

INTR
33,5

1990

Received 31 July 2022
Revised 27 December 2022
17 April 2023
27 June 2023
Accepted 3 July 2023

Combating misinformation with internet culture: the case of Brazilian public health organizations and their COVID-19 vaccination campaigns

Julian Marx

School of Computing and Information Systems, The University of Melbourne, Parkville, Australia

Beatriz Blanco

School of Communication Sciences, University of Vale do Rio dos Sinos, Porto Alegre, Brazil

Adriana Amaral

School of Communication, Universidade Paulista, Sao Paulo, Brazil

Stefan Stieglitz

Chair of Business Information Systems and Digital Transformation, University of Potsdam, Potsdam, Germany, and

Maria Clara Aquino

School of Communication Sciences, University of Vale do Rio dos Sinos, Porto Alegre, Brazil

Abstract

Purpose – This study investigates the communication behavior of public health organizations on Twitter during the COVID-19 vaccination campaign in Brazil. It contributes to the understanding of the organizational framing of health communication by showcasing several instances of framing devices that borrow from (Brazilian) internet culture. The investigation of this case extends the knowledge by providing a rich description of the organizational framing of health communication to combat misinformation in a politically charged environment.

Design/methodology/approach – The authors collected a Twitter dataset of 77,527 tweets and analyzed a purposeful subsample of 536 tweets that contained information provided by Brazilian public health organizations about COVID-19 vaccination campaigns. The data analysis was carried out quantitatively and qualitatively by combining social media analytics techniques and frame analysis.

Findings – The analysis showed that Brazilian health organizations used several framing devices that have been identified by previous literature such as hashtags, links, emojis or images. However, the analysis also unearthed hitherto unknown visual framing devices for misinformation prevention and debunking that borrow from internet culture such as “infographics,” “pop culture references” and “internet-native symbolism.”



Internet Research
Vol. 33 No. 5, 2023
pp. 1990-2012
Emerald Publishing Limited
1066-2243
DOI 10.1108/INTR-07-2022-0573

© Julian Marx, Beatriz Blanco, Adriana Amaral, Stefan Stieglitz and Maria Clara Aquino. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licences/by/4.0/legalcode>

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 823866.

Research limitations/implications – First, the identification of framing devices relating to internet culture add to our understanding of the so far little addressed framing of misinformation combat messages. The case of Brazilian health organizations provides a novel perspective to knowledge by offering a notion of internet-native symbols (e.g. humor, memes) and popular culture references for misinformation combat, including misinformation prevention. Second, this study introduces a frontier of political contextualization to misinformation research that does not relate to the partisanship of the spreaders but that relates to the political dilemmas of public organizations with a commitment to provide accurate information to citizens.

Practical implications – The findings inform decision-makers and public health organizations about framing devices that are tailored to internet-native audiences and can guide strategies to carry out information campaigns in misinformation-laden social media environments.

Social implications – The findings of this case study expose the often-overlooked cultural peculiarities of framing information campaigns on social media. The report of this study from a country in the Global South helps to contrast several assumptions and strategies that are prevalent in (health) discourses in Western societies and scholarship.

Originality/value – This study uncovers unconventional and barely addressed framing devices of health organizations operating in Brazil, which provides a novel perspective to the body of research on misinformation. It contributes to existing knowledge about frame analysis and broadens the understanding of frame devices borrowing from internet culture. It is a call for a frontier in misinformation research that deals with internet culture as part of organizational strategies for successful misinformation combat.

Keywords Misinformation, Internet culture, Frame analysis, Social media, Twitter, Global South

Paper type Research paper

1. Introduction

The global COVID-19 pandemic gave rise to a parallel spreading of misinformation in online communication, which was also coined the COVID-19 “Infodemic.” In this light, social media have become preferential outlets for amplifying information of untrusted sources, rumors or conspiracy theories (Brennen *et al.*, 2020; Di Domenico *et al.*, 2021). The threat that emanates from misinformation on social media manifests itself in various forms. Members of the public can be misled and put in situations that endanger their health and well-being. Moreover, misinformation can manipulate the codetermination of democratic consensus-building (Bayer *et al.*, 2022). Commercial organizations can also be affected by misinformation as it may impact brand images, the stock market, sales numbers, share prices or consumer trust (Bollen *et al.*, 2011; Visentin *et al.*, 2019). The motivation to produce or spread misinformation on social media is miscellaneous: to profit, to harm others, to influence, to create disorder, spread a (political) ideology or for sheer amusement (Bayer *et al.*, 2022; Morgan, 2018; Sharma *et al.*, 2019; Visentin *et al.*, 2019).

In crisis situations, such as pandemics, it is critical for governmental institutions, such as public health organizations, to identify, collect and distribute accurate information to prevent misinformation from spreading (Ben Lazreg *et al.*, 2018). During the COVID-19 pandemic, the social media communication of public health organizations gained importance, as it constituted a primary channel for social mobilization and awareness campaigns, for example, for sensitizing the public to vaccinations. The vast spread of COVID-19-related misinformation, however, complicated these tasks. A case in which this problem was particularly salient was the pandemic situation in Brazil in 2021. At the time, Brazil had recorded 9,497,795 confirmed cases of COVID-19, with 231,012 deaths, numbers that were exceeded only by the United States and India (WHO, 2021). Brazil particularly suffered from a lack of political action to contain the virus, exemplified by the unfounded claims of its president, Jair Bolsonaro, who regularly downplayed the risks of COVID-19 (Londoño, 2021). Moreover, Brazil’s response to COVID-19 has long been assessed as insufficient. Testing rates were below the global average, and no national policies on contact tracing or social distancing were implemented (Hallal, 2021). In addition, the conveyed negligence concerning the pandemic was closely linked to social media communication. Many official statements expressing distrust toward COVID-19 vaccines were live streamed through platforms such as Facebook and Twitter (Amaral *et al.*, 2022).

Notably, Brazilian internet culture is characterized by a very engaged audience that often deploys internet-native elements such as memes and inside jokes as a strategy to encounter (political-charged) misinformation (Amaral, 2016; Declercq, 2022). One example is the adaption of the Brazilian funk song “Bum Bum Tam Tam” for publicizing the CoronaVac vaccine, manufactured by the research center Butantã Institute (Barretto Briso, 2021). Examples such as this make it evident that politically charged environments, such as Bolsonaro’s tenure in Brazil, require public health organizations to develop capabilities of carefully framing the information they provide publicly. One major factor for vaccination hesitancy is political opposition (Chaney and Lee, 2022), which makes framing an even more important issue. In its psychological tradition, framing refers to variations in how a piece of information is presented to a certain audience (Cacciatore *et al.*, 2016; Kahneman, 2003). Due to the political context and lack of support from the government, public health organizations in Brazil faced the dilemma of framing their vaccination campaigns in such a way that they could withstand the misinformation-laden environment in the Brazilian social media sphere while not risking political sanctions.

Prevailing research on misinformation combat in the context of social media has focused on the individual perception of misinformation by users (e.g. Allcott *et al.*, 2019), the mapping and classification of misinformation disseminators (e.g. Amaral *et al.*, 2022; Burki, 2019) and the investigation of technological means to detect or flag misinformation (e.g. Ross *et al.*, 2018). A largely overlooked frontier in this domain is the strategic act of *preventing* misinformation. By using the same biomedical metaphor as the “infodemic” notion, van der Linden (2022) used psychological inoculation theory to explain the importance of misinformation prevention. He posits that “just as vaccines trigger the production of antibodies to help confer immunity against future infection, the same can be achieved with information” (p. 464). Real-time debunking and misinformation detection techniques are important organizational capabilities, but only after inoculation, that is, prevention measures, have failed (Lewandowsky and van der Linden, 2021). A systematic review by Skafle *et al.* (2022) revealed that scholarship concerned with COVID-19 related misinformation on social media primarily deals with the types of misinformation (conspiracy claims, medical misinformation, vaccine development) and its effects such as vaccine hesitancy. We problematize this body of work because of a lack of emphasis on misinformation prevention. Moreover, we problematize that most studies dealing with COVID-19 misinformation do not contextualize their empirical analysis. An exception is a study by Leng *et al.* (2021), which examined the cultural, social and political contexts of COVID-19 misinformation surfacing in China. Understanding these contexts and how information campaigns are framed as a result thereof, we argue, is imperative to advancing our knowledge of how misinformation combat can succeed. Consequently, more case studies are needed that consider different cultural, social and political contexts and how they affect the framing of preemptive misinformation countermeasures such as health campaigns. In this vein, this study investigates the case of Brazilian public health organizations and their use of internet culture to support COVID-19 vaccination campaigns and prevent the spread of anti-vaccination misinformation.

The analysis of this case identifies hitherto unknown organizational means of framing, that is, elements of internet culture, and their impact on social mobilization via social media and preemptive measures of misinformation containment. The results of this study contribute to knowledge in three key aspects. First, the context-specific elements of framing identified in this case study extend the literature on the frame analysis of organizational online communication. Researchers interested in frame analysis in organizational contexts can benefit from these findings as they provide categories for qualitative manual and/or computational inquiries of social media data. Second, this study contributes to an improved theoretical understanding of the relationship between organizational framing and misinformation prevention on social media. By interpreting the case of Brazilian public health organizations, we introduce the frames of “infographics,” “pop culture references,”

“recognized authority” and “internet-native symbolism” to the literature on misinformation containment. Third, implications for practice are derived that inform decision-makers about the possibilities of public campaigning. As the research team behind this study consists of scholars from Brazil and Germany, the joint analysis and discussion of the results unearthed the often-overlooked cultural, social and political peculiarities of framing. This helps to contrast several assumptions and strategies that are prevalent in (health) discourses in Western societies and scholarship. Awareness in this regard helps to improve the intercultural competences of organizations and decision-makers to combat misinformation beyond national boundaries.

