Who Is Responsible for Delhi Air Pollution?
Indian Newspapers' Framing of Causes and Solutions

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In 2018, the World Health Organization declared Delhi the most polluted city on the planet. This study examines how the Indian print news media has framed the issue of Delhi air pollution, and framed responsibilities for its causes and solutions. This content analysis examines stories from *The Times of India, Hindustan Times,* and *The Hindu* for news coverage of Delhi air pollution between 2011 and 2016, when Delhi was enveloped in the worst toxic smog. Findings revealed that personal-level causal attributions (i.e., cars) were mentioned more frequently than were societal-level or other causes (industrial emissions and weather). The responsibility for solutions was attributed to the government and businesses, however, and not to individuals, which may be due to the nation's high-context culture. Theoretical implications and practical applications are discussed.

Keywords: Delhi, India, air pollution, content analysis, news framing

One morning in November 2016, Delhi residents woke up to a deadly smog, with the particulate matter at 15 times higher than safe levels ("Delhi Pollution," 2016). This record-breaking toxicity put at risk the lives of an estimated 25 million people (Bhatnagar, 2016). During a five-day period, the state government took many actions to combat the worst effects, including closing all Delhi schools, halting all construction projects, banning diesel generators, except those in hospitals, and even sprinkling water on the streets ("Schools Shut," 2016). In October 2017, the nation's Supreme Court addressed the problem with a temporary ban on the sale of firecrackers in Delhi, just before Diwali, the most important Hindu festival in North India ("India Supreme Court," 2017). News reports mentioned that despite the ban, Delhi

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residents burned firecrackers anyway, and air quality in some places exceeded hazardous levels again (Zanane & Stalin, 2017).

Air pollution has become the leading cause of cancer and a major cause of respiratory infections, heart disease, and lung cancer (World Health Organization, 2016). Outdoor pollution accounted for almost 3 million deaths worldwide, mostly in developing countries (World Health Organization, 2016).

Despite this serious health risk, and growing concern around the world, there is a gap in the literature regarding how Indian media are framing the issue of air pollution. Frames in media influence how the public defines a social problem, and they set the agenda for policy makers to address such issues (Cobb, & Elder, 1971; Gitlin, 1980; S.-H. Kim, Scheufele, & Shanahan, 2002). Media frames help shape perceptions of how the public attributes causes and responsibility for solutions to such a problem (Entman, 1993; Iyengar, 1991). Understanding this phenomenon will help media companies, health communications practitioners and policy makers clarify the causes and solutions to the public. Delhi consistently exceeds the most threatening levels of hazardous air pollution by almost 10 times (Rizwan, Nongkynrih, & Gupta 2013), the worst among all those measured (Chaudhari, Gajghate, & Singh, 2015). In 2014, Delhi surpassed Beijing as the city with the worst air pollution in the world ("India Admits," 2014). And it has worsened in recent years: There is now twice as much suspended particulate in Delhi as there was in the early 1990s. Outdoor air pollution is now the fifth largest killer in India, with almost 620,000 premature annual deaths due to air pollution-related diseases (IANS, 2013).

The purpose of this study is to examine the frames in news coverage about Delhi air pollution to see how the Indian print media have presented who is responsible for causing the condition and who should be charged with providing solutions. This study performs content analysis of 372 newspaper stories between 2011 and 2016, from the three most widely circulated English-language newspapers, *The Times of India, Hindustan Times,* and *The Hindu*. The goal is to provide analysis of media frames relating to Delhi air pollution, which may be shaping not only public opinion but also policies aimed at addressing this serious and understudied health issue.

Literature Review

Framing of Public Health and Social Issues

Framing theory has guided previous research on how the media can affect public opinion and policy formation for health issues such as pollution (Kensicki, 2004), poverty (S.-H. Kim, Carvalho, & Davis, 2010), obesity (S.-H. Kim & Willis, 2007; Major, 2009), and cancer (Andsager & Powers, 2001; Hoffner & Ye, 2009). News media use framing to package discrete pieces of information related to an issue and present it in an understandable way (S.-H. Kim, Carvalho, Davis, & Mullins, 2011). The media shape public perceptions with story frames that offer possible causes, solutions, or recommendations for various problems (S.-H. Kim et al., 2010; S.-H. Kim & Willis, 2007). Media coverage draws attention to problems, which helps in setting agendas for government officials, policy makers, and the general public (Cobb & Elder, 1972). In other words, media framing of social and health issues such as air pollution may help inform the public not only to think about them but also *how* to think about these issues by making certain factors more salient in their stories (Entman, 1993; S.-H. Kim et al., 2002).

The news media also use different explanations or frames to reflect attributions of cause and responsibility (S.-H. Kim et al., 2011).

While framing social or health issues, journalists select their news sources, preferably quoting sources such as organizations, experts, politician, and "ordinary people" who provide depth to a story (Boyce, 2006; Len-Ríos et al., 2009; Zoch & Molleda, 2006). However, at times this information may be more biased than factual (Greenberg & Knight, 2004).

In communication research, framing has often been linked to agenda setting, to explore why and how certain health and social issues become the focus of the media and public attention, and which sometimes results in policy change as a solution (McKeever, 2012). Walsh-Childers (1994) found that coverage of health issues by widely circulated newspapers with follow-up stories may result in changes in health policy. Thus, analysis of framing of the air pollution problem of Delhi in widely circulated Indian newspapers over a certain period is imperative to understand the potential policy changes related to this issue.

Media may also attribute blame for causing or ascribe responsibility for fixing social problems (Holton, Weberling, Clarke, & Smith, 2012). These frames can impact individuals' decisions about whether to act and how to solve social problems, such as air pollution and poverty (Iyengar, 1991). Whenever news media frame a social problem from the perspective of an individual person or event, it is considered as episodic framing, whereas thematically framed news stories are told from a broader, societal perspective (Iyengar, 1991). Episodic framing can evoke individual blame and decrease support for broader political, economic, or environmental solutions. Conversely, thematic framing that presents an issue as a larger societal problem can increase support for these solutions (Iyengar, 1991). Major (2009) conducted an experiment to investigate the media framing effects of health problems—lung cancer and obesity—and revealed that thematic framing called for collective public action, while episodic framing encouraged individual action to solve health issues in society. S.-H. Kim and Willis (2007) conducted a content analysis of newspaper and television coverage of obesity and found that personal causes and solutions were mentioned more frequently than societal-level causes and solutions.

In a content analysis study of newspaper and television coverage of poverty between 1993 and 2007, S.-H. Kim et al. (2010) found that societal causes and solutions were mentioned significantly more than personal attribution of responsibilities, especially in newspaper articles. Holton et al. (2012) also found that mentions of societal-level causes were increasing and personal solutions were decreasing in recent years, depending on the problem.

