difference between being uninformed and being misinformed (Kuklinski, et al., 2000). If someone is uninformed about a topic, then they are ignorant of the truth and may make decisions based on other information that could be related to the topic at hand, but if someone is misinformed, then they confidently hold false beliefs and may make wrongful decisions based on the misinformation. In other words, someone is misinformed if they hold false beliefs but believe them to be true. Disinformation is a further wrinkle defined by intent (Andersen and S  e, 2020; Rid, 2020). Someone is disinforming if they spread misinformation that they know to be false. The problem for misinformation studies is that determining intent is difficult. Regardless of how someone becomes misinformed, once someone believes in false information, it can be challenging to correct the misinformation due to characteristics of the information environment.

As embodied in the media adage “if it bleeds, it leads,” emotional and novel stories disseminate much faster than other types of stories (Berger and Milkman, 2012; Vosoughi, et al., 2018). Therefore, stories that encourage outrage, arousal, or surprise will receive a larger audience and encourage a reporting style that takes advantage of the types of story that spread. This also suggests that a story correcting a previous piece of misinformed news may not spread as easily due to the lack of emotion or novelty. Furthermore, corrections may not be as effective as expected because of cognitive perceptions of truth and credibility.

When someone receives new information, they can choose to reject the information as false or believe the information is true and update their cognitive models in a Bayesian-model of updating prior knowledge (Brashier and Marsh, 2020). Whether or not someone accepts the new information can depend on if they are engaging in directionally motivated reasoning or accuracy motivated reasoning (Kunda, 1990). Accuracy reasoning is when someone is motivated by the desire to be correct and possess an accurate model of the truth, while directional motivation is not about accuracy but about accepting information only if it is ideologically-congruent and reinforces a world view. Motivated reasoning contributes to the spread of misinformation and adds to the difficulty of correcting misperceptions.

Directional motivation does not necessarily stem from a lack cognitive activity (Kahan, 2013) but is instead a form social expression. Additionally, the emotional content (like anger) of misinformation can trigger motivated reasoning (Weeks, 2015). When asked factual questions (such as economic statistics) motivated reasoning can affect whether someone responds truthfully (Schaffner and Roche, 2017). For example, partisan motivations can affect how someone answers a question about the unemployment rate. Additional research has shown that motivated reasoning can be overcome by incentivizing someone to be accurate. John G. Bullock,

et al., (2013) offered respondents a chance to win \$200 if they answered a factual question correctly and found that motivated reasoning was reduced. If people are directionally motivated but are incentivized by their own health to overcome such reasoning, then factual news reports may overcome partisan expression and correct misinformation

Early research suggested that when someone is corrected, people will dig in their heels and the correction will backfire, causing someone to believe in the misinformation even more (Nyhan and Reifler, 2010). However, subsequent research has not been able to recreate the backfire effect (Weeks and Garrett, 2014; Amazeen, et al., 2018; Ecker, et al., 2020; Pennycook, et al., 2020; Swire-Thompson, et al., forthcoming), suggesting that the backfire effect is rare and isolated to specific circumstances (Wood and Porter, 2019) that may be driven more by partisanship, ideology, or specific groups (Nyhan, et al., 2013) in response to specific pieces of misinformation (Nyhan, 2020). The broad debunking of the backfire effect shows that correcting misinformation is possible and local news can help people come to the truth by giving consumers accurate information. However, correcting may come with unintended consequences.

Good intentioned news coverage may inadvertently spread misinformation about the coronavirus (Phillips and Milner, 2020) due to a psychological phenomenon known as the “illusory truth effect” (Wang, et al., 2016; Unkelbach and Rom, 2017). Psychologists have documented that people will rate repeated statements as more true than new statements, even when the statement is misinformation (Fazio, et al., 2015; Pennycook, et al., 2018). Additionally, people develop a fluency in the misinformation that sometimes does not have to be a repeated statement, but rather a cognitive perception. For example, statements in a bold typeface are rated as truer than others, and statements that rhyme are also rated as truer, in addition to other perception effects (Brashier and Marsh, 2020). The illusory truth effect presents a danger to any

news coverage of uncertain events like the coronavirus pandemic. By trying to correct a piece of misinformation, a local news story may be inadvertently repeating the original misinformed statement and reinforcing the consumer's misperceptions.

Data, Methods, and Case Selection

The first variable of interest is reported mask wearing behavior. Airborne transmission is believed to be a primary vector of the SARS-CoV-2 virus that causes COVID-19 and the risk of airborne transmission can be reduced by wearing a face covering (Zhang, et al., 2020). Masks help lower airborne transmission of the virus and requiring public mask-wearing via government mandate can help increase public mask wearing behavior and slow the community spread of COVID-19 (Lyu and Wehby, 2020). We use a publicly available dataset from the *New York Times* on mask wearing behavior (See *New York Times*, 2020). Between July 2 and July 14, the *Times* partnered with the data company Dynata to obtain 250,000 survey responses spread across all 50 states plus the District of Columbia at the county level of analysis. Participants were asked “how often do you wear a mask in public when you expect to be within six feet of another person?” with a five-point scale answer of never, rarely, sometimes, frequently, or always.

