COMMUNICATION & SOCIETY

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The dissemination of science news in social media platforms during the COVID-19 crisis: Characteristics and selection criteria

Abstract

This study explores the specific characteristics of science news stories posted on social media platforms during the first phase of the global pandemic crisis (the first semester of 2020). The focus of the study is to enhance our understanding of the selection criteria for science-related news content posted on social media platforms. Our approach takes into consideration the evolving technological environment of these platforms and the new relationships between media professionals and social media users. Our findings indicate that, under specific circumstances, scientific discoveries may be prioritized in the selection of news stories. We also suggest specific additions to the framework proposed by Harcup and O'Neil (2017), indicating that news stories during crisis situations are more internationally oriented, where audience proximity is created not around "nearby" events but those occurring in other countries around the world. In times of crisis, the main target of news stories is not simply to attract the audience's interest with classic clickbait tactics but to respond to the immediate socio-political context in a meaningful way.

Keywords
Science news, social media, news criteria, news characteristics, Covid-19.

1. Introduction

Traditional media enterprises use social media platforms to increase the visibility of the news stories (content) they produce and present through their printed, audiovisual and web entities. For online news, the pressure to obtain clicks and shares strongly influences decisions about news selection and treatment (Thurman & Myllylahti, 2009; Phillips, 2012) and for this reason science-related news content was not previously prioritized, as it did not attract large numbers of users.

However, since December 2019 and the rapid worldwide spread of COVID-19, science-related news stories gained ground rapidly within the social media environment, in response to the increased audience need for timely and accurate information regarding the pandemic. As with other types of news content, these stories belong to different sub-categories within the area of science, some of which are posted on social media and others not.

This study aims to explore the specific categorization and characteristics of science news stories posted on social media platforms during the first phase of the pandemic (the first

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semester of 2020). The focus of the study is to identify the specific characteristics of these news stories and thus to enhance our understanding of the selection criteria for science-related news content posted on social media platforms more generally. Our work contributes to the scholarship around news values on social media platforms, which seeks to explain why events with similar intrinsic news value are not always given the same prominence, as well as which news values may or may not be inherent in any given story. Our approach takes into consideration the evolving technological environment of social media platforms and the new relationships between producers and consumers. We apply the term "news value" as an indicator of the relevance of news factors and accept the assumption that the attribution of relevance differs between several media formats (Kepplinger & Ehmig, 2006).

2. Theoretical Framework

2.1. *News values on social media platforms*

Scholarship on news values has remained largely unchallenged since Galtung and Ruge's (1965) perceptive typology of twelve factors. They argued that the more an event satisfied particular conditions, the more likely it was to be selected as news. The conditions included eight general factors: frequency, threshold (including absolute intensity and intensity increase), unambiguity, meaningfulness (including cultural proximity and relevance), consonance (involving both predictability and demand), unexpectedness (including unpredictability and scarcity), continuity, and composition (McGregor, 2002; see also McQuail, 1994; Tumber, 1999). Harcup and O'Neill revisited Galtung and Ruge's theory, initially in 2001 and again in 2017, to include the role of social media. In their 2017 revision, they stress that news values are important because they inform the mediated world that is presented to news audiences, providing a shared shorthand operational understanding of the content that journalists produce (Harcup & O'Neill, 2017).

Building on their initial study on news value (Harcup & O'Neil, 2001), in 2017 they identified that potential news stories must generally satisfy one (and preferably more) of the following requirements to be selected for posting on social media platforms. As observed, not all requirements constitute traditional news values, while others mainly refer to clickbait practices:

- Exclusivity: Stories generated by, or available first to, the news organization as a result of interviews, letters, investigations, surveys, polls, etc.
- Bad news: Stories with particularly negative overtones such as death, injury, defeat and loss (of a job, for example).
- Conflict: Stories concerning conflict such as controversies, arguments, splits, strikes, fights, insurrections and warfare.
- Surprise: Stories that have an element of surprise, contrast and/or the unusual about them.
- Audiovisuals: Stories that have arresting photographs, video, audio and which can be illustrated with infographics.
- Shareability: Stories that are thought likely to generate sharing and comments via Facebook, Twitter and other forms of social media.
- Entertainment: Soft stories concerning sex, show business, sport, lighter human interest, animals, or offering opportunities for humorous treatment, witty headlines or lists.
- Drama: Stories concerning an unfolding drama such as escapes, accidents, searches, sieges, rescues, battles or court cases.
- Follow-up: Stories about subjects already in the news.
- The power elite: Stories concerning powerful individuals, organizations, institutions or corporations.

