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Leticia Pires Andrus, Stephenson Waters

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FRAMING THE FLAMES: ANALYZING NEWS COVERAGE OF THE 2019 AMAZON RAINFOREST FIRES BY BRAZILIAN AND AMERICAN NEWSPAPERS

LETICIA PIRES ANDRUS

University of Louisiana at Lafayette, Lafayette - Louisiana - United States

ORCID: <https://orcid.org/0000-0003-2165-0558>

STEPHENSON WATERS, Ph.D.

University of Louisiana at Lafayette, Lafayette - Louisiana - United States

ORCID: <https://orcid.org/0000-0001-7484-604X>

DOI: (Only for Editors)

ABSTRACT – The purpose of this research was to analyze how major American and Brazilian newspapers framed the Amazon rainforest fire that occurred in August 2019. Framing theory was used as the foundation to build the literature review and guide this study to the research questions and hypotheses. The sample in the analysis was composed of news articles (N = 250) from the American newspapers *The New York Times* and *The Washington Post*, and the Brazilian newspapers *Folha de S. Paulo* and *O Estado de S. Paulo*. These newspapers were chosen based on their circulation and the influence of these media in their respective countries. The frames were selected using previous literature that analyzed organizational crises and new media coverage of environmental issues. The relevance of this study relies on the environmental and economic importance of the Amazon rainforest territory not only for Brazil but also for other countries around the world. The deforestation and the destruction of this green area impact the population of many countries in South America and represent an environmental crisis. Due to the importance of the Amazon rainforest, this study seeks to understand what message media from different countries are sending to their audience when covering the 2019 fires in the Amazon. This paper contributed to improving to understand of the application of framing theory in communication research, and the understanding of how the use of distinct media frames by cross-cultural media can imply a particular message to the audience.

Key words: Environmental Journalism, Brazilian Rainforest Fires, Framing Theory, Content Analysis.

ENQUADRANDO AS CHAMAS: Analisando a cobertura jornalística dos incêndios na floresta Amazônica em 2019 por jornais Brasileiros e Americanos.

O objetivo desta pesquisa foi analisar como os principais jornais americanos e brasileiros enquadraram o incêndio na floresta amazônica que ocorreu em agosto de 2019. A teoria do enquadramento foi usada como base para construir a revisão da literatura e orientar este estudo para as perguntas e hipóteses da pesquisa. A amostra da análise foi composta de artigos de notícias (N = 250) dos jornais americanos *The New York Times* e *The Washington Post*, e dos jornais brasileiros *Folha de S. Paulo* e *O Estado de S. Paulo*. Esses jornais foram escolhidos com base em sua circulação e na influência dessa mídia em seus respectivos países. Os quadros foram selecionados com base na literatura anterior que analisou crises organizacionais e a cobertura da nova mídia sobre questões ambientais. A relevância deste estudo se baseia na importância ambiental e econômica do território da floresta amazônica não só para o Brasil, mas também para outros países do mundo. O desmatamento e a destruição dessa área verde afetam a população de muitos países da América do Sul e representam uma crise ambiental. Devido à importância da floresta amazônica, este estudo procura entender qual mensagem a mídia de diferentes países está enviando ao seu público ao cobrir os incêndios de 2019 na Amazônia. Este artigo contribuiu para melhorar a compreensão da aplicação da teoria de enquadramento na pesquisa de comunicação e a compreensão de como o uso de enquadramentos de mídia distintos pela mídia intercultural pode implicar uma mensagem específica para o público.

Palavras-chave: Jornalismo ambiental, incêndios em florestas tropicais brasileiras, teoria de enquadramento, análise de conteúdo.

ENMARCANDO LAS LLAMAS: Análisis de la cobertura informativa de los incendios de la selva Amazónica en 2019 por periódicos Brasileños y Estadounidenses

RESUMEN – El propósito de esta investigación fue analizar cómo los principales periódicos estadounidenses y brasileños enmarcaron el incendio de la selva amazónica que ocurrió en agosto de 2019. La teoría del encuadre se utilizó como base para construir la revisión de la literatura y guiar este estudio hacia las preguntas e hipótesis de investigación. La muestra del análisis se compuso de artículos de noticias (N = 250) de los periódicos estadounidenses *The New York Times* y *The Washington Post*, y de los periódicos brasileños *Folha de S. Paulo* y *O Estado de S. Paulo*. Estos periódicos se eligieron en función de su tirada y de la influencia de estos medios en sus respectivos países. Los encuadres se seleccionaron a partir de la bibliografía previa que analizaba las crisis organizativas y la cobertura de los nuevos medios de comunicación de las cuestiones medioambientales. La relevancia de este estudio radica en la importancia medioambiental y económica del territorio de la selva amazónica no sólo para Brasil, sino también para otros países del mundo. La deforestación y la destrucción de esta zona verde afectan a la población de muchos países de Sudamérica y representan una crisis medioambiental. Debido a la importancia de la selva amazónica, este estudio busca entender qué mensaje están enviando los medios de comunicación de diferentes países a su audiencia cuando cubren los incendios de 2019 en el Amazonas. Este trabajo contribuyó a mejorar la comprensión de la aplicación de la teoría del encuadre en la investigación de la comunicación, y la comprensión de cómo el uso de distintos encuadres mediáticos por parte de medios transculturales puede implicar un mensaje particular para la audiencia.

