

5-27-2019

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Pollard, Jessica, "A Drop in The Bucket: Evaluating Modern Print News Coverage of Drought in the U.S." (2019). *University Honors Theses*. Paper 777.

10.15760/honors.795

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A Drop in the Bucket: Evaluating modern print news coverage of drought in the U.S.

By:

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An undergraduate honors thesis in partial fulfillment of the requirements for the degree of

Bachelor of Arts In Geography

Advisor:

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INTRODUCTION

In 1957 science reporter Robert C. Cowen of the Christian Science Monitor wrote, “Every time you start a car, light a fire, or turn on a furnace you’re joining the greatest weather 'experiment' men have ever launched. You are adding your bit to the tons of carbon dioxide sent constantly into the air as coal, oil and wood are burned at unprecedented rates,” (Cowen, 1957). It was one of the first mentions in the United States press of what would later be known as climate change: a change in climate which is possibly related to human activity and compromises the composition of the atmosphere (“UN Framework Convention on Climate Change”, 1994). Before the 1950s, the news coverage of environmental issues was relatively insignificant. News media highlighting the concerning human impact on the environment first came into more prominent swing during the mid-20th century (Boykoff and Roberts, 2007) notably with Rachel Carson’s 1962 book on the harmful environmental implications of pesticide use, *A Silent Spring*. Now, as the press’s contribution to the conversation surrounding climate change continues through decades of modernization, several studies have shown that news influences public perception of and policy about human-caused environmental changes (Weingart et.al, 2000; Carvalho and Burgess, 2005). Of course, harnessing this influence within the media is not so easy as slapping a headline on data from a recent scientific study. To achieve full effect, reporters must strike a delicate balance between reporting on scientific information regarding human-caused environmental issues like climate change and including dialogue about the issues from a diverse group of those affected in their work (Priest, 2016).

This paper analyzes how recent press in the United States communicates climate change issues in reporting to the public. First, I investigated the research paradigm of media frames.

Then, I reviewed prominent literature which discusses the relationship between the institutions of media, science, and the public. I applied the theories within these works to provide an analysis of national media coverage from four different newspapers during the 2011-2017 drought in California, which has been linked to climate change. Examining this specific event helped to shed light on how journalism and environmental science interact and how they could interact more efficiently to convey information to civilians, policy makers, and others in order to inspire change (Priest, 2016).

Taking a look at drought coverage in national print media may provide insight into the press's current perception of climate change and environmental topics. This issue is particularly pertinent due to the focus on a state as economically and agriculturally crucial as California, which the United States is largely reliant on for agricultural goods ("California Agricultural Production Statistics", 2016) .

The research in this paper asked five research questions geared towards determining how prevalent incorporation of climate change was in the drought coverage.

1. How frequently did mainstream national print news address the drought in California during the timeframe of interest?
2. How frequently was climate change addressed in this coverage?
3. What kinds of professionals were frequently quoted throughout this coverage?
4. What does national print coverage of the drought reveal about inclusion of climate change in U.S. reporting?
5. Do the journalistic norms explored in the literature review portion of this paper persist in the coverage analyzed for this study?

Background on the California drought is provided in section 3 of the paper, “Case Study: California Drought”.

2. Literature Review

2.1 Framing

The concept of framing originally derives from the field of sociology and came into focus during the 1960s, but it is frequently used in communications scholarship (Ardevol-Abreu, 2015). Overtime, the theory gained momentum in communications studies when evaluating the efficacy of news writing. As notable communications scholar Robert Entman described framing in media, it is the way that different aspects of reality are amplified and assigned a problem, a cause, an evaluation, and a solution. When a problem is repeatedly assigned the same frame in the media, it comes to hold dominant meaning. This means that the public will most likely digest the frame and accept it as truth (Entman, 1993).

In 1978, researcher Gaye Tuchman described the news as a window with frames that block out parts of reality which the viewer cannot perceive. In dissecting this metaphor, we can examine all players in news production. The person who built the window- the journalist- is the sender of information. The person peering out the window is the receiver, and the space from which they peer can represent cultural influence. What they peer out to is reality, but it is distorted by the scope and shape of the window. Senders, receivers, culture, and text are all components of media frames which communications researchers can explore (Ardevol-Abreu, 2015).

Tuchman was studying the media in the 1970s and at the time, considered the press to hold major influence over political agenda. And while the news media in the 1970s were

markedly different from what we have in the United States today (McQuail, 2002), the questions Tuchman asked are still waiting to be answered. She wondered why some matters receive press coverage when others do not, and through her exploration of newsrooms in the U.S. via interviews and participant observations, she determined that it must have something to do with the inner workings of the journalism world and outside influences (see: Cantor 1980; Scheufele, 1999). Potential factors which influence the outcomes of news production which have been identified and studied by Tuchman and others (e.g Scheufele, 1999; Priest, 2016) include: the status quo, ideology and political orientation, environmental work pressure, interest groups and politicians, and the routine of a journalist .

