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Dynamics of Climate Disinformation in Facebook and Instagram Posts in Brazil

Luana Cruz
Instituto Nacional de Comunicação Pública da Ciência e Tecnologia, Belo Horizonte, Brazil
Conceptualisation, formal analysis, investigation, methodology, writing – original draft

Vanessa Fagundes
Instituto Nacional de Comunicação Pública da Ciência e Tecnologia, Belo Horizonte, Brazil
Conceptualisation, methodology, visualisation, writing – review & editing

Luisa Massarani
Instituto Nacional de Comunicação Pública da Ciência e Tecnologia, Belo Horizonte, Brazil/Fundação Oswaldo Cruz, Rio de Janeiro, Brazil
Conceptualisation, funding acquisition, methodology, supervision, validation, writing – review & editing

Thaiane Oliveira
Departamento de Estudos de Mídia, Universidade Federal Fluminense, Niterói, Brazil
Data curation, methodology, writing – review & editing

Abstract

This study examines the dynamics of climate disinformation in Facebook and Instagram posts in Brazil, focusing on the misrepresentation of scientific data aimed at discrediting science. We characterised the recurring themes, forms of expression, social actors involved, languages, and types of narratives that encompass fallacies, conspiracy theories, and religious viewpoints. Furthermore, we cross-referenced these categories with the presence or absence of scientific arguments to explore whether the use of science in climate disinformation serves to reinforce specific viewpoints or fuel controversy. The methodological approach included content and thematic analysis of 77 climate disinformation posts on these platforms, collected between January 1, 2023, and December 31, 2023, using the descriptors "climate change" and "global warming". Our findings confirm the existence of a climate disinformation ecosystem with distinct Brazilian characteristics, where public discussions reinforce the notion of humanity's demise, framed within catastrophic rhetoric and propagated by alternative media. The analysis also highlights that Facebook is increasingly a space for more explicit climate disinformation, often linked to fanaticism, as opposed to Instagram, which presents climate disinformation in a way that does not directly deny science.

Keywords

climate disinformation, online platforms, Facebook, Instagram, climate change denial

Dinâmicas da Desinformação Climática em Publicações de Facebook e Instagram no Brasil

Resumo

Neste estudo, analisamos a dinâmica da desinformação climática em publicações de Facebook e Instagram no Brasil, com enfoque nos fenômenos que envolvem a deturpação de dados científicos para desacreditar a ciência. Caracterizamos os temas em circulação, as formas de expressão, os atores sociais envolvidos, as linguagens, os tipos de narrativas que incluem falácias, teorias conspiratórias e relatos religiosos. Além disso, cruzamos essas categorias com a presença ou ausência de argumento científico para observar se o uso da ciência na desinformação climática serve para reforçar pontos de vista e impulsionar controvérsias. Para tanto, nosso caminho metodológico passou pela análise de conteúdo e temática de 77 publicações de desinformação climática nessas duas plataformas online, recolhidas entre 1 de janeiro de 2023 e 31 de dezembro de 2023, a partir dos descritores "mudanças climáticas" e "aquecimento global". Como resultado, confirmamos a existência de um ecossistema da desinformação climática com especificidades brasileiras que fazem a discussão pública reforçar a ideia de finitude da humanidade, sob uma retórica catastrófica e agenciada por mídias alternativas. A análise também aponta que o Facebook vem se desenhando como um espaço de desinformação climática mais explícita ao se associar aos fanatismos, em contraposição ao Instagram, em que se delineia uma desinformação climática sem negação frontal da ciência.

Palavras-chave
desinformação climática, plataformas online, Facebook, Instagram, negacionismo climático

1. Introduction

Climate disinformation refers to deceptive or misleading content that misrepresents scientific data, including by omission or cherry-picking, in order to erode trust in climate science, climate-focused institutions, experts, and solutions (Climate Action Against Disinformation, 2023b). The spread of climate disinformation is exacerbated by the infrastructural and mediating role of online platforms (d'Andréa, 2020), which continue to shape perceptions and reinforce biases, influencing the public's understanding of climate change as an established reality (Thapa Magar et al., 2024). This study focuses on how these disinformation dynamics are affecting public discourse in Brazil, a country where online platforms are key sources of information (Newman et al., 2024). Climate disinformation is characterised by the pervasive circulation of environmental topics marked by an overload of posts, contested narratives, inaccurate or false content, the delegitimisation of social movements, and attacks on socio-environmental advocates (Laboratório de Estudos de Internet e Redes Sociais, 2024). This raises critical questions about how these disinformation posts are expressed and experienced — by both communicators and Brazilian audiences — and their implications for public engagement with climate science.

Recent studies have highlighted both general trends and specific characteristics of climate disinformation across various online platforms and regions globally. In 2023,

a series of false narratives circulated on X (formerly Twitter), Facebook, Instagram, and TikTok, targeting extreme climate events in Brazil. One example was the misleading portrayal of floodgate openings during the flooding in Porto Alegre (Rio Grande do Sul; Purpose for Roots et al., 2023). Another study centred on X revealed the harassment of Brazilian environmental activists, who were repeatedly labelled as "climate cultists" and "eco-terrorists" (Climate Action Against Disinformation, 2023a). These classifications underscore the intensification of the discursive conflict surrounding climate change.

On a global scale, a report exposed YouTube's failure to effectively implement its own policies to combat disinformation, noting that the platform continued to run ads on videos promoting climate change denial while profiting from misleading sustainability content (Center for Countering Digital Hate, 2023). Additionally, in 2023, fabricated narratives in Chile obscured the climatic causes of forest fires, while in Peru, disinformation linked Cyclone Yaku to the HAARP system (High-Frequency Active Auroral Research Program)[1], diverting attention from the real climatic drivers (Purpose for Roots et al., 2023).

In Malaysia, researchers have shown that climate disinformation is more likely to be disseminated by politicians, organisations, and anonymous agencies, with a predominance of misleading and fabricated content. The findings suggest that politics and online platforms are the most critical factors influencing climate change (Hassan et al., 2024). In Canada, research indicates that climate disinformation contributes to an increasingly fractured and polarised society, establishing itself as a significant barrier to collective climate action (Bellamy, 2020).

The rigidity of beliefs about climate change, particularly in highly politicised contexts, has also been the subject of research. Some studies examine a "new denial" (Center for Countering Digital Hate, 2023), which adapts climate narratives to the era of undeniable warming. According to the study, "old denial" — which denies either the existence of global warming or its human influence — is losing ground. Instead, the focus has shifted towards attacking science and scientists to undermine climate action. Santini and Barros (2022) provide evidence that organised forms of denial, although still requiring further study, are linked to political ideology. There is a correlation between personal identification with neoliberal groups and resistance to accepting scientific guidelines. Therefore, the phenomena grouped under the label of denialist movements are more complex than these terms suggest: "not all of them involve a direct denial of science, but, much like illiberal populism with liberal democracy, they aim to occupy and reframe its cultural core" (Cesarino, 2022, p. 179).

As an aggravating factor, online platforms — due to their intentional, non-neutral, and non-audited activities (ECI UFMG, 2022; Gillespie, 2018) — fail to signal updates to policies that could combat the "new denial". On the contrary, they continue to monetise disinformation content, with platforms like YouTube profiting up to US$13,400,000 annually from ads on channels that adopt the new climate narratives (Center for Countering Digital Hate, 2023). In a recent interview (Vick, 2024), Alexandre Costa, a professor at the

[1] A United States scientific project designed to study physical phenomena in the upper layers of the Earth's atmosphere, but often cited in conspiracy theories to explain climate events.

State University of Ceará and climate scientist, coined the term "soft denial" to describe communications that do not conceal global warming but instead delay solutions, arguing that they may be more dangerous as they neutralise important scientific voices that could provide crucial information to society.

Against this backdrop, efforts to gather more data and detail the dynamics of climate disinformation are essential. In the context of discourses on science during the pandemic, Latour (2020) refers to the COVID-19 pandemic as a "dress rehearsal" for the global challenges of the anthropocene. Based on this premise, a research agenda has emerged on disinformation practices concerning science (Nguyen & Catalan, 2020; Oliveira, 2020), within which climate disinformation is situated. While this research highlights the culmination of a long-standing process that has fostered anti-scientific practices, there are few studies focused on identifying the themes, formats, and operational modes of climate disinformation, particularly in regional and local contexts (Bellamy, 2020; Hassan et al., 2024; Medeiros et al., 2024). According to Santini and Barros (2022), the rapid growth of academic work on the impacts of disinformation in climate science discourses still presents opportunities for analyses of climate change denial from the viewpoint of cultural variations rather than solely as a global phenomenon.

Thus, this article aims to characterise climate disinformation on Facebook and Instagram in Brazil, recognising that examining the dynamics of disinformation circulation and its related disputes over meaning offers a deeper understanding of how people produce, discover, and interpret information and the implications these practices have for the production of shared knowledge (Oliveira, 2020). To achieve this, we conducted a content and thematic analysis (Neuendorf, 2018) of climate disinformation posts on these two platforms in 2023, using the descriptors "climate change" and "global warming". In addition to this introduction, the article includes a theoretical overview of the climate disinformation ecosystem, a description of the data collection and analysis methods, a presentation of the results, a discussion, and final considerations.