Palabras clave: Periodismo medioambiental, incendios en la selva brasileña, teoría del encuadre, análisis de contenido.

1 Introduction

In 2019, the Amazon, the largest and most biodiverse rainforest on Earth, plunged into inferno. On August 21 of that year, *The New York Times* published a story calling the Amazon rainforest lands in Brazil “completely lawless” while also reporting an increase in the rate of fires during then-Brazilian President Jair Bolsonaro’s term (Sandy, 2019, para. 5). According to the *Times*, this was because Bolsonaro’s industry-friendly policies loosened environmental protections of the region, cutting funding and weakening the power of conservation laws, which in turn opened the forest to further deforestation and destruction. Also on August 21, the Brazilian newspaper *Folha de S. Paulo* published a story that said Bolsonaro placed the blame for these blazes on people unaffiliated with the Brazilian government, writing that “without proof, Bolsonaro affirmed that the fires on the Amazon rainforest might have been caused by Non-governmental Organizations” (Uribe & Freelon, 2019, para. 2). Despite Bolsonaro’s baseless attempts to avoid responsibility for the devastation, news coverage of these events was varied and attempted to bring coherence to the chaos fires inevitably bring. At 2.72 million square miles, the Amazon rainforest is a vital component of both the planet’s ecological health and the global economy (Fearnside, 2003; Kirby et al., 2006), thereby making coverage of such havoc vital to the public interest both in Brazil and abroad.

Differences in culture and language, as well as media industry environments, may naturally lead to variance in news coverage of the same issue in different countries (Tannen, 1984). Events that happen locally may have global effects, but local news coverage will likely emphasize differing aspects of a topic than an international news outlet. The Amazon fires, then, may have worldwide repercussions, but news in Brazil may focus on certain matters that are of less interest to audiences in the United States. More coverage, from more diverse journalists, will likely expand interpretations of the event. The understanding of cross-cultural communication is relevant to elucidate the

problems that the language used and the attributes of an object between different countries can cause to the audience when interpreting a message.

But when it comes to covering the fires themselves, news media in Brazil and the United States both shape an interpretation of reality by highlighting specific facts of what is covered while deemphasizing other aspects of the events. By giving prominence to certain facts and not others, different news organizations in these countries will distribute diverse messages to their audiences, leaving their respective publics to draw differing conclusions and interpretations of why and how these events occurred (Entman, 1993). Thus, the use of framing theory provides a powerful lens to understand how American and Brazilian newspapers shaped the coverage of one of the most destructive environmental crises of the past century.

Analyzing how these events were covered could prove instructive in understanding how news media in different countries account for environmental crises. Do differing approaches to coverage of the fires exist in news stories from the United States and Brazil, two countries with sizable media environments and economies that have a stake in the Amazon's health? Although there are studies that cover the framing of environmental issues (Chetty et al., 2015; Ladle et al., 2010; Terracina-Hartman, 2020), there is a gap in the literature regarding framing deforestation in cross-cultural media. The vital importance of the Amazon to life on the planet serves as a important justification for further research in this area. Considering this, the purpose of this paper is to analyze how major Brazilian and American newspapers covered the Amazon fire in August 2019, the month when the fires were at their worst and received the most coverage. Using a quantitative content analysis, this research analyzed the key areas where the articles differ and how the use of different frames may influence messages sent to the public.

2 Literature Review

2.1 Brazil and the Amazon

With most of its 2.72 million square miles set in northern Brazil, the Amazon has been gutted since the beginning of the 20th century, with an estimated 10,000 acres being lost every day (Heacox, 2021). The extraction of natural products such as oils, fruits, and fibers, and the occupation of the land to facilitate the practice of agricultural activities are considered the most destructive practices in the area (Pedlowski et al., 1997). As Brazil contains about 60% of the Amazon territory, the nation's environmental policies affect more land than those of neighboring countries (Kirby et al., 2006). The desire to preserve as much of the rainforest as possible led to the creation of the Central Amazon Conservation Complex, which is made up of six million hectares of land, containing more than 2,500 species of trees and more than 30,000 different plant species (Ipea, 2008). The Brazilian government's protection of the Amazon dates to a federal law established in 1948, which is officially a protected area called *Amazônia Legal* (Unesco, 2002).

Although the Brazilian government created different projects to protect the Amazon rainforest, deforestation in the area is a problem that started early in the 20th century (Lindsay & Simmon, 2007; Pedlowski et al., 1997). Originally, forests were razed to fulfill the needs of the growing population who settled in the area. Later, businesses went to the Amazon rainforest to gather natural products, such as latex, fruits, fibers, and natural oils to use in industrial manufacturing. The Brazilian government incentivized the occupation of the Amazon rainforest territory, prioritizing the extraction of raw products for exportation and facilitating the agricultural

business in the area (Pedlowski et al., 1997). Arguments for whether to use or study the area became fierce, as biologists wanted to investigate biodiversity and study the array of species of plants and animals, chemical businesses were searching for new oils and natural sources to apply towards their work, and the rural population was seeking to use other resources in the area as a way to make money (Lindsay & Simmon, 2007). The rainforest and its resources bring in more than \$8 billion to the Brazilian economy alone, with further economic effects rippling worldwide in industries ranging from medicine to personal electronics (Strand et al., 2018). Accordingly, news coverage of this region and its economic and environmental significance serves the public interest not only in Brazil, but internationally as well. Bringing light to these issues serve as an important framework with which to understand what is happening in such a remote, untamed part of our planet.