And while the parameters of framing in communications studies might seem cut and dry, there is a lot of debate in the scholarly community about what it means as a research paradigm. For the sake of this paper, a paradigm is defined as a general theory which informs the study of the processes of a particular system (Entman, 1993). Scholar Dietram Scheufele (1999) wrote about the convolution of framing theory in media effects, arguing that “it has been used repeatedly to label similar but distinctly different approaches,” (103). Scheufele wrote that because the term ‘frame’ is equated with other concepts like ‘agenda-setting’, it is hard to compare the empirical evidence of research which relies on framing theory. Some scholars, for instance, do not discriminate between frame ‘salience’- or accessibility- and frame ‘importance’ when collecting data on framing cause or effect. Scheufele recommended that instead of using framing as a loose paradigm, media researchers utilize a four-part framing process model. This model acknowledges the links between frame building, frame setting, individual effects of framing, and the link between audience and media frames (Entman, 1993). The research in this

paper is specifically interested in exploring the frame building and frame setting of print media in the U.S. due to time and resource constraints.

2.2 Media Frames and Climate Change

The cultural circuit model used by scholars Carvalho and Burgess (2005) to evaluate the construction of environmental risk in UK newspapers bares a striking resemblance to Scheufele's four-part framing process model, but caters specifically to climate change framing in print news. The media are considered throughout communications research to be influencers in public perception of risks like those posed by climate change (Carvalho and Burgess, 2005). Through the three circuits of cultural production, as described in "Cultural Circuits of Climate Change" (2005), news is formulated, circulated, and reformulated again based off of the response of the audience in a three part cycle. The first part of the cycle is comprised of logistical factors including a journalist's routine, previous knowledge, and time restraints. The second part of the circuit model is the creation of text. All articles rely on different rhetoric, sources, and hooks. These factors can play a huge part in how the audience forms or develops their opinion of the featured event or issue (Carvalho and Burgess, 2005). The third stage of cultural circuits revolves around consumption, and how the audience uses the information presented. The audience--comprised of laypeople, politicians, scientists, journalists, and other bodies of influence-- elicit collective and individual responses to the news. These responses can be observed through analyzing policy, public opinion, and the funding flow of both media entities and research teams. These changes make echoes within the community and land right back on the newsdesk: so the cycle renews.

Carvalho and Burgess examined 19 years worth of broadsheet newspaper coverage from 1985 to 2003 using critical discourse analysis to reveal the reciprocal nature of the relationship between the press and other prominent social institutions, like the government. They found evidence that social learning morphed with the press's continual coverage of climate issues, and that the media likely had the ability to influence the way major politicians address the public. Carvalho and Burgess were not alone in their findings. While the study in this paper did not explore the social effects of media framing, it is important to acknowledge scholarly work which suggests that the media is indeed very influential in terms of the climate change conversation. The power of the press is reason to dissect the processes of the first two circuits of climate change communication.

Boykoff and Roberts (2007) identified media influence in the climate change conversation, and also examined the strengths and weaknesses of then-current climate change reporting in the 2000s while building off of Carvalho and Burgess' three part circuit model. Boykoff and Robert's exploration of the first phase of the model-- which again relates to the internal and extrinsic logistics of journalism-- revealed that more climate change news is produced during times of immediate environmental stress, at the time of a public announcement by a prominent figure, or during a climate change related event (e.g: Kyoto Protocol or the Paris Agreement). Resultantly, media reporting on climate change can even affect international aid budgets for climate adaptation and mitigation. The press was less likely to cover an issue that lacks a definitive event like a heatwave than it was an issue with immediate effects like a hurricane. The time-scale of slow-growing events, like anthropogenic climate change itself, was irrelevant to the time-scale of a fast-paced newsroom. Stories that do take time to explore the

history and science behind an environmental phenomenon were described as having “thematic” as opposed to “episodic” frames, which base the reporting of issues on specific events (Iyengar, 1991). Boykoff and Roberts argued a need exists for more thematic reporting on climate change.

2.3 Thematic and episodic media coverage

In the book *Is Anyone Responsible? How Television Frames Political Issues* (1991), author and political scientist Shanto Iyengar acknowledged that different frames in the news could affect where consumers of news media place the responsibilities of different issues. Iyengar established the difference between episodic and thematic framing to express how some news hones in on a small-scale, event-based, emotionally-driven frame while other news is less emotional in its framing and more likely to address the long term causes of an issue. His landmark studies showed that typically, when an audience is absorbing “thematic” coverage of an issue, they are more likely to attribute the blame of an issue like poverty on systemic factors like the government or economic factors. Those consuming an episodic frame were more likely to attribute blame to individuals-- in the case of poverty, people were more likely to blame poor people for their issues than greater systems at play (Iyengar, 1991).