2. The Climate Disinformation Ecosystem

The evolving tactics of climate disinformation disseminators complicate the identification of how such content is created and circulated; however, efforts to define an ecosystem of climate disinformation have emerged. Cook (2020b), drawing on the ideas of Mark Hoofnagle (2007), initiated a systematic framework for climate disinformation, which he termed "FLICC" (fake experts, logical fallacies, impossible expectations, cherry picking, and conspiracy theories). He outlined that dubious and fabricated climate content predominantly employs techniques of science denial.

Firstly, the author refers to the use of fake experts, where content elevates individuals or institutions that appear to have authority. In the discourse of these "experts" (Klein & Klein, 2021), a recurring pattern emerges in which they establish bonds of trust with audiences, often through the recognition of their professional credentials and the use of expert language. Barros et al. (2024) demonstrated that, in the case of climate

disinformation on YouTube, the arguments of fake experts — particularly those downplaying human influence on climate change — can resonate strongly with audiences on the platform. Secondly, Cook (2020a) highlights the logical fallacy, in which the conclusions presented in content do not logically follow from the premises. Even if the conclusion appears plausible, the argument remains fallacious.

The third pillar of the FLICC structure is impossible expectations, which demand unrealistic standards of certainty or question scientific assertiveness by proposing answers that are not feasible. For example, a meme circulating on Facebook mocks Swedish activist Greta Thunberg for allegedly "missing" a predicted forecast from 2018 that the world would end in 2023 (Índio do Tapajós, 2023). The comments go as follows: "scientists can't even predict the weather next week. How can they predict the climate in 100 years?". Cook (2020a) also highlights the intentional selection of information that seems to confirm a particular position while disregarding data that contradicts it. An example of this is the argument that climate change occurred naturally in the past, so today's changes must be part of that natural cycle.

The final element of the FLICC framework is "conspiracy theories", in which spreaders of climate disinformation suggest the existence of a secret, sinister plan typically used to undermine scientists. Lewandowsky et al. (2020) demonstrate that many of these theories accuse scientists of being corrupt, claiming to have proof that experts have been misleading the public for decades. For instance, a Facebook profile (Pesadelo do Sistema, 2023), which regularly posts conspiracy theories, surveyed supposed patents for controlling or modifying the climate registered in the United States from 1891 to 2001. Among the mechanisms listed is the generation of electric fields to charge clouds, which is allegedly part of the HAARP system.

Alongside Cook's (2020a) propositions, Covering Climate Now and Climate Action Against Disinformation (2023b) recently identified climate disinformation tactics that align with previous research, highlighting three key elements: false balance, exploitation of chaos, and politicisation. False balance and exploitation of chaos refer to content that can create confusion and undermine scientific facts by presenting "balanced" views. Typically, based on scientific issues that have already been resolved, this content portrays sources from "both sides" as though the scientific community is divided on the matter. Silva (2017) had previously cautioned against these tactics, which were pioneered by fossil fuel companies in the 1980s and 1990s, leading to the "manufacture of uncertainty". This tactic serves to generate doubt through the use of scientific discourse or by attempting to present opinions as facts. Moreover, this content can fill an information void during times of uncertainty and chaos, spreading misinformation or instilling doubt instead of providing clarity.

Politicisation, conversely, encompasses both non-partisan and partisan issues in order to exploit deeply held identities and beliefs. It is characterised by the insertion of political arguments and symbols into the public framing of climate issues. In this instance, the public discourse shifts towards promoting extreme viewpoints (Lazer et al., 2018). As such, it reflects the political stances of climate disinformation purveyors,

as demonstrated in the example, where a speech by then-United States Vice President Kamala Harris in July 2023 was decontextualised to suggest the need to reduce the global population as a measure to combat climate change (Nel Patriota, 2023).

The ecosystem we have outlined closely mirrors the well-established context of disinformation (Mancoso et al., 2023; Scheufele & Krause, 2019; Wardle & Derakhshan, 2017), where deception patterns are constructed, trust is eroded, epistemic institutions are discredited, metanarratives break down, and discourses and meanings are contested in the quest for authority and legitimacy (Oliveira, 2020). This ecosystem also continues the disinformation dynamics previously identified in studies on COVID-19 and vaccines (Massarani, Leal, Waltz, & Medeiros; Recuero et al., 2021).

However, we identify specificities regarding climate change, particularly when examining its circulation. This approach not only complements systematic structuring — which could risk being seen as overly simplistic — but also helps avoid conceptual traps that frame disinformation solely in terms of intentionality or the dismissal of content based on the credibility of epistemic institutions (Oliveira, 2020).

3. Methodological Procedures

To characterise climate disinformation in Brazil, we collected data using CrowdTangle's graphical interface, employing the terms "climate change" and "global warming"[2] as search parameters for compiling the *corpus*. The dataset comprised posts from public Facebook fan pages and groups, as well as Instagram, published between January 1 and December 31 2023. We selected this timeframe because 2023 was marked by record-breaking global and Brazilian climate indicators[3], reinforcing evidence that climate change is progressing more rapidly than previously anticipated. The data extraction was conducted on January 23 2024, collecting the following details: user/group names, total interactions, post type, publication date, message content, and links.

The dataset included 45,746 entries from Facebook fan pages, 25,255 from groups, and 29,926 from Instagram, resulting in a total of 100,927 posts. To obtain a manageable sample, we applied a randomisation criterion. We selected $n = 385$ posts from each of the three sources (fan pages, groups, and Instagram posts)[4], yielding a final dataset of $n = 1,155$. This material was then manually reviewed and filtered.

The *corpus* was selected in two stages. In the first, inclusion and exclusion criteria were applied. We removed duplicate publications, texts in languages other than Brazilian

[2] The term "climate change" has a broader meaning than "global warming", as it encompasses all natural phenomena affected by climate change, whereas "global warming" refers more specifically to the average increase in the Earth's surface temperature compared to pre-industrial levels. Nevertheless, we chose to include this term in our data collection because it remains widely used to describe a range of atmospheric phenomena.

[3] The intensity of El Niño and La Niña influenced rainfall patterns and contributed to record-breaking temperatures, particularly during a heatwave in November. Brazil and the world recorded the highest average temperatures in history. Global carbon dioxide emissions reached unprecedented levels, with atmospheric carbon concentrations rising to 419 parts per million. Ocean warming and expanding deforestation have exacerbated prolonged droughts, leading to the most significant decline in river levels ever recorded in the Amazon (Ministério da Ciência, Tecnologia e Inovação, 2024).

[4] The selection of 385 entries ensures a 5% margin of error and a 95% confidence level.

Portuguese, posts unavailable at the time of manual analysis, and content in which the terms "climate change" and "global warming" were not used in the context of the environmental debate or atmospheric phenomena (consequences, causalities, controversies, debates, events, and coping actions). This resulted in 992 publications (323 from public Facebook fan pages, 293 from Facebook groups, and 376 from Instagram posts).

In the second stage, we conducted a detailed analysis to compose our *corpus* of publications characterised as disinformation. Each post was examined, including images, texts, comments, and videos. This process was based on the notion of a climate disinformation ecosystem and supported by previous research that systematises general disinformation indicators (Cook, 2020a; Lewandowsky, 2021; Scheufele & Krause, 2019; Wardle & Derakhshan, 2017). When necessary, we verified information through text and image searches using search engines and fact-checking websites.

We identified 77 publications (7.7% of the total) containing disinformation, which form the *corpus* of this study. We then conducted a content and thematic analysis (Neuendorf, 2018) through a systematic and quantitative approach. The process involved the following steps: reviewing theories on disinformation and climate disinformation to develop a codebook, defining variables based on conceptual definitions, establishing a coding framework, applying it to the *corpus*, and tabulating results. The analysis focused on cross-referencing data to identify key patterns in climate disinformation in Brazil.

The codebook developed for this research comprises 12 categories that enable analyses from multiple perspectives, recognising that disinformation demands an analytical approach that goes beyond rigid classifications. To construct the codebook, we examined studies on disinformation related to vaccines and COVID-19 (Costa et al., 2021; Klein & Klein, 2021; Massarani, Leal, Waltz, & Medeiros), as well as research on political and corporate dimensions (Bennett, 2018; Santos et al., 2021; Silva, 2017). We also considered studies on beliefs and religion (Alzamora et al., 2022; Fagundes et al., 2021; Lazer et al., 2018; Vosoughi et al., 2018) and the challenges journalism faces in countering disinformation (Sousa et al., 2022; Tandoc et al., 2017). Additionally, we incorporated literature on how textual language contributes to the construction of disinformation content (Molina, 2021; Munger et al., 2018; Venneti & Alam, 2017) and research on engagement dynamics — such as interactions, shares, comments, likes, reactions, and user positions (Baghdadi et al., 2023; Massarani, Leal, & Waltz, 2020; Massarani, Leal, Waltz, & Medeiros, 2021). We drew on studies that categorise the social actors involved in disinformation circulation (Bitencourt et al., n.d.; Magalhães et al., 2023) and the technological artefacts provided by platforms that shape dissemination (Cruz, 2023; Recuero et al., 2021). Finally, language studies supported the categorisation of expressive forms and the semantic field of disinformation (Charaudeau, 2005/2010; Lima et al., 2013). Table 1 outlines the categories.

