

IBERIFIER — Iberian Digital Media Observatory

Disinformation on social networks in Spanish and Portuguese Iberian digital media ecosystem

Report

Deliverable — D3.1



Co-funded by
the European Union

Iberifier – Iberian Digital Media Observatory has received funding from the European Commission under the Call DIGITAL-2023-DEPLOY-04, European Digital Media observatory (EDMO) — National and multinational hubs, with the reference IBERIFIER Plus - 101158511

Programme: Digital Europe Programme (DIGITAL)
Call: Accelerating the best use of technologies (DIGITAL-2023-DEPLOY-04)
Work program topic: European Digital Media observatory (EDMO) — National and multinational hubs
Grant Agreement: IBERIFIER Plus - 101158511
Project coordinator: Ramón Salaverría (University of Navarra)
Term: May 1, 2024 – Oct 31, 2026 (30 months)
Report submission date: October 31, 2025
Dissemination level: Public
Task 3.1: Technological surveillance of disinformation in social networks and Iberian digital news media
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Cite this Report as:

Huertas-Tato, J., Panizo-Lledot, Á., Camacho, D., Carolina, B., Philippe, O., Devlin, S., Rosas, C., Gómez Romero, J., Molina Solana, M., Vranič, A., Almeida, P., Gonçalves-Sá, J., Salaverría, R., & Sánchez-Hualde, A. (2025). *Disinformation on social networks in Spanish and Portuguese Iberian digital media ecosystem*. IBERIFIER. <https://doi.org/10.5281/zenodo.17476121>

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1. Introduction

The aim of this technical report is twofold and hybrid: Discovery and analysis of *misinformation spread patterns* in Online Social Networks (OSNs), and development of *technologies able to track* this aforementioned phenomenon. Practical applications of developed tools will help report on misinformation spread. We show both dimensions of this: results and methods.

Our object of study comprises three different topics: *Covid-19*, *Climate change*, and *Gender issues*. Each explores a different area of interest for European action. Covid-19, though dated, is a plentiful source of *medical* misinformation, readily available. Climate change is a pressing issue, as global average temperature rises, popular consensus on this topic becomes critical and the ability to quickly identify narratives and stances becomes extremely relevant. to be able to quickly identify Understanding the misinformation spread might offer insights on how to stop it and properly educate about a critical topic. Finally, Gender-related disinformation is applied to spread a hate-speech message too; understanding the spread might offer insight on hate-speech dissemination patterns by proxy.

1.1. Context

Misinformation came into the spotlight during the Covid-19 pandemic and has been present in public discourse ever-since. However, misinformation is not a new phenomenon, for example the misplaced assumption of ‘vaccine side effects’ dates back to Andrew Wakefield’s 1998 article about the MMR vaccine. This pseudoscientific publication misled a large portion of the population to erringly believe there is a causality relation between vaccines and autism, a fact that is still relevant as it is continuously reinforced in the fear-speech recently seen in the U.S.. Other scientific facts, like climate change, are called into question. By 2019 there has been observed a *100% agreement* of the scientific community on anthropogenic climate change (Powell 2017), which makes anthropogenic climate change denial especially jarring. Even more outlandish claims are made and become widespread, ranging from harmless crackpot theories like flat earth conspiracies, to actual national security threats like the Q-Anon conspiracy.

How can these *evidently wrong* facts become so popular? Online Social Networks play a pivotal role in the distribution of *any* kind of information. This includes both: the *harmful* and *harmless*. While earlier forms of misinformation had to travel physically through paper print or on a mouth-to-mouth basis, nowadays we can distribute messages globally (and *massively*) without barely any effort. There is a relevant keyword here: ‘Distribution’: as information travels and spreads, it leaves a trail of messages that can hypothetically be traced down. These trails form a network that shows exactly *how* accounts work together to distribute misinformation through a social media platform.