Specifically in reference to print news, articles which are set up in context to larger issues and rely on repeated connected coverage of the same issue could be considered thematic (Boykoff and Roberts, 2007). Shorter articles that tend to focus on one individual instance or event could be considered episodic. More recent research showed that thematic coverage lead to more thematic policy decisions in the sphere of climate change, where people who read thematic news are more likely to be in favor of climate change policy than those exposed to more episodic

coverage (Hart, 2011). One can determine whether framing is thematic or episodic by identifying the scale of the article, how much explanation of the problem is provided, and who is quoted or presented as a key player. As Boykoff and Roberts illuminated, often times the conflicts between individual “claim-makers” are favored in episodic articles over in-depth systemic analysis (2007). The press’s fixation on key players’ narratives in place of comprehensive histories of an issue can in part be explained by the authority order bias in journalism.

2.4 Authority Order Bias and other framing phenomena

For journalists covering environmental phenomena, science is only one part of the picture. Stories about the environment often include the perspectives of civilians, policymakers, business owners and other key players to create a multi-dimensional, layered story and keep audiences intrigued and connected (Priest, 2016). It is usual for journalists to turn to authority figures like government officials and high level business people as sources for news articles pertaining to environmental issues, even if they know less about the mechanics behind an issue than a scientist would (Boykoff and Roberts, 2007) because they are more relatable to the audience. Not all readers connect with raw scientific information or commentary, and some are quite likely to take on the views of prominent opinion leaders like government workers (Priest, 2016).

This authority-order bias creates an echo chamber. The words of news sources as authority figures are motivating the public to have new ideas about policy and legislation. These new ideas are transformed into new policy or rejected by these authoritative sources, who are major community stakeholders. It could be supposed that a climate scientist be considered an

‘authority’ over the knowledge of our changing climate, but the relationship between journalists and scientists has several complicated layers that sometimes hinders the inclusion of a scientist’s perspective a variety of topics (Priest, 2016). Some examples of this reach back into the first cultural circuit, as scientists are passionate about accuracy and many journalists and journalistic organizations do not allow interviewed scientists to review the copy of an article they are featured in. This can lead to scientists hesitating to be featured in the news. Both the journalist and the scientist establish what scientific findings are notable enough to make plain to the public, and this has a large factor in the proliferation of climate change information in the news media (Priest, 2016).

Balanced reporting is another journalistic norm which effects reporting on environmental issues (Brüggemann and Engesser, 2017). It is likely that the method of balanced reporting is used by journalists to field opposing views against each other to increase news value, validate claims, and avoid accusations of biased reporting attributes to this lack of concern. While there is essentially an international scientific consensus that climate change exists and is human caused, journalists are still pulling contrarian narratives into their work. Brüggemann and Engesser’s study revealed that climate deniers were mentioned or quoted more frequently than players in the International Panel on Climate Change (IPCC) between 2011 and 2012. They also wrote that the two highest emitting countries: the U.S and China expressed less public concern over climate change than other countries Entertaining opposing viewpoints rather than holding influencers accountable in reporting could lead the public to believe that they ought to question the validity of a changing climate at all.

Studies on climate change frames in the news media have reinforced the importance of examining print articles which report on environmental events for their depth and their sources. Several prominent scholars have demonstrated that these factors which culminate in the first and second phases of the cultural circuit model really do impact the third phase of audience engagement and response. The next section will briefly review literature which pertains to both drought and media frames.

2.5 Identifying gaps in existing research of drought in the press

Drought causes environmental, agricultural, and governmental distress gradually over a long period of time with effects that last well beyond the actual time frame of the event (Damien, 2013). The long term nature of drought contrasts the fast-paced, snapshot-style of modern mainstream news media discussed in the previous section. As aforementioned, journalists covering environmental issues tend to opt for episodic coverage of an event for budgetary and readership reasons (Rowe, 2012). They also tend to call upon public officials and other non-scientific claim-makers to provide professional insight on environmental phenomenon. In “Comparing Newspaper Coverage of Climate Change During Election Campaigns in the United States, Canada and Australia”, author Dan Rowe found that a driving principle in climate change reporting in 2007 and 2008 was to capture the voices of public officials regardless of how their views line up with current science.

While there is plenty of scholarly literature regarding different facets of climate change in the news media, works specifically examining drought portrayal appear to be relatively far and few between. “Journalism and the Perfect Heat Wave: Assessing the Reportage of North

America's Worst Heat Wave, July-August 1936" (2008) by Philip Hutchison provided historical background of water issues news coverage in the United States. The study showed that most articles regarding the heatwave were pertaining to drought and agricultural problems, supplemented with advice to fight the heat geared prominently towards middle and upper class Americans of the time. The study also showed that as soon as relief was in sight, coverage of the event experienced a drop. This finding aligns with a study that analyzed audience reaction to news stories from the late 1990s: "When No News Is Good News: Inferring Closure for News Issues" (2000). Miriam J. Metzger drew on Doris Graber's "cognitive schemata" to discuss how media audiences tended to fill in the blanks and assume the conclusion of an event covered in the press. Not only was there a tendency for audience members to sometimes infer the resolution of events, there was a relationship between the frequency of these inferences and the knowledge-base an individual had regarding the event. The more someone inferred, the less that background information they knew and the more geographical distance they held between themselves and an issue. Inferences usually included a positive resolution of the issue.