2. Background

2.1 Misinformation combat by public health organizations on social media

As a result of the COVID-19 “infodemic,” both the production of and research about misinformation, that is, deliberate or unintended false or inaccurate information, has increased (Nascimento *et al.*, 2022). An often-overlooked stakeholder group in research on misinformation is public health organizations, such as health ministries, medical research institutions or health associations. Social media provide public health organizations and their executives who are involved in health communication with an opportunity to reach large subsets of the public and provide them with crucial information, for example, during pandemics and other health crises (Mirbabaie *et al.*, 2020). However, the verification of available information from a variety of official and unofficial sources poses a particular challenge for public health organizations (Rathore *et al.*, 2021). In this vein, public health organizations not only have the mandate to react to health crises (e.g. misinformation combat) but also to inform the public actively and accurately as a trustworthy source (e.g. misinformation prevention) and to include the public in the discourse (Muhammed and Matthew, 2022). One of the concerns of research in this field is the effectiveness of communication strategies that may help organizations counteract and prevent misinformation (Mirbabaie *et al.*, 2022). For example, a study conducted by Vafeiadis *et al.* (2019) suggested that public health organizations counter the spread of misinformation by discrediting the source of the misinformation instead of dealing with a single piece of misinformation (e.g. a tweet). By doing so, the credibility of the source can be reduced, and the public is less likely to fall victim to the threat. Lewandowski and van der Linden (2021) structured the process of misinformation into three distinct phases: prevention, detection and debunking. Table 1 provides an overview of these phases.

Phase	Definition	Attribute(s)	Supporting literature
Prevention (including prebunking)	Pre-emptive measures to expose a population with accurate information (prevention) and/or potential misinformation narratives to sensitize the public (prebunking)	Proactive	Lewandowsky and van der Linden (2021), Ecker <i>et al.</i> (2022)
Detection	The capacity or skill to identify flawed argumentation or false facts that disinform its recipients	Reactive	Asr and Taboada (2019), Shu <i>et al.</i> (2017)
Debunking	The correction of misinformation by (1) providing an alternative causal explanation, and/or (2) arousing suspicion about the source of the misinformation piece	Reactive	Lewandowsky and van der Linden (2021), Chan <i>et al.</i> (2017)

Source(s): Authors' own work

Table 1.
Three phases of
misinformation combat

Existing research heavily focuses on the reactive phases of misinformation containment such as detection (Asr and Taboada, 2019; Shu *et al.*, 2017) and debunking (Chan *et al.*, 2017). According to Lewandowsky and van der Linden (2021) and Ecker *et al.* (2022), the preventive phase of misinformation is largely overlooked. Research that explains the mechanisms of misinformation prevention, however, could contribute to our understanding of reducing the amount of misinformation that is created in the first place. Certain topics or events are highly susceptible to misinformation, one of which is vaccination (Vemprala *et al.*, 2021). To prevent misinformation about vaccinations on social media, public health organizations have employed a variety of strategies. One approach is to use social media platforms to promote accurate information about general health topics. This can include the distribution of educational videos, surveying public attitudes or prebunking misinformation (Tsao *et al.*, 2021).

Apart from exploring strategic measures to apply in each phase, another facet of research in this domain is how misinformation is disseminated on social media platforms such as Twitter. Features such as novelty and efficacy (Song *et al.*, 2023) as well as the salience and trustworthiness of the source (Di Domenico *et al.*, 2021) affect the decision to share misinformation on social media. In political contexts that are characterized through social division such as in the case of Brazil, perceiving the political opponent groups as more susceptible to believing in misinformation can make it more difficult to approach these issues (Yang and Tian, 2021). In their frame analysis of Twitter content about the COVID-19 pandemic, Wicke and Bolognese (2020) found four themes of contextualizing information, that is, frame packages: “communications and reporting,” “community and social compassion,” “politics” and “reacting to the pandemic.” The authors also verified the high recurrence of war metaphors in the analyzed sample, categorizing them as alternative frames such as “storm,” “monster” and “tsunami.” In addition, Park *et al.* (2020) observed that nonmedical frames such as personal stories about the pandemic were being shared more often than factual medical information.

2.2 Framing health information with internet culture

Framing theory explores how individuals use mental frameworks to make sense of the world around them. According to Goffman (1974), frames or *frame packages* are process-oriented and strategic resources that are constructed by an individual or a group. They mentally support the categorization, organization, and interpretation of information by providing a contextual background and making meaning out of isolated pieces of information. Frames are not neutral but rather are influenced by our social and cultural experiences, as well as by the context in which we encounter them (Walter and Ophir, 2019). For example, a frame used to interpret an event in Germany may differ from the frame used to interpret the same event in Brazil. Being situated in a competitive environment, frames are often constructed to achieve predetermined outcomes. The focus hereby lies within cognitive processes that interact with frames to produce certain effects (Carragee and Roefs, 2004). In this study, we operationalize framing theory by following established approaches to frame analysis. Table 2 shows an overview of the core concepts of frame analysis.

Framing has been widely researched in both offline and online environments (e.g. Baden, 2018; Ylä-Anttila *et al.*, 2022). In this study, we are particularly interested in frame packages and frame devices that originate from internet culture. The latter refers to practices, values, and beliefs that shape the production, circulation and consumption of information on the internet (Porter, 1997). It is shaped by the technical infrastructure of the internet, including contemporary social media platforms, as well as by social and cultural factors. The internet, and social media specifically, has increased the importance of visual framing (Brennen *et al.*, 2021). Visual frames can be categorized across denotative (what they depict), connotative

Concept	Definition	Implications for this study	References	Misinformation and internet culture
Framing	Selective presentation of information to influence attitudes, beliefs, decisions, and behaviors of media recipients	Understanding the role of internet culture for framing COVID-19 vaccination campaigns by Brazilian public health organizations	Chong and Druckman (2007)	1995
Framing devices	Word choices, metaphors, catchphrases, exemplars, descriptions, arguments, or visual icons	Deductive categorization of framing devices used in Twitter posts of Brazilian public health organizations	Qin (2015), Walter and Ophir (2019)	
Frame packages	Networks or “overarching ideas” that are composed of various framing devices	Inductive categorization of frame packages and interpretation of goals and strategy of Brazilian public health organizations	van Gorp (2010), Qin (2015)	
Source(s): Authors' own work				Table 2. Core concepts of frame analysis

(what metaphors are used), symbolic-semiotic (how they are composed) and ideological dimensions (what interest they promote) (Rodríguez and Dimitrova, 2011).

Framing health communication in the context of internet culture involves considering how to effectively present health information to a wide and diverse audience, for example, on social media (De Choudhury *et al.*, 2014). Clearly, social media have transformed the way that health information is accessed and shared, which has implications for how health communication is framed and presented by public health organizations (Zhao and Zhang, 2017). The COVID-19 pandemic provided us with many opportunities for observing the importance of internet culture for raising public awareness regarding the pandemic. Elements and actors native to internet culture such as memes and digital influencers were important factors in the process of making sense of the pandemic and in the process of community bonding (Pulos, 2020; de Saint Laurent *et al.*, 2021; Beck, 2022). In addition, the relevance of elements from internet culture as part of science communication has been debated for engaging new audiences (Gartley, 2022), with potential positive impacts on vaccination campaigns.

Brazilian internet culture is a vivid example of the entanglements of entertainment, public debates and political activism (Amaral, 2016). Public institutions in the country have adopted this understanding and imbed elements from internet culture elements in their communication. An example is the adaption of the Brazilian funk song “Bum Bum Tam Tam” for promoting the CoronaVac vaccine, which was manufactured in Brazil by the research center Butantã Institute (Barretto Briso, 2021). In January of 2021, when Brazil was starting its vaccination campaigns, thousands of Twitter users mentioned the music video because its pronunciation sounds like “Butantã.” After the spontaneous buzz on social media, the institute invited the song’s artist Mc Fioti to rerecord the music video to encourage people to get vaccinated. The viral music video has spawned new versions and memes that circulated on the internet in the first months of 2021, representing an antithesis to the Brazilian federal government’s suspicious opinion on COVID-19 vaccines.

To better understand the phenomenon of internet culture as a means against the spread of misinformation, this study investigates the emergence of alternative frames on social media in a highly complex political context. The guiding research questions of this work are as follows:

RQ1. How do Brazilian public health organizations use internet culture to frame COVID-19 vaccination campaigns on social media?

RQ2. To what extent can internet culture provide framing devices to combat misinformation on social media?

Methodologically, we combine qualitative frame analysis with social media analytics (SMA) techniques to investigate the framing used by public health organizations in Brazil for COVID-19 vaccination campaigns. The design of the empirical investigation is outlined in the following section.