We aggregate the county-level response data to the state level due to the level of analysis of our local news media data. Aggregation does have the effect of flattening any urban-rural divides on pandemic responses (Kim, et al., 2020a), but since we are asking a question about the broad contours of the relationship between local news, misinformation, and behavior, this presents a future avenue of research. Finally, the nature of the survey mask data does have three notable limitations for our research questions. First, mask-wearing may be considered a socially desirable behavior (Podsakoff, et al., 2003) and respondents may overstate their frequency of how often they wear a mask when going out into public. Second, news reports (Smith, 2020) and

early psychological research (Cheng, 2020) show that mask wearing is politicized, so survey responses may contain “partisan cheerleading” (Bullock and Lenz, 2019) where responses reflect partisan leanings rather than true behavior. Polarization also seems to affect other pandemic-related activity like social distancing and even beliefs about the future impact of the virus (Allcott, et al., 2020). Finally, the *New York Times* and Dynata only performed the survey once, so we cannot see how mask-wearing has changed since the data was gathered, limiting our explanatory power but providing for another avenue of future research.

Local news media data is gathered from MediaCloud Explorer which collects news stories from around the world, making it possible to collect local news data from print, radio, and television outlets (MIT Center for Civic Media and Berkman Klein Center, 2020). Within the United States, MediaCloud has many different geographic categorizations, so we use data divided at the state-level in local news collections. States fall into two categories: those with a mask mandate and those without. For states without a mask mandate, we collected data for the approximately two weeks that the survey took place (July 2-14). We collected data for the states with a mandate separated into the two weeks before and the two weeks after the mask mandate was officially issued by the state governor (or mayor in the case of Washington DC). MediaCloud was queried by using the search terms: (“coronavirus” OR “covid”) AND “mask”.

In addition to mask wearing data from the *New York Times* and local news data from MediaCloud, we use other publicly available data to help guide case selection. General state identification and population data is from Opportunity Insights (2020). Mask wearing mandate data is from *Axios* (Fernandez, 2020) and mandate policy implementation dates are from *CNN* (Kim, et al., 2020b). Governor data is from the National Governors Association’s 2020

“Governors Roster.” Finally, coronavirus case and death data are also from the *New York Times* which collects data at the county, state, and national levels (See *New York Times*, 2020).

In this study, we selected six states to compare the relationship between local news coverage, misinformation, and mask behavior: Montana, Idaho, Arizona, New Hampshire, Florida, Texas, Illinois, and Ohio. See figure 1 for a summary table of our cases. Montana and Idaho both have relatively low reported mask compliance (“never” or “rarely” survey responses), but Montana has a mask mandate (in effect July 16) and Idaho does not. Montana has a Democratic governor while Idaho has a Republican governor. Arizona and New Hampshire have relatively high levels of reported mask compliance (“frequently” and “always” survey responses), and Arizona has no mask mandate, but New Hampshire does (August 11). Both Arizona and New Hampshire have Republican governors. Florida, Illinois, and Texas have a high number of COVID-19 deaths. Florida has no mask mandate, but Illinois (May 1) and Texas (July 3) do have mask mandates. Florida and Texas have Republican governors, but Illinois has a Democratic governor. Finally, Ohio represents a middle-of-the-road case with a mandate that went into effect July 23, relatively high COVID-19 deaths, average mask compliance, and a Republican governor.

The media data was scraped using MediaCloud and analyzed using a combination of computational text analysis in R and qualitative content analysis methods using NVivo. MediaCloud outputs the URL and headline of the stories, but not the full text, requiring navigation to the website for a full qualitative analysis and limiting the computational analysis to only the text of the headline. Not having access to the full story text is a limitation to large-scale computational text analysis but seeing the headline alone may simulate the process of searching for information on the internet because many people will read and share a story even though they

have only read the headline (Gabelkov, et al., 2016). The practice of people only engaging with the headline before sharing likely contributes to the lack of cognitive engagement with information (Pennycook and Rand, 2020) and may be explained by social dynamics behind social media sharing beyond pure epistemological truth (Pennycook, et al., 2020).