Metzger's original hypotheses were based on the timeline of news coverage of the 1984 drought in Ethiopia, when media outlets in the U.S. generally discontinued coverage of the drought before it was over. Metzger cited the work of Richard E. Petty and John T. Cacioppo's "Attitudes and Persuasion" as identifying the tendency among audience members to infer a positive conclusion. Metzger wrote, "The tendency to assume 'no news is good news' may stem from a more general 'positivity bias' in human nature. Petty and Cacioppo define this bias as a 'tendency for people to organize their conceptual worlds in positive ways'" (Metzger, 785).

In “Drought, Debate, and Uncertainty: Measuring Reporters' Knowledge and Ignorance about Climate Change” (Wilson, 2000), Wilson used drought as a case study to establish that lack of scientific expertise among the journalist community in the United States was attributing to the spotty quality and fluctuating prevalence of 20th century climate change coverage.

The available literature on framing in the mainstream press has theorized that there is a long and impactful story behind the construction of every news article. As illuminated by Carvalho and Burgess as well as Scheufele and others, the pressures of deadlines and the lack of expert knowledge that journalists face when covering a scientific issue like climate change could affect the framing of a story. The construction of articles, including the quoted narrators and the length of background information could also affect how the audience begins to see an issue. As mentioned earlier, these factors have created frames which influence audiences and in turn could impact international aid funding, policy formation, public speaking and public opinion.

Frames in drought reporting are relatively understudied, according to the literature review conducted for this paper.

As aforementioned, in the next section I will examine how mainstream print news describes the extreme drought in California which began in 2011. Using content analysis and pulling from the model presented by Carvalho and Burgess, I will describe how modern national print media portrays the longform climate issue of drought in the U.S and provide suggestions grounded in scholarly research as to how the media could better represent drought and contribute to the climate change conversation.

3. Case study: California Drought

In 2014, Governor Jerry Brown of California stated, “We can’t make it rain, but we can be much better prepared for the terrible consequences that California’s drought now threatens, including dramatically less water for our farms and communities and increased fires in both urban and rural areas. I’ve declared this emergency and I’m calling all Californians to conserve water in every way possible” (Brown, 2014), and declared a state of emergency in California.

By this time, the high temperatures and low precipitation rates associated with extreme drought had already ravaged the state for over two years (Richman and Leslie, 2018). In terms of precipitation, this event was not the driest in modern California. Precipitation deficits in California reached higher levels during 1977. Even still, the severity of recent precipitation lows and temperature highs made this modern drought a 200-year extreme event (AghaKouchak et.al, 2014), and likely the worst drought in California since reliable records were established in 1895 (Richman and Lance, 2018). It is also important to take into account that a population increase since the last extreme drought events in California put more significant stress on water usage in the state, particularly considering that one-third of all vegetables and two-thirds of all fruits and nuts consumed in the United States. come from California (CDFA, 2016). Between 2011 and 2014 in California, 17,000 agricultural jobs were lost due to the drought (Seager et.al, 2015).

Since then, the warm-dry conditions that sparked the drought have been connected to anthropogenic-- or human caused-- climate change by some researchers (e.g: Diffenbaugh et.al, 2015). Since 1970, increasing greenhouse gas concentrations have attributed to changes in atmospheric pressure and circulation that are linked to extreme drought events like the one which

happened this century in California (Climate Change, 2014). This trend has indicated that the probability of drought occurrence and severity-- in part thanks to the trend of increasing temperatures and decreasing levels of precipitation -- could increase over time.

Evaluating the press's handling of this specific instance of extreme drought in California gave clues as to how print media could portray future climate events in a way that increases public engagement and inspires more climate-change oriented policy throughout the United States.. California is undeniably valuable to the country, recently becoming the fifth largest economy in the world in 2018, according to the United States Bureau of Economic Analysis (Associated Press, 2018). On its own, California is the fifth largest supplier of food in the world. According to an article in the Los Angeles Times in 2014, California's agricultural sector lost 2.2 billion dollars in relation to the drought, while the continual drilling for groundwater was causing increased environmental degradation. As previously mentioned, climate change is creating an increase in extreme drought events like California's most recent drought, and it is possible that another could occur in the state again. This drought was economically and agriculturally significant in the United States, and therefore it can be expected that it would attract more news media attention than a drought occurring in a less populated, less economically crucial place.