Narrative Policy Framework

A related theory, narrative policy framework (NPF), is another approach for studying stories produced by Indian media, which are frames that attempt to influence governments about environmental issues and other policy debates (McBeth, Shanahan, Arrandale, Anderson, & Rose, 2012). NPF constructs

A holistic framework designed to accurately capture and describe policy narratives, while also employing these theories to provide testable hypotheses that allow for the

accurate assessment of the influence of policy narratives on public opinion, policy change, and policy outcomes. (Shanahan, Jones, & McBeth, 2011, p. 535)

Hallahan (1999) found that the attribution of responsibility was one of the most vital frames for communicating health issues. Stone (2002) found that the use of literary narrative devices revealed constructs about who wins and who loses in a particular policy issue. Baumgartner and Jones (1993) found that within such policy narratives, an interest group is always part of the story. Olofsson, Weible, Heikkila, and Martel (2017) used NPF as a foundation for automated text coding of India nonprofits' online website articles on the topic of Delhi air pollution. They found that narratives on these websites focused on individual and societal causes—cars and lack of government regulations—both of which were villainized as controlled by "wealthy people" and that solutions were in the realm of universities and research organizations (p. 965).

Media framing of environmental policies creates public interest either in support of or opposed to governmental intervention, as seen in studies about nuclear power and radioactive accidents at Three Mile Island and Chernobyl (Freudenburg & Rosa, 1984; Van der Pligt, 1992). Previous studies specifically about air pollution have largely focused on the impact of increasing particulate matter in the air and consequent health concerns such as lung cancer (Pope et al., 2002), respiratory infections (Dockery & Pope, 1994; Kampa & Castanas, 2008), or even death (Samet, Dominici, Curriero, Coursac, & Zeger, 2000). There is a gap in studying how the topic of Delhi air pollution is presented in the media.

Delhi Pollution

Delhi, one of the largest global population centers, faces challenges in addressing air pollution, due to inadequate infrastructure (Gurjar, Butler, Lawrence, & Lelieveld, 2008), massive urbanization (Nagpure, Gurjar, & Martel, 2014), volcanic activity, dust, industrial emissions, vehicular emissions, landfills, and open burning (Ministry of Environment, Forests and Climate Change, 2016). Man-made causes can be further categorized as individual level (cars, fireworks) and as societal level (factories, poor road maintenance). In other words, air pollution in Delhi may be caused by individual behaviors such as burning fireworks or traveling in cars instead of lack of public transport, and also caused by wider societal or environmental conditions such as emissions from factories, bad weather conditions, and poor road maintenance (Ryan, 1976). A 2016 report from the Indian Ministry of Environment and Forests highlighted individual-level causes as being the main contributors of air pollutants in India, from personal automobiles (72%), along with other factors such as household pollution, industrial emissions, construction of infrastructure, garbage burning, and road dust (Ministry of Environment, Forests and Climate Change, 2016). Thus, based on the literature, this study hypothesizes the following:

H1:   *Indian newspapers will present individual-level causes more often than society-level causes for creating Delhi air pollution.*

According to Hofstede (1984), and other scholars, Indians are higher in power index and appreciate the hierarchical distribution of power in society. The centralized top management and those with higher authority expect common people with less power to be submissive to them (Hofstede, 1993). Thus, Indians prefer group relations and value institutions with power (Shuter, Dutta, Cheong, Chen, & Shuter, 2017). Powerful newspapers may reflect this characteristic of their readers in the stories they

publish about air pollution. Some studies have found solution frames that require government and societal involvement, such as the need to implement stringent rules to curb vehicular and industrial emissions, to use alternative fuels for household cooking and heating, to control agricultural burning, and to curb deforestation (Lim et al., 2013). Thus, this study also hypothesizes the following:

H2:   *Indian newspapers will present society-level solutions more frequently than individual-level solutions for Delhi air pollution.*

        Existing research on Delhi pollution seems to focus primarily on scientific atmospheric measures, health-care issues, and government strategies (e.g., Guttikunda & Calori, 2013; Nagpure et al., 2014). Although these articles provide valuable information on the causes, solutions, and impact of the toxic air pollution, they do not examine the media representations of Delhi pollution. Olofsson, Weible, Heikkila, and Martel (2017) focused on word frequencies, nodes, and correlations between actors and website text. Using automated text coding, they measured parent node frequencies and correlations between actors. They found that transport was heavily mentioned in newspapers and is often associated with the words "government" and "authority." Most proposed solutions were university and research agencies, regulation, and administrative enforcement and capacity. However, there is a gap in the research in terms of how Indian media suggest individual and societal causes and solutions for the problem, and what sources they used to report this prominent health issue. Sources are important, as they help frame the journalists' news stories (Golan & Himelboim, 2015). These might be individual citizens, representatives of government agencies, think tanks, universities, and political parties (Howard, Kollanyi, Bradshaw, & Neudert, 2017), or policy makers, businesses, interest groups, celebrities, and activists (J.-Y. Kim, Xiang, & Kiousis, 2011). Zoller (2017) studied activist groups such as nongovernment organizations (NGOs) and how they created visibility for the health effects from corporate behaviors in a sort of narrative for civil rights. To learn more about media framing of health issues in India and to understand the story-source influence on the media framing of causes and solutions of Delhi air pollution, this study poses a single exploratory research question:

RQ1:   *What story sources were included in Indian newspaper coverage of Delhi air pollution?*

Method

        To test these hypotheses and explore the research question, the authors used quantitative content analysis. Emphasizing the appropriateness and uniqueness of content analysis, Berelson (1952, p. 18) defined it as "a research technique for the objective, systematic, and quantitative description of the manifest content of information." This study examined the news coverage of Delhi air pollution in *The Times of India, Hindustan Times,* and *The Hindu* for more than five years, from September 2011 to December 2016. *The Times of India, The Hindu,* and *Hindustan Times* were selected because they are the highly circulated English-language newspapers among Audit Bureau of Circulation (2018) member publications. Additionally, these newspapers are among the most widely circulated newspapers in Delhi–National Capital Region (NCR) (Variyar, 2014) and influential English language newspapers in India (Maslog, Lee, & Kim, 2006). The time frame of September 2011 to December 2016 was chosen because the World Health Organization (WHO) declared Delhi to be the most polluted city among developing

countries in September 2011 (Chaudhari et al., 2015), and Delhi saw its worst carcinogenic smog—also known as the "Great Delhi Smog"—in November 2016 ("Delhi Pollution," 2016).

Selection of Sample

This study used purposive sampling by employing rigorous standards of sample selection, which reproduces "the relevant causal features of a larger universe (representativeness) and provides variation along the dimensions of theoretical interest (causal leverage)" (Gerring, 2008, p. 645). Using the Factiva database, the keywords "Delhi and pollution" yielded 220 news articles from *The Times of India*, 244 articles from *Hindustan Times,* and 104 articles from *The Hindu*. It was noted that the words "Delhi pollution" in the headline and lead paragraph decreased the number of articles, while using "Delhi OR pollution" increased the number of unrelated articles in the search. Using the Factiva database and the keywords "Delhi AND pollution" to search news coverage from September 2011 to December 2016 yielded a total of 548 news articles.