3. Research design

3.1 Case description

The case at issue deals with Brazilian public health organizations, which faced unprecedented challenges during the COVID-19 pandemic. Brazil's president at the time, Jair Bolsonaro, actively engaged in publicly conveying the government's distrust of vaccines, especially in the first months ensuing the delivery of COVID-19 vaccinations. Furthermore, some of Bolsonaro's political opponents supported vaccination campaigns both as an important public health measure as a political strategy. Concerning public health organizations, this complex political context resulted in a much fragmented and decentralized strategy for communicating vaccination campaigns to the public through social media, especially on Twitter. Consequently, federal institutions were divided between managing the openly proclaimed anti-vaccination position of the president, trying to attenuate and even to reframe it and spreading information regarding the national vaccination campaign, encouraging the population to get vaccinated as soon as possible. Meanwhile, local institutions such as state and city health secretaries defined their communicational approaches by aligning them with the political positioning of their leaders, sometimes confronting Bolsonaro's statements openly ([Gramacho and Turgeon, 2021](#)). The polarized political environment paired with the sensitive issue of mass vaccination against COVID-19 makes this case particularly interesting for studying the role of public health organizations and their efforts to combat misinformation.

Further, the public engagement in the debate about COVID-19 vaccination through social media was particularly high, as observed during the broadcast of the Parliamentary Investigation on Bolsonaro administration's negligence concerning the pandemic. The investigation was followed by millions of Brazilians via social media platforms such as Twitter and Twitch, with the former being central to the communication between the audience and the Brazilian parliamentarians. Some Twitter profiles deployed fandom-oriented techniques, such as popular culture references and inside jokes to engage the population in political activism against Bolsonaro's support for anti-vaccination politics ([Declercq, 2022](#)).

3.2 Data collection

Against the backdrop of this case, we aim to understand how different Brazilian public health organizations managed to deal with this complex political context in framing the COVID-19 vaccination campaign on Twitter. We purposefully selected a sample of 24 Twitter profiles of Brazilian public health organizations and individuals representing those organizations. The selection criteria for the profiles were the following: (1) profiles of official public health organizations that belong to Brazilian government bodies, (2) profiles of high-level executives (such as the Minister of Health) of such organizations, (3) profiles of public-funded health research institutions working in the fabrication and distribution of COVID-19 vaccines in Brazil such as the Butantã Institute in São Paulo, and Oswaldo Cruz Foundation in Rio de Janeiro, respectively responsible for Coronavac and Oxford-AstraZeneca vaccines, (4) profiles of prominent states' and cities' secretaries of health and (5) nongovernmental health

organizations. In addition, the Minister of Health's profile was added to the sample because it constituted an important source of information concerning the vaccination campaign. Table 3 shows an overview of the analyzed profiles.

This work follows a SMA approach as suggested by Stieglitz *et al.* (2018), combining automated data collection with manual coding. After the first step of concretizing the *research domain*, the second and third steps of the framework, *tracking* and *preparation*, will be laid out in this section. Moreover, we followed the SMA ethics guidelines suggested by Jung *et al.* (2022). The data for this case study were tracked with the standard Twitter search API. For this analysis, we collected all postings from the Twitter profiles of the 24 Brazilian public health organizations and individual representatives (see Table 1) during a three-month period, starting in January 2021, which marked the beginning of the COVID-19 vaccination campaign in Brazil. The tracking resulted in a dataset of 77,527 tweets. Subsequently, we selected the postings containing the keywords "corona" and "COVID," considering that these filters are also able to select postings containing the terms "coronavirus" and "COVID-19." We chose not to use vaccination-related keywords because it would have resulted in also

Profile (@)	Description	Type	Followers
secomvc	President Bolsonaro's Special Secretary of Social Communication	Governmental institution	283.890
mqueiroga	Minister of Health	High level executive holding a position in a governmental institution	241.065
minsaude	Ministry of Health	Governmental institution	1.376.683
ConassOficial	Health Secretaries National Council	Non-profit and non-governmental institution	48.189
comunicacns	Health Secretaries National Council's media channel	Non-profit and non-governmental institution	25.613
spsaude_	São Paulo State Health Secretary	Governmental institution	24.775
SaudeMG	Minas Gerais State Health Secretary	Governmental institution	NA*
saudegovpi	Piauí State Health Secretary	Governmental institution	4.413
SespaPara	Pará State Health Secretary	Governmental institution	97.800
SaudeAlagoas	Alagoas State Health Secretary	Governmental institution	NA*
saudegovba	Bahia State Health Secretary	Governmental institution	7.595
secsaude df	Distrito Federal Health Secretary	Governmental institution	18.923
SaudePE	Pernambuco State Health Secretary	Governmental institution	NA*
saudepr	Paraná State Health Secretary	Governmental institution	NA*
saudegoias	Goiás State Health Secretary	Governmental institution	NA*
saudeprefsp	São Paulo City Health Secretary	Governmental institution	13.353
saudepoa	Porto Alegre City Health Secretary	Governmental institution	59.399
Saude_Rio	Rio de Janeiro City Health Secretary	Governmental institution	108.327
SaudeGovRJ	Rio de Janeiro State Health Secretary	Governmental institution	NA*
butantanoficial	Butantã Institute, which manufactures the Coronavac vaccine in Brazil	Research institution	204.237
fiocruz	Oswaldo Cruz Foundation, which manufactures the Oxford-AstraZeneca vaccine in Brazil	Research institution	156.299
CanalSaude	Oswaldo Cruz Foundation's media channel	Research institution	33.786

Note(s): *Not available due to the Brazilian Elections Law, which forbids governmental institutions to publish, during election years, content that can be considered candidates' advertisement pieces, such as good results in public health policies. Therefore, some institutions deactivated their social media accounts

Source(s): Authors' own work

Table 3.
Overview of the
analyzed Twitter
profiles

selecting tweets about the vaccination campaigns for other diseases, such as poliomyelitis and influenza. This keyword-based filtering resulted in a subsample of 14,666 tweets, excluding retweets and answers on tweets through Tableau's text filter. All tweets that began with "RT" (retweet) or "@" (answer to a tweet) were filtered from the dataset to avoid duplicates. Hereby, all remaining tweets are original tweets. Given that the qualitative assessment of more than 14,000 tweets was impracticable for a manual coding approach, we used Excel's RAND function to randomly select a final sample of 400 tweets, resulting in a confidence level superior to 95% (Taherdoost, 2017). Moreover, we repeated the keyword-based filtering in the subsample of 14,666 tweets selecting postings containing the terms "fake," "falso," "falsa" or "mentira" ("fake," "false" and "lie" in Portuguese) and manually selecting publications regarding the vaccination campaign. This second filtering resulted in the selection of 136 additional tweets related to misinformation about the COVID-19 vaccination campaign. The final sample for the manual coding thus consisted of 536 tweets.

3.3 Frame analysis

For the *analysis* (step 4 of the SMA framework), we chose to conduct a frame analysis as it constitutes a useful methodological approach for the scrutiny of strategic communication on social media. Frame analysis emerged from framing theory (Goffman, 1974) and focuses on the observation of interaction processes, with an emphasis on the variance between specific points or episodes in conflict interaction (Dewulf *et al.*, 2009). The identification of *framing devices*—that is, specific linguistic structures, such as metaphors, visual icons, and catchphrases that communicate frames—is therefore important (Gamson and Modigliani, 1989).

Contemporary research studies that employ frame analysis as an empirical method use both deductive and inductive approaches. Deductively conducted frame analyses operationalize framing theory by using a predefined set of frames known from the literature and categorizing the data accordingly (Ylä-Anttila *et al.*, 2022). However, this approach might not result in the identification of unknown framing devices and frame packages and might restrict the scope of the analysis. Consequently, as Walter and Ophir (2019) suggested, inductive approaches to frame analysis are suitable for identifying patterns of framing not based on theoretical relationships but on the construction of a context-specific data corpus (e.g. Allen *et al.*, 2021). In this case, larger topical themes of framing activity (frame packages) are derived based on inductive grouping of linguistic or platform-specific elements (frame devices). Qin (2015) argued that framing devices for Twitter are specific, since the composition of tweets differs from classic news articles, which are the subjects of earlier frame analyses. Elements such as hashtags, mentions, attached links, images and other items were found to be framing devices in previous frame analyses of tweets (Qin, 2015; Xiong *et al.*, 2019). They differ from classic framing devices in legacy news, which contain headlines, subheadings, photo captions, logos, statistics, charts and other elements (Tankard, 2001). Refer to Table 2 for an overview of the core concepts of frame analysis.

The coding process was carried out by two researchers who were native speakers in two phases. In the first phase, the two researchers approached the data openly to inductively determine frame packages in the posts of Brazilian public health organizations and classify them (Walter and Ophir, 2019). First, we were particularly interested in the way Brazilian public health organizations framed content related to vaccination campaigns and misinformation about them. Second, we were interested in the role of Brazilian internet culture in this process, which might differ from preexisting frames developed in previously analyzed contexts (Wicke and Bolognese, 2020). To determine the frame packages, we considered the assumed goals of the health organizations according to the context of the COVID-19 pandemic in Brazil, presupposing that the main objective of their communication

was to educate and engage the public regarding this subject. Therefore, the frames packages were classified according to what the coders assumed as the intention behind the postings, such as informing about the vaccination schedules in one city, debunking misinformation or inviting the adoption of preventive measures. In the second phase, the sample was analyzed again addressing specific framing devices. Social media framing devices were deductively classified according to [Qin \(2015\)](#) and [Tankard \(2001\)](#). Emerging frame devices were inductively categorized if needed. The frequency of frame packages and framing devices was quantified to be able to rank them by occurrence. The combination of quantitative and qualitative approaches in this frame analysis aims to provide multiple perspectives on the complexities of the case ([Touri and Koteyko, 2015](#)).