Theme	Fear of climate change
	Denies climate change
	Extreme weather events
	Environmental activism
	Criticising environmental activism
	Politicisation of climate change
	Climate change event/conference
	Combat actions and solutions
	Consequences of climate change
	Marketing
	Religious/spirituality
	Culpability
	Other
Types of disinformation	Simulates journalistic text or scientific dissemination
	Elevates ordinary people to a source of representation or expert in a field
	Questions* scientific evidence, lacking scientific foundation
	Has false connections, contexts, or fabricated, contradictory, unsustainable content
	Reinforces belief biases or amplifies conspiracy theories
	Expresses disbelief in epistemic institutions (science, universities, journalism, and others)
	Contributes to the "manufacture of uncertainty" or forms controversies
	Suggests big news, makes shocking/surprising statements, incites emotions (fear, surprise, disgust), or weighs in on emotional discourse with a catastrophic narrative
	Aligns with fanaticisms (religious, political, and others)
	Other
Expressive form	Humour
	Protest
	Educational
	Scientific
	Catastrophic
	Emotional
	Informative
	Ordinary
Type of image	Generic element of nature (water, fire, sky, animals)
	Photograph that reports an event
	Advertising (planned concept, idea, framing, lighting, setting, characters)
	Art (drawing, creation, montage)
	No images
	Other

Type of post	Album
	Photo
	Text
	Video
	Link
Social actors	Traditional media
	Alternative media**
	Journalist/commentator
	Politician
	Research institute/university
	Science communicator
	Science professional
	Education professional
	Celebrity
	Body/institution (executive, legislative, judiciary)
	Private company
	Non-governmental organisation/foundation
	Activist
	Religious/spiritual leader
	Other
User-author profile	Mega (over 1,000,000 followers)
	Macro (between 100,000 and 1,000,000)
	Micro (between 20,000 and 100,000)
	Nano A (between 5,000 and 20,000)
	Nano B (between 1,000 and 5,000)
	Domestic (between 500 and 1,000)
	Seasonal (below 500)
Purpose	To make known (inform)
	To make feel (capture, seduce to make believe)
	To incite/induce (recommend and induce changes in behaviour)
	Other
Format and language	Standardised with a reproducible bias (memetic)
	Exaggerated to attract attention, with eye-catching writing and clickbait titles
	A mix of multimodal resources (infographics, gifs, emojis, maps, drawings, font or colour modulations)
	Print
	Exclusively textual
	Other

Terms used	Group 1: "Brazil", "environment", "COP", "UN", "climate"
	Group 2: "Indigenous", "Amazon", "planet", "agroecology", "zero waste", "degrowth", "community management", "energy sovereignty", "energy transition"
	Group 3: "energy", "sustainability", "water", "carbon", "development"
	Group 4: "end times", "the disintegration of the universe", "cosmology", "life on Earth", "climate collapse", "God"
	Group 5: "climate justice", "climate debt", "climate refugees", "environmental racism", "Global South", "Global North"
	Group 6: "eco-terrorism", "eco-terrorists", "climate cult", "eco-extremism", "eco-fascism", "environmental alarmism"
	Group 7: "bioenergy", "carbon storage", "decarbonisation", "net zero emissions", "carbon market", "emission reduction", "smart agriculture", "geoengineering", "green economy", "green make-up"
	Group 8: "climate anxiety", "eco-anxiety", "climate collapse", "climate crisis", "environmental disaster"
	Group 9: "rain", "heat", "cold", "wind/windstorm", "cyclone", "hurricane", "winter", "summer", "temperature"
	Group 10: other terms
Scientific argument	Yes
	No
Circulation strategy* **	No
	Search engine optimization technique
	Generic topic/hashtag
	Meme images
	Thematic trend
	Interaction (polls, @-tagging)

Table 1. *Categories of analysis*

Notes. *"Questioning" itself does not constitute disinformation, as it is an inherent part of scientific inquiry. The issue arises from the specific context in which it occurs. **Unaffiliated with media conglomerates. ***This refers to the dynamics of how a publication circulates on online platforms, encompassing data on digital audiences and performance metrics. It is closely tied to the concepts of visibility, reach, and optimisation.

After the coding process and the qualitative analysis of each publication, we quantified the patterns in themes, types of disinformation, social actors, and forms of expression. This revealed key indicators of how disinformation publications are articulated and perceived by Brazilian audiences. Furthermore, we cross-referenced these patterns with the presence or absence of scientific arguments to explore whether the use of science in climate disinformation serves to reinforce specific viewpoints, fuel controversy, and so on. Additionally, we conducted other cross-checks that provided insights into the linguistic and discursive choices employed in disinformation publications.

4. Results and Discussions

4.1. Thematic Axis

Our first step in analysing climate disinformation in Brazil on Facebook and Instagram was to examine the themes that dominate public discussion. To define the 13 thematic groups that make up the "thematic axis" category, we drew on recent reports (Climate Action Against Disinformation, 2023a, 2023b) outlining emerging themes, as well as generating the list inductively from the *corpus* itself (Neuendorf, 2018). The results reveal that the predominant themes in Instagram and Facebook posts are "fear of climate change" (18%), "consequences of climate change" (18%), and "religious/spirituality" (16%). Notably, the themes of "criticising environmental activism" and "marketing" were absent from the posts analysed (Figure 1).

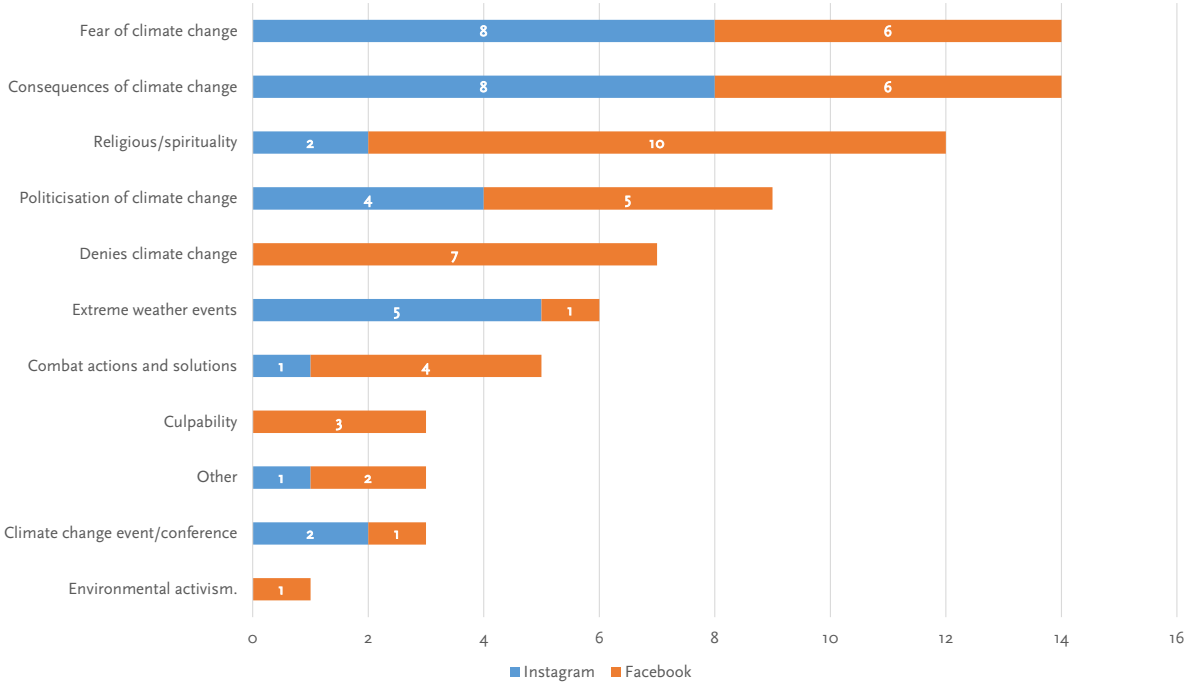

Figure 1. *Themes on Facebook and Instagram posts (number of posts) — Brazil, 2023*

The data on the "fear of climate change" aligns with recent studies examining the emotional and psychological impacts of climate change, particularly the suffering it causes (Clayton, 2020; Coffey et al., 2021; Voşki et al., 2023). Although psychometric or dimensional measures assessing the full range of emotions tied to climate change are lacking, there has been a growing focus on understanding eco-anxiety, eco-anger and eco-grief, which have emerged as the most common emotional responses (Voşki et al., 2023). Meanwhile, the theme of the "consequences of climate change", which ranks alongside "fear of climate change", also covers the broader implications of a changing

global climate on social structures, migration policies, and, notably, human health. In particular, there was a significant recurrence of content discussing microorganisms and diseases that rising temperatures could exacerbate.

Finally, the theme of "religious/spirituality" highlights a connection, not always rational, between the Earth's warming and the biblical apocalypse, reinforcing a confirmation bias that Cesarino (2022) has identified among anti-structuralist groups, such as climate change deniers. This rhetoric fosters a rupture, encouraging audiences to envision the future through apocalyptic lenses that contradict current realities. This manifestation is not limited to religious or spiritual contexts; the link between these audiences and neoliberal ideologies also takes shape through the economic theologies of the profit-driven market and its "oracular, conspiratorial, pyramidal, and phantasmagorical" elements (Cesarino, 2022, p. 54). In our *corpus*, there are instances of religious/political leaders — self-styled coaches or guides — who juxtapose narratives of financial prosperity with apocalyptic visions. Thus, the three predominant themes are interwoven, directing public discourse toward a bleak vision of humanity's eventual demise. Table 2 provides examples of the most recurrent themes.