Analysis included feature stories about pollution in Delhi and the NCR, regardless of page and section of the article. Following the same exclusion criteria used by past research (Holton et al., 2012), this study removed opinion articles, letters to the editor, entertainment stories, book reviews, news briefs (150 words or less), and other similar articles, in addition to duplicate articles, articles from states other than Delhi–NCR, as well as articles not focused on air pollution. Also, if the article mentioned Delhi merely as a meeting venue but did not focus on air pollution, it was excluded (Olofsson et al., 2017). Opinion articles and letters to editors were excluded because the study's focus is on news framing, which is regarded as a function of journalistic reporting rather than the viewpoint of one person (McKeever, 2012). After removing all irrelevant articles, the final sample included 372 articles. The unit of analysis was a complete news article. All articles were printed and coded by two trained graduate student coders. The final sample contained 153 articles from the *Hindustan Times,* 151 from *The Times of India,* and 68 from *The Hindu*. *The Hindu* has its largest base of circulation in southern India and is considered a progressive independent newspaper, while *Hindustan Times* is considered centrist, and *The Times of India* is considered conservative in its political alignment ("World Newspapers and Magazines," 2018).

Coding Variables

Gerring (2012, p. 13) stated that the "description of a topic usually precedes causal analysis of that topic." Table 1 defines each potential cause and solution to Delhi air pollution that was included in the coding instrument.

Table 1. Attribution of Causal and Solution Responsibility (Coding and Intercoder Reliability).

Causal responsibility	Solutions responsibility
Personal level causes for Delhi pollution (Krippendorff's alpha = .86)	**Personal level solutions for Delhi pollution (Krippendorff's alpha = 1.0)**
Use of diesel-based generators/rampant use	Using energy efficient resources: Solar lamps/LEDs
Burning biomass/waste burning	Carpooling (reduce congestion)
Vehicular emission	Use of technology, like an app
Increased number of cars/congestion	Compliance with emission laws of Delhi: P.U.C. (pollution under control) certificate for vehicles
Road dust due to traffic	
Emission from cooking stoves/tandoors/fossil fuels/wood burning	
Burning firecrackers/selling or importing banned fireworks	
Construction/demolition of infrastructure projects/poor management of construction waste/dust	
Societal-level causes for Delhi pollution (Krippendorff's alpha = .88)	**Societal-level solutions for Delhi pollution (Krippendorff's alpha = .87)**
Aerosols/emissions from power or waste processing plants	Air quality: monitoring stations, air-treatment systems (e.g., virtual chimneys, mist fountains, wind purifications)
Pollution from neighboring states (crop burning in Haryana/Punjab) or neighboring countries like Pakistan	Reducing congestion (e.g., odd–even car-rationing/car free days)/checks on commercial trucks/autos, tax-based measures to reduce car buying
Commercial emissions: combustion/burning of industrial waste	Green initiatives: funding green projects/massive plantations/saplings/greenways/reforestation
Commercial vehicle (truck) emissions	Implementation of stricter norms: banning/imposing fines on dumping construction debris/ban burning waste or biomass/banning diesel vehicles and generators/legal notices to defaulters for noncompliance of water/vehicle and power norms
Resuspension of traffic dust	Curbing road dust: vacuuming roads, clean pavements, water sprays
New industry: establishment of new small-scale industry or scrap markets	Creation of recycling plants, waste management, energy plants, sewage treatment plants, solar energy plants, increase use of clear fuels like CNG, Bharat Stage-VI (BS-VI)
Weather: unfavorable meteorological conditions	Firecrackers: Prevent illegal fireworks from entering Delhi, ban firecrackers/advise to curb fireworks
Public transport: Misuse of buses, nonmaintenance (less frequency/bad condition), waste of public transport resources (traveling of buses on noncongested routes/timings)	Public transport: Improving or assessing public transport (new buses, cycle tracks, e-rickshaw), encouraging people to use public transport (provide incentives, bring awareness)
	Controlling emissions/shutting down power plants Pollution check for vehicles/fine offenders
	Close schools on some days/staggering work times for businesses/shutting down industries for some days

Coding categories were developed through an extensive review of the news articles from each newspaper. Many categories were created at the beginning, and the coding sheet was revised many times to remove or combine some of the causes and solutions categories before preparing the final version. Attributions of causal responsibility for Delhi air pollution were categorized into personal and societal causes. Personal-level causes included behavior of an individual, lifestyle, and other factors that might be responsible for Delhi air pollution.

Personal-level causes were divided into eight categories: Using diesel generators, burning biomass or waste, emissions from personal vehicles, increased number of individual automobiles, road dust due to traffic, emissions from cooking stoves, burning firecrackers, and infrastructure projects (see Table 1 for details).

Societal-level causes for Delhi air pollution were also divided into eight categories: emissions from power or thermal plants, pollution from a neighboring state or country, industrial emissions, exhaust from commercial vehicles, resuspension of traffic dust, establishment of new industry, weather conditions, and public transport (see Table 1).

Table 1 also shows attributions of solution responsibility for Delhi air pollution categorized into four personal-level solutions, including carpooling, using solar lamps, using new technology, and compliance with emission laws. There are 11 societal-level solutions: improving public transport, reducing road congestion, taking green initiatives, implementing stricter norms, adding recycling plants, curbing road dust, banning fireworks, controlling emissions from power plants, monitoring air quality, pollution checks for vehicles, and closing schools or businesses on certain days. These societal-level solutions largely covered various governmental programs and policy changes, and stricter actions by the government.

Story sources, defined as any individual or organization quoted or cited for providing information in the air pollution articles, were counted and coded into the following categories: representatives of state or central government, nonprofit spokesperson, science/medical/pollution expert, and judicial representatives (see Table 2). Sources could be individually named (e.g., Arvind Kejriwal) or mentioned as organizations providing information (e.g., "World Health Organization observed . . ." or "National Environmental Engineering Research Institute [NEERI] data show . . ."). Additionally, judicial bodies were included as sources in news coverage of Delhi air pollution because journalists mentioned the National Green Tribunal (NGT) often and quoted various judges and lawyers in their stories. The NGT was established in 2010 for speedy and effective disposal of cases relating to environmental protection and conservation of forests and other natural resources. It is a specialized judicial body equipped with the essential expertise to handle environmental disputes involving multidisciplinary issues (National Green Tribunal, 2010).

Coders counted the number of each type of source appearing in each story, counting one type of source only once per article even if it appeared multiple times in the same article. The codebook provided definitions and examples of sources (see Table 2).

Table 2. Sources of the News Stories on Delhi Pollution.