4. Findings

4.1 *Frame packages used by Brazilian public health organizations*

We identified 14 emergent frame packages. The most frequently addressed frame package in the sample was case numbers,” followed by “fact checking,” “vaccination campaign information” and “public policies.” The three least recurrent frame packages were “vaccine information,” “personal stories” and “debunking fake news.” An overview of all identified frame packages is provided in [Table 4](#).

An analysis of the most liked and retweeted posts among the sample revealed that their engagement metrics tend to be higher in the frame packages addressing the pandemic statistical data and giving instructions on how and when to get vaccinated. We also found that 195 (36.4%) of the postings provided some numeric or statistical information. The most liked frame packages, on average, were “public policies,” “vaccination campaign information,” “vaccination coverage report” and “case numbers.” The most retweeted frame packages were similar: “public policies,” vaccination campaign information,” “case numbers” and “vaccination coverage report.” The most liked posts varied between 6,946 and 232 likes, and the most shared posts ranged between 1,104 and 31 retweets.

The content of the most engaging frame packages in both samples emphasized positive feelings and efficacy, such as tranquilizing news about public policies, debunking upsetting misinformation concerning vaccines and clear instructions on how to get vaccinated. We also observed that postings classified in the framing packages “personal stories” and “vaccine information,” both appear among the most engaging tweets, despite occurring only 5 and 11 times in the sample. The same applies to the high recurrence of numbers and statistical data, which can also be interpreted as an effective strategy to inform the population about the status of the vaccination campaign.

4.2 *Framing devices used by Brazilian public health organizations*

Aside from Twitter-specific frame devices that were previously identified by the literature, we discovered additional salient frame devices relevant in this case: “infographics,” “pop culture references,” “recognized authority” and “internet-native symbolism.” Images and hashtags are the most frequent framing devices followed by links, numbers and statistics. Their quantitative distribution is shown in [Table 5](#).

The salience of images within the tweet sample suggests that framing information visually is central for the vaccination campaigns of Brazilian public health organizations. Some organizations shared *screenshots* of fake news pieces that circulated social media for debunking purposes. *Memes* and pop-culture references were used to appeal to specific target groups and fan communities. *Infographics* were used as a design technique to show numeric and statistical information. Photographs were shared to provide an insider perspective and to convey accessibility and transparency. Those images (and videos) mostly showed

INTR 33,5				
	Frame packages	Description	Tweets	%
2000	Case numbers	Information concerning the COVID-19 infection and death rates	114	21.3
	Fact-checking	Exposition and debunking of recurrent misinformation and fake news and reassuring that vaccines are safe and effective	89	16.6
	Vaccination campaign information	Specific information regarding the status of the local vaccination campaigns	78	14.6
	Public policies	Information about public health strategies for containing the COVID-19 pandemic, divulgation of events, and information concerning the Brazilian Universal Health System (SUS)	62	11.6
	Dependable sources	Sharing of dependable sources about the COVID-19 vaccination campaign, such as governmental and research institutions' official websites	54	10.0
	Vaccination coverage report	Reporting the vaccination coverage, and celebrating local vaccination campaign success	47	8.8
	Prevention measures	Call for action for the adopting of preventive measures, like washing hands and wearing masks, and information about their effectiveness	30	5.6
	Collective action	Recommendations for the population's active participation in facing fake news	28	5.2
	Research promotion	Dissemination of research on COVID-19, vaccines, and treatments	20	3.7
	Hospital situation	Information about the local hospitals' occupancy rate, hospital renovations, and new buildings	17	3.2
	COVID-19 information	General information about COVID-19 regarding symptoms, variants, and modes of transmission	12	2.2
	Fake news education	Information about dangers of misinformation and fake news, its consequences, and the status of this issue in society	12	2.2
	Vaccine information	General information about COVID-19 vaccines, such as efficacy, safety, side effects etc.	11	2.0
	Personal stories	Stories about personal experiences with the COVID-19 pandemic	5	0.9
	Source(s): Authors' own work			

Table 4.
Identified frame packages

2000	Framing device	Description	Number of tweets (%)
	Images	Tweets containing one or more images (including "infographics")	346 (64.5)
	Emojis	Tweets containing one or more emojis	205 (38.2)
	Infographics	Tweets in which numerical and statistical data are the main information or focus	201 (37.5)
	Video	Tweets containing videos embedded on them (We did not consider links for videos on external platforms)	57 (10.6)
	Pop culture references	Tweets mentioning pop culture elements such as video games, movies, TV shows, and celebrities	9 (1.7)
	Internet-native symbolism	Tweets mentioning internet-native elements such as memes and social media influencers	7 (1.3)
	Source(s): Authors' own work		

Table 5.
Identified visual framing devices used by Brazilian public health organizations

journalistic images of hospitals, vaccine bottles, vaccination locations and politicians and the organizations' employees inspecting hospitals or attending official events.

One image shows the Fiocruz Foundation in Rio de Janeiro. In the middle, an inspection of a hospital is depicted, working as a proof that this event took place (denotative dimension). Another image shows an infographic of the vaccination coverage taxes in Porto Alegre city. It

shows on the left the number of first doses administered in the city, and, on the right, the number of people who have already received two doses of the vaccine. In the center, we can read the total of administered doses and below that is the number of booster doses. The image title can be translated as “Vaccinometer” and is a wordplay with “Velocimeter.” The emphasis on numbers (symbolic-semiotic dimension) and the velocity metaphor (connotative dimension) are deployed to convey the efficiency of the vaccination campaign. Other images posted by public health institutions include montages with screenshots of misinformation or fake news that are being debunked. In one case, the São Paulo state government uses a screenshot to reference a specific video containing misinformation. The translation of the accompanying text reads as follows: “The video that shows an empty syringe in vaccine administration in Ceará is fake. True information can only be found through official channels. São Paulo State Government.” This approach to visual framing is also an example of addressing the denotative dimension; however, the reality depicted is not an event or public health measure, but a fragment of the fake news piece itself.

In combination with other framing devices, we also found instances of public health organizations using “pop culture references.” One of them depicts the Brazilian vaccination mascot, Zé Gotinha—translated as “Little Drop Joe”—which has been in existence since the 1990s (Pôrto and Ponte, 2003). The mascot was used by pop singer Olivia Rodrigo on the cover of her album *Sour*, which was released in 2021. The image was shared by the Rio de Janeiro City Secretary of Health. It also contains the vaccination schedule for teenagers aged 13 and above, and in the post in which it was shared, we could read a wordplay with “Good 4 U,” the name of the singer’s most well-known song, and a reference to the name of the Olivia Rodrigo’s fandom, “Livies”:

Good 4 U that the most anticipated moment has arrived for the teenagers aged 13: the covid-19 vaccine! “Livies” or not, take your colorful stickers and glue them on your planner, so you don’t forget! It’s at the top of the charts and Droplet Joe confirms: getting vaccinated is good for you! #JustComeOn

Other posts had references to pop culture products, such as video games and Brazilian popular TV shows, or addressed “internet-native symbols,” such as memes. One compares the COVID-19 vaccine’s second dose to a new stage in the Super Mario World video game. The text says: “*You beat the stage on the video game, but are you stagnated in the vaccination? Tsc tsc . . . Get up and go to get the second dose!*”

In the example in Figure 1 (left), we can read “Wake up girl!” (In Portuguese: “Acorda menina!”), which is known in Brazil as the popular TV frontwoman Ana Maria Braga’s catchphrase, used here to draw attention to the affirmative “every vaccine is good.” The text



Figure 1.
Examples of a “pop
culture reference” (left)
and an “internet-native
symbol”

Source(s): Reproduced with permission from the São Paulo City Administration Office and the State Government of Piauí

outside the box says, “*Getting Vaccinated Sampa*” (“Sampa” is an informal abbreviation of “São Paulo”). Inside the box, we read, “*Wake up, girl! Getting the COVID-19 vaccine protects you against severe forms of the disease. #AllVaccinesAreGood.*”

The second example in [Figure 1](#) (right) is a reference to a Brazilian popular meme, a photo of two young women subtitled as “*Se juntas já causam, imagina juntas*” (translation: “If we already rock together, we also imagine together”). In the context of the public health organization’s tweet, it is used to address the importance of getting the first and the second doses of the COVID-19 vaccine.

This analysis showed that “pop culture references” and “internet-native symbols” were deployed strategically by Brazilian health organizations to approach specific groups that had certain identification or affective bonds with those references, especially fans. As fans are interpretive communities with shared practices and cultural references, fandoms are attractive to political coopting. Further, these characteristics make it possible to use the same shared practices and references for community bonding. Considering this, “pop culture references” and “internet-native symbols” such as memes provide public health organizations with powerful framing devices, for example, to deal with a context of serious social division.