Theme	Example
Fear of climate change	"Scientists set a date for the end of the world caused by super temperatures (...). As reported in the British tabloid Daily Star, Dr Alexander Farnsworth, the lead researcher, stated that the intense heat will burn everything to extinction" — retrieved from https://www.instagram.com/p/CxsH3PYuRAG/ on October 28, 2024.
Consequences of climate change	"The rise in cases of infection caused by *Naegleria fowleri*, commonly referred to as the 'brain-eating' amoeba, which leads to primary amoebic meningoencephalitis (PAM), has raised concerns in the United States. This freshwater organism has been spreading as a result of climate change" — retrieved from https://www.instagram.com/p/Cs1mDUCJ1D6/ on October 28, 2024.
Religious/spirituality	"Nothing will remain. Worms will vanish at the snap of a finger before the Wrath of God. Nature will awaken from its long silence, leading to unimaginable catastrophes" — retrieved from https://www.facebook.com/groups/2282915840285 92/permalink/2158862960971435 on September 3, 2024.

Table 2. *Examples of publications*

When we isolate the "thematic axis" category for Facebook alone, the "religious/spirituality" theme (22%) predominates, followed by "climate change deniers" (15%). The "religious/spirituality" theme is primarily represented by posts in public groups run by religious leaders and groups promoting spirituality, which are very popular on this platform. Furthermore, when we focus solely on Instagram, the themes "fear of climate change" (26%) and "consequences of climate change" (26%) dominate, followed by "extreme weather events" (16%). This last theme was particularly driven by disinformation during a heatwave that Brazil faced in September and October 2023, which saw record temperatures.

In addition to these highlights for the most recurrent themes, it is worth noting that the theme "denies climate change" appears discreetly on Facebook (9%) and does not appear on Instagram. This data helps us realise that climate narratives are adapting to an

era of undeniable warming, with denialists employing other strategies, as outright denial may no longer be the most effective approach.

4.2. Typology of Disinformation

Our second analytical step involved examining the "typology of disinformation" category, where we identified the attributes of a disinformation publication. These attributes indicate that such content casts doubt on the (unequivocal) human influence on climate change or the necessity for urgent action while also misrepresenting scientific data to undermine trust in the sciences and institutions that study climate-centred solutions.

As a result (see Figure 2), the most prevalent type of disinformation in Instagram and Facebook posts is that which "has false connections, contexts, or fabricated, contradictory, unsustainable content" (36%). This is followed by content that "aligns with fanaticisms (religious, political, and others)" (21%) and content that "suggests big news, makes shocking/surprising statements, incites emotions (fear, surprise, disgust), or weighs in on emotional discourse with a catastrophic narrative" (12%).

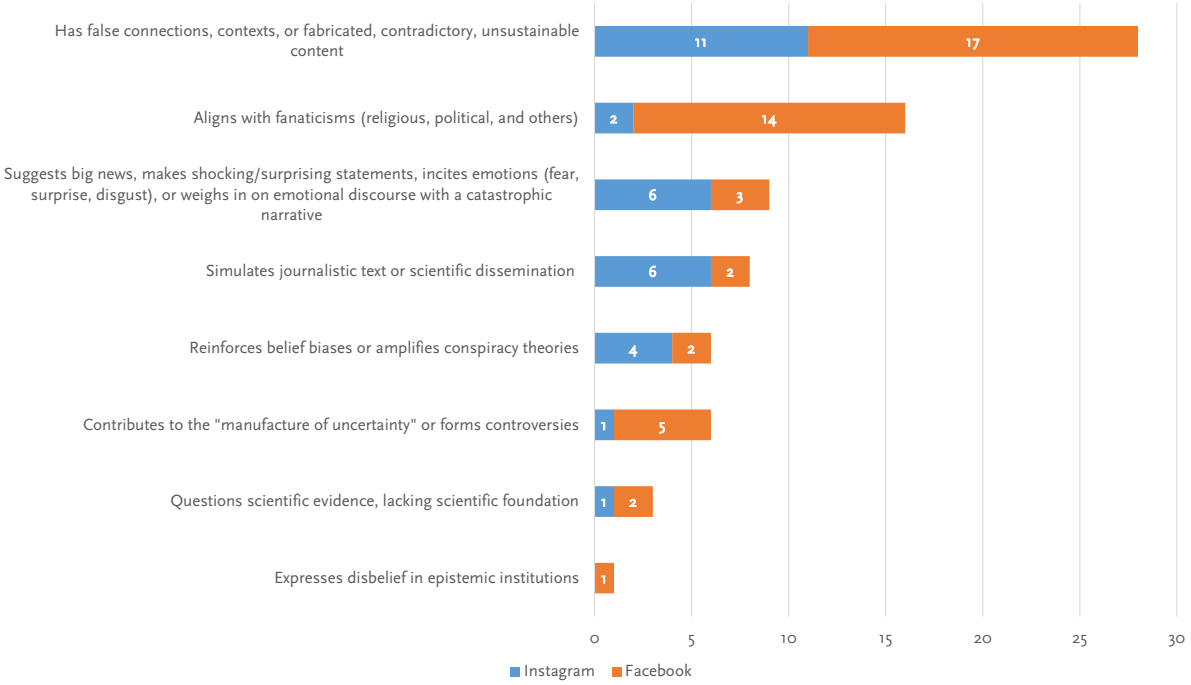

Figure 2. *Type of disinformation on Facebook and Instagram posts (number of posts) — Brazil, 2023*

The predominance of the type "has false connections, contexts, or fabricated, contradictory, unsustainable content" highlights the presence of the FLICC structure (Cook, 2020a) in climate disinformation on Instagram and Facebook, similar to patterns identified in other disinformation flows (Mancoso et al., 2023). The facts presented in posts of this category are not always fabricated; rather, they are framed in a way that renders them untenable and out of context, often through the use of false experts and deliberate

choices that fuel conspiracy theories. We observed that this type of disinformation is frequently disseminated by alternative media profiles (48% of all actors), which employ an informative textual style but provide poorly researched and weakly contextualised information. Notably, within this category, the most recurrent theme is "consequences of climate change" (32%), as it addresses the present and future effects of climate change, allowing for the strategic insertion of viewpoints that redirect discussions on the social dimensions of climate change.

On the other hand, the significant occurrence of the type "aligns with fanaticisms (religious, political, and others)" highlights particular aspects of the conversation among Brazilian audiences. Without seeking to exhaust the discussion on the use of religious elements to amplify the impact of disinformation content, we note that this strategy contributes to the encouragement of extreme points of view (Lazer et al., 2018), a common feature of false content about science. However, in Brazil, this phenomenon takes on culturally specific dimensions, as 89% of the population believes in God or a higher power (Global Religion, 2023).

Finally, the occurrence of the typology "suggests big news, makes shocking/surprising statements, incites emotions (fear, surprise, disgust), or weighs in on emotional discourse with a catastrophic narrative" is closely linked to the predominance observed in the "thematic axis". This type of disinformation tends to reinforce narratives of fear surrounding climate change. In fact, 50% of the publications categorised under the theme "fear of climate change" fall within this typology, as they rely on shocking statements and emotional incitement. Table 3 presents examples of the most recurrent types of disinformation.

Type of disinformation	Example
Has false connections and contexts	"'Climate change and global warming' are just a cover-up for their electric wars (...), which include spraying the skies with genetically modified mosquitoes, heavy metals like barium, strontium, or aluminium, and deploying different types of mind-control waves" — retrieved from https://www.facebook.com/groups/1453947501565187/permalink/3210785095881410 on September 5, 2024.
Aligns with fanaticisms (religious, political, and others)	"Global warming is real! It is written in the apocalypse! God is the only one who can change it, and it's not a punishment! The real punishment is that the Lord isn't solving it simply because we're not asking! (...) If you want your children to have a future, start praying — pray, pray, pray" — retrieved from https://www.facebook.com/groups/2059291461023584/permalink/3453229381629778 on October 28, 2024.
Suggests big news	"Which species will dominate the Earth after humanity's demise? (...) If we stop to think on an even larger scale, bacteria are the most likely contenders. After all, they've been around for four billion years and played a fundamental role in shaping the Earth's atmosphere" — retrieved from https://www.facebook.com/100064809035801/posts/728071366029825 on October 28, 2024.

Table 3. *Examples of publications*

When we focus solely on Facebook, there is a noticeable increase in the category "aligns with fanaticisms (religious, political, and others)" (30%). However, the predominant type remains "has false connections, contexts, or fabricated, contradictory, unsustainable content" (37%). On Instagram, the most common type is also "has

false connections, contexts, or fabricated contradictory, unsustainable content" (35%), followed by "suggests big news" (19%) and "simulates journalistic text or scientific dissemination" (19%). This contrast between the two platforms indicates that Facebook is becoming a space for more overt and almost caricatured climate disinformation, as it is strongly linked to fanaticism. In contrast, climate disinformation on Instagram aligns more closely with the "new denial" (Center for Countering Digital Hate, 2023).

4.3. Social Actors and User-Actor Profile

We examined the conditions under which discursive exchanges occur between communicators and their audiences, considering online platforms as spaces for production, circulation, and reception (Charaudeau, 2005/2010). In this third analytical step, we analysed the platform environment as a space for social practice, structured by the conditions of both the medium and our time. Specifically, we identified the profiles of social actors involved in the circulation of climate disinformation, drawing on the categorisation proposed by Magalhães et al. (2023). In addition to naming these actors, we considered their profiles based on follower or subscriber count, following the approach of Bitencourt et al. (n.d.), and classified them into seven categories: mega, macro, micro, nano A, nano B, domestic, and seasonal.