4. Research methods

After reviewing the available literature on media frames of climate change, I decided the method of content analysis would be an efficient way to observe the characteristics which build frames in national drought coverage. Content analysis is a research method from communication

sciences which requires the recording of systematic observations of media (Riffe et.al, 2019). In this case, the content analysis approach will be tailored to analyzing print news.

I reviewed articles from four different mainstream newspapers in the United States: The New York Times, The Washington Post, The Wall Street Journal, and the Los Angeles Times. These are four of the most widely read and distributed print newspapers in the United States, according to reports released in 2013 by the Alliance for Audited Media. Large circulation rates of these papers, ranging from the Washington Post's 474,767 total circulation average to the Wall Street Journal's 2,378,827 total circulation average during 2013 suggest that these were some of the most prominent newspapers during the middle of my research period, which ranges from January, 2012 to December, 2014.

Publication	Total Articles (1/1/2012-12/31/2014)	Total Articles w/ limitations	Proportion of relevant articles (%)
LA Times	78,067	92	0.11
New York Times	111,079	33	0.02
Wall Street Journal	83,065	30	0.03
Washington Post	270,628	24	0.008
Total	542,839	179	0.03

I used the ProQuest database, rather than the commonly used LexisNexis database because it features an archive of the LA Times, otherwise unavailable. While the other three newspapers

had a more thorough database on Lexis Nexis, I wanted to keep each variable publication equal in terms of access.

Within the Proquest database, I put multiple limitations on each archive search to find articles for this study. I used the search terms "California (Place)" -- which includes every abbreviation of California in the search-- and "drought" in ProQuest under each publication's

archive. A time limitation was put on the search for articles written between January 1, 2012 and December 31, 2014. This time period is a part of the three driest consecutive years during the drought in California, according to the Water Department of Resources (2015). I selected “newspapers” in order to exclude online blog content from each publication. I also selected to only search for straight “news” articles to exclude editorial work and other commentaries, as my study is focused news reporting. In the table below I have listed the total articles written within the time period of my study. I compared these numbers with the amount of articles which remained after imposing the search limitations described above to reveal how frequent total drought coverage was during this time across all four of the most prominent newspapers in the US. This comparison reveals that between Jan.1, 2012 and Dec.31, 2014, coverage of the California drought comprised less than one percent of all national print headlines from these prominent publications. This

process has been noted in Table 1 above.

Between all four publications, my limited search yielded 179 articles total. Due to

Publication	Total Articles (with limits)	Percentage out of 179 total articles	Ratio Sample
LA Times	92	51%	15
New York Times	33	18%	6
Wall Street Journal	30	16%	5
Washington Post	24	13%	4
TOTAL	179	100%	30

time constraints, I sought to analyze only a manageable sample of these articles. To do so, I used the method of ratio sampling to decide how many articles from each publication to analyze. My sample size was N=30. The LA Times, with 15 articles, represented the highest ratio in this instance likely because it is based in the state which is my topic of interest. I analyzed six articles from The New York Times, five from The Wall Street Journal, and four from The Washington

Post, based on how many search results each newspaper archive yielded, as shown in Table 2 below.

With a numbered system, I used simple randomization to select specific articles from each of the archives which specific articles I would be analyzing.

All selected articles were evaluated using a coding scheme I developed and tested on several articles from several publications before conducting my official research. For the purpose of this paper, I initially tracked the word count, title, date, section, and author for each paper. By hand, I took a count of how many times each article mentioned the phrase “climate change”. The occurrence of the phrase “climate change” in this study indicated more thematic coverage. The indication used to identify the prevalence of thematic framing was built off of the work of Iyengar (1990) and later Hart (2011). Like Iyengar offered in *Is Anyone Responsible*, an episodic frame “takes the form of a case study or event-oriented report and depicts public issues in terms of concrete instances” while a thematic frame “by contrast, places public issues in some more general or abstract context” (8).

In “The Influence of Episodic and Thematic Climate Change Frames on Policy Preferences and Individual Behavior Change”, Hart conducted a study to examine how episodic and thematic framing of the impact of climate change on polar bears affect reader opinions. Articles with episodic frames for the study told the story of a single polar bear which was struggling. Thematic frames were expressed through articles which discussed how climate change was affecting all polar bears.

This study was concerned over whether the drought in California was being addressed through a single issue or through the larger context of droughts and climate change. A single

issue might be, for instance, that a farmer in California is facing water shortage, while a story with broader context may talk about how climate change-related droughts have caused more farmers to face water shortages, including those in California. I assumed that thematic frames would be more likely to contain the general phrase “climate change” than episodic frames would because the phrase indicates a more global context. By hand, I took a count of how many times the phrase “climate change” was featured in each article. I then took note of each source quoted in each article, categorizing them by position: lay-person, farmer, scientist, professor, government official or politician, business person, or other. Methods of sourcing a fact or idea in a news article can vary. Some journalists might paraphrase their source’s words, or even draw on multimedia aides to get a source’s point across. For the purpose of clarity in this paper, I chose only to collect data on individuals whose statements were subject to direct quotation in writing.