This same logic applies to individuals who can be classified as social media influencers, which we grouped under the framing device of “internet-native symbols.” One public health organization sought the support of a local social media influencer to support the COVID-19 vaccination campaign. In a post from the São Paulo City Secretary of Health, the institution shared a photograph of the famous Brazilian fashion social media influencer and writer Bruna Vieira, who has more than 394,000 followers on Twitter. She is depicted showing her vaccination card to the camera and smiling.

The translation of the accompanying text reads as follows: “Used to put her feelings on the paper, @brunavieira, 27, let the emotions flow as getting vaccinated in São Paulo this Wednesday (4). Keep your eyes on our social media feed and, when your time arrives, do it like her: get vaccinated! #VaccineSampa #AllVaccinesAreGood”

These shared experiences supported a collective narrative of the crisis and, combined with other internet-native symbols such as memes, were central in the shaping of public opinion around subjects such as social distancing and vaccination. Social media influencers have their own fandoms and can appeal to already existing communities, but the personal experiences of people who are not famous can also be very engaging, as exemplified in this analysis by the frame package “personal stories.” When a social media influencer shows support for a public health measure such as vaccination campaigns, which in the Brazilian context is also interpreted as a political opinion, the fandom tends to follow this tendency. Appealing to community-shared references and fan communities, the “pop culture references” and internet-native symbols’ framing devices were related to the connotative dimension of visual framing. Memes, catchphrases, pop culture elements and digital influencers were used to add symbolic meaning to these images, mostly to position the public health organization as an actor who earns membership within an internet-native audience or community.

Within the more general strategic dimension of misinformation prevention, we found that public health organizations frequently used the framing device “recognized authority.” This included external scientists and individuals holding high-level positions in the public health organizations themselves. The approach here was not to appeal to fandom communities but to use these individuals’ authority to validate the vaccination campaign. The engagement metrics of these postings were not very impressive, ranging between 0 and 66 retweets and 0 to 304 likes. Apart from visual framing devices, public health organizations frequently used hashtags. An analysis of their distribution revealed a lack of organization and unicity in the overall strategy of Brazilian public health organizations to promote the COVID-19 vaccination campaign with hashtags. We found 197 hashtags in our sample. This number

is comparatively high as each local government created its own hashtag. Of those hashtags, 111 were mentioned only once. In some cases, we also highlighted the variations of spelling, such as “#Covid19,” “#Covid-19” and “#Covid_19,” which makes it more difficult for the regular Twitter user to receive all information about the pandemic from one search query. Local hashtags can be important framing devices in helping users find information regarding the vaccination campaign in their places of residence, but without a global hashtag indexing the entire Brazilian national campaign, it remains difficult to discover a specific local hashtag. In the Brazilian context, local hashtags also have a political aspect as framing devices: they indicate the local governments that are supportive or critical of President Bolsonaro.

Furthermore, despite the states’ and cities’ individual hashtags, the most mentioned ones were very generic and did not focus specifically on the vaccination campaign. They included general terms such as “COVID-19,” “coronavirus,” “fake news,” “health” and “bulletin”; institutional and organization’ names, such as *SUS* or *Conass*; and Brazilian states such as Minas Gerais (MG) or Rio de Janeiro (RJ). The hashtag #SUS, a reference to the Brazilian Universal Healthcare System (in Portuguese, “Sistema Único de Saúde”), is important due to its centrality in political disputes around Bolsonaro’s positionings regarding universal public healthcare. The president’s critics used the hashtag to show support for universal healthcare in Brazil and to criticize Bolsonaro’s statements against it. Moreover, public health organizations and Bolsonaro’s supporters used the hashtag to attribute the success of the vaccination campaign to the alleged good management of SUS in Bolsonaro’s government. This usage of the hashtag #SUS is comparable to tactics used by fandoms, which promote massive postings of specific hashtags to make the subject of fan interest more visible. In this sense, public health organizations did not use local hashtags as effectively as some fandom communities did.

5. Discussion

5.1 *The role of internet culture for misinformation combat in Brazil*

The findings of our analysis with regards to [RQ1](#) highlight that Brazilian internet culture and the complex political situation in the context of the COVID-19 pandemic are represented in public health organizations’ use of framing devices. The presence of “internet-native symbolism” and “pop culture references” in the analyzed sample is surprising considering existing knowledge about misinformation prevention ([Allcott et al., 2019](#)). However, it is not a surprise when considering the history and context of internet culture in Brazil. As [Amaral \(2016\)](#) showed in her discussion of the Brazilian culture of memes on Twitter, Brazilian internet culture is quite unique when viewed from a perspective typical for the Global North. Cultural differences, for instance, can be observed in relation to how humor is used, the appropriation of global media franchises (or celebrity cultures) produced outside of Brazil to its social-political context and the constitution of a Brazilian internet culture that reveals contradictions and issues on gender, generations, age, social classes and races. The intersectionality between issues in these categories has also appeared in [Vieira’s \(2021\)](#) analysis of memes in the Brazilian Twittersphere. In terms of the political situation, we observed some aspects of how Brazilian political disaggregation affects its public organizations’ misinformation prevention strategies.

Tweets relying on “internet-native symbols” and “pop culture references” can be considered good examples of the alignment of public vaccination campaigns with internet culture ([Amaral, 2016](#)). Those postings, however, did not necessarily show higher engagement metrics than other postings. The tweets containing images with more likes and retweets often provided information about the number of hospital beds and vaccine doses available to the population, the COVID-19 contamination taxes, and the pandemic death rates. However, the post mentioning social media influencer Bruna Vieira is the 5th

most liked (1,135), and the reference to Olivia Rodrigo is the 21st (248 likes). These numbers indicate that these framing devices might reach better engagement metrics if used more often or combined with other frame packages, for example, those referring to the “hard” facts and numbers of the crisis. The presence of “internet-native symbols” and social media influencers represents another framing device for misinformation prevention, as the presence of popular individuals can overcome the popularity shortcomings of institutions during crisis situations (Mirbabaie *et al.*, 2020). The high engagement metrics of posts that emphasize numerical and statistical data indicate that these categories of informational evidence have high potential for preventing and combating misinformation targeting the public and not only highly involved individuals (Vafeiadis and Xiao, 2021).

5.2 Toward a frontier of political contextualization in misinformation research

Brazil has a historical tradition of successful vaccination campaigns. Nevertheless, the country’s population vaccination rates are falling in parallel with increasing anti-vaccination movements inside and outside the country (Langlois, 2021). Yet, despite this pessimistic scenario, the Brazilian population is still very supportive of vaccines, which is visible in the good numbers of the COVID-19 vaccination campaign (Henrique, 2022). The main difficulty faced by the Brazilian people regarding this matter during the pandemic was the delay of Bolsonaro’s government in buying vaccines, combined with his constant public exhibition of distrust of them (Ferrante *et al.*, 2021). With regards to RQ2, the public health organizations analyzed in this paper found a very receptive public regarding their publications addressing the COVID-19 vaccination campaign. We verified this interest in the high numbers of retweets and likes in the “public policies,” “vaccination campaign information” and “vaccination coverage report” frame packages. The engagement metrics also confirm that Brazilian Twitter users rely on the public health organizations’ profiles as sources of information about the pandemic status and know when and where they could get vaccinated. In turn, the public health organizations seemed to rely heavily on the Brazilian population’s trust in vaccinations since they did not address the ubiquitous problem of misinformation very often at that time.

The frame package “debunking misinformation and fake news” is the least frequent in the analyzed sample and did not appear among the tweets with higher engagement metrics, although public health organizations had high levels of trustworthiness that usually helps to debunk misinformation (Allcott *et al.*, 2019). The spread of misinformation is an increasing problem in Brazil (Amaral *et al.*, 2022). Combined with the lack of a national communication strategy for the COVID-19 vaccination campaign in Brazil, the absence of a more assertive approach to debunking misinformation is a relevant strategic weakness if we consider the tactics used by fake news spreaders (Vafeiadis *et al.*, 2019). Unlike the health organizations analyzed in this paper, these groups often build large networks of multiple profiles that share the same hashtags and texts (Ross *et al.*, 2019).

Hence, we observed that in the Brazilian political context, frame packages that focus on communicating governmental public health measures and their results, such as “public policies” and “vaccination coverage report,” were also deployed by the federal government-related health organizations as strategic framings for attenuating President Bolsonaro’s anti-vaccine public statements. By focusing their communication on divulgating the vaccination campaign’s success, public health organizations conveyed that the federal government complied with the people’s desires. Moreover, despite the president’s public statements, the government-related health organizations’ communication on social media made visible efforts to show Bolsonaro’s supposed support of the vaccination campaign, attributing its success to his leadership. By contrast, public health organizations associated with the opposite political alignment used the divulgation of the vaccination campaigns’ evolution to demonstrate their

success in facing Bolsonaro's anti-vaccination positioning. In both cases, the framing device "numbers and statistics," including the use of infographics, has been identified as crucial. This finding seems contradictory but also demonstrates that misinformation research must consider the broader local political context and its complexities instead of only focusing on the content of social media communication (Bisiada, 2022).