As a result, we found that "alternative media" (40%) — mainly micro and macro profiles (35%) — are the predominant social actors in climate disinformation on Facebook and Instagram. They are followed by "activists" (18%), primarily with micro profiles (35%); "religious/spiritual leaders" (17%), mostly with nano B and micro profiles (29%); and "traditional media" (14%), which are largely macro profiles (45%).

As "alternative media", there are curator profiles and news compilers that function as information hubs. However, in their circulation of content, they often introduce personal biases, selective viewpoints, misrepresentations of scientific data, and frameworks that fuel disinformation. These profiles rarely base their posts on original journalistic research or production despite frequently describing themselves as "journalistic". We thus identify the widespread dissemination of these channels as a significant factor in the disinformation dynamics affecting public discourse in Brazil, primarily because these profiles position themselves as news hubs, which can mislead their audiences.

When we focus solely on Facebook (see Figure 3), the percentage of "religious/spiritual leaders" (24%) and "activists" (22%) increases, yet "alternative media" (30%) still dominate as enunciators of disinformation content. The prominence of the religious element reappears, reinforcing both the "thematic axis" and the "typology of disinformation". On Instagram, "alternative media" (55%) dominate with a significantly higher percentage, followed by "traditional media" (19%) and "activists" (13%).

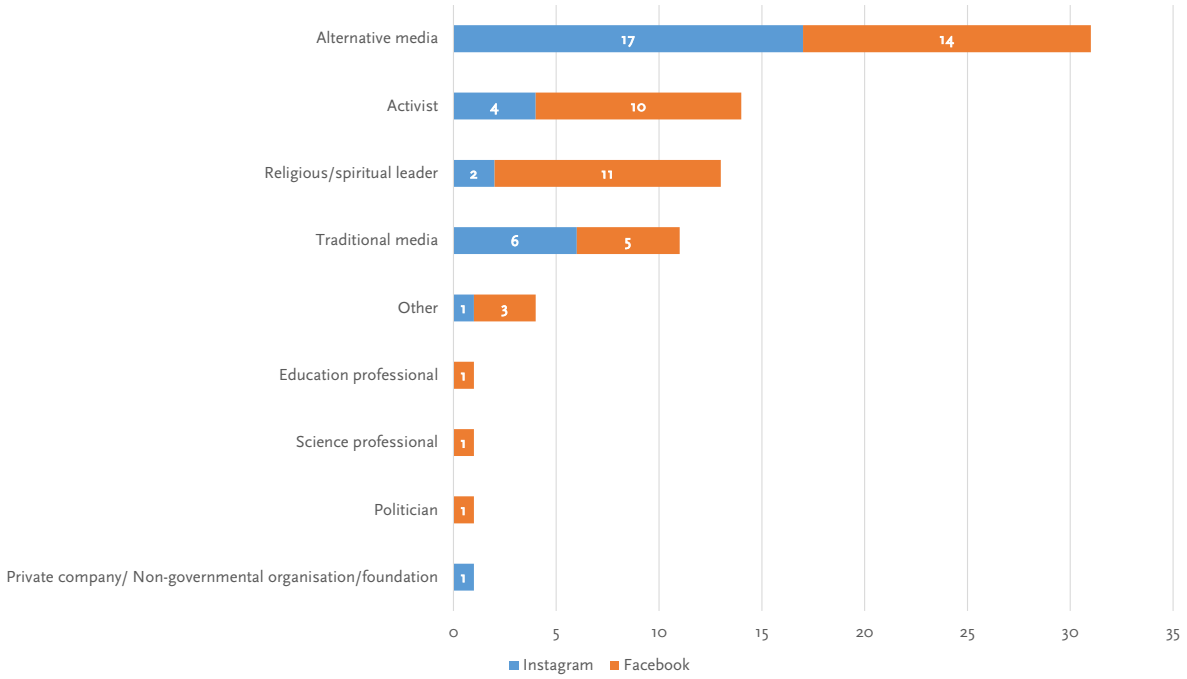

Figure 3. *Social actors on Facebook and Instagram posts (number of posts) — Brazil, 2023*

4.4. Expressive Form

We analysed the discursive behaviour of the actors responsible for publishing climate disinformation. To do so, we categorised the prevailing "expressive form" (Charaudeau, 2005/2010) in the content, a concept similar to the "tone of the video" category identified by Costa et al. (2023) in their study of COVID-19 vaccine information circulating on TikTok.

In the results (Figure 4), the expressive form that predominates on Instagram and Facebook is "catastrophic" (29%), which is almost always based on real facts used in a sensationalist way that directs the reader towards extremist behaviour. The "informative" expressive form (25%) ranks second, largely due to the prominent role of "alternative media" as social actors in the dissemination of climate disinformation. As previously analysed, these profiles ground their publications in the conventions of the informative genre, characterised by direct language, the use of data, and scientific arguments to frame the topic or issue. However, these elements are often employed in a decontextualised and sometimes misleading manner. In third place, the "emotional" expressive form (13%) emphasises beliefs and is closely linked to the theme "religious/spirituality" (70%), and the typology "aligns with fanaticism (religious, political and others)" (60%).

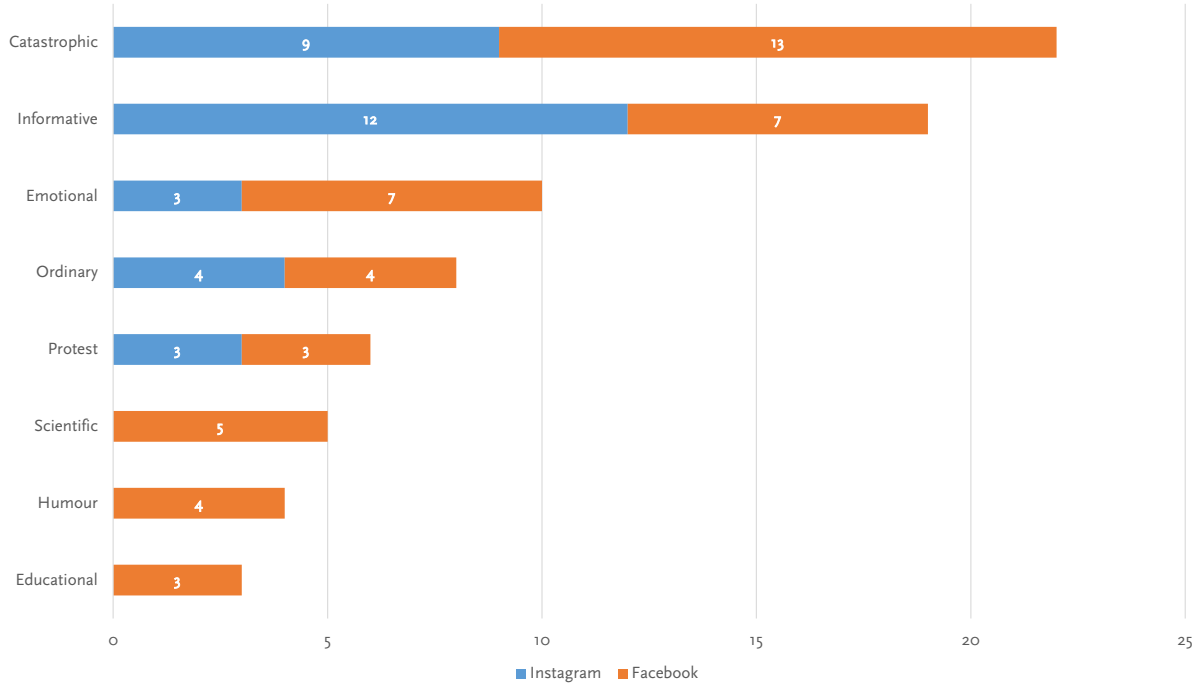

Figure 4. *Expressive form on Facebook and Instagram posts (number of posts) — Brazil, 2023*

When we focus solely on Facebook, the "catastrophic" expressive form is the most prevalent (28%), being almost twice as frequent as both "informative" (15%) and "emotional" (15%), which are tied for second place. On Instagram, the "informative" expressive form takes the lead (39%), followed by "catastrophic" (29%) and "ordinary" (13%). Table 4 presents examples of the most common expressive forms.

Expressive Form	Example
Catastrophic	"A study released by scientists from the University of Bristol in the United Kingdom asserts that the world will not be able to withstand climate change, with the planet experiencing extreme temperatures and violent natural phenomena that will make life on Earth impossible" — retrieved from https://www.facebook.com/groups/2490077421302304/permalink/3450464305263606 on October 28, 2024.
Informative	"The UN may encourage people to reduce their meat consumption, but will it have any effect? A livestock expert argues that Americans are unlikely to heed messages telling them to eat less meat, even if they come from the United Nations" — retrieved from https://www.facebook.com/groups/1737395983230724/permalink/3266427003660940 on October 29, 2024.
Emotional	"Take care of God's wonders. Discover some simple and sustainable actions. World Environment Day, celebrated in June, serves to remind and raise awareness about the importance of protecting nature. Climate change and environmental degradation are among the most pressing threats to humanity. If left ignored, the Earth as we know it may no longer exist in the future" — retrieved from https://www.instagram.com/p/CuAVF87JPNl/ on October 29, 2024.