2.2 Framing Theory

How this coverage is framed by journalists, then, provides a clear focus to audience on specific areas of relevance. Media frames serve as narrative forms used by journalists that convey specific messages to the public (Scheufele, 1999). The use of certain media frames by content creators thus can affect the public's interpretation of an event. Specifically, Entman (1993) defined framing as a process that highlights specific elements of a story to promote aspects of an issue. Chong and Druckman (2007) further defined frames as tools that journalists, mass media, and the elite in general use to direct the meaning of a story. Using the Amazon fires as an example, a presumptive focus on an environmental impact frame or economic consequence frame — two seemingly obvious frames that would be considered for this type of coverage when covering deforestation — can suggest different levels of salience to the public, influencing their interpretation of the event. A pure focus on economic effects, for instance, may likely lead audiences to deemphasize the environmental aspects of the events.

To frame in news media is to select specific aspects of a text and emphasize them throughout a news story, which thereby increases the salience of a specific issue that allows for “a causal interpretation, moral evaluation, and/or treatment recommendation” (Entman, 1993, p. 52) of a particular item. Frames can define the boundaries of public discussion of an issue by determining the causes of an event, making moral judgments, and suggesting possible solutions or remedies. For Chong and Druckman (2007), news frames have the ability to organize a social reality for audiences by giving meaning to different issues and promoting diverse interpretations. Most of these studies in communication research tend to analyze frames to identify patterns in coverage and analyze the differences between media outlets.

Framing environmental issues and deforestation

Framing studies of environmental news show a consistent relationship among the environmental concerns themselves and the political, economic, and social issues that are intricately linked to them. When it comes to climate change-focused environmental news, politics and economics are enmeshed in the issue. Biswas and Kim, for example, compared the news coverage by major newspapers in the United States and India of the Paris Climate Change Conference in 2015. They found that similarities in political conflict and environmental consequences were shared by U.S. and Indian newspaper coverage, but coverage in the U.S. spent more space focusing on the need for social progress and innovation in environment-friendly initiatives. Chetty, et al. (2015), also explored the coverage of climate change by the three major newspapers in New Zealand and found that politics was the most prominent frame in the coverage followed by social progress, and economic competitiveness.

More specifically, news coverage of deforestation shows facets of framing that are distinct from coverage of broader environmental issues. In a study of coverage of the most significant wildfires that occurred between 2003 and 2013, Terracina-Hartman (2020) concluded that much coverage of this kind was framed around human capital and loss in terms of life, specifically wildlife and domestic animals. Other frames showed the range of the fire by highlighting the number of acres lost, the number of people affected by the fires, and overall environmental effects. Ladle et al. (2010) compared how British and Brazilian newspapers framed deforestation in the Amazon rainforest more than a decade before the 2019 wildfires. Analyzing articles published between 2000 and 2005, the authors concluded the Brazilian news rarely identified the reasons behind the deforestation in the Amazon rainforest. On the other hand, British news highlighted the international demand for soya, beef, and natural products as the primary reasons for deforestation in the Amazon. Ladle et al. (2010) claimed that Brazilian newspapers emphasized “the necessity of economic development, lack of good governance, and the development of the economic infrastructure (particularly roads) that accompanies wide-scale growth of agribusinesses such as soya farming” (p. 321) whereas British newspapers highlighted the “encroachment of agribusiness into pristine rainforest, was found predominantly in the UK press” (Ladle et al., 2010, p. 321). It is worth understanding if these trends, especially among Brazilian news outlets, are similar nearly two decades later in a differing political and economic climate.

2.2 The Frames of Crisis Coverage

Semetko and Valkenburg identified five specific frames that are frequently found in news coverage, as they reflect conventions of professionalized journalism: conflict, human interest, economic consequences, attribution of responsibility, and morality. An and Gower (2009) more specifically identified the frequent reliance on these frames in news coverage of crises, or unpredicted events that lead to instability among individuals or groups. Moreover, in specific news coverage of wildfires, Terracina-Hartman (2020) wrote that coverage of loss of land and life, as well as ecological consequences of forest fires, is reflected in a frequent use of an environmental impacts frame. As the Amazon rainforest fires certainly qualify as an environmental crisis, these frames are appropriate as a foundation for this research.

Attribution of responsibility. According to An and Gower (2009), the use of this frame associates the responsibility of an event — whether as to the cause of it or the required remedy — to either a specific person, a group of people, or an organization. Typically, news coverage frames the responsibility of an event in an either/or context, with more traditional news outlets using this frame more frequently (Semetko & Valkenburg, 2000). Kim (2015) argued news media usually attributes responsibility of an event at an individual level more than at a societal level, though this “varied across different issues and seemed to depend on the nature of the issue itself” (Kim, 2015, p. 557). Bolsonaro’s questionable claims of NGO’s and outsiders starting the fires may thus influence Brazilian coverage of the event, and the more traditional forms of journalism in major U.S. newspapers. Thus:

H1: Brazilian newspapers will primarily attribute the responsibility of the 2019 fires in the Amazon rainforest with an individual level frame.

H2: American newspapers will primarily attribute the responsibility of the 2019 fires in the Amazon rainforest with a societal level frame.