The MediaCloud dataset cleaning process is as follows. First, duplicates were removed – for example, in Arizona, a news group called “AZ Central” reposts the same story to multiple local affiliate websites for cities like Phoenix, Glendale, or Scottsdale. In some states like Arizona, as many as 2,286 duplicate stories out of 3,143 total stories were removed, while in other states like Idaho, 17 duplicate stories out of 223 total stories were removed. See figure 2 below for full summary table of media data. Second, corpora were created out of the MediaCloud datasets which included cleaning the textual data for computational analysis by making all the text lowercase and removing punctuation, extra spaces, and numerical digits. After cleaning the corpora, term frequency count and word correlation were used to quantitatively analyze the local news headlines. Finally, unique headlines were hand coded for misinformation with a select handful of the stories read in-depth for specific misinformation content and anti- or pro-mask sentiments.

Headlines were coded two ways: discouraging mask wearing (which is subdivided into two codes: non-mask related misinformation and mask related misinformation) or encouraging masks (and debunking misinformation). Note that the headlines coded for discouraging mask wearing may not be intentionally spreading misinformation and may instead be repeating misinformation without an explicit check. For example, two Florida stories from wtsp.com have the headlines “Verify: Can wearing a face make weaken the immune system?” and “Is COVID-19 worse than the flu? After five months, the answer is becoming clearer.” These are the kinds of

headlines that further reinforce the illusory truth effect – a repetition of misinformation without a direct rebuttal that can replace the misinformation with an alternative explanation. In the second example, there is no clarification of COVID-19 causing the flu in the headline itself – the answer that is becoming “clearer” is not present in the headline. Stories like the two examples above may discourage those who only read the headline from wearing a mask because they are not getting a full picture of the truth.

Findings

Mask wearing is generally accepted throughout the United States, including the case selection states. Across the 50 states plus Washington D.C., the average percentage of people who reported to wearing a mask in public where social distancing is not possible “never” or “rarely” is 14% and the average percentage of people who said they wear a mask “frequently” or “always” is 75%, making the average percentage of people who said “sometimes” 11%. Across the 8 selected states, the average “never” or “rarely” percentage is 17%, the “frequently” or “always” is 71%, and “sometimes” is 12%. Therefore, our case selection is closely representative of the 50 states and D.C., but there is variation across states. New Hampshire has the highest level of mask wearing where 81% of respondents said “frequently” or “always” and 11% of respondents said “never” or “rarely.” Arizona, Florida, and Texas also have relatively high levels of self-reported mask wearing. This is contrary to previous findings reported in the news and highlights the challenge of measuring behavior. For example, an *Arizona Republic* study (Wilder, 2020) reported that based on Twitter data, Arizona was the most resistant to mask wearing, but the *New York Times* data suggests Arizonans do wear masks when going into public. Twitter data is not representative of a population, and often magnifies the loudest voices because it only captures those who one, use Twitter, and two, use Twitter often. In terms of states that did not report wearing masks, Montana has the lowest level of mask wearing where

only 53% of respondents said “frequently” or “always” and 32% of people said “never” or “rarely.” Idaho and Ohio also have relatively low levels of mask wearing. See figures 1 and 3 for the full range of mask wearing for the cases in our selection.

At the state governance level, having a democratic governor moderately correlates with having a mask mandate (coefficient = 0.63). Furthermore, having a democratic governor positively correlates (.44) with “frequently” or “always” wearing a mask in public and negatively correlates with (-.44) “never” or “rarely” wearing a mask in public. COVID-19 cases and deaths correlate weaker with mask wearing than the political party of the governor. These findings lend more evidence to support the theory that mask wearing is politicized. See figure 4 for full correlation coefficients between: mask mandates, governor party, COVID-19 cases & deaths, and mask wearing frequency. Note, however, that the governorship of different states is an imperfect representation of the political leanings of a state because there are some states that lean left and have a Republican governor (e.g., Massachusetts) or lean right and have a Democrat governor (e.g., Montana or Louisiana).

Our qualitative analysis of the media sets reveal that most of the headlines in our dataset are truthful in nature, many covering the day-to-day development of the pandemic and reaction from local government. Of the total unique stories gathered by our MediaCloud query, an average of 22.57% are explicitly about masks in the headline. See figure 2 for the MediaCloud data statistics. Many of the news headlines are factual reporting of coronavirus development. For example, there are many stories about X city, Y county, or Z state establishing a mask mandate, or stories regarding the number of local COVID-19 cases and deaths. Additionally, there is some overlap between the stories between states as NPR, ABC, NBC, or other media groups use the same story across their local affiliates.