Table 4. *Examples of publications*

For this category, we also cross-referenced data on the language and aesthetics of the publications. Notably, in posts with a "catastrophic" expressive form, the "exaggerated

to attract attention, with eye-catching writing and clickbait titles" format predominates (73%), often accompanied by images using "art/drawing, creation, montage" (55%). This choice of language aligns with the sensationalist tone, reinforcing extremist narratives. Our analysis reveals that these posts typically revolve around terms related to "end times, disintegration of the universe, cosmology, life on Earth, climate collapse, God" (50%). As previously discussed, the concept of demise is integral to what Cesarino (2022) refers to as the "temporality of permanent crisis", which merges with denialist rhetoric, driving the (hyper) dynamics of contingent content circulation on online platforms.

4.5. Other Data Cross-References

By cross-referencing the analysis of other categories, several interesting dynamics surrounding climate disinformation emerge. For instance, the majority of Instagram and Facebook posts that incorporate scientific arguments exhibit a "catastrophic" expressive form (45%), which is double the proportion of "informative" posts (24%), which ranks second (Figure 5).

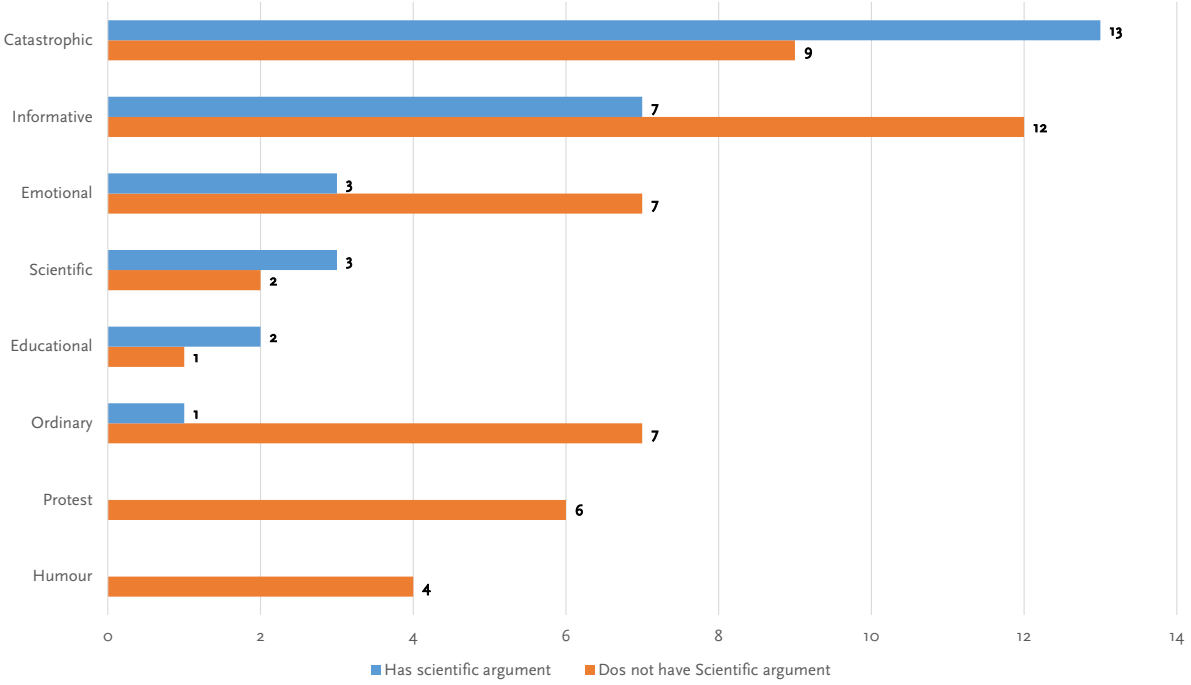

Figure 5. *Expressive form vs scientific argument (number of posts) — Brazil, 2023*

This suggests that scientific assumptions are being leveraged alongside apocalyptic rhetoric. Such practices have the potential to introduce epistemic uncertainties into scientific processes, ultimately undermining climate decision-making. By instilling fear in the population, these practices dangerously blur the lines between science and religion. This is further evidenced by the fact that the majority of Instagram and Facebook posts incorporating scientific arguments focus on the theme of "fear of climate change" (41%), more than double the proportion of posts on the "consequences of climate change" (17%; Figure 6).

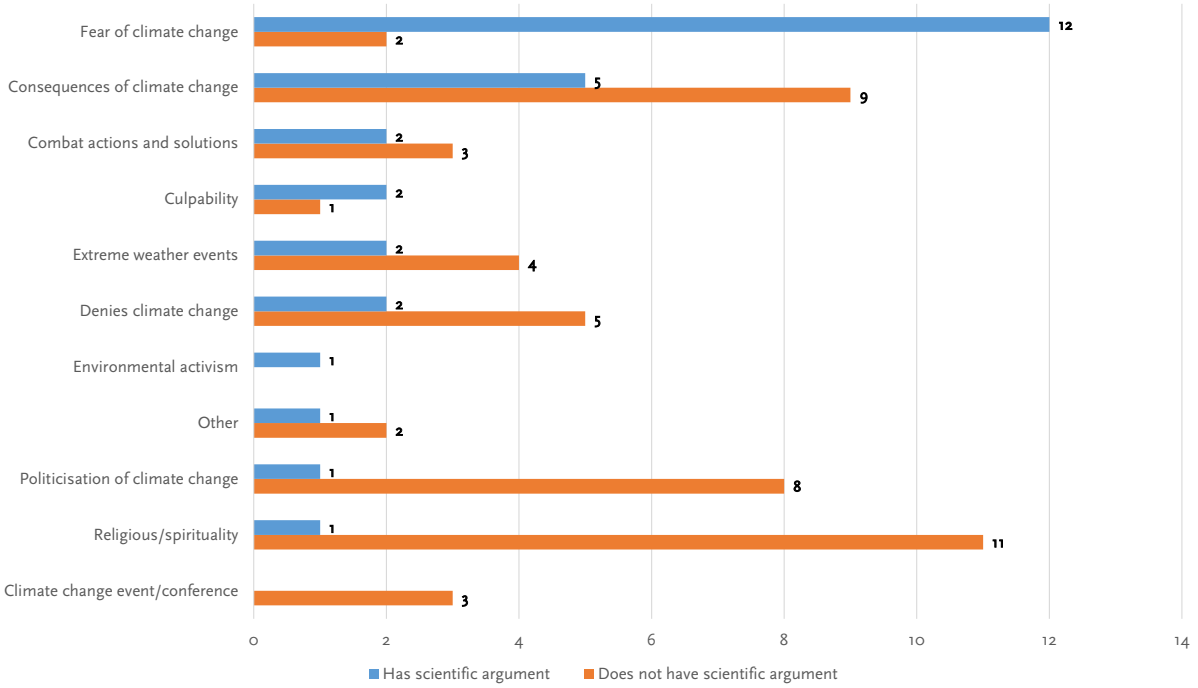

Figure 6. *Theme vs. scientific argument (number of posts) — Brazil, 2023*

Hence, the rhetoric of science is embedded in certain climate disinformation practices. The inclusion of scientific arguments can influence how Brazilian audiences understand and engage with climate issues, particularly when we observe the strong connection between climate phenomena and the skewed notion of the impending end of the world. For these reasons, we align with studies (Santini & Barros, 2022) that challenge the thesis of insufficient scientific communication as the root cause of climate denial. This is because rational arguments are often overridden by beliefs and values selectively incorporated into the climate discourse to sway public opinion.

5. Final Considerations

When we examined how climate disinformation is expressed on Facebook and Instagram, we found that Brazilian communicators and audiences engage in a public debate dominated by fear and a catastrophic tone, which accentuates the perceived seriousness of climate change. This is conveyed through posts laden with false contexts and driven by alternative media, which position themselves as news hubs, ultimately misleading their audiences. The data highlights the existence of climate disinformation ecosystems with unique Brazilian characteristics, steering public discourse towards a narrative focused on the impending end of humanity. This is particularly evident in the three dominant themes: "fear of climate change" (18%), "consequences of climate change" (18%), and "religious/spirituality" (16%). The analysis further reveals that Facebook has become a platform for more overt climate disinformation, often linked to fanaticism. In contrast, Instagram's climate disinformation is framed in a way that does not outright deny science.

All of this points to a discourse that erodes trust in climate science and contributes little to the discussion of solutions in Brazil. We observe that climate change denialists have evolved into strategists of controversy and falsehoods. Denial, in its traditional form, has lost its effectiveness, as seen in the limited mention of "climate change deniers" on Facebook (9%) and its complete absence on Instagram. Many of these controversies and falsehoods are rooted in framing climate change as part of a dark and apocalyptic future, stoking fear. The concerning factor is that these narratives are frequently built upon scientific rhetoric, as demonstrated by the fact that 41% of posts containing scientific arguments focus on the theme of "fear of climate change".

The limitations of our study lie in the focus on only two platforms (Instagram and Facebook), which, although widely used by Brazilians, do not represent the entirety of environments where climate disinformation is disseminated. Additionally, the challenge lies in the difficulty of analysing a more numerically representative *corpus*, as we aimed to code the data using more comprehensive and nuanced parameters.

Our contextual and localised approach to Brazilian specificities stands out. However, we have not lost sight of the fact that climate discourse is grounded in rhetorically contradictory environments, which highlight a global challenge: confronting mitigation regimes, whose actions will have economic and political implications that are incompatible with the lifestyles and consumption patterns of contemporary societies. This challenge is significantly fuelled by climate disinformation circulating on online platforms, particularly the misrepresentation of scientific data, which in turn impacts public debate on the environment.