However, tracking this trail is challenging. Information often moves beyond social media e.g. through traditional media outlets, non-network digital media or word of mouth, transference is done through non-structured means. For example, imagine you



see a post on Twitter/X, then write about it without ever interacting with the earlier post. How do we track this information? Is it even possible?

In addition, the internet is progressively becoming a network of ‘walled gardens’¹ which makes tracking misinformation between social media platforms even harder. In addition, social media platforms are slowly turning into ‘crippleware’². Most platforms do not provide the kind of public access needed to analyze content in sufficient detail to track misinformation while those that allow access often impose paywalls beyond the reach of many academic institutions. While initiatives like the Digital Services Act (DSA, detailed in **Annex 1**) may help address this challenge in the future, *for now* we must rely on workarounds to uncover how interactions on social media actually unfolds.

Ironically, now, more than ever, it has become a pressing issue to understand the dynamics of misinformation spread. While technological works frequently focus on misinformation at a content level (like discerning whether something is misinformation or not), the actual dynamics of spread have been disregarded alongside with the nature of the spread information, i.e. by accepting or refusing certain news or content.

Properly studying and understanding social network misinformation spread dynamics is core to *national security*, *media literacy* and more crucial challenges Europe has to face in this latest decade. As technological institutions, our approach is eminently technical, making use of existing cutting edge techniques, as well as newly developed algorithms to help us characterize the dissemination of misinformation online. We have technological challenges to overcome in order to properly analyse this phenomena from a data science perspective.

1.2. Tech challenges

To conduct this report we needed to overcome existing limitations in the state of the art. We have briefly hinted at the nature of these issues beforehand. To summarize, two main technical challenges have been found: a) Datasets of user-generated content are now exceedingly scarce within the current OSN ecosystem. b) There is a lack of metadata-rich datasets that enable straightforward tracking of information as it spreads across a social media platform.

There is some overlap between both challenges. For example, the scarcity of data means that metadata-rich datasets are harder to come by. However, we treat them as two separate phenomena that we find solutions for independently.

Challenge 1: Data scarcity. As more companies lock their data behind unreasonable paywalls (even for researchers) data has become scarce. During development of this report we pondered on several alternatives. Twitter/X has steep prices for the amounts

¹ A “walled garden” is a common tech term, it denotes that users cannot access the data of a given service.

² “Crippleware” refers to software that has been deliberately downgraded, excluding vital functionality, until the user pays for it. Twitter/X access to data to researchers has been subject to this phenomenon, for example.



of data needed. Meta is strictly inaccessible, being very protective of their data. Youtube deals mostly with video, which is considerably harder to trace, on top of having steep daily limits for free users. Same goes with TikTok; on top of the technical difficulty, it also offers an opaque endpoint (a specific web address where apps request and exchange information or services) that's hard to freely work with. Reddit followed in the footsteps of Twitter/X and restricted access to their data too. So far, we have mentioned some of the major platforms found online, discarding them one by one. To operate with data we need to freely access the message-content data, or have a functional endpoint to a well-maintained search engine; neither of these platforms offer these strictly necessary functionalities at a reasonable price. Therefore, the largest platforms have to be discarded immediately. Other, smaller platforms do comply with our pre-requisites for the analysis, however, they lack something crucial to our report: Portuguese or Spanish communities. The lack of hispanic or lusophonic speakers in platforms such as Bluesky or Mastodon make them ineligible to study our target languages.

Solution 1: Telegram. Telegram is a glaring omission from the challenge description. It is the only network that allows for widespread data acquisition. It works like Whatsapp (another Meta product) but has an available public endpoint that lets us connect directly to the chats and gather the necessary information for disinformation tracking purposes. We crawl the network from some seed channels, recovering as many messages as possible. This network links to the next channel³. As interactions between messages are not explicit, they require to be discovered in some way. Overall, Telegram stands as the best alternative to study misinformation spread.

However, this platform presents another challenge: Telegram does not produce metadata that enables straightforward tracking of messages across the network. Unlike other platforms, such as X (formerly Twitter), where propagation can be easily studied, Telegram provides far less information.