Coding variable	Krippendorff's alpha
1. Government source	
(a) State government: This category includes any individual employed by the Delhi government.	0.907
(b) Central government: This category includes any individual employed by the central Indian government.	0.928
2. Science/medical sources: This category includes any individuals involved in treatment or research on the causes and solutions of Delhi air pollution, including doctors, scientists, therapists, researchers, or scientific organization such as NEERI, MET (Indian meteorological department), or medical organizations such as the All India Institutes of Medical Sciences. The individual could also be referred as a pollution expert.	0.843
3. Nonprofit sources: This category includes any individual employed by or representing a local, national, or international nonprofit or advocacy organization (e.g., Centre for Science and Environment, International Institute for Applied Systems Analysis, WHO, UNESCO).	0.939
4. Judicial bodies: This category includes any individual employed by or representing a national, district, or special environmental judicial bodies like the NGT and Supreme Court (e.g., judges, justices).	0.836

Coder Reliability

Previous literature stressed the importance of the intercoder reliability for making the content analysis process rigorous and valid (Krippendorff, 2004; Lombard, Snyder-Duch, & Bracken, 2002). This study reported Krippendorff's (1980) alpha index for intercoder reliability, as it accounts for chance agreements (Lombard et al., 2002), "and it satisfies all of the important criteria for a good measure of reliability" (Hayes & Krippendorff, 2007, p. 78).

Two graduate student coders analyzed 15 articles (five articles from each newspaper) together using the protocol to improve the coding book and bring mutual understanding, which was followed by modest adjustments. After training and pilot tests, they coded a random sample of 45 articles (12%) of the data, in the parameter recommended by Wimmer and Dominick (1997).

The coders first examined whether each article and program mentioned one or more of the eight personal and eight societal causes. Each cause was coded as 0 (not present) or 1 (present). Coders then determined the number of mentions of personal and societal causes in each news article. Some articles made no mention of either personal or societal causes, whereas others mentioned more than one. A single cause was counted as one mention in an article, irrespective of the number of times it was mentioned in

that article (S.-H. Kim et al., 2010). This same process was followed to count the number of personal and societal solutions, and sources mentioned in each news story. Krippendorf's alpha was also used to assess reliability on the causal and responsibility attributes and source variables.

Krippendorf's alpha ranged from .84 to 1.0 for causes, solutions, and sources in the Delhi air pollution articles. Final intercoder reliability was $a = .86$ for personal causal attribution, $a = .88$ for societal causal attribution, $a = 1.0$ for personal responsibility attribution, and $a = .87$ for societal responsibility attribution. Reliability for the source variables ranged from $a = .84$ to $a = .94$. Thus, all variables achieved good levels of reliability as alpha was greater than 0.80 (Krippendorff, 2004), and were also consistent with other studies using content analysis (e.g., Riffe, Lacy, & Fico, 2005).

Results

News coverage of Delhi air pollution in *The Times of India*, *Hindustan Times*, and *The Hindu* increased gradually over time from 2011 to 2016, coinciding with the increasing particulate matter concentration in the Delhi air (Maji, Dikshit, & Deshpande, 2016). News coverage of Delhi pollution appeared less frequently in *The Hindu* than in the *Hindustan Times* and *The Times of India*. One possible explanation could be that *The Hindu* is headquartered in Chennai, the capital city of the southern state of Tamil Nadu, and its large circulation is less focused in Delhi and more in southern states such as Andhra Pradesh, Tamil Nadu, Kerala, Telangana, and Karnataka.

Table 3. Attributions of Personal-Level Causal Responsibility in News Coverage of Delhi Pollution.

	Hindustan Times (*N*= 153)	The Times of India (*N* = 151)	The Hindu (*N* = 68)	Media total (*N* = 372)
Vehicular emissions	18	24	13	55
Increased cars	20	17	7	44
Burning biomass	16	12	13	41
Infrastructure projects	14	8	7	29
Burning firecrackers	16	5	4	25
Road dust from traffic	6	5	8	19
Use of generators	3	6	4	13
Emissions from cooking and so forth	5	4	4	13
Total	98	81	60	239

The hypotheses addressed whether certain causes and solutions for Delhi air pollution appeared more often than others. Hypothesis 1 posited that Indian newspapers focus on personal-level causes more often than societal-level causes. Indeed, personal-level causes appeared much more frequently than societal causes (239 mentions vs. 195). Table 3 shows that vehicular emissions was the most frequently mentioned individual cause, appearing in 55 (23%) articles, followed by increased number of cars/congestion (n = 44, 18.4%), and burning biomass/waste burning (n = 41, 17.2%). The next most frequently cited individual-level causes were construction and demolition of infrastructure projects (n = 29, 12%) and burning firecrackers (n = 25, 10.5%).

Table 4 shows that the most frequently mentioned societal cause was weather/unfavorable meteorological conditions (n = 83, 42.6%), followed by emissions from power plants (n = 37, 18.9%), and pollution from neighboring countries/states such as crop burning in Punjab and Haryana (n = 34, 17.4%). The next most frequently cited societal-level causes were emissions from industries (n = 20, 10.3%) and emissions from commercial vehicles (n = 13, 6.7%). Thus, H1 was supported, as a paired-samples t test indicated individual causes appeared more often than societal-level causes (t = 2.08, p < .05).

Table 4. Attributions of Societal-Level Causal Responsibility in News Coverage of Delhi Pollution.

	Hindustan Times (N = 153)	The Times of India (N = 151)	The Hindu (N = 68)	Media total (N = 372)
Weather	35	28	20	83
Emissions from power plants	12	17	8	37
Neighboring states/countries	14	13	7	34
Emissions from industries	8	10	2	20
Emissions from commercial vehicle	5	5	3	13
Public transport	2	2	1	5
Traffic dust	0	1	1	2
New industry	0	1	0	1
Total	76	77	42	195

Hypothesis 2 posited that Indian newspapers would present societal-level solutions more frequently than personal-level solutions. Societal solutions appeared much more frequently (603 times, compared with 24 mentions of individual solutions). Table 5 shows that the most frequently mentioned societal solution was implementation of stricter norms ($n = 125$, 20.7% of total), followed by reducing congestion/odd-even scheme/car-rationing ($n = 118$, 19.6%), and creation of recycling plants ($n = 78$, 12.9). Table 5 illustrates the societal solutions that appeared in the three Indian newspapers.

Table 5. Attributions of Societal-Level Solution Responsibility in News Coverage of Delhi Pollution.

	Hindustan Times (N = 153)	The Times of India (N = 151)	The Hindu (N = 68)	Media total (N = 372)
Stricter norms	47	52	26	125
Reducing congestion	53	39	26	118
Recycling plants	32	36	10	78
Air quality	25	22	18	65
Public transport	21	29	12	62
Pollution check	20	12	4	36
Shutting power plant	11	11	5	27
Curbing road dust	10	7	9	26
Firecrackers	15	6	5	26
Shutting schools	7	8	5	20
Green initiatives	5	12	3	20
Total	246	234	123	603

Carpooling to reduce congestion was the most frequently mentioned personal-level solution, appearing in nine (3.8%) news articles (see Table 6), followed by using energy efficient resources ($n = 8$, 3.3%) and using technology, like an app ($n = 6$, 2.5%). Hypothesis 2 was supported by a paired-samples t test, which indicated that the difference between societal and individual solutions was statistically significant ($t = 22.613$, $p < .001$).