In my research, I used article length to signal the deemed importance of the drought issue (Damanhoury and Saleh 2017; Zoch and Turk 1999), assuming that articles with thematic frames utilized a higher word count to delve into the background of a topic. In content analysis of print news, there does not appear to be a standard measure of article length. For the purposes of this paper, the article length parameters range between

0-500 words (short), 501-999 words (medium), and

articles beyond 1000 words (long),

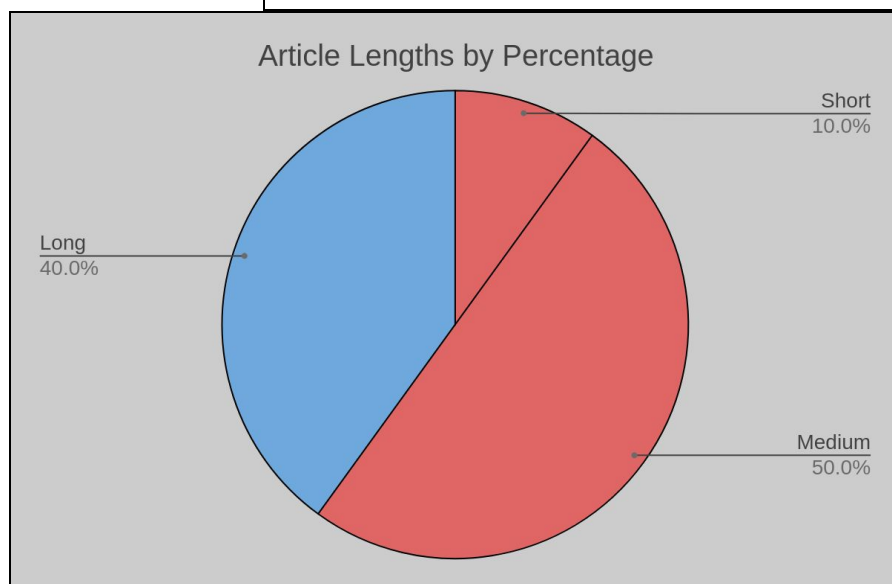
based on the parameters used by Pew

Research Center (Mitchel et.al,

2016). The small percentage of short

articles identified, however,

Figure 1: Article Lengths



eventually indicated that a more meaningful comparison could be drawn between articles which contain less than 1,000 or more than 1,000 words.

5. Findings

After reviewing the 30 randomly selected articles for this study, some of the data yielded supports the literature discussed in the review section of this paper. Less than half (n=30, 40%) of the news stories were longform pieces. Climate change was mentioned in seven (23%) of the 30 articles, meaning that over 75 percent of the sampled articles made no mention of climate change. Public officials were the most highly represented type of source in this study. Thirty-nine different public officials were quoted over the course of 18 articles (60%). In this section, I will discuss the results I found through collecting data on the amount and length of articles, as well as their quoted sources and incorporation of climate change.

5.1 Article quantities and length

Between Jan.1, 2012 and Dec.31, 2014 the The New York Times, The Washington Post, The Wall Street Journal, and the Los Angeles Times published 542,839 total print articles collectively. Just 179-- or .03 percent-- of these articles featured both search terms: “drought” and “California”. It was revealed that over half (n=18, 60%) of the 30 articles were written using fewer than 1000 words and would be considered by researchers like those at Pew Research Center to be short-form. My sample suggests that short-form coverage of California drought in U.S print media was more prominent than longform coverage. Three of the journalists featured in

my study are repeat authors within my sample, which suggests that they are following the issue as a beat and are focusing on continual coverage.

5.2 The Climate Change Conversation

Of my 30 article sample, seven articles referred to “climate change” or “global warming” a total of 17 times. Only one of the 12 longform articles featured in the study made a single mention of climate change: "Decade of Drought Threatens West" by Jim Carlton (The Wall Street Journal). The article reports on Lake Mead-- the largest reservoir in the nation-- and how its shrinking water levels could mean water shortages in the western U.S. “A Bureau of Reclamation study last year found the river system wouldn't be able to meet demand in 50 years, due to climate change and the region's forecast growth” wrote Carlton, “Water managers say they will have to come up with new ways to stretch supplies of the river and other sources, such as through the use of new technology to increase efficiency” (The Wall Street Journal, 2014). The article’s focus is primarily on drought futures and state water rights.