Challenge 2: Metadata-rich data. In order to study propagation dynamics across social media, it is necessary to have links that relate pieces of information. For example, X/Twitter has resposts, quotations and responses, which lead to self-evident relationships as users explicitly interact with content. These metadata act as edges for social graphs, in other words, as the relation two pieces of information share. We can, then, travel from message to message following the trace of interactions users left. X/Twitter was the ideal platform to study this kind of dynamics as these relationships were extremely abundant and easy to obtain. Thus, when we study social media propagation dynamics, we need a way to find links between informational pieces. These have been traditionally found via metadata generated from explicit interactions in the platform, without the need to infer any kind of link. Metadata-rich data that allows tracking a piece of information in a straightforward way have been a cornerstone of this field of study. While this is still possible using legacy databases (old data downloaded before the lockdown) we are no longer able to study propagation on more modern trends. Walled garden policies have rendered many techniques unfeasible for research centers.

³ The algorithm is detailed in section 6.1.



Solution 2: Link inference. Our proposal, used in this report, begins by understanding the following: even in databases with annotated relationships, information propagates in spurious ways. For example, following the old X/Twitter approach, any user could read another tweet and plagiarize its contents. This relationship would have never been taken into consideration, as per the database, it was nonexistent. In some particular scenarios, information is propagated through offline means like word of mouth, along with offsite means like chat conversations. Understanding that propagation can happen within non-explicit channels, allows us to try and infer these relationships.

Recent advances in Natural Language Processing have allowed the academic community to analyse text via similarity. This core idea that two pieces of similar content share a high score, can be applied in cases like the aforementioned plagiarism scenario among others. Similarity-based relationships, in our experience, have been partially ineffective when plainly applied, requiring several adjustment steps to represent high-quality information cascades.

Therefore, the proposed solution to the omission of relationship data is finding similarity-informed relationships. Our report and study rely on these similarity-based techniques.

Challenge 3: Integrative Analysis. As mentioned, Twitter/X has made academic access very costly. However, given its still significant use and historical data, it is still a relevant platform. Moreover, there has been little cross-national analysis, leveraging multi-lingual platforms.

Solution 3: Comparison Across Platforms. As a source of misinformation claims, we used the GlobalClaims⁴ dataset (Vranić et al.). This collection of multi-country, multi-lingual fact-checked claims provides the veracity classification, thematic classification across 22 subtopics, and original URL, facilitating social media analysis.

1.3. Objectives

Within this report we aim to fulfill several objectives. The main objective stemming every other point is the following: Analyze social media propagation in the hispanic/lusophonic ecosystem.

Objective 1 → *Overcome technical challenges to study propagation without explicit interaction data.* This high-level objective represents the *technological* part of the report, comprising all the techniques necessary to achieve a high quality study.

Objective 1.1 → *Obtain large amounts of data from Telegram.* After initial screenings, Telegram lacks a proper interface to access all information at once, the only solution is the mass access and storage of messages in local repositories.

Objective 1.2 → *Algorithmic recovery of common hoaxes in the wild.* Using all information available, recover hoaxes to be studied under the selected topics. These

⁴ <https://doi.org/10.1145/3746275.3762201>

are: Covid-19, Climate change, Gender-related. Available databases contain several usable hoaxes, such as the IBERIFIER Plus database.

Objective 1.3 → *Develop a semantic-informed linking algorithm.* One of the keystones of this report is the novelty of the approach. This means developing novel techniques from scratch, as well as adapting existing techniques for this analysis.

Objective 2 → *Topic analysis of target domains.* Evaluating every subject of disinformation is unfeasible, our report is constrained to a subset of target topics that require some rationale. Sub-objectives represent each target domain. We have opted to spread our analysis across several domains, including sample topics that may help understand several patterns. We focus on misinformation hotbeds, topics where misinformation has proven to be extremely virulent.