Human-interest. This frame focuses on an emotional angle of a story, presenting sources’ feelings and stimulating the emotive aspects of the audience (An & Gower, 2009). For Cho and Gower

(2006), the human-interest frame presents an emotional perspective when presenting an issue, which may lead the audience to think more sympathetically about those affected by an event. The use of the human-interest frame in news coverage of crisis might be an indicator of why people respond to some crisis more seriously than others, and the use of this frame might influence the audience's decision to attribute responsibility to the event (Cho & Gower, 2006). This frame, according to Cho and Gower, can be found not only in natural disaster news but also in coverage of an organizational crisis, as "(i)t stimulates emotion and exaggerates our evaluation or perception of crises much more negatively than a different frame might" (Cho & Gower, 2006, p. 422). This frame is frequently used by journalists to promote engagement with a story and can increase attention and affect by emphasizing emotion over more dryly presented statistics and facts. Thus:

H3: Apart from the environmental impacts frame, the human-interest frame will be the most frequently found frame in both American and Brazilian news coverage of the Amazon rainforest fires.

Conflict frame. This frame reflects the coverage of disagreement between disparate parties involved in the story. According to An and Gower (2009), in a crisis, there will always be at least two parties that will have differing ideas about the causes and outcomes of an issue, and media outlets will frequently emphasize this aspect of a story above others. Pinkley and Northcraft (1994) described the frame as "the lenses through which disputants view a conflict situation" and this frame often highlights one side of the conflict over another (1994, p. 193). For Bartholomé et al. (2015), this frame highlights a conflict between individuals, groups, or organizations with the intent to capture the audience's attention.

This frame is typically applied to studies involving political issues and public opinion (Reese et al., 2001). When describing the frame's influence on audiences, Bartholomé et al., (2015) suggested that "audiences like to pick sides in a conflict so that they can relate and identify themselves with their preferred politicians or parties" (p. 448). As coverage of the Amazon fires appears to cite government and political sources:

RQ1: How frequently does the conflict frame appear in news coverage by American and Brazilian newspapers of the Amazon rainforest fires?

Economic consequences. For An and Gower (2009), the economic consequences frame highlights the economic impacts of an issue for an individual, a group of people, or an organization. The frame also can illustrate the short- and long-term financial consequences following a crisis. Semetko and Valkenburg (2000) view the economic frame as one of the most important frames used in news coverage, as it reflects concrete factors that can directly affect a community's immediate needs. The Amazon fires, for example, affect Brazil's economic output of raw materials, which thus disturb industries throughout the world that people rely on for their livelihoods. Similarly, Terracina-Hartman (2020) identified the most common frames used to cover wildfires throughout the United States. Results indicated that most news media covered the events using an economic frame. Therefore, it is probable that news coverage of the events relevant to this research may emphasize the economic aspects and outcomes of the forest fires. Content using economic frames can be more complex than human interest and conflict frames, as it can require specific terminologies and explanatory statistics that might not entice audience attention like human-interest or conflict frames (Valenzuela et al., 2017).

RQ2: How frequently does the economic consequences frame appear in news coverage by American and Brazilian newspapers of the Amazon rainforest fires?

Morality. This frame emphasizes the moral judgement aspects of a story. Crises that affect the environment or the public can appear as the result of an immoral or antisocial act. An (2011) explained that the morality frame typically appears as a quotation from an individual, group, or party attributed as responsible for a crisis. To elaborate on the morality frame, An (2011) introduced the concept of an immorality frame, which affects audience interpretation of a message making people mad and angry. How a crisis is framed morally is important for stakeholders of an issue, as "... presuming that the immorality news frames may affect people's moral judgment about the company, news media should be considered as one of the core variables that crisis managers need to pay attention to handle the crisis" (An, 2011, p. 170). Determining the moral (or immoral) attributes of an event can be complex, as moral judgment is determined by a complex set of factors ranging from culture to individual preferences, which can then influence political views (Hatemi et al., 2019). Considering the low internal reliability of the morality frame found during the analysis (see below), as well as the relatively low frequency of occurrence in the data set overall, it was omitted from hypothesis testing for this work.

Environmental impacts. Finally, this frame is used by researchers to analyze content that directly covers issues and events pertaining to the planet's ecosystem. The Amazon rainforest fires are prima facie an environmental issue, so the investigation of this frame is certainly apt, though it is likely to be self-evident and frequently found in this analysis. This frame takes the form of coverage in terms of loss of life and land, and the hypothetical long-term consequences for the environment. Environmental disasters are a common topic covered by the media, and most media outlets focus on the immediate crisis and how that information is communicated to audiences in ways that can be of use (Houston et al., 2012). These frames look at "human, built environment, natural environmental impact, hazard, health, damage, and safety" issues (Houston et al., 2012, p. 611). Considering the definitions of environmental frame used by previous literature, and the importance of analyzing this frame when studying media coverage of environmental issues:

RQ3: How frequently does the environmental impacts frame appear in news coverage by American and Brazilian newspapers of the Amazon rainforest fires?

3 Methodology

Quantitative content analysis allows for a precise examination of patterns and themes in observations of media messages (Riffe et al., 2019). This study used a quantitative content analysis methodology to examine the use of specific media frames used by major American and Brazilian newspapers to cover the outbreak of a fire in the Amazon rainforest in August 2019. A terminology search of news content on Google Trends, using the phrase "Amazon rainforest fires" in English and Portuguese ("incêndios Amazônia") showed that late August and early September had a spike in news coverage about the fires in the Amazon rainforest. This aligned with Meirelles (2019), who found that news publication about the fires reached its peak between August 23 and September 6.