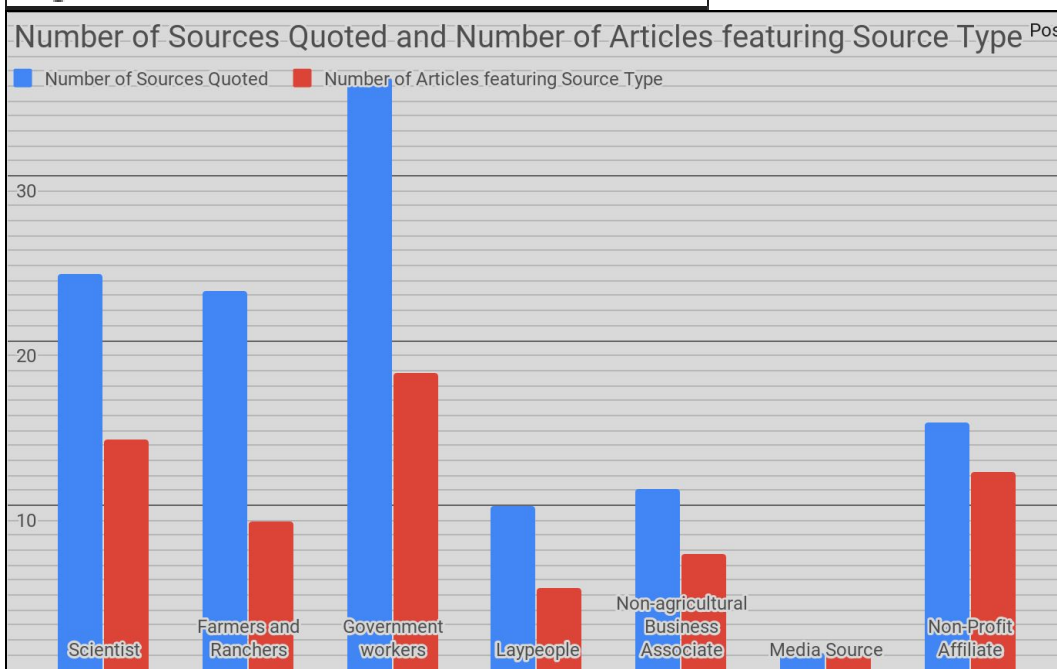
Longform articles like "Prop.1 aims at the next drought; Even if water bond measure passes, any relief it provides is probably years away." by Bettina Boxall (The LA Times) discuss legislative responses to the drought or "Water Policy Poses Threat to Almonds in California" by Felicity Barringer (The New York Times) discuss the effect of drought on farming and produce, rather than the cause of drought.

Six short form stories mentioned climate change a total of 16 times. In “U.S rules for water use aren’t so cool or clear”, Jim Tankersley wrote “But now, as drought rages, climate change raises the risk of future droughts and the West's population continues to grow, Glennon

says America needs better-functioning markets to maximize the water it has available - or we risk leaving a lot of people poor and thirsty in the future” (The Washington Post, 2014). Climate change is referenced in the story as a reason why America needs freer water markets, according to professor Robert Glennon. Another article, “No, Chipotle is not getting rid of guacamole” by Mark Berman (The Washington Post, 2014) pulls a Tweet from the restaurant chain Chipotle about how climate change may result in price increases or menu item removal . The article then

discusses how the drought is impacting food

Figure 2: Sources



prices. Three of the articles were centered around the topic of climate change, as indicated by their structure and content.

5.3 Sources

Public officials were most frequently quoted throughout my sample. Public officials were quoted 36 times in 18 different articles. Many of the officials were representing the Bureau of Reclamation, the California Department of

Water Sources, and other water related government agencies. Other officials quoted throughout my sample included then-President Barack Obama, then-Governor Jerry Brown, and representatives from different water districts in California.

The second most frequently quoted group of professionals were scientists, who were quoted 24 times over the course of 14 articles. Many of them were either university professors or scientists that belonged to an organization. Farmers were quoted 23 times throughout nine total articles, often comparing recent agricultural seasons to those of the past, or discussing coping techniques for water shortages. Figure 2 (above) demonstrates the number of quoted sources in blue, and the number of articles featuring the source in red.

6. Discussion

The results of the research suggest that due to the long term nature of drought events and the highly episodic nature of U.S news (Damien, 2013), coverage of the drought in California only comprised (n=179, .03%) of total print among all four papers examined during this study's time period. With over half of the articles randomly selected coming out of the Los Angeles Times in California, the ratio of articles randomly selected for this research suggests that the drought phenomenon did not receive as much broad national coverage as it did more statewide coverage, despite the key role that California plays in the agricultural economy in the whole of the United States. It was unsurprising, based on literature featured in the review portion of this paper, that climate change was incorporated into less than $\frac{1}{3}$ (n=7, 23%) of articles within the sample. The most surprising part of the data results was that overwhelmingly, references to climate change occurred in shorter articles. Drawing on Boykoff and Robert's analysis of