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- Relevance: Stories about groups or nations perceived to be influential with, or culturally or historically familiar to, the audience.
- Magnitude: Stories perceived as sufficiently significant in terms of the large numbers of people involved or their potential impact, or involving a degree of extreme behavior or extreme occurrence.
- Celebrity: Stories concerning people who are already famous.
- Good news: Stories with particularly positive overtones such as recoveries, breakthroughs, cures, wins and celebrations.
- News organization's agenda: Stories that set or fit the news organization's own agenda, whether ideological, commercial or as part of a specific campaign (Harcup & O'Neil, 2017).

However, in a period of crisis, several of these criteria may not be fulfilled and/or other news values may arise to satisfy users' demands and needs.

2.2. *The first phase of the pandemic crisis on social media platforms*

Social media provide members of the public with a channel to quickly communicate their own interpretations of an unfolding crisis, making them an easily accessible source when little information is available in the first crucial hours (Russell-Neuman *et al.*, 2014). Some scholars claim that the public do not prefer such news stories, favoring instead stories about subjects such as entertainment, sports, and crime (or "non-public affairs" news) (Hamilton, 2004; Tewksbury, 2003) and other subjects related to everyday life (Thorson, 2008).

In this context, Shoemaker and Vos (2009, pp. 124-126) discuss the narrative structure of stories. Early studies on the pandemic assessed recurrent narratives generated through users' reactions to news content posted on Facebook, to examine the platform's role during the crisis (Papa & Maniou, 2020). The findings indicate that high personalization of users' news stories is favored over knowledge and information about the pandemic, ranging from the use of irony, humor and sarcasm (Shifman *et al.*, 2007) to the deployment of xenophobic messages. There is also a discursive meaning constructed around raised awareness of the impact of COVID-19, which is clearly marked as a consistent and uniform narrative demonstrating homogeneity among users' discourses. Users' comments acquire a rather negative overtone towards political elites and political authorities, who are systematically blamed for the situation. The final narrative emerging from this analysis is centered on emotions, which often take the form of a unifying, discursive element. This category is apparent through a symbolic construction of the crisis around emotions, feelings and personal stories, which allow for a feeling of togetherness to be established (Papa & Maniou, 2020, pp. 23-24).

As Villar-Rodríguez, Souto-Rico and Martín (2022) argue, social media are the 'breeding ground' for falsehoods and misinformation. As such, an important aspect of the pandemic presented through social media is the role of misinformation. In early studies on the role of social media in the crisis, the term "infodemic" (WHO, 2020; Zarocostas, 2020) was coined to outline the perils of misinformation in the management of virus outbreaks (Mendoza *et al.*, 2010; Starbird *et al.*, 2014), since it could accelerate the spread of the epidemic by influencing and fragmenting social response (Kim *et al.*, 2019). Cinelli *et al.* (2020) provide an in-depth analysis of social dynamics in a time window where narratives and moods on social media related to COVID-19 emerged and spread. In a comparative analysis on five social media platforms (Twitter, Instagram, YouTube, Reddit and Gab) during the COVID-19 outbreak, they found that the interaction patterns of each platform combined with the specific characteristics of their audience play a pivotal role in information and misinformation spreading. Ferrara (2020) illustrates the problem of containing the spread of unverified information about COVID-19, showing that questionable and reliable information spread according to similar diffusion patterns. Along similar lines, Gallotti *et al.* (2020) suggest that low-quality information anticipates epidemic diffusion in various countries, with the peril of

exposing those countries' populations to irrational social behaviors and public health risks. Thousands of social media users suffered from health hazards due to medication and health misinformation, especially in the early months of the pandemic crisis. For example, a piece of COVID-19 misinformation circulated mainly through social media claimed that highly concentrated alcohol could disinfect the body by killing the virus, a claim that killed at least 800 (Islam *et al.*, 2020; Al-Zaman, 2021). As this study will show, misinformation has been an important aspect of the pandemic and was explicitly evident on social media platforms.

3. Scope of Study and Research Questions

This study explores the link between media reporting of COVID-19 issues during the early months of the pandemic, and news values and characteristics as significant selection criteria of the articles shared on social media platforms. Although many science-related news stories are produced on a daily basis by media professionals, not all of them are selected for dissemination and sharing on social media platforms. This work examines the criteria by which specific stories are selected for sharing while others are not, with stories about COVID-19 used as a case study, and seeks to answer the following research questions:

RQ1. How are news stories around the COVID-19 crisis selected by the media to be posted on Facebook and Instagram?

RQ2. Which are the recurrent topics/themes of news stories selected by the media to be posted on their science Facebook and Instagram pages?

RQ3. Which are the selection criteria of news stories (characteristics) around COVID-19 posted on the Facebook and Instagram pages of the media?