Four newspapers were selected for sample construction for this study: two American newspapers, *The New York Times* and *Washington Post*, and two Brazilian newspapers, *O Estado de S. Paulo* and *Folha de S. Paulo*. Each newspaper was selected because of their high print and online circulations and influence as national news sources in their respective countries, as well as the ready availability of archival content. Additionally, each newspaper serves an audience in one of each nation's major metropolitan areas. In 2019, *The New York Times* averaged about 597,000 daily print subscribers, ranking third behind the *Wall Street Journal* and *USA Today*. The *Washington Post*

ranked sixth with about 313,000 daily print subscribers (Watson, 2021). *Folha de S. Paulo* had the highest print circulation in Brazil in 2019, averaging 328,438 papers sold daily, with *O Estado de S. Paulo* third, with 242,373 copies sold daily. Newspapers from both countries were considered only based on their daily print distribution due to a lack of publicly available digital subscription numbers from the Brazilian publications.

To collect the articles from the American newspapers, this study used the NexisUni database. A search using the terms “Amazon rainforest”, “fires”, and “deforestation” during the timeline under study showed a total of 95 articles from the newspapers *The New York Times* ($n = 70$) and *Washington Post* ($n = 25$). To search for the Brazilian news articles, a search using the PressReader database with the words “Amazônia”, “incêndios”, and “desmatamento” (the same terms used to look for the news articles in English) showed a total of 155 news articles published by the newspapers *O Estado de S. Paulo* ($n = 76$) and *Folha de S. Paulo* ($n = 79$). For both database searches, duplicates and wire service articles were excluded from the dataset. Additionally, both databases did not include the name of the authors.

In sum, this study analyzed a total of 250 articles, of which 155 were from Brazilian newspapers and 95 were from American newspapers. The difference in the number of news articles from Brazil compared to the United States can be explained by the proximity of the fires. As the fires occurred in Brazil, it is expected that the coverage of the issue would be increased in that country. To analyze the presence of media frames in each news article and to exclude the articles that were not directly covering the fires, this study only coded articles that included the keywords “Amazon”, “fires”, and “deforestation” (and the respective terms in Portuguese) in the title, headline, and/or the first five paragraphs, as a frame observed near the top of a news story will likely emphasize its overall importance (An & Gower, 2009; Semetko & Valkenburg, 2000). Articles that did not meet these criteria were excluded from the sample.

3.1 Procedures

To maintain robust intercoder reliability for this study (De Swert, 2012; Lombard et al., 2010), news articles were coded by two bilingual individuals fluent in English and Portuguese. The coders began with a pilot study, testing a total of 44 articles (18 percent of the sample) to verify the preliminary coding measures. Following a second meeting to discuss the pilot test results and make necessary adjustments, an intercoder reliability analysis was performed for the entire dataset. The pilot test and full intercoder reliability results can be found in Table 1 below.

To analyze the presence of media frames in the news articles, the coders used a codebook based on the methods created by Semetko and Valkenburg (2000). According to Matthes (2009), this type of coding is efficient in determining “whether a definition was explicitly translated to frame extraction or if the definition was cited just to ground the reader” (2009, p. 354). Following the codebook, the coders answered yes (1) or no (0) to a series of questions in a Microsoft Excel spreadsheet. After finishing the analysis, the data was processed using SPSS version 24. This study used Chi-Square analyses, considering that all variables were categorical measures.

3.2 Measures

The measures of this study were based on methods used by Semetko and Valkenburg (2000). To measure the presence of media frames in news articles, a series of questions were developed to which the coders had to answer yes or no. The presence of each framing was coded as 0 (frame not present) or 1 (frame present). Each series of questions measured the presence of

the following media frames: *attribution of responsibility*, *human interest*, *morality*, *economic consequences*, *conflict*, and *environmental impacts*. According to Semetko and Valkenburg (2000), the attribution of responsibility frame can be found if articles suggest that the government or other parties were explicitly held to be responsible for the issue. The human-interest frame is present in stories that emphasized how individuals and/or groups were affected by an event. The conflict frame is identified by looking at disagreements between two or more individuals, groups, or parties within a news story. Economic consequences can be identified in articles that mentioned financial gains or losses after the issue or event occurred. A morality frame can be seen in articles that presented a moral message. Finally, according to Terracina-Hartman (2020), the environmental impacts frame highlights the number of people affected by the fires, the acres lost, and other environmental impacts caused by an issue.

4 Results

The analysis from the pilot test and final analysis of the dataset used Krippendorff's Alpha (α) to test the intercoder reliability of the sample, showing the level of agreement between the two coders when coding multiple variables (De Swert, 2012). Hayes and Krippendorff (2007) posited that an acceptable minimum value for reliability using Krippendorff's Alpha is $\alpha \geq .75$. The pilot test included the analysis of 44 randomly selected articles (18 percent) from the full dataset. Table 1 shows the Krippendorff's Alpha (α) coefficient for each frame analyzed in this study during the pilot test and full analysis. All frames in the analysis but morality had a satisfactory level of reliability, meaning a high level of agreement between the coders. Because the morality frame showed an initial and final reliability coefficient lower than .75, the frame was not used for hypothesis testing and omitted from the study.