Objective 2.1 → *Explore mass messages based on topic.* Offering a visualization of the topic helps contextualize further results. A study can be conducted on messages to view the separation of discourse by thematic/narrative influence.

Objective 2.2 → *Analyze misinformation propagation in health issues.* The chosen topic for this task is observing Covid-19 disinformation. The global pandemic is an old topic by now, however it is very convenient. 1) It helps us validate our analysis by comparing it to previous topics. 2) There is still panic about vaccines and other Covid-adjacent issues ongoing. 3) Data on Covid-19 is plentiful and well-known, therefore it's a perfect control-case.

Objective 2.3 → *Analyze misinformation propagation in environmental issues.* For this objective we will use Climate Change. Unlike Covid-19, it has not been some time-localized event, instead it has been ongoing for several decades. There is a pressing need for environmental action, and the continued misinformation has been a rock in the way since its discovery; thus the choice.

Objective 2.4 → *Analyze misinformation propagation in social issues.* Finally, we observe gender-related issues, LGBTQI+ social issues. Again, acceptance of non-normative collectives has been a perennial societal challenge. In this regard, education is a key component of combating societal inequality and misinformation is one of their biggest threats. Therefore, understanding the dynamics of misinformation woven with hate speech is fundamental for development.

Objective 3 → *Apply developed techniques to practical chosen domains.* This is fairly straightforward. Using the results from Objectives 1 and 2 we expect to properly analyze misinformation propagation.

Objective 3.1 → *Examine misinformation cascades on chosen hoaxes.* Using the linking algorithm, we can obtain cascades that can be observed and analyzed. The result of this objective is a practical examination on how misinformation is spread.

Objective 3.2 → *Examine misinformation actors and influence over cascades.* Given several cascades, it is possible to examine details like: who influences who? Which

channel acts as an authority on a given topic? Is influence evenly distributed?. These questions can be explored in full using the provided cascades and checking the targeted misinformation channels (forums of discussion).

Objective 3.3 → *Examine actors and stances over disinformation narratives.* Cross OSNs retrieving data from multiple sources to detect who supports who. Is this revealing of actors intentions? How does stance evolve over time?

Objective 4 → *Offer a comparison of fact-checked claims across platforms*

Objective 4.1 → *Extract large amounts of data from Twitter/X.* Take advantage of an existing large and curated dataset of fact checked claims. Focus on claims in Spanish and Portuguese, on Covid19 and environmental issues. Identify which of those claims circulated on Twitter/X.

Objective 4.2 → *Analyze temporal dynamics of false information spread.* From the identified claims, create sharing cascades and cascade distributions and describe the hoax frequency over time.

Objective 4.3 → *Compare frequency and topics across platforms and countries.* Identify common hoaxes between Twitter/X and Telegram, in Portugal, Spain, Latin America and Brazil, using automatic similarity methods (including fuzzy matching).

Overall, this develops our objectives, which we will fulfill across the document.

2. Topic analysis for visualization

In this section we will analyse the hoaxes identified on Telegram, produced by each search, as well as the found affected channels. Each topic is analyzed within their own subsection.

2.1 Covid-19 hoaxes and actors

We present the hoaxes found in Table 1, while associated channels are in Table 2. Keep in mind our algorithms are language-agnostic. Inputs can detect cascades in any language.