Our analysis of frame packages and framing devices emphasizes that the political disputes in Brazil shape public health organizations' communication on Twitter. This particularly applies to the appropriations and interpretations by opposite political groups, making it hard to classify these frame packages as aligned with one or another political group. Concerning future directions in misinformation research, this aspect emphasizes the need to contextualize information sources that stand in a partisan relationship to each other. Moreover, as this case showed, the political context in which public health organizations operate can have a large impact on how to approach misinformation combat.

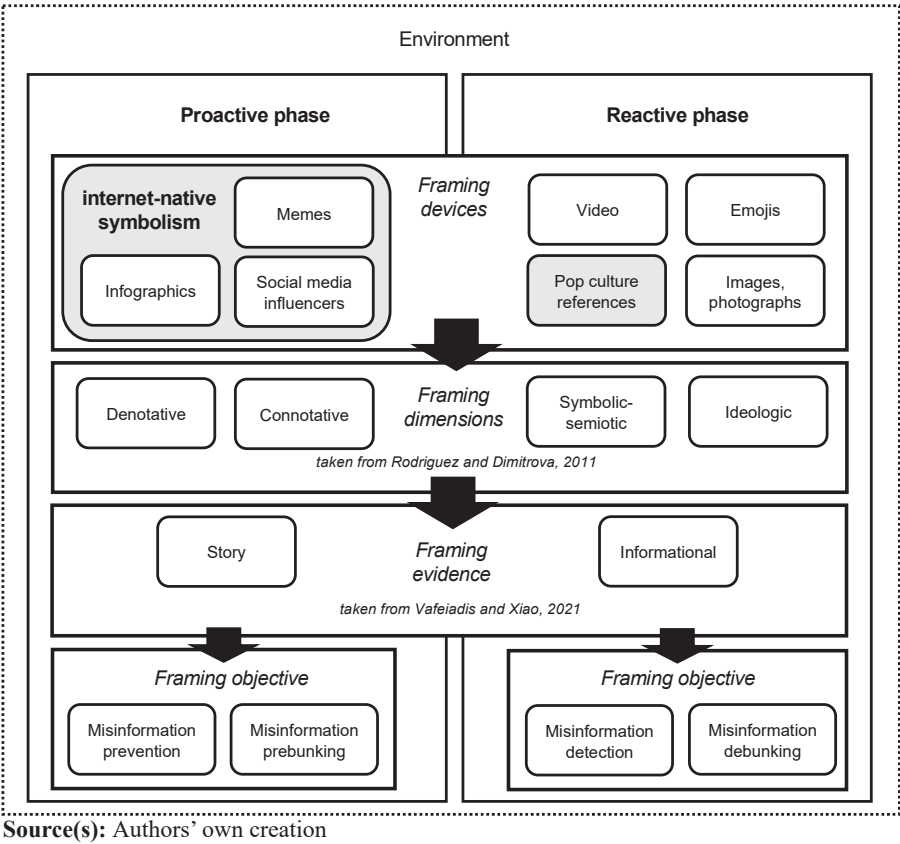
5.3 Contributions to theory

The salient strategic element we identified in the Brazilian vaccination campaigns on social media was the use of visual framing techniques. From existing literature, we know that the importance of visually framing accurate information in contexts such as vaccination campaigns increases, given that misinformation is also being framed visually (Brennen *et al.*, 2021). Concerning the denotative approach to visual framing in this case, numbers might be perceived as "hard" and objective facts. Therefore, the framing device of "infographics" can be considered an important element for misinformation prevention and combat. Numeric and statistical representations combined with an appealing visual language make it possible to combine these data with symbolic-semiotic elements and their associated meanings, such as the speed and efficiency metaphor in the "vacinometer" infographic (Rodriguez and Dimitrova, 2011). Whereas the denotative dimension is mostly addressed for showing the veracity of the facts and events mentioning or addressing specific fake news pieces, connotative elements such as community-shared references and memes are central for targeting highly engaged audiences, positioning a public health organization as an insider in Brazilian digital culture. The use of "infographics" constitutes a symbolic-semiotic strategy for the visual representation of statistics and numerical data. Considering the ideological dimension of visual framing, the images shared by the analyzed institutions focused on showing accessibility and efficiency while managing the vaccination campaign.

Further, the framing devices "pop culture references" and "internet-native symbolism" show that there is an alternative to the "war" framing previously introduced by Wicke and Bolognese (2020). The analyzed public health organizations focused their publications on the framing categories I and IV ("Communications and Reporting" and "Reacting to the Pandemic"). Largely avoiding categories II and III ("Community and Social Compassion" and "Politics") makes sense considering the complex Brazilian political context and the dilemma public health organizations found themselves in. The "Community and Social Compassion" frame has also not been deployed for addressing misinformation, pointing to the severe Brazilian social division in this context.

Even though some "pop culture references" were previous research, our categorization enables a better understanding of their intersection with fandom communities and internet culture. We encourage future research to dive deeper into the entanglements of organizational and fan communication studies as we also observed a lack of unified strategies around the use of hashtags, for instance. The findings of this study help to develop conceptual dimensions of misinformation combat that extend existing theory. In Figure 2, we introduce a conceptual framework of visual framing for misinformation combat. It includes the key findings of this study and integrates them with existing literature on visual framing

Figure 2.
Conceptual framework
of visual framing for
misinformation combat



and misinformation literature (Vafeiadis and Xiao, 2021; Rodriguez and Dimitrova, 2011). The concepts that were developed in this study are highlighted in gray.

5.4 Practical implications

Our findings show a broad repertoire of elements that can be deployed by stakeholders of misinformation combat such as public health organizations. We support a view that organizations who have limited authority in certain social settings can mitigate this problem by employing authoritative proxies on their behalf. For example, a public health institution which has no authority in a certain fandom community can make up for this through a collaboration with an influential individual or organization from that community. This strategy can also be extended by the employment of local celebrities or cultural products that target specific communities.

Considering the work on misinformation prevention by Lewandowsky and van der Linden (2021), our findings show that framing health information with internet culture can serve the purpose of shifting the playing field from political narratives to an alternative framing or “encoding” of the information. This allows organizations to detach information from political ideologies and make it accessible to internet-native audiences. For example, the politically laden topic of vaccination can be communicated more effectively to certain

communities if reframed in a non-political narrative. As the case of Brazilian health organizations shows, symbols and narratives coming from internet culture can help organizations to better address sensitive issues for the benefit of the people.

Finally, we suggest that organizations with a stake in misinformation combat approach their actions in alignment with the phases of misinformation combat. Most importantly, organizations should be aware that measures can be taken to prevent misinformation before they spread. This requires a proactive engagement with topics and platforms which constitute the breeding ground from misinformation. The framework provided in [Figure 2](#) provides an overview of phases and objectives that characterize the pursuit of strategic misinformation combat.

6. Conclusion and outlook

6.1 Summary

In this paper, we analyzed a sample of Twitter posts published by Brazilian public health organizations in the context of the COVID-19 vaccination campaign in 2021. Specifically, we applied qualitative and quantitative frame analysis techniques to identify the most frequently used frame packages and framing devices in public health communication in Brazil. A total of 14 frame packages characterize the strategic activities carried out by the investigated organizations and their representatives. Alongside already known framing devices, the investigation of this case unearthed novel framing devices that relate to Brazilian internet culture, including “infographics,” “pop culture references” and “internet-native symbolism.” Moreover, this case shows that the political context shapes the choice of framing techniques for misinformation combat. The dilemma in which many Brazilian public health organizations found themselves (e.g. governmental vs. oppositional positions toward vaccination) affected their ability to openly address misinformation. Finally, the analysis of this case emphasizes that research on the proactive phase of misinformation prevention deserves more attention as it is currently given.

6.2 Theoretical and practical contributions

This study contributes to existing knowledge in a threefold manner. First, the identification of visual framing devices relating to internet culture adds to our understanding of hitherto little addressed organizational framing. The case of Brazilian public health organizations provides a novel perspective on knowledge by offering a notion of cultural peculiarities (e.g. internet-native symbolism, pop culture references) for misinformation prevention and combat. Based on these findings, we introduce a conceptual framework that integrates theoretical dimensions of visual framing, framing devices that are borrowed from internet culture, and the distinct phases of misinformation combat (prevention, detection, debunking). Second, this study emphasizes the need for a political frontier of misinformation research that does not relate to the partisanship of the spreaders but that relates to the political context of the analysis (e.g. dilemmas of public organizations with a commitment to provide accurate information to citizens). Third, the findings of this study inform decision-makers and public health organizations about framing devices that are alternatives to prevalent communication practices and can guide strategies to promote accurate information during crises and/or prevent misinformation.

6.3 Limitations and further research

This study has limitations as the chosen manual coding approach restricts the ability to draw much larger subsamples. The results of this case study do not allow statistical generalization to other countries or cultural contexts. If readers wish to generalize from this case, we caution

them to make their own judgment calls about the risks of doing so. Consequently, we invite scholars to form inter-disciplinary teams that cover expertise in both computational data analysis and cultural contextualization of misinformation phenomena. This will allow research teams to draw and analyze samples from a more diverse range of countries and to make theoretical contributions that are not confined by generalization to organizations from the Global North. Moreover, although very prominent in Brazil, Twitter does not cover the Brazilian social media and internet sphere in its entirety. Certain societal or political groups might be underrepresented and some overrepresented in the sample.