We find that in the two weeks leading up to a mask mandate there are many stories about the effectiveness of masks and stories that encourage mask wearing, but after a mask mandate goes into effect, these types of stories are no longer written and the gap in coverage is filled by stories that spread misinformation about masks or discourage mask use. For the studied states with a mask mandate (Illinois, Montana, New Hampshire, Ohio, and Texas), the total number of stories explicitly about masks and their proportion of total stories, declines after the mask mandate goes into effect. After a mandate, the average number of stories correcting misinformation or encouraging masks drops from 25.2 stories to 15.4 stories. Simultaneously, after a mandate, the average number of stories that spread mask misinformation or discourage mask use increases from 9 stories to 13.4 stories. In many of the states (Illinois, Ohio, and Texas), the misinformation stories outnumber the pro-mask stories – see the “Misinfo.Diff” column of figure 2. For the states we looked at without a mandate (Arizona, Florida, and Idaho), we find that an average of 7.5% of the stories on masks are misinformation or discourage mask wearing, which is lower than the average percentage of misinformation stories in states with mandates.

That said, the share of stories about masks that contain misinformation or discourage wearing a mask is worrying. One of the trends we see after a mask mandate is enacted is the questioning of the mandate’s legality or lack of enforceability. For example, “‘Don’t be a sheep’: Sheriffs rebels against new mask requirements” reads one Texas headline, or “Masks now required in Butler, Hamilton counties. But who will enforce?” reads an Ohio headline. Quantitatively, this trend is captured in word correlations (figure 4) where after the Texas mask-mandate, “enforce” correlates with “mask” in headlines at .27, the third most correlated word after “mandate” and “order.” There are other word correlations that can tell us about how media

coverage of mask use varies across states. In Idaho, a state with low mask use and no mandate, “prison,” “protests,” and “enforce” all correlate with “mask” at .21. In Ohio, a state with a mandate but low mask self-reported mask use, “resist” correlates with “mask” at .21, and in Arizona, a state without a mandate, but high levels of mask usage, “wear,” “wearing,” and “wears” correlate with “mask” at .33, .28, and .26 respectively. Word correlations do not necessarily translate into misinformation, which is why we combined computational text analysis with qualitative methods, coding headlines by hand.

In our qualitative analysis of the many mask-related headlines, we did not find evidence of overtly explicit anti-mask sentiment in local news coverage. However, there are stories of people purposefully violating mask wearing rules like customers spitting or coughing on store employees when the customers were asked to wear a mask. These anecdotes do not necessarily mean there is a pattern of overall hostility. When misinformation is presented or left unchecked in local news, it is often through op-eds or letters to the editor (e.g., “Letter: Masks aren’t the answer to COVID-19”), poorly written rhetorical question headlines (e.g., “Wearing a face mask: Does it infringe on my personal freedom?”), or through repetition without correction (e.g., “Verify: Can wearing a face mask weaken the immune system?”) which reinforce the illusory truth effect. Although it is a good-intentioned fact-check, the way the headlines are phrased, they repeat misinformation without providing a direct alternative statement. By presenting misinformation without then countering with an immediate correction that can replace a misperception with an accurate statement, headlines like the three above are reinforcing anti-mask sentiment (violations of personal freedom) and misperceptions about the efficacy of mask wearing in controlling the pandemic (masks weakening immune systems or not being an answer to COVID-19).

Our mask wearing data is captured in only one timespan sample (July 2-14), so we are not able to make any causal argument of how misinformation and correction may affect mask wearing over time before and after a mandate. That said, we do not find a direct correlation between self-reported mask wearing and misinformation (at least when analyzing Arizona, Florida, Idaho, and the other 5 states pre-mandate). We do find that both anti- and pro-mask stories correlate with COVID-19 cases per capita (see figure 5 for shortened coefficient table). Furthermore, mask misinformation stories and stories that encourage wearing a mask are correlated with each other, which along with correlation with cases per capita, suggests competing messages in the media coverage of the coronavirus pandemic where more salience of the virus is accompanied by more information of both varieties. However, any explanatory power is limited because of the small n of only 8 states.

Discussion

Masks, other important public health behaviors like social distancing, and even beliefs about the future impact of the coronavirus are increasingly polarized in the United States. The political party of a state's governor correlates with the existence of mask mandates as well, more so than actual COVID-19 cases and deaths in the state. This is potentially harmful for public health because recent research shows that mask mandates can help lower community spread of the SARS-CoV-2 virus. That said, people are generally accepting of wearing masks, and self-reported survey data from the *New York Times* suggests that people do wear masks when out in public. However, the *Times*' data is from early July and does not show change in mask wearing behavior over time. As the COVID-19 pandemic carries on, people may tire of wearing masks or rebel against wearing them or grow laxer in mask wearing habits. The future of mask wearing will partially depend on how masks are discussed on local, social, and national medias where

misinformation can erode perceptions and beliefs about the efficacy of masks or enhance the sense of the violation of personal liberty by mask mandates.