4. Method

4.1. *News story analysis*

Qualitative content analysis (Ahuvia, 2008) was carried out on 325 COVID-related news stories posted on the science Facebook and Instagram pages of three major media outlets. We used an open approach to categorization, initially adopting Harcup and O'Neill's (2017) taxonomy, but also accommodating new and emerging themes such that categories of data were defined as the study progressed.

The data retrieved comprised unique news stories for each medium selected, with similar posts in Facebook and Instagram counted only once in the total sample. The stories were categorized in terms of their main topic type, thus identifying the recurring subjects and themes of the discursive attributes of news in relation to the pandemic crisis of COVID-19. The categorization procedure was carried out by two researchers, both specializing in social media narratives. During the pilot stage, Coder 1 and Coder 2 coded 10% of the final sample, representing news stories from all media examined. This initial coding procedure yielded an intercoder reliability test value of 0.92 (Spearman's correlation). In the next stage, Coder 1 categorized the same sample of stories. Two months after the pilot study, Coder 1 repeated the pilot categorization procedure on the same sample of news posts, to test intracoder reliability. The initial reliability test yielded a p value of 0.89 (Spearman's correlation), while the second scale intracoder test yielded a p value of 0.82 (Spearman's Rho), also validated by a Cohen's Kappa value of 0.87. Based on these scores, Coder 1 proceeded to categorize the whole sample.

After repeated readings, the main themes that appeared in the selected news stories (Condor & Gibson, 2007) were identified and we proceeded with their interpretation. The analysis involved the identification of "commonplace" aspects of accounting practice (Condor & Gibson, 2007, p. 121).

Each news story was analyzed to identify which, if any, of the Harcup and O'Neill (2001, 2017) news values and characteristics could be detected in the sample; and whether any amendments, additions or deletions to the list of news values might be considered

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appropriate during the COVID-19 pandemic. The selection criteria of news values to be posted on social media were revisited, taking into consideration (a) the context of the crisis; (b) the social media affordances used to publish and promote the news stories; and (c) the selection for analysis of science news stories only. The analysis is focused on the presence of discursive attributes (visual and verbal content) in news stories based on their: *topic and style, tone and rhetoric, structure and use of social media tools,* and *audiovisuals and graphs.*

- *Topic and style*: the focus is to determine the discursive attributes of each news story and event around the pandemic (entertainment, fun, power elites).
- *Tone and rhetoric*: following Harcup and O'Neill (2017), the emphasis is on vocabulary (adjectives, adverbs, verbs) and the argumentation (neutrality, partiality, advocacy, justification, criticism, drama, good news, bad news, etc.) used to represent and evaluate the pandemic.
- *Structure and use of social media tools*: the emphasis is to observe some of the structural elements of the news stories such as length, inclusion of hyperlinks, and multimodality, such as the inclusion of audiovisual elements (Deuze, 2003).
- *Audiovisuals and graphs*: News stories that have arresting photographs, video, audio and which can be illustrated with infographics (Harcup & O'Neill, 2017).

Naturally, the aim of the study is not to offer an exhaustive analysis of all news stories on the COVID-19 pandemic, which is beyond the scope of this article. Rather, we seek to demonstrate how a discursive perspective on news selection criteria in science can allow us systematically to investigate how a particular story can be valuable for posting on social media, identify which news values are relevant in this selection, and examine the contribution of videos and images specifically in times of crisis.

4.2. *Sample*

The sample consists of 325 news stories posted on the official Facebook and Instagram pages of the three largest newspapers (by readership) targeting a global audience and from three different countries[1]: *The New York Times, The Guardian* and *Le Monde.* The sample was drawn from the official science Facebook and Instagram pages of each medium selected, to capture only the characteristics of articles posted on these platforms and avoid biases induced by website-specific characteristics. The media outlets selected for this analysis have active science social media pages and regularly post news stories written by professional journalists or scientific experts. To select a sample of the pages that were returned by the search engine, five criteria were applied. Science pages were selected if they (a) were clearly attached to the news outlet, (b) were public, (c) contained a written description of the news media outlet, (d) were active during the period selected for data collection, e) contained news stories regarding COVID-19. The social media pages attached to the selected news outlets are the following: *Le Monde Environnement et Sciences, The Guardian Science, The New York Times - Science*. News stories/posts selected for analysis cover the period December 2019 to May 2020, a period which includes the major global outbreak trajectory of COVID-19 (Author citation, 2020). The extraction of the social media data sets was accomplished using the *Instapaper* web tool.

5. Findings and Analysis

The four categories of news stories emerging from the analysis are presented in Table 1: the first corresponds to "*pseudoscience*," the second to *infotainment/entertainment centered* news stories, the third to the *latest technological discoveries*, while the fourth presents *expert/medical opinion*s on COVID-19.