We suggest further research to put more emphasis on exploring the possibilities of misinformation prevention, for example, how organizations can strategically use prebunking mechanisms to sensitize social media users for misinformation. Furthermore, we encourage researchers to further explore the use of internet-native symbolism and (local) internet culture for misinformation prevention in future studies. Here, investigating how framing information with internet culture affects user engagement and how it can reduce the susceptibility to misinformation would be a valuable research endeavor.

In March of 2023, the newly elected government in Brazil launched an official campaign to fight misinformation (“Brasil Contra Fake”). We invite all misinformation scholars to take Brazil as an example and continue their efforts to support this fight.

References

- Allcott, H., Gentzkow, M. and Yu, C. (2019), “Trends in the diffusion of misinformation on social media”, *Research and Politics*, Vol. 6 No. 2, pp. 1-8.
- Allen, L.D., Odziemczyk, I.Z., Perek-Białas, J. and Ayalon, L. (2021), “‘We should be at the back of the line’: a frame analysis of old age within the distribution order of the COVID-19 vaccine”, *Gerontologist*, Vol. 61 No. 8, pp. 1317-1325.
- Amaral, A. (2016), “Cultura pop digital brasileira: em busca de rastros político-identitários em redes”, *Revista Eco Pós*, Vol. 19 No. 3, pp. 68-89.
- Amaral, A., Jung, A.-K., Braun, L.-M. and Blanco, B. (2022), “Narratives of anti-vaccination movements in the German and Brazilian twittersphere: a grounded theory approach”, *Media and Communication*, Vol. 10 No. 2, pp. 144-156.
- Asr, T.F. and Taboada, M. (2019), “Big data and quality data for fake news and misinformation detection”, *Big Data and Society*, Vol. 6 No. 1, pp. 1-14.
- Baden, C. (2018), *Doing News Framing Analysis II*, Routledge, New York, NY.
- Barretto Briso, C. (2021), “Brazil: viral rapper becomes unexpected champion of Covid vaccine drive”, available at: <https://www.theguardian.com/global-development/2021/jan/29/brazil-mc-fiotti-covid-vaccine-remix-music-video> (accessed 28 June 2023).
- Bayer, J., Bitiukova, N., Bard, P., Szakács, J., Alemanno, A. and Uszkiewicz, E. (2022), “Disinformation and propaganda – impact on the functioning of the rule of law in the EU and its member states, policy department for citizens’ rights and constitutional affairs”. doi: [10.2139/ssrn.4090610](https://doi.org/10.2139/ssrn.4090610), (accessed 20 November 2022).
- Beck, C.S. (2022), *Celebrity in the Time of Covid: Fandom and the Influence of Pandemic Messaging*, McFarland & Company, Jefferson, NC.
- Ben Lazreg, M., Chakraborty, N.R., Stieglitz, S., Potthoff, T., Ross, B. and Majchrzak, T. (2018), “Social media analysis in crisis situations: can social media be a reliable information source for emergency management services?”, *Proceedings of the 27th International Conference on Information Systems Development: Designing Digitalization*, pp. 1-12.
- Bisiada, M. (2022), “Discourse and social cohesion in and after the COVID-19 pandemic”, *Media and Communication*, Vol. 10 No. 2, pp. 204-213.

- Bollen, J., Mao, H. and Zeng, X. (2011), "Twitter mood predicts the stock market", *Journal of Computational Science*, Vol. 2 No. 1, pp. 1-8.
- Brennen, J.S., Simon, F.M., Howard, P.N. and Nielsen, R.K. (2020), *Types, Sources, and Claims of COVID-19 Misinformation*, Reuters Institute/University of Oxford, available at: <https://reutersinstitute.politics.ox.ac.uk/types-sources-and-claims-covid-19-misinformation> (accessed 20 November 2022).
- Brennen, J.S., Simon, F.M. and Nielsen, R.K. (2021), "Beyond (mis)representation: visuals in COVID-19 misinformation", *The International Journal of Press/Politics*, Vol. 26 No. 1, pp. 277-299.
- Burki, T. (2019), "Vaccine misinformation and social media", *The Lancet Digital Health*, Vol. 1 No. 6, pp. e258-e259.
- Cacciatore, M.A., Scheufele, D.A. and Iyengar, S. (2016), "The end of framing as we know it. . . and the future of media effects", *Mass Communication and Society*, Vol. 19 No. 1, pp. 7-23.
- Carragee, K.M. and Roefs, W. (2004), "The neglect of power in recent framing research", *Journal of Communication*, Vol. 54 No. 2, pp. 214-233.
- Chan, M.P.S., Jones, C.R., Hall Jamieson, K. and Albarracín, D. (2017), "Debunking: a meta-analysis of the psychological efficacy of messages countering misinformation", *Psychological Science*, Vol. 28 No. 11, pp. 1531-1546.
- Chaney, D. and Lee, M.S. (2022), "COVID-19 vaccines and anti-consumption: understanding anti-vaxxers hesitancy", *Psychology and Marketing*, Vol. 39 No. 4, pp. 741-754.
- Chong, D. and Druckman, J.N. (2007), "Framing theory", *Annual Review of Political Science*, Vol. 10 No. 1, pp. 103-126.
- De Choudhury, M., Ringel Morris, M. and White, R.W. (2014), "Seeking and sharing health information online: comparing search engines and social media", *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 1365-1376.
- de Saint Laurent, C., Glăveanu, V.P. and Literat, I. (2021), "Internet memes as partial stories: identifying political narratives in coronavirus memes", *Social Media + Society*, Vol. 7 No. 1, pp. 1-13.
- Declercq, M. (2022), "Sou insuportável: como @jairmearrependi ajudou a modernizar a esquerda", *UOL TAB*, available at: <https://tab.uol.com.br/noticias/redacao/2022/11/23/sou-insuportavel-como-jairmearrependi-ajudou-a-modernizar-a-esquerda.htm> (accessed 20 November 2022).
- Dewulf, A., Gray, B., Putnam, L., Lewicki, R., Aarts, N., Bouwen, R. and Van Woerkum, C. (2009), "Disentangling approaches to framing in conflict and negotiation research: a meta-paradigmatic perspective", *Human Relations*, Vol. 62 No. 2, pp. 155-193.
- Di Domenico, G., Nunan, D., Sit, J. and Pitardi, V. (2021), "Free but fake speech: when giving primacy to the source decreases misinformation sharing on social media", *Psychology and Marketing*, Vol. 38 No. 10, pp. 1700-1711.
- Ecker, U.K., Lewandowsky, S., Cook, J., Schmid, P., Fazio, L.K., Brashier, N., Kendeou, P., Vraga, E.K. and Amazeen, M.A. (2022), "The psychological drivers of misinformation belief and its resistance to correction", *Nature Reviews Psychology*, Vol. 1 No. 1, pp. 13-29.
- Ferrante, L., Duczmal, L., Steinmetz, W.A., Almeida, A.C.L., Leão, J., Vassão, R.C., Tupinambás, U. and Fearnside, P.M. (2021), "How Brazil's president turned the country into a global epicenter of COVID-19", *Journal of Public Health Policy*, Vol. 42 No. 3, pp. 439-451.
- Gamson, W. and Modigliani, A. (1989), "Media discourse and public opinion on nuclear power: a constructionist approach", *American Journal of Sociology*, Vol. 95 No. 1, pp. 1-37.
- Gartley, L. (2022), "Cladistics ruined my life: intersections of fandom, internet memes, and public engagement with science", *Journal of Science Communication*, Vol. 21 No. 5, pp. 1-20.
- Goffman, E. (1974), *Frame Analysis: An Essay on the Organization of Experience*, Harvard University Press, Cambridge, MA.