The analysis of climate disinformation in Brazil suggests that numerous particularities are rooted in cultural factors and the rise of anti-structural groups, such as the "new denialists'. Therefore, there is a pressing need for studies in other regions that take into account cultural intersections, offering an increasingly regionalised and localised perspective within the field of disinformation research.

Translation: Anabela Delgado

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References

Alzamora, G., Mendes, C., & Ribeiro, D. M. (Eds.). (2022). *Sociedade da desinformação e infodemia*. Fafich; Selo PPGCOM; UFMG.

Baghdadi, J. D., Coffey, K. C., Belcher, R., Frisbie, J., Hassan, N., Sim, D., & Malik, R. D. (2023). #Coronavirus on TikTok: User engagement with misinformation as a potential threat to public health behavior. *JAMIA Open*, *6*(1), 1–5. https://doi.org/10.1093/jamiaopen/ooad013

Barros, C., Silva, D., Loureiro, M., Medeiros, P., Salles, D., & Santini, M. (2024). Negacionismo climático no YouTube: Como argumentos de falsos especialistas repercutem nos comentários da audiência. *Anais do 33° Encontro Anual da COMPÓS*, *33*, 1–28.

Bellamy, J. (2020, December 18). *Climate change disinformation and polarization in Canadian society*. North American and Arctic Defence and Security Network. https://www.naadsn.ca/wp-content/uploads/2020/12/20-dec-Bellamy-Disinformation.pdf

Bennett, W. L., & Livingston, S. (2018). The disinformation order: Disruptive communication and the decline of democratic institutions. *European Journal of Communication*, *33*(2), 122–139. https://doi.org/10.1177/0267323118760317

Bitencourt, E., dos Santos, J. G. B., Hansen, A. S., Papaevangelou, C., Foa, C., & Junqueira, L. (n.d.). *Gramming# covid19, reframing the pandemic*. Retrieved October 12, 2024, from https://metodosdigitais.fcsh.unl.pt/?page_id=2208

Center for Countering Digital Hate. (2023). *The new climate denial: How social media platforms and content producers profit by spreading news forms of climate denial*. https://counterhate.com/wp-content/uploads/2024/01/CCDH-The-New-Climate-Denial_FINAL.pdf

Cesarino, L. (2022). *O mundo do avesso: Verdade e política na era digital*. Ubu Editora.

Charaudeau, P. (2010). *Discurso das mídias* (A. M. S. Corrêa, Trans.). Contexto. (Original work published 2005)

Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders*, *74*, 1–7. https://doi.org/10.1016/j.janxdis.2020.102263

Climate Action Against Disinformation. (2023a). *COP, look, listen: Spotlight 1 – The growing threat to climate activists*. https://caad.info/wp-content/uploads/2023/12/COP-Look-Listen-Spotlight-1.pdf

Climate Action Against Disinformation. (2023b, September 25). *Climate mis-/disinformation backgrounder*. https://caad.info/analysis/briefings/climate-mis-disinformation-backgrounder/

Coffey, Y., Bhullar, N., Durkin, J., Islam, M. S., & Usher, K. (2021). Understanding eco-anxiety: A systematic scoping review of current literature and identified knowledge gaps. *The Journal of Climate Change and Health*, *3*, 1–6. https://doi.org/10.1016/j.joclim.2021.100047

Cook, J. (2020a). Deconstructing climate science denial. In D. Holmes & L. M. Richardson (Eds.), *Research handbook on communicating climate change* (pp. 62–78). Edward Elgar Publishing.

Cook, J. (2020b, March 31). *A history of FLICC: The 5 techniques of science denial*. Skeptical Science. https://skepticalscience.com/history-flicc-5-techniques-science-denial.html

Costa, B. B. P., Maia, L. R. H., Santos Júnior, M. A., Oliveira, T., & Massarani, L. (2023). As vacinas contra a Covid-19 no TikTok no Brasil. *Cuadernos.info*, (56), 117–142. https://doi.org/10.7764/cdi.55.63663

Costa, L. M., Nóbrega, L. B., & Maia, C. T. (2021). Combate à desinformação na pandemia da Covid-19: A reação das plataformas digitais. *Revista Eletrônica Internacional de Economia Política da Informação, da Comunicação e da Cultura*, *23*(1), 162–177.

Cruz, L. T. S. (2023). *Plataformização do texto: Reconfiguração de práticas de escrita e edição a partir de mediações algorítmicas do Google* [Doctoral dissertation, Centro Federal de Educação Tecnológica de Minas Gerais].

d'Andréa, C. F. B. (2020). *Pesquisando plataformas online: Conceitos e métodos*. EDUFBA.

ECI UFMG. (2022, May 12). *O papel dos algoritmos e das plataformas digitais em contextos sociopolíticos* [Video]. YouTube. https://www.youtube.com/watch?v=nzRdD6XiGA4

Fagundes, V. O., Massarani, L., Castelfranchi, Y., Mendes, I. M., Carvalho, V. B. D., Malcher, M. A., & Lopes, S. C. (2021). Jovens e sua percepção sobre fake news na ciência. *Boletim do Museu Paraense Emílio Goeldi. Ciências Humanas*, *16*(1), e20200027. https://doi.org/10.1590/2178-2547-BGOELDI-2020-0027

Gillespie, T. (2018). A relevância dos algoritmos. *Parágrafo*, *6*(1), 95–121.

Global Religion. (2023). *Religious beliefs across the world*. Ipsos. https://www.ipsos.com/sites/default/files/ct/news/documents/2023-05/Ipsos%20Global%20Advisor%20-%20Religion%202023%20Report%20-%2026%20countries.pdf

Hassan, I., Musa, R. M., Latiff Azmi, M. N., Razali Abdullah, M., & Yusoff, S. Z. (2024). Analysis of climate change disinformation across types, agents and media platforms. *Information Development*, *40*(3), 504–516. https://doi.org/10.1177/02666669221148693

Hoofnagle, M. (2007, April 30). *Hello scienceblogs*. ScienceBlogs. https://scienceblogs.com/denialism/2007/04/30/hello-to-scienceblogs

Índio do Tapajós. (2023, March 13). *Bem... Nem todo mundo é perfeito... Siga-me !!!!* [Post]. Facebook. https://www.facebook.com/100064147808741/posts/586868763461379

Klein, E. J., & Klein, G. V. (2021). A circulação do discurso especializado como parte dos fluxos de desinformação sobre a COVID-19 no WhatsApp. *Matraga - Revista do Programa de Pós-Graduação em Letras da UERJ*, 28(53), 282–297. https://doi.org/10.12957/matraga.2021.56313

Laboratório de Estudos de Internet e Redes Sociais. (2024). *Ecossistema da desinformação socioambiental no Brasil*. https://netlab.eco.ufrj.br/post/ecossistema-de-desinforma%C3%A7%C3%A3o-socioambiental-no-brasil

Latour, B. (2020). Is this a dress rehearsal? *Critical Inquiry*, *47*(S2), S25–S27. https://doi.org/10.1086/711428

Lazer, D. M., Baum, M. A., Benkler, Y., Berinsky, A. J., Greenhill, K. M., Menczer, F., & Zittrain, J. L. (2018). The science of fake news. *Science*, *359*(6380), 1094–1096. https://doi.org/10.1126/science.aao2998

Lewandowsky, S. (2021). Liberty and the pursuit of science denial. *Current Opinion in Behavioral Sciences*, *42*, 65–69. https://doi.org/10.1016/j.cobeha.2021.02.024

Lewandowsky, S., Cook, J., Ecker, U., Albarracín, D., Kendeou, P., Newman, E., Pennycook, G., Porter, E., Rand, D., Rapp, D., Reifler, J., Roozenbeek, J., Schmid, P., Seifert, C., Sinatra, G., Swire-Thompson, B., van der Linden, S., Wood, T. J., & Zaragoza, M. S. (2020). *The debunking handbook 2020*. Center for Climate Change Communication. https://doi.org/10.17910/b7.1182

Lima, V. M. A., Santos, C. A. C. M., & Vogel, M. J. M. (2013). A teoria do campo semântico no desenvolvimento de vocabulários estruturados para a web semântica. In *I Congresso ISKO Espanha e Portugal* (pp. 313–329). CETAC.MEDIA.