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[1] See data for 2020 in www.trendook.com/top-10-newspapers-in-the-world/ (Top 10 Newspapers in the World - Trendook) and *Le Monde*: total monthly circulation France 2020 | Statista].

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Table 1. Categories of news stories.

Newspapers	'Pseudo-science'	Infotainment regarding risk prevention	Technological discoveries (tracking, tests, risks, drones, refuting misleading information)	Experts/medical researchers' opinions on COVID-19 (effects, risks, prevention and fake news)
The Guardian	50	5	20	58
The New York Times	38	3	22	53
Le Monde	43	10	10	13

Source: Own elaboration based on the research sample.

We present each category separately, focusing on the characteristics of news stories posted on the Facebook accounts of news organizations. After multiple readings of the material, we concluded that the collected articles from all pages constitute a single volume of material that could be analyzed based on the different characteristics it represented.

5.1. *Pseudoscience news stories*

The first category of pseudoscience concerns powerful individuals, mainly political figures, country leaders and organizations. In these stories, powerful elites conflate causation and the contributing factors of COVID-19 through a mixture of pseudoscientific statements using specific wordplay. Most of the news stories show the powerful elites imposing their own ethical standards in science on weaker nations in order to further their interests at the expense of the powerless victims of COVID-19. Within this first category, news stories are presented within these frames: (a) the pandemic is represented as an international and contextual crisis by scientists, experts or country leaders; (b) the opinion of the political elites around the world centers largely on the impact of COVID-19 as the primary focus of the crisis; and (c) the impact of COVID-19 on third countries is discussed, with an emphasis on the deaths and losses in those populations and the actions taken by the elites.

Regarding the tone and rhetoric, the analysis reveals that a dramatic tone tends to be used in most of the news stories to describe the situation around COVID-19, with phrases such as: "international drama," "spreading the terror," "thousands of victims" and "COVID-19 –the invisible enemy." In other cases, and to varying degrees, information and opinion articles in this category and featured regularly on the Facebook and Instagram pages of media organizations tended to revolve around larger-scale events in distant locations. These were reflective of drama and action and associated specific persons such as political elites with aspects of the story. The political elite framing, associated with the measures taken in response to COVID-19 and the lack of news stories with a critical perspective, lead to a generally negative and serious tone of the coverage of the pandemic and its implications for the international context. It seems that the objective here is to create a sense of proximity between distant subjects and the crisis. Rather than assessing the current situation of the public health system, what is considered is the numbers of those dying, hospitalized or otherwise affected around the world; the more atrocious the story, the more likely it is to be posted on social media. In this case, proximity is more cultural and psychological than physical, and assumes that news stories affecting populations that are considered distant are more likely to make headlines and create a sense of unity, which connects with the idea that "we are all affected by COVID-19." "We" would be citizens of every country affected by COVID-19. This contradicts the news values framework of Harcup and O'Neill (2001, 2017), in which proximity is created by covering events in the same region. During the pandemic, proximity

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is created around events happening at the same time around the world. What is similar is the magnitude aspect of the selection of events and narratives. The large numbers of people affected by COVID-19 mean these stories tend to be sufficiently significant in terms of magnitude, and also involve a degree of extreme behavior or extreme occurrence.

This significance is often transmitted through lengthy news stories followed by the use of strong visuals which tend to represent hospital patients using headlines such as: "Male coronavirus patients with low testosterone levels are MORE likely to die from COVID-19, German hospital finds" (*Daily Mail*, May 13, 2020); "The Guardian view on the new coronavirus: buying time can save lives" (*The Guardian*, March 5, 2020). Interactive maps with the latest deaths and confirmed cases in each region and country of the world are present in almost all the news stories. Every visual or photo is followed by a description, often referring to medical expert opinion. News stories posted also include videos, illustrated with infographics (Harcup & O'Neill, 2017).

5.2. *Infotainment/entertainment news stories around risk prevention: humor and sarcasm*

The second category is "infotainment and entertainment," entertaining news information with an emphasis on humor and sarcasm. Most of the news stories found on Facebook and Instagram can be categorized as "soft science stories" around the pandemic crisis, using funny headlines, memes and gifs, for example: "Doctors without patients: Our waiting rooms are like ghost towns" (*The New York Times*, May 7, 2020); "Coronavirus has made things crazy and scary, and they were already crazy and scary before" (*The Guardian*, March 19, 2020); "China's coronavirus back-to-work lessons: Masks and vigilance" (*The New York Times*, May 13, 2020).