Table 6. Attributions of Personal-Level Solution Responsibility in News Coverage of Delhi Pollution.

	Hindustan Times (N = 153)	The Times of India (N = 151)	The Hindu (N = 68)	Media total (N = 372)
Carpooling	1	6	2	9
Using energy-efficient resources	3	4	1	8
Use of technology	1	3	2	6
Emission laws	0	1	0	1
Total	5	14	5	24

Research Question 1 addressed whether certain sources were included more often in stories than others were in news coverage of Delhi air pollution. Table 7 illustrates that Delhi government sources ($n = 166$, 28.7%) were included most frequently in news coverage of Delhi air pollution. Representatives of judicial bodies ($n = 123$, 21.2%) and scientific/medical/ pollution "experts" ($n = 111$, 19.2%) were the next most common types of sources, followed by nonprofit sources ($n = 101$, 17.4%). Finally, Indian central government members ($n = 78$, 13.5) were the least common source type included in Delhi air pollution news coverage in Indian newspapers (see Table 7 for details). Delhi government sources were mentioned by the Indian newspapers more than the judicial bodies (McNemar's $\chi^2 = 9.33$, $p < .01$), experts (McNemar's $\chi^2 = 12.96$, $p < .001$), nonprofit (McNemar's $\chi^2 = 19.98$, $p < .001$), and central government sources (McNemar's $\chi^2 = 37.1$, $p < .001$).

Table 7. Presence of Sources in News Coverage of Delhi Pollution.

	Hindustan Times (*N* = 153)	The Times of India (*N* = 151)	The Hindu (*N* = 68)	Media total (*N* = 372)
State (Delhi) government	65	69	32	166 (28.6%)
Judicial bodies	52	43	28	123 (21.3%)
Scientific/medical or pollution expert	38	49	24	111 (19.2%)
Nonprofit organization	48	40	13	101 (17.4%)
Central (Indian) government	26	32	20	78 (13.5%)
Total	229	233	117	579 (100%)

Discussion

By analyzing 372 news articles from the *Hindustan Times, The Hindu,* and *The Times of India*, this study explored how Indian print news media framed the issue of air pollution in Delhi. More specifically, this study examined how the media presented the causes and solutions, both personal and societal, with various factors related to the unhealthy environment. Many of the news stories about Delhi air pollution centered on two major thematic events—the oppressive smoggy days in the fall of 2015 and again in 2016, which caused severe public health issues (Burke, 2015; Safi, 2016). What was termed the "Great Delhi Smog" became a defining topic in the newspapers. Although the causes were largely attributed to personal auto emissions and the increase in individual car traffic, the responsibility for solutions was ascribed to legislators and judicial entities who could control the individual use of cars. The news stories did not frame any solution in terms of individual agency, such as using cars less frequently or choosing public transportation, but more often in terms of the government enforcing the new laws. It was notable how few stories mentioned that individuals should use cars less frequently, or carpool—fewer than 10 out of the 372 news stories. Individual action was not a major part of the solution, in any newspaper.

As the India economy is one of the fastest growing in the world, and the transport sector contribution to the GDP growth is expected to rise from 5.6% in 2010 to 6.4% in 2050 (Dhar & Shukla, 2015), these factors may explain why Indian media and predominant government sources did not suggest that individuals stop using personal vehicles. In addition, India is a more collective society in general, so it is perhaps not surprising that the media framed more societal-level solutions than personal or individual actions. It may also be because the condition itself is more societal in its effects: The practice of many individuals using polluting automobiles also affects Delhi residents who do not use cars. Additionally, car-

owning Indian residents are usually from higher socioeconomic groups and can afford to commute without using public transit, whereas lower socioeconomic groups may not drive but largely suffer the repercussions of air pollution. This framing in newspapers for societal solutions confirms similar studies in other areas of public health, such as vaccinations (Holton et al., 2012), as well as wider social issues, such as poverty (S.-H. Kim et al., 2010).

Results of this study show that the second-largest proportional cause mentioned in news stories—nearly as frequently as personal vehicles—was the weather (coded as a societal cause), far more than were man-made polluters such as power plants and factories. Weather was "blamed" in news stories for causing air pollution twice as much as industry was. This might be interpreted as journalists letting big business and corporate giants off the hook for causing air pollution. It might also infer that there would be a limit of potential solutions if Mother Nature was causing the problem. Blaming the weather is virtually assuring readers that no person or group is responsible for causing air pollution—nor for finding a solution for it. Other framing studies have not revealed such a finding, revealing a unique distinction in India media.

The stories also did not include significant mention of improving mass transit systems as a solution, as this would certainly reduce the number of individual cars in traffic. In fact, if mass transit was mentioned at all in a news story, then it was most often framed as a flawed solution. For example, the Bus Rapid Transit (BRT) corridor was built by previous Sheila Dikshit government to ease the traffic congestion between two most important and crowded road stretches, i.e., from Ambedkar Nagar to Moolchand in Delhi (Singh and Manohar, 2018). But its efficiency was heavily criticized by everyone including media, citizens and government and finally, it was demolished in 2016 (Singh and Manohar, 2018).

Due to lack of planning and effective implementation of BRT in Delhi, Indian newspapers mentioned BRT in a negative tone. For example, former transport minister Saurabh Bharadwaj, as quoted in *The Times of India*:

> The stretch on which this BRT [Bus Rapid Transit] has been made was not the best choice. For one, the bus lanes are in the middle and getting to them is a huge pain for pedestrians. Secondly, there are about four major intersections on the road and despite a very expensive smart signaling system, the implementation has failed completely. We have asked for scrapping of the existing BRT. (Lalchandani, 2015, para.3)

The sources included in news stories about Delhi air pollution seem appropriate when one considers the issue. Government officials and science or medical experts are often sought after for inclusion in health news (McKeever, 2012). The literature stressed that quotes from government-affiliated sources and doctors have a large impact in shaping health-related news stories (Nisbet & Lewenstein, 2002; Tanner & Friedman, 2011). In the case of Delhi air pollution, however, the science experts seemed to focus on weather conditions more than elements that are controlled by people. In all the Indian news stories about Delhi pollution, individuals and "everyday citizens" were hardly represented at all. Thus, "ordinary voices," such as local residents near power plants, children, mothers, or elderly people who

suffered from health issues after toxic smog events in Delhi, seem to be missing in air pollution news coverage. This is another reflection of journalists and readers relying on the direction of higher authorities to reduce CO_2 emissions from various sources through the creation of new laws.