Table 1 – Krippendorff's Alpha reliability results of pre-test and entire sample

| Frame | Krippendorff's Alpha (α) - pre-test | Krippendorff's Alpha (α) - sample |
|-------------------------------|--|--|
| Attribution of responsibility | 0.89 | 0.86 |
| Human interest | 1.00 | 0.80 |
| Morality | 0.65 | 0.69 |
| Economic consequences | 1.00 | 0.83 |
| Conflict | 1.00 | 0.85 |
| Environmental impacts | 0.90 | 0.80 |

Table 2 shows the overall frequencies and percentages of the prevalent frames used by the newspapers in America and Brazil. Table 3 breaks down frame usage by each newspaper. *The New York Times* and *Washington Post* predominantly used human interest, environmental impact, and attribution of responsibility frames to tell their stories, and *O Estado de S. Paulo* and *Folha de S. Paulo* largely did the same. Human interest was the most used frame throughout the dataset, closely followed by the environmental impacts frame, and the attribution of responsibility frame ranking third.

Table 2 – Frame frequencies by country (Values in parentheses represent percentage of frequencies by country)

| | Brazilian Newspapers | American Newspapers |
|-------------------------------|----------------------|---------------------|
| Attribution of Responsibility | 107 (69) | 73 (76.8) |

| | | |
|-----------------------|------------------|-----------------|
| Human Interest | 134 (86.4) | 84 (88.4) |
| Morality | 35 (22.5) | 25 (26.3) |
| Economic Consequences | 55 (35.4) | 34 (35.7) |
| Conflict | 91 (58.7) | 65 (68.4) |
| Environmental Impacts | 132 (85.1) | 80 (84.2) |
| Total Articles | 155 (100) | 95 (100) |

Table 3 – Frame frequencies by newspaper (Values in parentheses represent percentage of frequencies by newspaper)

| | Brazil | | United States | |
|-------------------------------|--------------------------|-----------------------------|---------------------------|------------------------|
| | <i>Folha de S. Paulo</i> | <i>O Estado de S. Paulo</i> | <i>The New York Times</i> | <i>Washington Post</i> |
| Attribution of Responsibility | 58 (73.4) | 49 (64.4) | 55 (78.5) | 18 (72) |
| Human Interest | 68 (86) | 66 (86.8) | 62 (88.5) | 22 (88) |
| Morality | 23 (29.1) | 12 (15.7) | 18 (25.7) | 7 (28) |
| Economic Consequences | 24 (30.3) | 31 (40.7) | 25 (35.7) | 9 (36) |
| Conflict | 50 (63.2) | 41 (53.9) | 47 (67.1) | 18 (72) |
| Environmental Impacts | 65 (82.2) | 67 (88.1) | 61 (87.1) | 19 (76) |
| Total Articles | 79 | 76 | 70 | 25 |

H1 predicted that Brazilian newspapers would attribute the responsibility of the fires in the Amazon rainforest at primarily an individual level, as Bolsonaro’s and the Brazilian government’s official statements surrounding the events largely did the same. The hypothesis was not supported, as the content analysis showed that Brazilian government policies and the country’s farming industry were largely considered to be responsible for the fires.

H2 posited that American newspapers would attribute the responsibility of the fires in the Amazon rainforest at a societal level. This hypothesis was supported, as Bolsonaro’s claims and coverage of deforestation were predominant in coverage. Newspapers from both countries frequently used a societal level frame when attributing the responsibility of the fire to the government or another party. The content of the articles featured the use of the same sources of information, such as interviews with Bolsonaro and representatives from NGOs, which can be indicated as a primary factor that contributed to these results. Table 4 shows the frequencies and percentages of articles that featured the attribution of responsibility frame at a societal level, as well as the questions used to indicate the presence of the frame.

Table 4 – Attribution of Responsibility Divided by Level and Country of Publication (Values in parentheses represent percentage of the use of frame by country)

| | Brazilian Newspapers | American Newspapers |
|--|----------------------|---------------------|
| Question 1 - Societal Level Does the story attribute the responsibility of the fires to the government or any other party? | 62 (62) | 61 (64.2) |
| Question 2 - Societal Level Does the article suggest that is the government’s responsibility to alleviate the damages caused by the fires? | 93 (60) | 59 (62.1) |

The attribution of responsibility frame was utilized to identify the responsible parties for the fire, to point solutions for the fire, and to understand if it was the government’s responsibility

to alleviate the damages caused by the fire. In a *Washington Post* story with the headline “Putting out the Amazon Fires isn’t just a physical challenge — it’s a political one,” for example, McCoy and Lopes (2019, para. 5) wrote that “(t)he fires are not traditional in any sense. Most have been set intentionally, by farmers and loggers clearing land.”

Supporting this claim, McCoy and Lopes (2019) later in the same story wrote:

“The fires, which continue, have been blamed largely on loggers and farmers, who set them to clear land for pasture and agribusiness. Bolsonaro campaigned last year on promises to open the Amazon for development; deforestation rates there have nearly doubled since he took office in January. The fires are not traditional in any sense. Most have been set intentionally, by farmers and loggers clearing land. The ground is not arid but sodden. And it is not one big blaze but hundreds, many separated by wide distances” (The *Washington Post*, 2019, para. 7).