Our findings suggest that local news is mostly acting as a cross-cutting source of truthful information against the misinformation that is available on social media or from national news sources. However, across all the eight states analyzed in this study, we found stories that would reinforce illusory truth by repeating false information without an explicit replacement explanatory statement. Additionally, misinformation was accompanied by stories questioning the enforcement of mask mandates and encouraging anti-mask behavior. In the states with a mandate, we found that the ratio between anti- and pro-mask stories changes in favor of misinformation and anti-mask sentiment after the mandate is enacted by the governor. Furthermore, as the number of stories explicitly about masks declines after the official instatement of a mask mandates, the percentage of those stories that contain misinformation or discourage mask wearing increases. The shift in the media environment after a mandate favors misinformation and we believe this is a problem for information diffusion.

Local news does not exist in its own environment and indeed must compete and cooperate with other news that spreads on social media. Furthermore, unlike the old information environment where new information was delivered to someone by a gatekeeping newsroom, people actively search for new information online in a search engine like Google and news stories are passed from person-to-person via social media like Twitter. Therefore, the concept of a “data void,” or search terms where query data is limited, (Golebiewski and boyd, 2018) is applicable to the ceding of news space to anti-mask stories. When people search for something online, the algorithm will return something (unless maybe you type in a random string of characters), even if it is partially unrelated or complete misinformation. Furthermore, search can

also favor more recent news stories. When someone searches for something like “mask news in Boise, Idaho,” the algorithm will return the latest stories from relevant news sources, and if more recent news start to be majority misinformation or otherwise anti-mask, then those are the stories they are likely to receive unless the URLs have been actively moderated out of the search results, which is unlikely. In the case of disaster events, people are actively searching for new information about the disaster and steps they can take to stay safe. We are not saying that local newsrooms should constantly reproduce repetitive news, but we suggest that newsrooms pay close attention to the type of stories they are publishing. When it comes to misinformation and illusory truth, editorial discretion is critically important.

We believe that misinformation does not matter unless it affects our behavior and changes outcomes. Wearing masks less hurts us by discouraging a form of behavior that can protect us against the community spread of a deadly virus where every day the pandemic continues, more people contract the disease caused by the virus and potentially die. Therefore, misinformation during a disaster (even a small amount) can have disastrous effects on a community. We should not exaggerate the effects of misinformation like the attempts of Cambridge Analytica or the Internet Research Agency to affect American elections (Rid, 2020), but we should understand how misinformation can have harmful impacts on a community during a disaster because of a confused information environment with potentially deadly effects. In a quickly moving disaster area, correct information is critical for saving lives, and misinformation can have real harms.

Limitations and Future Research

This research presents a look at local news misinformation and anti-mask sentiment, finding that local news does occasionally reinforce illusory truth, but there are limitations. First,

there are limitations of the media datasets including unknown audiences and potential missing sources. The MediaCloud data does not include any kind of metric of audience size, so we cannot know how widely seen or read the headlines are. Furthermore, the MediaCloud dataset may be omitting some local news sources that we are unaware of. Second, there are limitations of our COVID-19 case and death data and the mask data gathered from the *New York Times*. The mask data is aggregated from the county-level to the state-level and was gathered at only one point in time, so we cannot know how mask wearing behavior has shifted since early July, nor how mask mandates or misinformation may be affecting any behavioral change. The mask data may also suffer from social desirability bias where people are not reporting their true behavior because wearing a mask may be the preferred response. Additionally, the COVID-19 case and death data we used is at the state-level which loses some of the variation that may be taking place at the local level. Third, our qualitative method of hand-coding headlines may have internal reliability issues of inconsistencies, but we believe that over the large sample of headlines, the effects of any inconsistencies are small.

A final limitation is that with the exception of Illinois which enacted a mask mandate in early May, most of the coverage we looked at was in July and August, and it is possible that any politicized bifurcation in mask wearing behavior occurred before our studied time period. In other words, people were exposed to politicized and false information in March, April, May, and June and this early exposure informed long-term decision making by creating an initial misperception about the safety and efficacy of masks in stopping community spread. However, this assumes that people will not change their minds as the virus spreads and begins to affect people in their own neighborhood.

This research opens many avenues of future research that can build upon our findings. One, while we looked at misinformation in local news at the state level, there is potential to research mask wearing and local news at the county- or city- levels of analysis. Two, mask wearing behavior was only captured in one self-reported survey, therefore another round of surveys should be conducted to see how mask wearing has changed since early July as the pandemic continues to run its course. Third, the scope of the research can be expanded by increasing the state sample size and by incorporating other methods of computational text analysis including sentiment analysis and topic modeling. Fourth, the MediaCloud data could be paired with sharing data on Twitter (or Facebook, though that data is inaccessible) to better explore the intersection between local news and social media. Combining local news URLs with Twitter sharing data would allow us to discover which stories are being shared online, and how social media may be amplifying their reach and spreading misinformation further than they would otherwise through local readership. Finally, a similar research study of local news coverage can be applied to the information environment around other non-pandemic disasters like hurricanes or wildfires.