Magalhães, E., Alves, M., Oliveira, V., Oliveira, T., & Massarani, L. (2023). Esfera pública digital e atores sociais que pautaram as discussões sobre vacinas no Instagram e Facebook no Brasil durante a pandemia de COVID-19 (2020-2021). *Observatório (OBS*)*, *17*(3), 194–216. https://doi.org/10.15847/obsOBS17320232262

Mancoso, K., Paes, A., de Oliveira, T., & Massarani, L. (2023). Pesquisa em desinformação e divulgação científica: Uma revisão da literatura latino-americana. *Journal of Science Communication*, *6*(01), 1–22. https://doi.org/10.22323/3.06010201

Massarani, L., Leal, T., & Waltz, I. (2020). O debate sobre vacinas em redes sociais: uma análise exploratória dos links com maior engajamento. *Cadernos de Saúde Pública*, *36*(Suppl 2), e00148319. https://doi.org/10.1590/0102-311X00148319

Massarani, L. M., Leal, T., Waltz, I., & Medeiros, A. (2021). Infodemia, desinformação e vacinas: A circulação de conteúdos em redes sociais antes e depois da COVID-19. *Liinc em Revista*, *17*(1), e5689. https://doi.org/10.18617/liinc.v17i1.5689

Medeiros, P., Salles, D., Magalhães, T., Melo, B., & Santini, R. M. (2024). Greenwashing e desinformação: A publicidade tóxica do agronegócio brasileiro nas redes. *Comunicação e Sociedade*, *45*, e024008. https://doi.org/10.17231/comsoc.45(2024).5417

Ministério da Ciência, Tecnologia e Inovação. (2024, March 5). *El Niño 23-24 é um dos cinco mais fortes já registrados, diz Organização Meteorológica Mundial*. https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/noticias/2024/03/el-nino-23-24-e-um-dos-cinco-mais-fortes-ja-registrados-diz-organizacao-meteorologica-mundial

Molina, R. G. (2021). ¿Quién cree las fake news? Análisis de la relación entre consumo de medios y la percepción de veracidad de noticias falsas sobre la enfermedad COVID-19 en Nuevo León, México. *AdComunica*, (21), 265–285. https://doi.org/10.6035/2174-0992.2021.21.13

Munger, K., Luca, M., Nagler, J., & Tucker, J. (2018). *The effect of clickbait*. Center for the Study of Democratic Politics. https://csdp.princeton.edu/sites/g/files/toruqf2376/files/media/munger_clickbait_10182018.pdf

Nel Patriota. (2023, July 17). *BEM QUE ESSA BISCA, PODERIA COMEÇAR POR ELA MESMA. Teoria da conspiração, neh? Em discurso durante evento na noite da* [Post]. Facebook. https://www.facebook.com/groups/230418592223279/permalink/735412951723838

Neuendorf, K. A. (2018). Content analysis and thematic analysis. In P. Brough (Ed.), *Advanced research methods for applied psychology* (pp. 211–223). Routledge.

Newman, N., Fletcher, R., Robertson, C., Arguedas, A., & Nielsen, R. (2024). *Reuters Institute digital news report 2024*. Reuters Institute; University of Oxford. https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2024-06/RISJ_DNR_2024_Digital_v10%20lr.pdf

Nguyen, A., & Catalan, D. (2020). Digital mis/disinformation and public engagment with health and science controversies: Fresh perspectives from Covid-19. *Media and Communication*, *8*(2), 323–328. https://doi.org/10.17645/mac.v8i2.3352

Oliveira, T. M. de. (2020). Como enfrentar a desinformação científica? Desafios sociais, políticos e jurídicos intensificados no contexto da pandemia. *Liinc em Revista*, *16*(2), e5374. https://doi.org/10.18617/liinc.v16i2.5374

Pesadelo do Sistema. (2023, March 10). *O verdadeiro aquecimento global!* [Post]. Facebook. https://www.facebook.com/100064174563179/posts/586501663498981

Purpose for Roots, Friends of the Earth, & Climate Action Against Disinformation. (2023). *Misinforming Latin America: Narrative analysis of extreme weather in Brazil, Chile, and Peru*. https://caad.info/wp-content/uploads/2023/11/Report_Misinforming-Latin-America.pdf

Recuero, R., Soares, F., & Zago, G. (2020). Polarização, hiperpartidarismo e câmaras de eco: Como circula a desinformação sobre COVID-19 no Twitter. *Revista Contracampo*, *40*(1), 1–17. http://doi.org/10.22409/contracampo.v40i1.45611

Santini, R. M., & Barros, C. E. (2022). Negacionismo climático e desinformação online: Uma revisão de escopo. *Liinc em Revista*, *18*(1), e5948. https://doi.org/10.18617/liinc.v18i1.5948

Santos, M. L. R., Paim, M. C., Soares, C. L. M., Santos, D. M., Sande, R. S., & Santos, G. R. M. (2021). Ações governamentais para enfrentamento da crise de desinformação durante a pandemia da Covid-19. *Saúde Debate*, *45*(spe2), 187–204. https://doi.org/10.1590/0103-11042021E213

Scheufele, D. A., & Krause, N. M. (2019). Science audiences, misinformation, and fake news. *Proceedings of the National Academy of Sciences*, *116*(16), 7662–7669. https://doi.org/10.1073/pnas.1805871115

Silva, D. R. (2017). *Relações públicas, ciência e opinião: Lógicas de influência na produção de (in)certezas* [Doctoral dissertation, Universidade Federal de Minas Gerais]. Repositório Institucional da UFMG. http://hdl.handle.net/1843/BUOS-B8YFTP

Sousa, V., Capoano, E., Costa, P. R., & Paganotti, I. (2022). Did Covid-19 infect the news? How journalists, audiences and production processes have changed due to the pandemic. *Universitas*, (37), 19–40. https://doi.org/10.17163/uni.n37.2022.01

Tandoc, Jr, E. C., Lim, Z. W., & Ling, R. (2017). Defining "fake news". A typology of scholarly definitions. *Digital Journalism*, *6*(2), 137–153. https://doi.org/10.1080/21670811.2017.1360143

Thapa Magar, N., Thapa, B. J., & Li, Y. (2024). Climate change misinformation in the United States: An actor–network analysis. *Journalism and Media*, 5(2), 595–613. https://doi.org/10.3390/journalmedia5020040

Venneti, L., & Alam, A. (2017, July). *Clickbaits: Curious hypertexts for news narratives in the digital medium* [Conference presentation]. NHT17, Prague, Czechia. https://ceur-ws.org/Vol-1914/NHT17-1.pdf

Vick, M. (2024, October 22). *'Negacionismo soft pode ser mais perigoso que o histérico'*. Nexo. https://www.nexojornal.com.br/entrevista/2024/10/22/publicidade-petroleo-atila-shell-entrevista-alexandre-costa

Voşki, A., Wong-Parodi, G., & Ardoin, N. M. (2023). A new planetary affective science framework for eco-emotions: Findings on eco-anger, eco-grief, and eco-anxiety. *Global Environmental Psychology*, *1*, 1–31. https://doi.org/10.5964/gep.11465

Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. *Science*, *359*(6380), 1146–1151. https://doi.org/10.1126/science.aap9559

Wardle, C., & Derakhshan, H. (2017). *Information disorder: Toward an interdisciplinary framework for research and policy making*. Council of Europe. https://tverezo.info/wp-content/uploads/2017/11/PREMS-162317-GBR-2018-Report-desinformation-A4-BAT.pdf

Biographical Notes

Luana Cruz holds a PhD in Language Studies from the Federal Center for Technological Education of Minas Gerais. She is a researcher at the National Institute of Science and Technology for Public Communication of Science and Technology and a

lecturer on postgraduate courses in Advertising Creation and Audiovisual Production, Digital Journalism Production, Strategic Communication in Organisations, and High-Performance Strategies in Digital Communication at the Pontifical Catholic University of Minas Gerais. Additionally, she is a journalist for the *Projeto Ilíada* within the National Education and Research Network.

ORCID: https://orcid.org/0000-0003-2169-3048

Email: luanatsc@gmail.com

Address: Instituto Nacional de Comunicação Pública da Ciência e da Tecnologia, Belo Horizonte, Brasil

Vanessa Fagundes holds a PhD in Sociology from the Federal University of Minas Gerais. She is a researcher at the National Institute of Science and Technology for Public Communication of Science and Technology and a lecturer on the postgraduate course in Public Communication of Science (Amerek) at the Federal University of Minas Gerais. Additionally, she serves as the coordinator of the Communications Office at the Research Support Foundation of the State of Minas Gerais.

ORCID: https://orcid.org/0000-0002-8018-8490

Email: vafagundes2@gmail.com

Address: Instituto Nacional de Comunicação Pública da Ciência e da Tecnologia, Belo Horizonte, Brasil

Luisa Massarani holds a PhD in Management, Education, and Dissemination in Biosciences from the Federal University of Rio de Janeiro. She is the coordinator of the National Institute of Science and Technology for Public Communication of Science and Technology and a researcher at the Casa de Oswaldo Cruz, Oswaldo Cruz Foundation. She holds a PQ-1B productivity in research grant from the National Council for Scientific and Technological Development and a Scientist of Our State grant from the Carlos Chagas Filho Foundation for Research Support of the State of Rio de Janeiro.

ORCID: https://orcid.org/0000-0002-5710-7242

Email: luisa.massarani@fiocruz.br

Address: Casa de Oswaldo Cruz, Fundação Oswaldo Cruz, Rio de Janeiro, Brasil

Thaiane Oliveira holds a PhD in Communication from Fluminense Federal University. She is the coordinator of the Laboratory for Research in Science, Innovation, Technology, and Education and a researcher at the National Institute of Science and Technology (INCT) for Public Communication of Science and Technology, the INCT in Informational Disputes and Sovereignties, and the INCT in Conflict Management. She is also a researcher at the Unesco Chair Language Policies for Multilingualism and the National Science for Education Network and a member of the Brazilian Academy of Sciences. She is a recipient of a PQ-2 productivity in research grant from the National Council for Scientific and Technological Development and a Young Scientist of Our State grant from the Carlos Chagas Filho Foundation for Research Support of the State of Rio de Janeiro.

ORCID: https://orcid.org/0000-0002-8588-3548
Email: thaianeoliveira@id.uff.br
Address: Universidade Federal Fluminense, Niteroi, Brasil

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