The emphasis here is on the "unusualness" and "playful" dimension of the news item. Some of the darker but "entertaining" human-interest stories might perhaps be more accurately labeled as dramatic. While Harcup and O'Neill (2017) suggest that these stories are often "soft stories concerning sex, show business, sport, lighter human interest, animals, or offering opportunities for humorous treatment, with witty headlines or lists," when referring to the COVID-19 crisis, news stories disseminated are more personalized and emotionally oriented messages, as a way of countering negative feelings during the pandemic. Humor is used to shift perspective from the stressful and exhausting information overload brought on by users continuously browsing the news, distracting them from the pandemic as a "problem" and immediate "threat," and reducing the paralyzing feelings of fear and helplessness. These types of news stories refer to the "unusualness" of COVID-19 by highlighting unexpected or spectacular aspects of the news stories (Grabe *et al.*, 2001) in a more playful way. In most cases, infotainment news stories tend to be more neutral in presenting and evaluating the crisis. Most tend to be short, with hyperlinks and strong audiovisual elements (e.g., funny videos on how to wear your mask or wash your hands).

This finding connects with the utilization of social media as a tool for amusement and easing emotional tension and anxiety (Lee & Ma, 2012). Previous studies reveal that most of the information shared on Facebook aims to foster relaxation and enjoyment (Baek *et al.*, 2011). Kim *et al.* (2019) established a positive connection between entertainment and Facebook usage. Taking this into consideration, entertainment stories might be added as a characteristic to the framework of Harcup and O'Neill (2017). These stories are likely to generate sharing and comments via Facebook and other forms of social media, including by users of news organizations' Facebook pages. In terms of special conditions affecting this, the widespread requirement for self-isolation during the pandemic meant that entertainment news stories increased their reach.

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5.3. *Technological discoveries related to COVID-19*

The third category of "technological discoveries related to the COVID-19 pandemic crisis," refers to "good news." These stories are particularly positive, with an emphasis on expert or scientific opinions on technological discoveries about prevention methods, apps to track the infected population or to show if people have come in contact with an infected person. In this category, most of the headlines and news stories mention technological or scientific developments, for example: "Google and Apple show samples of how eventual coronavirus exposure apps might look and forbid use of GPS-enabled location services" (*Daily Mail*, May 4, 2020); "With Crispr, a possible quick test for the coronavirus" (*The New York Times*, May 7, 2020); "App shows promise in tracking new coronavirus cases, study finds" (*The New York Times*, May 12, 2020).

The tone tends to be generally positive, although sometimes neutral due to the lack of internationally concerted action in this area, both in terms of coordination and information exchange. It seems that news stories fail to institutionalize past experience or make it visible. The news stories in this category tend to be more descriptive, failing to articulate researchers' discoveries in clear or actionable terms that respond to their audience's practical, political and technical questions.

Descriptions and information about technological discoveries tend to be phrased in jargon that is not easily accessible to users. They often mention concerns about privacy, data protection and civil liberties, creating a sense of uncertainty. News stories are often accompanied by informative videos on how to access and install the apps.

5.4. Expert medical and researchers' opinions on COVID-19: between "bad" and "good" news

The fourth category reveals news stories written mostly by public health experts, medical staff and researchers. Most of the actors presented in the news stories emphasize the effects, risks and prevention measures related to COVID-19. In contrast to previous categories, this category of frames points out (a) the psychological impact of accessing inappropriate or biased information on COVID-19 and (b) health policy and research funding agendas around COVID-19 prevention and vaccination. The first discursive attribute refers to the effort of medical experts to tackle news stories presenting fake or false information to audiences. Through these news stories, the medical community aims to correct misinformation about COVID-19, which was spreading rapidly through social media and messaging apps. The tone is often alarmist, implying that if the audience is ignorant, psychological effects can occur, such as stress, panic and fear. Most of the news stories refute false information and underline messages around precautions and health safety measures promoted by WHO, such as social distancing and hand hygiene.

In the first discursive attribute, tone and rhetoric tend to be negative, using phases such as "terrible consequences" and "dangerous outcome of COVID-19" associated with negative happenings and behavior, such as "if you don't respect the precautions, we will get it" (*The Guardian*, March 10, 2020), "'Finally, a virus got me': Ebola expert on nearly dying of coronavirus" (*The Guardian*, April 14, 2020). The tone is often associated with the rhetoric, referring to serious consequences if the population fail to follow the guidelines. Most of the news stories make use of strong audiovisual elements, such as hyperlinks, photographs or videos of people suffering from COVID-19. The novelty here is that even these images and videos refer to negative emotions, capturing users' attention by showing people experiencing negative or surprising emotions.