Conclusion

In this study, we analyzed the relationship between local news, misinformation, and mask wearing. We found that approximately 75% of Americans report that they frequently or always wear a mask in public. However, about 10% of Americans report that they rarely or never wear a mask in public. The disinclination to wear a mask in public may be caused many factors, but we do not believe local news is a substantial reason why someone would choose to go mask-less. In fact, we believe that most local news act as a cross-cutting force against other information sources that may discourage mask wearing and encourage anti-mask sentiment. That said, local news does occasionally engage in reinforcing illusory truth by repeating misinformation without

replacing the misperception with an alternative statement. Local news also occasionally has stories that may reinforce anti-mask sentiment like questioning the legality and enforceability of mask mandates while stressing that mandates violate civil liberties. Furthermore, we find that after the enactment of a mask mandate, the amount of anti-mask stories grows relative to pro-mask stories.

We believe that the shift in media coverage after mask mandates presents a problem as the pandemic continues to run its course. It appears that local news misinformation is not responsible for people rejecting mask wearing, but small shifts in mask wearing that may be caused by any misinformation can have large effects on the long-term effects on resilience. The media is an actor in constructing the perception of risk of the pandemic, so the replacement of pro-mask stories by anti-mask stories can affect the public's long-term perceptions of COVID-19 risk. Disaster events are times of confusion where correct information can have significant effects on safety and survivability. The decline of local news sources over the past few decades is alarming if local news is serving as a main source of news that crosscuts against more misinformation-laden news sources.

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Figures

Figure 1. Case Selection Summary Table

Case Selection Summary Table								
State	Mandate	Mandate.Date	DemGov	Gov.Name	Covid19.Cases	Covid19.Deaths	Never.Or.Rarely	Frequently.Or.Always
Arizona	0		0	Doug Ducey	196305	4688	10.29%	80.23%
Florida	0		0	Ron DeSantis	588594	10048	11.28%	77.69%
Idaho	0		0	Brad Little	29252	299	24.86%	60.67%
Illinois	1	5/1/2020	1	JB Pritzker	215903	8064	14.36%	72.96%
Montana	1	7/16/2020	1	Steve Bullock	6095	89	32.24%	53.27%
New Hampshire	1	8/11/2020	0	Chris Sununu	7050	428	11.27%	81.39%
Ohio	1	7/23/2020	0	Mike DeWine	112003	3929	19.32%	65.65%
Texas	1	7/3/2020	0	Greg Abbott	588050	11252	11.16%	79.12%

Figure 2. MediaCloud Descriptive Statistics

Media Set Summary Table										
Media.Sets	Total.Stories	Duplicates	Unique.Stories	Mask.Stories	Mask.Story.Perc	Misinformation			Pro.Masks	Misinfo.Diff
						NonMask	Mask	Mask.Perc		
Arizona-7.02-7.14	3143	2286	857	175	20.42%	10	18	10.29%	32	4
Florida-7.02-7.14	4313	2591	1722	399	23.17%	8	24	6.02%	51	19
Idaho-7.02-7.14	223	17	206	63	30.58%	3	4	6.35%	9	2
Illinois-4.16-4.30	1881	1216	665	163	24.51%	7	6	3.68%	13	0
Illinois-5.02-5.16	2115	1487	628	99	15.76%	1	7	7.07%	2	-6
Montana-7.01-7.15	363	46	317	92	29.02%	2	2	2.17%	15	11
Montana-7.17-7.31	234	14	220	48	21.82%	0	5	10.42%	9	4
New Hampshire-7.27-7.8.10	445	202	243	51	20.99%	1	1	1.96%	4	2
New Hampshire-8.12-8.26	572	262	310	46	14.84%	3	5	10.87%	9	1
Ohio-7.08-7.22	4412	2478	1934	612	31.64%	10	17	2.78%	31	4
Ohio-7.24-8.07	1751	915	836	129	15.43%	9	11	8.53%	10	-10
Texas-6.18-7.02	4117	2102	2015	533	26.45%	6	19	3.56%	63	38
Texas-7.04-7.18	4958	2940	2018	380	18.83%	10	39	10.26%	47	-2