H3 predicted that American and Brazilian newspapers would most frequently use the human-interest frame when covering the wildfires. A Chi-Square analysis found this hypothesis to be supported ($X^2(4, N = 250) = 5.06, p < .05$). The frequency results presented in Table 2 also support this hypothesis, showing that 86.4% of the Brazilian articles used the human-interest frame while 88.4% of the American articles used the same frame in their coverage.

The human-interest frame was used to feature a “typical” person who was affected by the fires, who served as a representative of the larger group or community. For example, Agamenon da Silva Menezes, a farmer’s union leader in Brazil, was used as a source in one story to illustrate the overreaction by many regarding the fires, as he considered them a normal part of the ecological cycle. His quotes reflected the overall theme of the story, which asserted that many in Brazil found Bolsonaro’s policies emphasizing economic development to be popular. “We’re going to continue producing here in the Amazon and we’re going to continue feeding the world There’s no need for all this outrage” (Andreoni & Londoño, 2019).

RQ1 asked how frequently the conflict frame would appear in news coverage by both American and Brazilian newspapers. For both nation’s coverage, conflict appeared in more of half of the stories, with the frequency results presented in Table 2 showing that 58.7% of the Brazilian articles used the conflict frame while 68.4% of the American articles used the same frame in their coverage. A Chi-Square analysis found that this finding was significant ($X^2(4, N = 250) = 9.15, p < .05$). Conflict between parties was a more prominent issue for American news coverage in this analysis, but other frames were used more frequently to tell the story of the fires. A clear example of conflict, from a *Washington Post* story titled “The Amazon isn't on fire, Brazil's Bolsonaro tells the UN General Assembly; it's full of riches”:

“Marina Silva, a former environmental minister who presided over a massive reduction in deforestation in the 2000s, said Bolsonaro's speech would further alienate Brazil from global efforts to preserve the environment. ‘It is unfortunate, worrying, and very sad to see Brazil, which was once a protagonist in the environmental agenda, deny the reality of the grave problem of deforestation’ she said. ‘Only someone completely deranged and delirious can negate that which the eyes can see.’” (Lopes, 2019, para. 6-7).

RQ2 examined the frequency of the appearance of the economic consequences frame in news coverage by American and Brazilian newspapers. About a third of news stories in the dataset had instances of this frame, as Table 2 shows that 35.7% of American news articles used this frame in their stories, while 35.4% of Brazilian articles used an economic consequences frame in their articles about the fires. A Chi-Square analysis showed that these findings were statistically insignificant ($X^2(4, N = 250) = 4.56, p > .05$). The results showed that even though newspapers from

both countries used the economic consequences frame in their coverages, this frame was not predominant in the articles. It is possible that because the dataset featured stories covering the fires so close in time to the actual event, it was too soon to evaluate or estimate the economic consequences of the fires.

Finally, RQ3 asked how often American and Brazilian newspapers used the environmental impacts frame when covering Amazon rainforest fires. Table 2 shows that 84.2% of the American articles used this frame to cover their stories while 85.1% of Brazilian articles mentioned environmental effects in their coverage. This ranked second to the human-interest frame in total coverage by only a few percentage points for each country and newspaper. These findings were also statistically significant, according to a Chi-Square analysis ($\chi^2(4, N = 250) = 14.92, p < .05$). This makes logical sense and was expected, as forest fires in any context are an environmental issue, as loss of land potential long-term consequences for the ecological conservation of the affected area are a primary theme and concern that emerge from the topic for not only policymakers and environmental activists, but those who are directly affected by the fires as well.

The environmental impacts frame was used to show the environmental damages caused by the fire, such as land and life losses, and to determine the extent of the damage to the rainforest. For example:

“By Saturday, the fires had destroyed 2.5 million acres of forestland in the eastern state of Santa Cruz, double the area burned a week ago. They were approaching the city of Santa Cruz.” (Kurmanaev & Machicao, 2019, para. 11).

Also:

“The most important city in the north, Novo Progresso had an increase of 300% in new cases of deforestation last Saturday in comparison with the day before. With 124 cases, it was the record number of the year. However, on Sunday (11), the number rose to 203 cases of deforestation in the area” (Uribe, 2019, para. 1).

5 Discussion

This study analyzed the frames used by major American and Brazilian newspapers when covering the August 2019 wildfires in the Amazon rainforest. This research used a framing theoretical foundation, which is regularly used in communication studies to understand news media content and how the use of specific frames can impact the interpretation of a message (Tewksbury et al., 2009). By focusing on aspects of professionalized journalism such as language, source use, and thematic utilization, framing theory is crucial in understanding how news media build meaning for audiences (Chong & Druckman, 2007; Entman, 1993; Scheufele, 1999).

Results from this analysis indicated that news articles from both Brazil and the United States frequently used human interest, environmental impact, and attribution of responsibility frames in most of their stories. Brazilian and American newspapers also used these news frames in a similar way. It was expected that when covering an environmental issue, newspapers from both countries would rely on an environmental impact frame. These findings were also like that of Terracina-Hartman (2020), who found that most of the stories covering an environmental issue predominantly used a broader view of the environmental impact frame instead of focusing on local problems. For instance, most of the stories about the fire in the Amazon rainforest in 2019 focused on the big picture of the issue, concentrating on the vast number of acres burned and highlighting the

environmental damages. Only, a smaller portion of the stories (17.2%) focused only on specific people who were directly affected by the fire or on the lives lost. This shows that although the newspapers emphasized the environmental effects caused by the fire, the stories generally did not necessarily cover the entirety of the issue, looking at the “big picture” instead of focusing on more detailed information.