The second discursive attribute links to stories with a rather positive tone, mentioning how people affected are recovering, the breakthroughs, cures, and vaccine development studies. Most of the news stories use more scientific and personalized language, such as: "conditions for clinical testing," "molecules," "profile of vaccine developers," "industry

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benchmarks for traditional vaccine development paradigms." Headlines have a more positive tone, for instance: "Scientists consider indoor ultraviolet light to zap coronavirus in the air" (*The New York Times*, April 2, 2020); "How to boost your immune system to avoid colds and coronavirus" (*The Guardian*, March 8, 2020); "Researchers are racing to make a coronavirus vaccine. Will it help?" (*The New York Times*, March 10, 2020); "Good news: new research suggests that most everyone does make antibodies, and at levels likely to confer some immunity" (*The New York Times*, March 10, 2020); "Scientists consider indoor ultraviolet light to zap coronavirus in the air" (*The New York Times,* May 9, 2020). While most positive news is found in this category, some of the stories indicate fears or uncertainty, making reference to "bad news," for example: "Coronavirus will force hospital chiefs to make some terrible choices" (*The Guardian*, April 10, 2020); "Study offers details of U.S children severely sickened by coronavirus" (*The New York Times*, May 11, 2020); "Bad news wrapped in protein: Inside the coronavirus genome" (*The New York Times*, April 4, 2020). Most of the news stories tend to be exclusive or promoted as such by the news organization on their respective social media page. Most are generated or are available first to the news organization as a result of interviews, testimonials, investigation and surveys with scientific experts or doctors specialized in matters related to the pandemic. Credibility is attributed to the key sources (doctors, experts, etc.) as valuable and legitimate actors in the coverage of the crisis. Most of the news stories are lengthy, presenting in-depth and meaningful analysis. Often, the news stories are accompanied by scientific experts' interviews and hyperlinks to their laboratory research.

6. Conclusions

This study analyzes the selection criteria and topics of COVID-related news stories posted on the science social media pages (Facebook and Instagram) of specific news media. The analysis examined the criteria and topics and their interpretations as these relate to the crisis. The study highlights the importance and implications of understanding the selection of news stories posted on the science Facebook and Instagram pages of news media (in line with Harcup & O'Neill, 2017). Our findings indicate that the pandemic crisis requires some adjustments and updates to the current framework, and lead us to propose for discussion an updated set of selection criteria identifiable within posted news stories on social media science pages. Although there are exceptions, we found that news stories posted on these pages during the pandemic crisis seem to meet the following requirements.

Most of the news stories can be categorized as "pseudoscience," related to people affected, dead or seriously unwell. The study shows that in a period of crisis, more dramatic and "bad" stories are likely to be included in social media posts. This finding indicates that, on average, stories do not directly adhere to the selection criteria of O'Neil and Harcup (2020) but mainly rely on the evolution of the story. The first category reveals that news stories during the crisis are presented with a negative tone, favored over knowledge and information around the pandemic. Its manifestations may range from the use of alarmist language to a more serious tone in describing the problem. It seems that journalists, when selecting such news stories, are "domesticating" news in an effort to create proximity and meaning among distant subjects (in line with Cohen, 2002). When reporting crisis situations, journalistic selection criteria can disrupt a more balanced and nuanced reportage. News story selection during the pandemic can be "oversimplified," causing a negative effect on the narration of the crisis, rather than producing a uniform selection of news stories. Our findings suggest an important addition to the framework of Harcup and O'Neil (2017), indicating that news stories are more internationally oriented, with proximity created not around nearby events but those occurring in other countries around the world.

The second category is "infotainment and entertainment." The study demonstrates that in times of crisis, several news stories selected for dissemination through social media present elements of irony, humor and sarcasm. It seems that in times of crisis, characteristics

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such as humor are prioritized in news selection, which may cause fluctuations in the representation of the pandemic. This finding is in line with previous studies (Newman, 2011), where shareability is one of the most significant aspects in selecting news stories. Stories which make the audience laugh are more likely to attract clicks and shares, while online audience metrics, and specifically audience clicks, affect journalistic decision-making.

The third and fourth categories of characteristics relate to technological discoveries as regards the crisis and news stories written mostly by public health experts, medical staff and researchers. These categories reveal that, under specific circumstances, good news or scientific discoveries may be prioritized in the selection of news stories.

Overall, in crisis situations, the selection criteria for news stories posted on social media platforms tend to differ. In times of crisis, the main target of news stories is not simply to attract the audience's interest with classic clickbait tactics but to respond to the immediate socio-political context in a meaningful way. Selection criteria identified in this work indicate several additions to the framework proposed by Harcup and O'Neil (2017).