Figure 3. Mask Usage by State

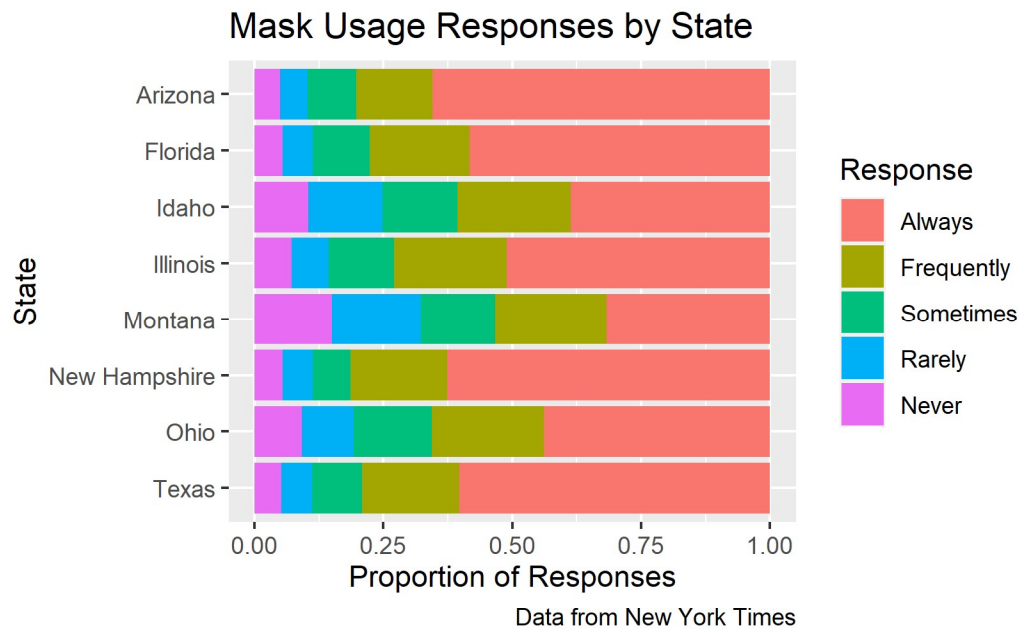


Figure 4. Correlation Coefficients

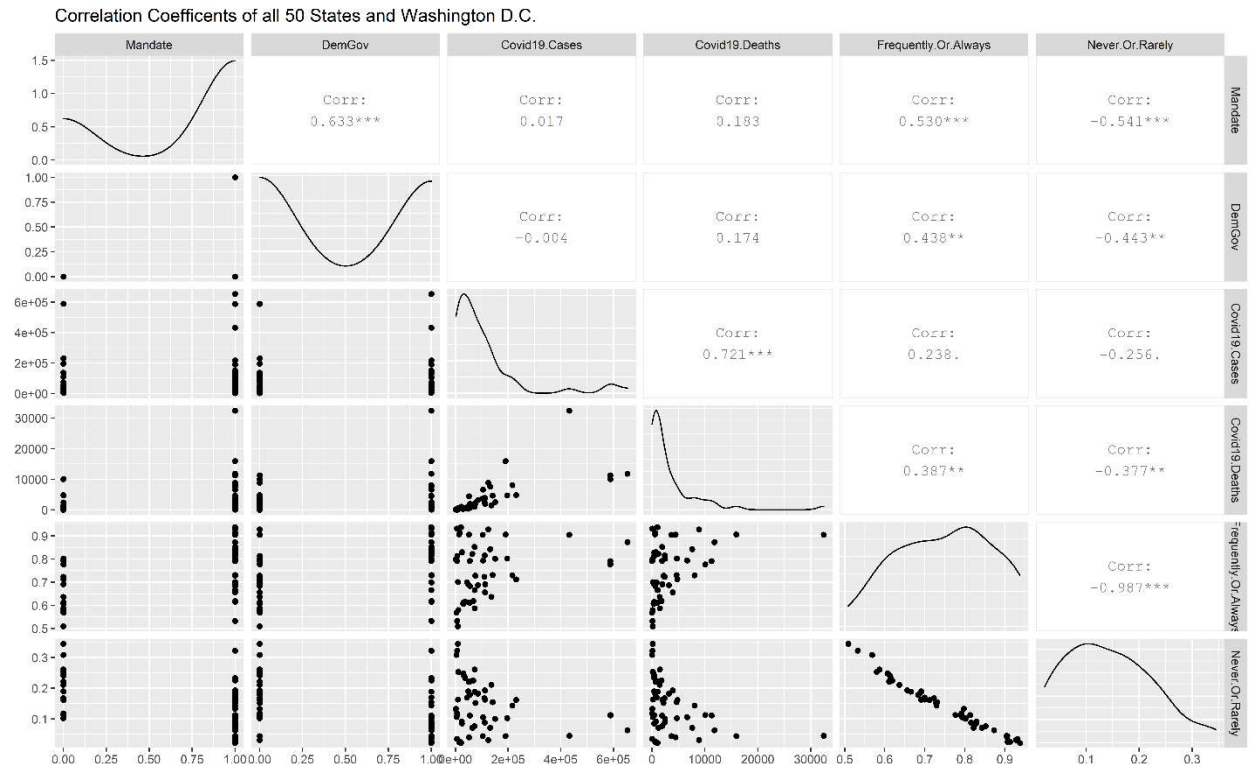


Figure 5. Mask-Word Correlations

Arizona Top-15 Mask Correlations		Florida Top-15 Mask Correlations		Idaho Top-15 Mask Correlations	
Word	Correlation	Word	Correlation	Word	Correlation
wear	0.33	mandate	0.47	mandate	0.44
wearing	0.28	wear	0.23	customer	0.30
mandate	0.27	ordinance	0.19	mandates	0.26
wears	0.26	wearing	0.18	mayor	0.25
requirements	0.22	wears	0.18	boise	0.23
issues	0.21	martin	0.15	central	0.22
destroys	0.20	face	0.14	without	0.21
display	0.20	order	0.14	business	0.21
rolex	0.20	lieu	0.13	passes	0.21
retailer	0.20	requirements	0.13	crowd	0.21
face	0.19	use	0.13	past	0.21
holocaust	0.18	walk	0.13	prison	0.21
shopper	0.17	safely	0.13	protests	0.21
rule	0.16	youd	0.13	enforce	0.21
statewide	0.16	better	0.12	group	0.21

Illinois Pre-Mandate Top-15 Mask Correlations	
Word	Correlation
requirements	0.36
wear	0.27
drive	0.27
need	0.26
face	0.25
requirement	0.24
you	0.24
cloth	0.23
correctly	0.21
how	0.19
wearing	0.19
mandate	0.19
launches	0.19
citywide	0.16
shortage	0.16

Illinois Post-Mandate Top-15 Mask Correlations	
Word	Correlation
charged	0.30
guard	0.30
face	0.28
security	0.28
wearing	0.27
dispute	0.26
factory	0.25
store	0.24
makers	0.24
respond	0.24
killing	0.23
wear	0.20
your	0.19
over	0.18
institute	0.16

Montana Pre-Mandate Top-15 Mask Correlations	
Word	Correlation
mandate	0.38
commander	0.28
incident	0.28
public	0.23
requirement	0.22
resolution	0.22
use	0.22
consider	0.22
ordinance	0.22
rule	0.22
adopts	0.22
statewide	0.22
wear	0.20
whitefish	0.20
wearing	0.19

Montana Post-Mandate Top-15 Mask Correlations	
Word	Correlation
mandate	0.32
order	0.25