Nonprofit organizations were quoted less frequently than government sources or health experts. This may indicate the limited number of air-pollution nonprofits based in Delhi, or it may reflect their poor communication efforts with media. This reflects the need or opportunity for greater media advocacy efforts on the part of environmental nonprofit organizations (McKeever, 2012; Zoller, 2017). This is similar to what De Souza (2010, p. 491) found, which was that Indian elite newspapers published the views of government and NGO actors but "the voices of NGO beneficiaries are blatantly missing from the news discourse." As such, there remains a reluctance to include nonprofit organizations as sources for Delhi air pollution news stories, as they may have less influence with readers (and journalists) than government sources do. Clearly, this finding is a departure from NPF studies, which rely on such organizations and interest groups to propagate policy solutions (Olofsson et al., 2017; Stone, 2002). In keeping with Indian citizens'—and evidently, journalists'—respect for power, Delhi residents suffering in the worst air pollution in the world are looking to those in authority to direct the search for solutions, to create the laws that will direct personal agency. More news stories that are episodic in nature may help provide readers with a sense of responsibility and action for solutions, rather than the thematic frames that emphasize the weather, or waiting for government action. The deadly air quality in Delhi is a unique condition that requires more extensive media coverage and more extensive frames of attribution to start improving the burgeoning health problem.

This study is novel in its approach of examining the media framing of a global health problem in an international context. This study is a significant contribution to the wide literature of health communication, media framing, and advocacy, which has largely existed in the U.S. context. This study supports and extends the argument made by Zoller (2017) that ill effects of corporate actions, such as hazardous emissions from industries or power plants, can be addressed by integrating the efforts from all groups, including health activists, NGOs, leading scholars, and the public to understand and emphasize the significance of this form of health activism. Moreover, this study expands on research of Delhi air pollution conducted by Olofsson and colleagues, by dividing the causes and solution of air pollution into two categories, which helped in understanding the depth of the problem. Also, by examining the story sources, this study highlighted an important missing link in news frames: "ordinary voices." Other studies focusing on the U.S. health issues have emphasized the importance of individuals and family members as experts (Boyce, 2006; McKeever, 2012), but they were missing in Indian news reports of air pollution, which indicate the uniqueness of this study and Indian media.

Limitations

This study has limitations. First, the sample (N = 372) was small when one considers the five years included in the sample. Only the top circulated English-language newspapers were included in the sample, and considering that India is a multilingual country, and only around 10% of its population, or 125 million people, speak English, this could be a limitation (Masani, 2012). *The Times of India, The Hindu,* and *Hindustan Times* do not represent the large Indian media landscape, but they are, perhaps,

the most influential among the nation's elite (De Souza, 2010). Moreover, the sample did not include television, radio, blogs, or other forms of media, which may also influence public perceptions and policies surrounding air pollution in Delhi. Future research should investigate other forms of media. However, newspapers remain an important source for complex stories and health information (e.g., Len-Ríos et al., 2009; Riffe et al., 2007).

Conclusion

Indian media frame Delhi air pollution as caused largely by emissions from individual cars, power plants, and bad weather, but solvable by the nation's government and policy makers. Poor air quality may reflect that tremendous growth in India's consumer economy and personal income has put more automobiles on the streets, and more factories in the city. The Indian government is also looking for sustainable ways to curb air pollution without impacting economic growth (Dhar & Shukla, 2015). This study also highlights loopholes in the mass transit structure in Delhi, which needed to be strengthened to discourage Delhiites using their personal vehicles. Also, NGOs and major industrialists are required to come forward to negotiate with the Indian government to provide eco-friendly solutions such as battery-operated cars and rented electric scooters, among others. This study stresses that Indian media must publish the voices of the common man, who are suffering as well as causing air pollution, along with NGOs' voices, who may provide resources as well as a better solution to this deadly problem.

Future research might code frames or subframes within the articles to delve deeper in terms of policy decision making and media advocacy. For example, it would be helpful to see if news articles differentiated between human frames, scientific frames, or policy frames (McKeever, 2012). S.-H. Kim (2015) suggested that using more episodic frames, or those with frames of "gain" or "loss," might elicit more emotional responses from readers, and a sense of individual responsibility. Analyzing press releases from the government or nonprofit organizations and comparing them with news coverage could reveal additional findings related to framing. Ultimately, this study revealed important findings related to news coverage of Delhi air pollution and has added to current research on media advocacy. More research in these areas would add to our understanding of this important topic and process.

References

Andsager, J., & Powers, A. (2001). Framing women's health with a sense-making approach: Magazine coverage of breast cancer and implants. *Health Communication, 13,* 163–185. doi:10.1207/S15327027HC1302_3

Audit Bureau of Circulations. (2018). *Highest circulated amongst ABC member publications (across languages)*. Retrieved from http://www.auditbureau.org/files/Highest%20Circulated%20amongst%20ABC%20Member%20Publications%20(across%20languages).pdf http://www.auditbureau.org/files/

Baumgartner, F. R., & Jones, B. D. (1993). *Agendas and instability in American politics*. Chicago, IL: University of Chicago Press.

Berelson, B. (1952). *Content analysis in communication research*. Glencoe, IL: Free Press.

Bhatnagar, G. V. (2016, July 19). Delhi is now world's second most populous city. *The Hindu*. Retrieved from http://www.thehindu.com/news/cities/Delhi/delhi-is-now-worlds-second-most-populous-city/article6203066.ece

Boyce, T. (2006). Journalism and expertise. *Journalism Studies*, *7*, 889–906. doi:10.1080/14616700600980652

Burke, J. (2015, December 11). Delhi considers shutting schools as toxic smog continues. *The Guardian*. Retrieved from https://www.theguardian.com/environment/2015/dec/11/delhi-considers-shutting-schools-as-toxic-smog-continues

Chaudhari, P. R., Gajghate, D. G., & Singh, D. K. (2015). Studies on respirable particulate matter and heavy metal pollution of ambient air in Delhi, India. *American Journal of Engineering Research, 4*, 45–57.

Cobb, R. W., & Elder, C. D. (1971). The politics of agenda-building: An alternative perspective for modern democratic theory. *The Journal of Politics, 33*, 892–915.

Delhi pollution: Government issues health advisory as smog chokes city. (2016, November 8). *Hindustan Times*. Retrieved from http://www.hindustantimes.com/delhi-news/delhi-pollution-government-issues-health-advisory-as-smog-chokes-city/story-byUVNCraAWGH5CQ3usVsaN.html

De Souza, R. (2010). NGOs in India's elite newspapers: A framing analysis. *Asian Journal of Communication*, *20,* 477–493. doi:10.1080/01292986.2010.496863

Dhar, S., & Shukla, P. R. (2015). Low carbon scenarios for transport in India: Co-benefits analysis. *Energy Policy, 81*, 186–198. doi:10.1016/j.enpol.2014.11.026

Dockery, D. W., & Pope, C. A. (1994). Acute respiratory effects of particulate air pollution. *Annual Review of Public Health*, *15,* 107–132.

Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, *43*, 51–58. doi:10.1111/j.1460-2466.1993.tb01304.x

Freudenburg, W. F., & Rosa, E. A. (1984). *Public reactions to nuclear power: Are there critical masses?* Boulder, CO: Westview Press/American Association for the Advancement of Science.

Gerring, J. (2008). Case selection for case-study analysis: Qualitative and quantitative techniques. In J. M. Box-Steffensmeier, H. E. Brady, & D. Collier (Eds.), *The Oxford handbook of political methodology* (pp. 645–684). Oxford, UK: Oxford University Press.

Gerring, J. (2012). Mere description. *British Journal of Political Science*, *42*, 721–746. doi:10.1017/S0007123412000130

Gitlin, T. (1980). *The whole world is watching: Mass media in the making and unmaking of the New Left*. Berkeley, CA: University of California Press.

Golan, G. J., & Himelboim, I. (2016). Can world system theory predict news flow on Twitter? The case of government-sponsored broadcasting. *Information, Communication & Society*, *19*, 1150–1170. doi:10.1080/1369118X.2015.1106572

Greenberg, J., & Knight, G. (2004). Framing sweatshops: Nike, global production, and the American news media. *Communication and Critical/Cultural Studies*, *1*, 151–175. doi:10.1080/1479142041001685368

Gurjar, B. R., Butler, T. M., Lawrence, M. G., & Lelieveld, J. (2008). Evaluation of emissions and air quality in megacities. *Atmospheric Environment, 42,* 1593–1606. doi:10.1016/j.atmosenv.2007.10.048

Guttikunda, S. K., & Calori, G. (2013). A GIS based emissions inventory at 1 km × 1 km spatial resolution for air pollution analysis in Delhi, India. *Atmospheric Environment*, *67*, 101–111. doi:10.1016/j.atmosenv.2012.10.040

Hallahan, K. (1999). Seven models of framing: Implications for public relations. *Journal of Public Relations Research, 11*(3), 205–242. doi.org/10.1207/s1532754xjprr1103_02

Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. *Communication Methods and Measures*, *1*, 77–89. doi:10.1080/19312450709336664

Hoffner, C., & Ye, J. (2009). Young adults' responses to news about sunscreen and skin cancer: The role of framing and social comparison. *Health Communication, 24*, 189–198. doi:10.1080/10410230902804067

Hofstede, G. (1984). *Culture's consequences: International differences in work-related values*. Beverly Hills, CA: SAGE Publications.

Hofstede, G. (1993). Cultural constraints in management theories. *The Academy of Management Executive, 7*, 81–94. doi:10.5465/ame.1993.9409142061

Holton, A., Weberling, B., Clarke, C. E., & Smith, M. J. (2012). The blame frame: Media attribution of culpability about the MMR–autism vaccination scare. *Health Communication*, *27*, 690–701. doi:10.1080/10410236.2011.633158

Howard, P. N., Kollanyi, B., Bradshaw, S., & Neudert, L.-M. (2017). *Social media, news and political information during the U.S. election: Was polarizing content concentrated in swing states?* Oxford, UK: University of Oxford.

IANS. (2013, February 13). Outdoor air pollution fifth largest killer in India. *DNA*. Retrieved from http://www.dnaindia.com/india/report-outdoor-air-pollution-fifth-largest-killer-in-india-1799722

India admits Delhi matches Beijing for air pollution threatening public health. (2014, May 8). *The Guardian*. Retrieved from https://www.theguardian.com/world/2014/may/08/india-admits-delhi-matches-beijing-air-polllution-world-health-organisation-cities

India Supreme Court bans fireworks in Delhi ahead of Diwali. (2017, October 9). *BBC News*. Retrieved from http://www.bbc.com/news/world-asia-india-41548784

Iyengar, S. (1991). *Is anyone responsible? How television frames political issues*. Chicago, IL: University of Chicago Press.

Kampa, M., & Castanas, E. (2008). Human health effects of air pollution. *Environmental Pollution*, *151*, 362–367. doi:10.1016/j.envpol.2007.06.012

Kensicki, L. J. (2004). No cure for what ails us: The media-constructed disconnect between societal problems and possible solutions. *Journalism & Mass Communication Quarterly, 81*, 53–73. doi:10.1177/107769900408100105

Kim, J.-Y., Xiang, Z., & Kiousis, S. (2011). Agenda-building effects by 2008 presidential candidates on global media coverage and public opinion. *Public Relations Review, 37*, 109–111. doi:10.1016/j.pubrev.2010.09.009

Kim, S.-H. (2015). Who is responsible for a social problem? News framing and attribution of responsibility. *Journalism & Mass Communication Quarterly, 92*, 554–558. doi:10.1177/1077699015591956

Kim, S.-H., Carvalho, J. P., & Davis, A. G. (2010). Talking about poverty: News framing of who is responsible for causing and fixing the problem. *Journalism & Mass Communication Quarterly, 87*, 563–581. doi:10.1177/107769901008700308

Kim, S.-H., Carvalho, J. P., Davis, A.G., & Mullins, A.M. (2011). The view of the border: News framing of the definition, causes, and solutions to illegal immigration. *Mass Communication & Society, 14*(3), 292–314. doi:10.1080/15205431003743679

Kim, S.-H., Scheufele, D., & Shanahan, J. (2002). Think about it this way: Attribute agenda-setting function of the press and the public's evaluation of a local issue. *Journalism & Mass Communication Quarterly, 79*, 1–25. doi:10.1177/107769900207900102

Kim, S.-H., & Willis, L. A. (2007). Talking about obesity: News framing of who is responsible for causing and fixing the problem. *Journal of Health Communication, 12,* 359–376. doi:10.1080/10810730701326051

Krippendorff, K. (1980). *Content analysis: An introduction to its methodology*. Newbury Park, CA: SAGE Publications.

Krippendorff, K. (2004). *Content analysis: An introduction to its methodology* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Lalchandani, N. (2015, March 15). Delhi's BRT may finally be scrapped as MLAs put pressure on govt. *The Times of India*. Retrieved from https://timesofindia.indiatimes.com/city/delhi/Delhis-BRT-may-finally-be-scrapped-as-MLAs-put-pressure-on-govt/articleshow/46569844.cms

Len-Ríos, M. E., Hinnant, A., Park, S. A., Cameron, G. T., Frisby, C. M., & Lee, Y. (2009). Health news agenda building: Journalists' perceptions of the role of public relations. *Journalism & Mass Communication Quarterly, 86*(2), 315–331. doi:10.1177/107769900908600204

Lim, S. S., Vos, T., Flaxman, A. D., Danaei, G., Shibuya, K., Adair-Rohani, H., . . . & Aryee, M. (2013). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: A systematic analysis for the Global Burden of Disease Study 2010. *The Lancet, 380*, 2224–2260. doi:10.1016/S0140-6736(12)61766-8

Lombard, M., Snyder-Duch, J., & Bracken, C. C. (2002). Content analysis in mass communication: Assessment and reporting of intercoder reliability. *Human Communication Research*, *28*, 587–604.