- Gramacho, W.G. and Turgeon, M. (2021), "When politics collides with public health: COVID-19 vaccine country of origin and vaccination acceptance in Brazil", *Vaccine*, Vol. 39 No. 19, pp. 2608-2612.
- Hallal, P.C. (2021), "SOS Brazil: science under attack", *The Lancet*, Vol. 397 No. 10272, pp. 373-374.
- Henrique, A.L.B. (2022), "COVID-19 vaccination in Brazil is a success, despite the failure of the federal government", available at: <https://oneill.law.georgetown.edu/covid-19-vaccination-in-brazil-is-a-success-despite-the-failure-of-the-federal-government> (accessed 20 November 2022).
- Jung, A.K., Clausen, S., Franzke, A.S. and Marx, J. (2022), "Cambridge Morality - towards an ethical framework for social media analytics", *Australasian Journal of Information Systems*, Vol. 26, pp. 1-35.
- Kahneman, D. (2003), "A perspective on judgment and choice: mapping bounded rationality", *American Psychologist*, Vol. 58 No. 9, pp. 697-720.
- Langlois, J. (2021), "Why vaccinations for several diseases are falling sharply in Brazil", available at: <https://www.nationalgeographic.com/science/article/why-vaccinations-for-several-diseases-are-falling-sharply-in-brazil> (accessed 20 November 2022).
- Leng, Y., Zhai, Y., Sun, S., Wu, Y., Selzer, J., Strover, S., Zhang, H., Chen, A. and Ding, Y. (2021), "Misinformation during the COVID-19 outbreak in China: cultural, social and political entanglements", *IEEE Transactions on Big Data*, Vol. 7 No. 1, pp. 69-80.
- Lewandowsky, S. and van der Linden, S. (2021), "Countering misinformation and fake news through inoculation and prebunking", *European Review of Social Psychology*, Vol. 32 No. 2, pp. 348-384.
- Londoño, E. (2021), *Bolsonaro Talked Vaccines Down. Now Brazil Has Too Few Doses*, The New York Times, available at: <https://www.nytimes.com/2021/01/18/world/americas/brazil-covid-variants-vaccinations.html> (accessed 20 November 2022).
- Mirbabaie, M., Bunker, D., Stieglitz, S., Marx, J. and Ehnis, C. (2020), "Social media in times of crisis: learning from hurricane harvey for the COVID-19 pandemic response", *Journal of Information Technology*, Vol. 35 No. 3, pp. 195-213.
- Mirbabaie, M., Marx, J. and Reimann, A. (2022), "Rumor correction in social media crisis communication: a case of connective sense-breaking", *AIS Transactions on Human-Computer Interaction*, Vol. 14 No. 2, pp. 150-184.
- Morgan, S. (2018), "Fake news, disinformation, manipulation and online tactics to undermine democracy", *Journal of Cyber Policy*, Vol. 3 No. 1, pp. 39-43.
- Muhammed, T.S. and Mathew, S.K. (2022), "The disaster of misinformation: a review of research in social media", *International Journal of Data Science Analytics*, Vol. 13, pp. 271-285.
- Nascimento, I.J., Pizarro, A.B., Almeida, J.M., Azzopardi-Muscat, N., Gonçalves, M.A., Björklunde, M. and Novillo-Ortiz, D. (2022), "Infodemics and health misinformation: a systematic review of reviews", *Bulletin of the World Health Organization*, Vol. 100, pp. 544-561.
- Park, H., Park, S. and Chong, M. (2020), "Conversations and medical news frames on Twitter: infodemiological study on COVID-19 in South Korea", *Journal of Medical Internet Research*, Vol. 22 No. 5, e18897.
- Pôrto, Â. and Ponte, C.F. (2003), "Vacinas e campanhas: as imagens de uma história a ser contada", *História, Ciências, Saúde-Manguinhos*, Vol. 10 No. 2, pp. 725-742.
- Porter, D. (1997), *Internet Culture*, Routledge, New York, NY.
- Pulos, R. (2020), "COVID-19 crisis memes, rhetorical arena theory and multimodality", *Journal of Science Communication*, Vol. 19 No. 7, pp. 1-30.
- Qin, J. (2015), "Hero on Twitter, traitor on news: how social media and legacy news frame Snowden", *International Journal of Press/Politics*, Vol. 20 No. 2, pp. 166-184.
- Rathore, A.K., Maurya, D. and Srivastava, A.K. (2021), "Do policymakers use social media for policy design? A Twitter analytics approach", *Australasian Journal of Information Systems*, Vol. 25 No. 1, pp. 1-31.

- Rodriguez, L. and Dimitrova, D.V. (2011), "The levels of visual framing", *Journal of Visual Literacy*, Vol. 30 No. 1, pp. 48-65.
- Ross, B., Heisel, J., Jung, A.K. and Stieglitz, S. (2018), "Fake news on social media: the (in)effectiveness of warning messages", *Proceedings of the 39th International Conference on Information Systems*, pp. 1-17.
- Ross, B., Pilz, L., Cabrera, B., Brachten, F., Neubaum, G. and Stieglitz, S. (2019), "Are social bots a real threat? An agent-based model of the spiral of silence to analyse the impact of manipulative actors in social networks", *European Journal of Information Systems*, Vol. 28 No. 4, pp. 394-412.
- Sharma, K., Qian, F., Jiang, H., Ruchansky, N., Zhang, M. and Liu, Y. (2019), "Combating fake news: a survey on identification and mitigation techniques", *ACM Transactions on Intelligent Systems and Technology*, Vol. 10 No. 3, pp. 21-42.
- Shu, K., Sliva, A., Wang, S., Tang, J. and Liu, H. (2017), "Fake news detection on social media: a data mining perspective", *ACM SIGKDD Explorations Newsletter*, Vol. 19 No. 1, pp. 22-36.
- Skafle, I., Nordahl-Hansen, A., Quintana, D.S., Wynn, R. and Gabarron, E. (2022), "Misinformation about COVID-19 vaccines on social media: rapid review", *Journal of Medical Internet Research*, Vol. 24 No. 8, e37367.
- Song, H., So, J., Shim, M., Kim, J., Kim, E. and Lee, K. (2023), "What message features influence the intention to share misinformation about COVID-19 on social media? The role of efficacy and novelty", *Computers in Human Behavior*, Vol. 138 No. 1, pp. 1-9.
- Stieglitz, S., Mirbabaie, M., Ross, B. and Neuberger, C. (2018), "Social media analytics—challenges in topic discovery, data collection, and data preparation", *International Journal of Information Management*, Vol. 39, pp. 156-168.
- Taherdoost, H. (2017), "Determining sample size; how to calculate survey sample size", *International Journal of Economics and Management Systems*, Vol. 2 No. 1, pp. 237-239.
- Tankard, J.W. (2001), "The empirical approach to the study of media framing", Reese, S.D., Gandy, O.H. and Grant, A.E. (Eds), *Framing Public Life*, Routledge, New York, NY, pp. 111-121.
- Touri, M. and Koteyko, N. (2015), "Using corpus linguistic software in the extraction of news frames: towards a dynamic process of frame analysis in journalistic texts", *International Journal of Social Research Methodology*, Vol. 18 No. 6, pp. 601-616.
- Tsao, S.-F., Chen, H., Tisseverasingh, T., Yang, Y., Li, L. and Butt, Z.A. (2021), "What social media told us in the time of COVID-19: a scoping review", *The Lancet Digital Health*, Vol. 3 No. 3, pp. e175-e194.
- Vafeiadis, M. and Xiao, A. (2021), "Fake news: how emotions, involvement, need for cognition and rebuttal evidence (story vs. informational) influence consumer reactions toward a targeted organization", *Public Relations Review*, Vol. 47 No. 4, pp. 1-14.
- Vafeiadis, M., Bortree, D.S., Buckley, C., Diddi, P. and Xiao, A. (2019), "Refuting fake news on social media: nonprofits, crisis response strategies and issue involvement", *Journal of Product and Brand Management*, Vol. 29 No. 2, pp. 209-222.
- van der Linden, S. (2022), "Misinformation: susceptibility, spread, and interventions to immunize the public", *Nature Medicine*, Vol. 28 No. 3, pp. 460-467.
- van Gorp, B. (2010), "Strategies to take subjectivity out of framing analysis", D'Angelo, P. and Kuypers, J.A. (Eds), *Doing News Framing Analysis*, Routledge, New York, NY, pp. 100-125.
- Vemprala, N., Bhatt, P., Valecha, R. and Rao, H.R. (2021), "Emotions during the COVID-19 crisis: a health versus economy analysis of public responses", *American Behavioral Scientist*, Vol. 65 No. 14, pp. 1972-1989.
- Vieira, E. (2021), "Quando a telenovela vira meme: como a zuera e o melodrama se articulam a partir dos memes da reprise de avenida Brasil?", available at: <http://www.repositorio.jesuita.org.br/handle/UNISINOS/9856> (accessed 15 April 2022).

- Visentin, M., Pizzi, G. and Pichierri, M. (2019), "Fake news, real problems for brands: the impact of content truthfulness and source credibility on consumers' behavioral intentions toward the advertised brands", *Journal of Interactive Marketing*, Vol. 45 No. 1, pp. 99-112.
- Walter, D. and Ophir, Y. (2019), "News frame analysis: an inductive mixed-method computational approach", *Communication Methods and Measures*, Vol. 13 No. 4, pp. 248-266.
- WHO (2021), "WHO coronavirus disease (COVID-19) dashboard Brazil", available at: <https://covid19.who.int/region/amro/country/br> (accessed 20 November 2022).
- Wicke, P. and Bolognesi, M.M. (2020), "Framing COVID-19: how we conceptualize and discuss the pandemic on Twitter", *PloS One*, Vol. 15 No. 9, e0240010.
- Xiong, Y., Cho, M. and Boatwright, B. (2019), "Hashtag activism and message frames among social movement organizations: semantic network analysis and thematic analysis of Twitter during the #MeToo movement", *Public Relations Review*, Vol. 45 No. 1, pp. 10-23.
- Yang, J. and Tian, Y. (2021), "Others are more vulnerable to fake news than I am": third-person effect of COVID-19 fake news on social media users", *Computers in Human Behavior*, Vol. 125, pp. 1-10.
- Ylä-Anttila, T., Eranti, V. and Kukkonen, A. (2022), "Topic modeling for frame analysis: a study of media debates on climate change in India and USA", *Global Media and Communication*, Vol. 18 No. 1, pp. 91-112.
- Zhao, Y. and Zhang, J. (2017), "Consumer health information seeking in social media: a literature review", *Health Information and Libraries Journal*, Vol. 34 No. 4, pp. 268-283.

Corresponding author

Stefan Stieglitz can be contacted at: stefan.stieglitz@uni-potsdam.de

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgroupublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com