effect	0.25
requirements	0.25
cowboy	0.25
over	0.19
officials	0.19
public	0.19
backlash	0.18
feared	0.18
records	0.18
blocking	0.18
disappointed	0.18
georgia	0.18
cchd	0.18

NewHampshire Pre-Mandate Top-15 Mask Correlations

Word	Correlation
ordinance	0.42
mandate	0.38
where	0.30
list	0.30
council	0.30
proposal	0.30
can	0.26
mandates	0.26
city	0.23
law	0.21
marketplace	0.21
debates	0.21
policy	0.21
hope	0.21
voices	0.21

New Hampshire Post-Mandate Top-15 Mask Correlations

Word	Correlation
mandate	0.56
order	0.37
portsmouth	0.26
board	0.26
statewide	0.26
issued	0.26
proposal	0.26
mandates	0.26
plainfield	0.26
without	0.26
use	0.21
mandatory	0.20
events	0.20
towns	0.20
ordinance	0.20

Ohio Pre-Mandate Top-15 Mask Correlations

Word	Correlation
mandate	0.43
order	0.28
requirement	0.19
statewide	0.19
mandates	0.16
effect	0.16
police	0.14
unenforced	0.14
wearing	0.14
issues	0.14
wears	0.14
enforce	0.13
dewine	0.13
complaints	0.13
wear	0.12

Ohio Post-Mandate Top-15 Mask Correlations

Word	Correlation
mandate	0.35
wearing	0.23
policy	0.21
woman	0.21
resist	0.21
finds	0.21
mandatory	0.18
compliance	0.18
kroger	0.17
pataskala	0.17
renovation	0.17
unveils	0.17
fitness	0.17
planet	0.17
alarm	0.17

Texas Pre-Mandate Top-15 Mask Correlations		Texas Post-Mandate Top-15 Mask Correlations	
Word	Correlation	Word	Correlation
order	0.35	mandate	0.36
mandate	0.29	order	0.32
requirement	0.21	enforce	0.27
issues	0.18	sheriffs	0.19
ordinance	0.18	wearing	0.19
face	0.16	requirement	0.19
wear	0.16	georgia	0.18
statewide	0.16	gov	0.15
policy	0.15	wears	0.15
headlines	0.14	holocaust	0.14
exempt	0.14	rule	0.14
effect	0.13	face	0.14
fort	0.12	issue	0.14
extended	0.12	catcher	0.14
bay	0.12	regular	0.14

Figure 5. Misinformation Correlation Coefficients