Maji, K. J., Dikshit, A. K., & Deshpande, A. (2016). Disability-adjusted life years and economic cost assessment of the health effects related to $PM_{2.5}$ and PM_{10} pollution in Mumbai and Delhi, in India from 1991 to 2015. *Environmental Science and Pollution Research, 24*(5), 4709–4730.

Major, L. H. (2009). Break it to me harshly: The effects of intersecting news frames in lung cancer and obesity coverage. *Journal of Health Communication, 14*, 174–188. doi:10.1080/10810730802659939

Masani, Z. (2012, November 27). English or Hinglish—Which will India choose? *BBC News*. Retrieved from http://www.bbc.com/news/magazine-20500312

Maslog, C. C., Lee, S. T., & Kim, H. S. (2006). Framing analysis of a conflict: How newspapers in five Asian countries covered the Iraq War. *Asian Journal of Communication*, *16*, 19–39. doi:10.1080/01292980500118516

McBeth, M. K., Shanahan, E. A., Arrandale Anderson, M. C., & Rose, B. (2012). Policy story or gory story? Narrative policy framework analysis of Buffalo Field Campaign's YouTube videos. *Policy & Internet, 4*, 159–183.

McKeever, B. W. (2012). News framing of autism: Understanding media advocacy and the combating autism act. *Science Communication*, *35*, 213–240. doi:10.1177/1075547012450951

Ministry of Environment, Forests and Climate Change. (2016). *Air pollution in Delhi: An analysis*. Shahdara, Delhi: India. Government Printing Office.

Nagpure, A. S., Gurjar, B. R., & Martel, J. C. (2014). Human health risks in national capital territory of Delhi due to air pollution. *Atmospheric Pollution Research*, *5*, 371–380. doi:10.5094/APR.2014.043

National Green Tribunal. (2010). Retrieved from http://www.greentribunal.gov.in/

Nisbet, M. C., & Lewenstein, B. V. (2002). Biotechnology and the American media: The policy process and the elite press, 1970 to 1999. *Science Communication*, *23*, 359–391. doi:10.1177/107554700202300401

Olofsson, K. L., Weible, C. M., Heikkila, T., & Martel, J. C. (2017). Using nonprofit narratives and news media framing to depict air pollution in Delhi, India. *Environmental Communication, 12*(7), 956–972. doi:10.1080/17524032.2017.1309442

Pope, C. A., III, Burnett, R. T., Thun, M. J., Calle, E. E., Krewski, D., Ito, K., & Thurston, G. D. (2002). Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. *JAMA*, *287*, 1132–1141. doi:10.1001/jama.287.9.1132

Riffe, D., Lacy, S., & Fico, F. G. (2005). *Analyzing media messages: Using quantitative content analysis in research* (2nd ed.). Mahwah, NJ: Erlbaum.

Rizwan, S. A., Nongkynrih, B., & Gupta, S. K. (2013). Air pollution in Delhi: Its magnitude and effects on health. *Indian Journal of Community Medicine*, *38*, 4. doi:10.4103/0970-0218.106617

Ryan, W. (1976) *Blaming The Victim*. New York: Vintage Books revised edition.

Safi, M. (2106, October 31). Toxic smog covers Delhi after Diwali. *The Guardian*. Retrieved from https://www.theguardian.com/world/2016/oct/31/toxic-smog-covers-delhi-after-diwali

Samet, J. M., Dominici, F., Curriero, F. C., Coursac, I., & Zeger, S. L. (2000). Fine particulate air pollution and mortality in 20 U.S. cities, 1987–1994. *New England Journal of Medicine*, *343*, 1742–1749. doi:10.1056/NEJM200012143432401

Schools shut, construction work stopped in smoke house Delhi. (2016, Nov. 7). *The Times of India*. Retrieved from http://timesofindia.indiatimes.com/city/delhi/Schools-shut-construction-work-stopped-in-smoke-house-Delhi/articleshow/55281788.cms

Shanahan, E. A., Jones, M. D., & McBeth, M. K. (2011). Policy narratives and policy processes. *Policy Studies Journal, 39*, 535–561.

Shivani, S. (2015, March 30). Delhi got its BRT wrong but we must give it another try. *Hindustan Times.* Retrieved from https://www.hindustantimes.com/columns/delhi-got-its-brt-wrong-but-we-must-give-it-another-try/story-2ICP5K84XgreUsafYWW4TK.html

Shuter, R., Dutta, U., Cheong, P., Chen, Y., & Shuter, J. (2017). Digital behavior of university students in India and the US: Cultural values and communication technologies in the classroom. *Western Journal of Communication*, *82*, 160–180. doi:10.1080/10570314.2017.1294703

Singh, P. & Manohar, M. (2018, August 15). Why dismantling of BRT is as big a failure as corridor itself. *The Times of India.* Retrieved from https://timesofindia.indiatimes.com/city/delhi/why-dismantling-of-brt-is-as-big-a-failure-as-corridor-itself/articleshow/65406914.cms

Stone, D. A. (2002). *Policy paradox: The art of political decision making*. New York, NY: Norton.

Tanner, A., & Friedman, D. B. (2011). Authorship and information sourcing for health news on local TV news Web sites: An exploratory analysis. *Science Communication, 33,* 3–27. doi:10.1177/1075547010364926

Van der Pligt, J. (1992). *Nuclear energy and the public*. Oxford, UK: Blackwell.

Variyar, M. (2014, September 19). *The Times of India, Hindustan Times* get down to street-fight over readership. *International Business Times*. Retrieved from http://www.ibtimes.co.in/times-india-hindustan-times-get-down-street-fight-over-readership-609499

Walsh-Childers, K. (1994). Newspaper influence on health policy development. *Newspaper Research Journal, 15,* 89–104.

Wimmer, R. D., & Dominick, J. R. (1997). *Mass media research* (5th ed.). Belmont, CA: Thomson Wadsworth.

World Health Organization. (2016, September 27). *WHO releases country estimates on air pollution exposure and health impact* (News release). Retrieved from http://www.who.int/mediacentre/news/releases/2016/air-pollution-estimates/en/

World newspapers and magazines. (2018). *Worldpress.* Retrieved from http://www.worldpress.org/newspapers/ASIA/India.cfm

Zanane, A. R., & Stalin, J. S. D. (2017, October 20). Delhi's air quality status report after Diwali is "very poor": 10 Points. *NDTV*. Retrieved from https://www.ndtv.com/india-news/delhis-air-quality-status-report-after-diwali-is-very-poor-10-points-1764897

Zoch, L. M., & Molleda, J. C. (2006). Building a theoretical model of media relations using framing, information subsidies and agenda building. In C. H. Botan & V. Hazleton (Eds.), *Public relations theory 2* (pp. 279–309). Mahwah, NJ: Erlbaum.

Zoller, H. (2017). Health activism targeting corporations: A critical health communication perspective. *Health Communication, 32*, 219–229. doi:10.1080/10410236.2015.1118735