As with most studies, this work presents certain limitations. First, all three media selected for analysis are based in the global North and, as such, their target audience mainly comprises citizens of these countries. Second, the content of the three media selected cannot be considered representative of all traditional media content nor of the news content posted on social media platforms by other media entities (i.e., local media). Finally, we acknowledge that a significant part of the audience may choose alternative sources of information beyond traditional media organizations, often resulting in misinformation and sensationalism. As such, this study attempts only to provide a starting point for an improved understanding of the processes and criteria for selecting news stories in times of crisis. Future research could shed light on possible implications of the selection of news stories during a crisis, such as how selection criteria affect the broader news agenda on social media platforms.

References

Ahuvia, A. (2008). Traditional, interpretive, and reception-based content analyses: Improving the ability of content analysis to address issues of pragmatic and theoretical concern. In R. P. Franzosi (Ed.), *Content analysis (Volume 1): What is content analysis? Defining the methodological playing field* (pp. 185-209). London, UK: Sage.

Al-Zaman, M. S. (2021). Social media and COVID-19 misinformation: How ignorant Facebook users are? *Heliyon*, *7*(5), e07144. https://www.doi.org/10.1016/j.heliyon.2021.e07144

Baek, K., Holton, A., Harp, D. & Yaschur, C. (2011). The links that bind: Uncovering novel motivations for linking on Facebook. *Computers in Human Behavior*, *27*(6), 2243-2248. https://www.doi.org/10.1016/j.chb.2011.07.003

Cinelli, M., Quattrociocchi, W., Galeazzi, A., Valensise, C. M., Brugnoli, E., Schmidt, A. L., Zola, P., Zollo, F. & Scala, A. (2020). The covid-19 social media infodemic. *arXiv preprint arXiv:2003.05004.* https://www.doi.org/10.1038/s41598-020-73510-5

Cohen, E. L. (2002). Online journalism as market-driven journalism. *Journal of Broadcasting & Electronic Media, 46*(4), 532-548. https://www.doi.org/10.1207/s15506878jobem4604_3

Condor, S. & Gibson, S. (2007). 'Everybody's entitled to their own opinion': Ideological dilemmas of liberal individualism and active citizenship. *Journal of Community & Applied Social Psychology*, *17*(2), 115-140. https://www.doi.org/10.1002/casp.885

Deuze, M. (2003). The web and its journalisms: Considering the consequences of different types of newsmedia online. *New Media & Society*, *5*(2), 203-230. https://www.doi.org/10.1177/1461444803005002004

Ferrara, E. (2020). #covid-19 on Twitter: Bots, conspiracies, and social media activism. *arXiv preprint arXiv:2004.09531.* https://www.doi.org/10.48550/arXiv.2004.09531

Maniou, T. A. & Papa, V.
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Characteristics and selection criteria**

Gallotti, R., Valle, F., Castaldo, N., Sacco, P. & De Domenico, M. (2020). Assessing the risks of 'infodemics' in response to COVID-19 epidemics. *arXiv preprint arXiv: 2004.03997.* https://www.doi.org/10.1038/s41562-020-00994-6

Galtung, J. & Ruge, M. H. (1965). The structure of foreign news: The presentation of the Congo, Cuba and Cyprus crises in four Norwegian newspapers. *Journal of Peace Research*, *2*(1), 64-90. https://www.doi.org/10.1177/002234336500200104

Grabe, M. E., Zhou, S. & Barnett, B. (2001). Explicating sensationalism in television news: Content and the bells and whistles of form. *Journal of Broadcasting & Electronic Media*, *45*(4), 635-655. https://www.doi.org/10.1207/s15506878jobem4504_6

Hamilton, J. (2004). *All the news that's fit to sell: How the market transforms information into news*. Princeton, NJ: Princeton University Press.

Hammad, M. A. & Alqarni, T. M. (2021). Psychosocial effects of social media on the Saudi society during the coronavirus disease 2019 pandemic: A cross-sectional study. *PLoS One*, *16*(3), e0248811. https://www.doi.org/10.1371/journal.pone.0248811

Harcup, T. & O'Neill, D. (2001). What is news? Galtung and Ruge revisited. *Journalism Studies*, *2*(2), 261-280. https://www.doi.org/10.1080/14616700118449

Harcup, T. & O'Neill, D. (2017). What is news? News values revisited (again). *Journalism Studies*, *18*(12), 1470-1488. https://www.doi.org/10.1080/1461670X.2016.1150193

Islam, M. S., Sarkar, T., Khan, S. H., Kamal, A. H. M., Hasan, S. M. *et al.* (2020). COVID-19-related infodemic and its impact on public health: A global social media analysis. *The American Journal of Tropical Medicine and Hygiene*, *103*(4), 1621-1629. https://www.doi.org/10.4269/ajtmh.20-0812.