longform thematically framed coverage of climate change in the news media, I surmised that the climate conversation would primarily be featured in long articles which have the space to explain the anthropogenic factors of a changing climate, and to explore how pressure changes and temperature increase attributed to drought phenomena such as the event in California. Instead, climate change was often referenced anecdotally, or in passing without further explanation. California was the central focus, rather than a case study in a discussion of environmental issues, except for in the case of two short form articles: "CALIFORNIA; Warming, drought link uncertain; Analysis underscores difficulty of gauging influence of human-caused climate change on rain patterns" (2014) by Bettina Boxall of the LA Times and "U.S. News: Obama Backs Fund for Studying Climate Change" (2014) by Carol E. Lee and Jim Carlton of the Wall Street Journal. In Boxall's article, climate change is the central topic as the findings of reports out of the American Meteorological Society and the discussion among scientists as to whether changing pressure systems are attributing to the drought in California or not are summarized. Lee and Carlton's article refers to then-President Barack Obama's visit to California, after which he acknowledges that climate change is exacerbating drought issues in the area.

The smaller proportion of scientists and professors quoted in comparison to political figures points to a gap in communication between journalists and scientists as explored in Susanna Priest's recent *Communicating Climate Change* (2016). It also suggests the existence of authority-order bias in these pieces. While conducting this research, however, I expected to find more quotes from both farmers and laypeople due to the effects the drought had on agriculture and on municipal water use across California. There were fewer quotes throughout the sample

from those personally affected by the drought, and more quotes about water rights, proposed legislations, distribution, and water strategies.

It appears that print coverage of the California drought, at its peak, comprised a small amount of overall news coverage across four of the nation's most prominent publications. This coverage tended to be shorter in length, and put an emphasis on policy surrounding drought. Climate change does not appear to be a central aspect of coverage, and governmental actors are called upon to provide insight into the drought issue more frequently than any other type of professional.

7. Limitations

While this study yielded notable data, the field calls for a more thorough investigation of climate change frames in longform issues like drought. One of the most prominent limitations of this study is the size of the sample, as a larger sample size of articles over a longer amount of time pertaining to the drought in California may yield more significant results in regards to how frequently climate change is addressed within print coverage. Researchers who pursue a similar topic may benefit from a more thorough content analysis of each article. Rather than searching for the key word "climate change" it may be interesting to explore which articles pull scientific language into their examination of drought as a climate issue. A content analysis which codes for themes in national drought coverage may be helpful in learning more about what issues are central to the print news industry when it comes to reporting on the long-term issue of climate change-related drought.

8. Conclusion

This study challenged my preconceived notions about the differences between thematic and episodic coverage. I went into the study expecting there to be a strong correlation between the mention of climate change, the length of an article, and the orient of its frame. What I discovered was that climate change was less of a centerpiece and more of a passing thought in articles that presented snapshot style glimpses of the problems caused by drought. In future studies, I hope to build off of the findings which expressed that authority-order bias and short form writing are prevalent in coverage of environmental issues. I look forward to designing more comprehensive and thorough content analysis schemes to pin down the current place of climate change in the environmental conversations initiated by the press.

As someone aspiring to report on environmental issues, this study has revealed that the scope of some environmental issues might be oriented towards policy and politics instead of scientific explanation, which could have a tangible effect on the future.

Susanna Priest, author of *Communicating Climate Change* (2016), wrote “The new message should not be ‘climate change exists’, or even ‘climate change exists, and it is caused by humans’, but ‘climate change believers are a strong majority, and they want action’” (4). The narrative of drought coverage in California subsists just barely on the edge of ‘climate change exists’. Echoing Priest, the point of communicating climate change science through the news media is to make science and scientific thought available to the public in a digestible way, so that citizens can contribute to their democracy and eventually to the formation of sound climate policy. Understanding if climate change had helped instigate the drought in California, for

instance, could be instrumental to formulating long term policies, from renewable tax incentives to emission limits. It could also inspire grassroots movements. The research analyzed in this paper suggests that print news media are doing little to provide citizens with scientific information that can be used to form movements around climate change awareness and preventability.

As Metzger wrote, it is easy for the public to fill in the gaps of an event that is not wholly reported on. In the case of modern drought in California, explanation of the event is lacking in news coverage. In order to encourage public engagement in the climate change conversation, this must be addressed. Movement towards longform continual coverage which frequently discusses climate change in relation to drought issues when relevant could be more effective at motivating audiences to get involved. Creating stories that have more space for scientific commentary and reducing authority-order bias by calling on fewer public officials to make comments about the drought and turning to a more diverse array of voices may refocus audience engagement around the climate change conversation. Because of the role California plays in feeding America, the drought issue there is not merely a problem of the individual state. Water shortages in California can have real, tangible effects on the entire nation, and national publications should highlight such issues more frequently in the future. Research on longform climate issues in the modern era of snapshot news should examine the relationship between science and journalism.

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