However, apart from the environmental impacts frame, the human-interest frame was the most predominant frame found in the dataset, indicating the use of a journalistic convention that humanizes and brings focus to the larger issue of environmental devastation. A possible explanation for this is that this fire had international repercussions and remained a popular topic on the media for several months, which made it possible for the newspapers to cover different sides of the story (Meirelles, 2019). Additionally, the heavy use of the frame could indicate a journalistic strategy to maintain interest for audiences during periods of saturated coverage, as human-interest frames can provide more emotional and direct involvement in a story than the dry recitation of statistics and quotes from politicians (Cho & Gower, 2006). The human-interest frame was mostly used in combination with other frames to bring focus on the people who were directly or indirectly involved in the fire. For instance, farmers and loggers were sometimes pointed to as a major contributor to the wildfires, yet their stories were used to provide human context to the larger issue. Also, the sacrifice of those in the Brazilian military was indicated in several stories as a component of attempts to control the fires.

The attribution of responsibility frame is commonly found in crisis coverage (An & Gower, 2009; Semetko & Valkenburg, 2000). Aligning with previous studies, the findings in this analysis indicated that the responsibility for the fires was attributed at a more macro level, as the Brazilian government was found to be lacking in policy protection for the Amazon rainforest. Additionally, the prominent farming and logging industries were found to be responsible, as many in these enterprises allegedly intentionally burned the rainforest to expand their businesses. Lax policy from the Brazilian government was indicated as the responsible for both the fire and helping control the issue.

Conflict was the fourth most-used frame by American and Brazilian newspapers in the data set. This frame was primarily observed, however, in timely coverage of the disagreement between the Brazilian government and President Emmanuel Macron of France regarding the use of funds to help contain the fires in the rainforest. The majority of the pertinent articles from both the United States and Brazil reported the French President wanted to have increased control over the Amazon rainforest to ensure the safety of the area. Brazilian President Bolsonaro defended the idea that the Amazon is a Brazilian territory and should be a responsibility of the Brazilian government only, without international interference, and accused Macron of having a “colonialist mind-set” (Uribe & Freelon, 2019). Several articles in the sample also found a conflict between the Brazilian president and Non-Governmental Organizations (NGOs). Bolsonaro accused NGOs of being responsible for the fires while the organizations defended themselves, accusing the Brazilian president of lying, as he provided no evidence to back up his assertions.

This finding also shows some of the conceptual difficulties in frame analysis: are Bolsonaro’s actions evidence of individual responsibility regarding the event, or as his institutional role as the Brazilian president? Are the squabbles between him and Macron conflict between individuals or governments? These issues show a clear relationship between attribution of responsibility and conflict. This analysis measured each aspect of the stories using both frames, but the conceptual issue is worthy of future consideration.

The economic consequences frame was mainly found in stories explaining why the Brazilian government rejected funds from Europe to help contain the fires in the Amazon rainforest. Contrary to these findings, An and Gower (2009) and Semetko and Valkenburg (2000) found economic consequences to be a predominant frame to cover crises. A possible explanation for this is that in the case of an environmental issue, the economic consequences of the fires gained less importance in coverage when compared with the immediate environmental effects. It is likely that economic issues were discussed more frequently in stories that were published outside of the timeframe used for this study.

Previous research has studied the media coverage of environmental issues (Chetty et al., 2015; Ladle et al., 2010; Schafer et al., 2017; Terracina-Hartman, 2020), but relatively fewer studies focus on comparing the news coverages of the environment across different countries. This study intended to help fill the gap in the literature regarding the study of environmental issues in cross-cultural media coverage. Even though this research filled a small gap in the literature, there is still a lot of work that needs to be done to refine the use of frames when analyzing an environmental crisis in different countries. One limitation worth noting for this study was the sample size. The choice was made to focus on the four newspapers in this research because of their journalistic reputation and national prominence in their respective countries. A more practical reason for this, however, was the availability of a suitable sample worth analyzing. Future research should consider the expansion of media sources to study to discover if the results for this topic hold.

Additionally, future framing studies of different environmental crises may uncover new patterns in the use of these frames in news coverage. Researchers could also study the relationship between Amazon deforestation and climate change, as well as news coverage of deforestation that has been happening in other rainforests around the world, such as in Indonesia and West Africa. Environmental issues affect everyone in myriad ways, and the news media is a primary delivery method from which we learn about what is happening to our planet. If framing theory allows us to understand how news media build meaning for audiences, then it is vital that we better understand how these processes work so that we all can make more informed and better decisions for our future.

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Leticia Pires Andrus is a doctoral student at the University of Louisiana at Lafayette, studying higher education administration. She received her Master of Science degree in communication from the University of Louisiana at Lafayette, and her Bachelor of Arts in journalism from the Pontifícia Universidade Católica de Campinas in Brazil. She can be reached at leticia.andrus@louisiana.edu.

Stephenson Waters, Ph.D. is an assistant professor in communication at the University of Louisiana at Lafayette, researching media effects. He received his master's and doctoral degrees from the University of Florida. He can be reached at stephenson.waters@louisiana.edu.

Conflicts of Interest

All authors declare that they have no conflicts of interest.

Authors Contribution

Leticia Pires Andrus: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft.

Stephenson Waters: Project Administration, Supervision, Validation, Writing – review & editing.



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