Kepplinger, H. M. & Ehmig, S. C. (2006). Predicting news decisions. An empirical test of the two-component theory of news selection. *Communications*, *31*(1), 25-43. https://www.doi.org/10.1515/COMMUN.2006.003

Kim, L., Fast, S. M. & Markuzon, M. (2019). Incorporating media data into a model of infectious disease transmission. *PloS One*, *14*(2) e0197646. https://www.doi.org/10.1371/journal.pone.0197646

Lee, C. S. & Ma, L. (2012). News sharing in social media: The effect of gratifications and prior experience. *Computers in Human Behavior*, *28*(2), 331-339. https://www.doi.org/10.1016/j.chb.2011.10.002

McGregor, J. (2002). Restating news values: Contemporary criteria for selecting the news. In M. Power (Ed.), *Communication: Reconstructed for the 21st Century: Refereed Proceedings of the Australian and New Zealand Communication Association International Conference* (pp. 1-7). Australian and New Zealand Communication Association (ANZCA).

McQuail, D. (1994). *Mass communication theory*. London: Sage.

Mendoza, M., Poblete, B. & Castillo, C. (2010). Twitter under crisis: Can we trust what we RT? In P. Melville, J. Leskovec & F. Provost (Eds.), *Proceedings of the First Workshop on Social Media Analytics* (pp. 71-79). New York: Association for Computing Machinery.

Newman, N. (2011). Mainstream media and the distribution of news in the age of social media. *Reuters Institute for the Study of Journalism*. Oxford: University of Oxford.

O'Neill, D. & Harcup, T. (2020). News values and news selection. In K. Wahl-Jorgensen & T. Hanitzsch (Eds.), *Handbook of journalism studies* (2nd ed.) (pp. 213-228). New York: Routledge.

Papa, V. & Maniou, T.A. (2020). Recurrent narratives around the COVID-19 crisis in social networks: a case study analysis on Facebook. *Tripodos*, *2*(47), 11-28.

Phillips, A. (2012). Sociability, speed and quality in the changing news environment. *Journalism Practice*, *6*(5-6), 669-679. https://www.doi.org/10.1080/17512786.2012.689476

Russell-Neuman, W., Guggenheim, L., Mo Jang, S. & Bae, S. Y. (2014). The dynamics of public attention: Agenda-setting theory meets big data. *Journal of Communication*, *64*(2), 193-214. https://www.doi.org/10.1111/jcom.12088

Maniou, T. A. & Papa, V.
The dissemination of science news in social media platforms during the COVID-19 crisis:
Characteristics and selection criteria

Shifman, L., Coleman, S. & Ward, S. (2007). Only joking? Online humour in the 2005 UK general election. *Information, Community and Society*, *10*(4), 465-487. https://www.doi.org/10.1080/13691180701559947

Shoemaker, P. J. & Vos, T. (2009). *Gatekeeping theory*. London: Routledge.

Starbird, K., Maddock, J., Orand, M., Achterman, P. & Mason, R. M. (2014). Rumors, false flags, and digital vigilantes: Misinformation on Twitter after the 2013 Boston marathon bombing (pp. 654-662). *IConference 2014 Proceedings.*

Tewksbury, D. (2003). What do Americans really want to know? Tracking the behavior of news readers on the Internet. *Journal of Communication*, *53*(4), 694-710. https://www.doi.org/10.1111/j.1460-2466.2003.tb02918.x

Thorson, E. (2008). Changing patterns of news consumption and participation: News recommendation engines. *Information, Communication & Society*, *11*(4), 473-489. https://www.doi.org/10.1080/13691180801999027

Thurman, N. & Myllylahti, M. (2009). Taking the paper out of news: A case study of Taloussanomat, Europe's first online-only newspaper. *Journalism Studies, 10*(5), 691-708. https://www.doi.org/10.1080/14616700902812959

Tumber, H. (1999). *News: A reader*. Oxford: Oxford University Press.

Villar-Rodríguez, G., Souto-Rico, M. & Martín, A. (2022). Virality, only the tip of the iceberg: ways of spread and interaction around COVID-19 misinformation in Twitter. *Communication & Society*, *35*(2), 239-256. https://www.doi.org/10.15581/003.35.2.239-256

WHO (2020). *WHO Situation Report 13*. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf?sfvrsn=195f4010_6 . (Accessed: 2010-09-30).

Zarocostas, J. (2020). How to fight an infodemic. *The Lancet, 395*(10225), 676. https://www.doi.org/10.1016/S0140-6736(20)30461-X