Table 1. Covid-19 Hoaxes. In Spanish

N	Hoax
1	Antes era la pandemia, ahora la guerra: los desinformadores se transforman con el conflicto de Ucrania
2	Bill Gates no ha admitido en este vídeo que la vacunación fue un "terrible error"
3	Bill Gates no ha dicho que va a inyectar vacunas anticovid-19 al ganado
4	Cuidado con el vídeo sobre el positivo en COVID-19 de la reina Isabel II que incluye una imagen de la ivermectina: no hay pruebas de que lo esté tomando y la cadena que lo emitió asegura que fue un error
5	Cuidado con los vídeos de hombres que dicen haber hecho el cambio de sexo registral "de un día para otro" para "beneficiarse" de la ley trans
6	El Parlamento español no suprimió el uso de mascarillas en interiores
7	El vídeo de Anthony Fauci sobre el no uso de mascarillas: está recortado y en realidad dice que se equivocó al no recomendarlas al inicio de la pandemia con lo que se sabe en 2023
8	En España no se alcanzaron 50 grados hace ya más de medio siglo
9	Es falso que la vacuna contra la covid-19 produzca "decenas de miles de muertos", como se asegura en una revista
10	Es falso que los Cuerpos de Seguridad del Estado y los jueces no fueran vacunados contra la covid-19
11	España no ha retirado la vacuna de Astrazeneca, al contrario de lo que afirma un tuit viral
12	Grafeno en las vacunas: cómo la mentira que nos convierte en un imán ha recorrido el mundo
13	La OMS no afirma que la pandemia se alargará por la vacuna de la covid-19 sino por la desigualdad en su reparto
14	La enfermedad de la covid-19 sí es nueva, al contrario de lo que indica el grupo Biólogos por la Verdad
15	La teoría conspirativa de los 'chemtrails': preguntas y respuestas
16	Las afirmaciones falsas sobre el 5G y la COVID-19 del vídeo de Thomas Cowan
17	Las falsedades del nobel Gaever para negar las evidencias del cambio climático
18	Las muertes cardiovasculares entre atletas profesionales no se han duplicado cada tres meses en 2021 por la vacuna
19	Las vacunas contra la COVID-19 no causan muertes repentinas, a diferencia de lo que afirma el documental viral "Died Suddenly"
20	Las vacunas de la covid-19 no causan "efectos autodestructivos" en el cuerpo
21	Los artículos que alertan de que más del 82% de las embarazadas vacunadas sufrirán abortos se basan en un estudio erróneo
22	Los documentos sobre la vacuna de Pfizer publicados por la FDA no desvelan efectos secundarios hasta ahora silenciados
23	Los laboratorios ucranianos financiados por los Estados Unidos no son para crear armas biológicas, sino para detectar la aparición de amenazas relacionadas con virus o bacterias
24	Los niños vacunados de covid no tienen 52 veces más probabilidades de morir
25	Los test PCR sí son una prueba diagnóstica
26	Mentiras antivacunas: así han intentado que realizáramos inmunizarnos en 2021
27	No es cierto que las mascarillas causen enfermedades neurodegenerativas incurables
28	No es ilegal vacunar a los niños contra la covid-19
29	No, Israel no ha dejado el EuroMOMO ni los datos reflejan un incremento alarmante de exceso de mortalidad tras la campaña de vacunación contra la COVID-19
30	No, Sanidad no ha "admitido" que 14 lotes de vacunas provocaron 200 muertos en España: cómo interpretar los informes de farmacovigilancia
31	No, la Unión Europea no ha lanzado "pasaportes sanitarios obligatorios" ni los no vacunados van a ser "excluidos de la sociedad"
32	No, no ha ingresado un niño de 10 años en la UCI del Hospital Virgen de la Arrixaca (Murcia) por un "infarto de miocardio" tras vacunarse contra la COVID-19
33	Nos preguntáis si España ha disparado la compra de gas a Rusia este verano
34	Pfizer no comercializó la vacuna de la covid sin comprobar su eficacia
35	Qué es la Agenda 2030 y qué dicen los bulos virales que desinforman sobre este plan impulsado por la ONU
36	Qué sabemos del vídeo de un supuesto ejecutivo de Pfizer reconociendo que la farmacéutica está "dirigiendo" la evolución del SARS-CoV-2
37	Rezar frente a una clínica abortiva no está prohibido, como afirma Catalán (UPN), pero puede ser delito si deriva en acoso
38	Trudeau no afirmó que seguirá aplicando medidas inconstitucionales contra la covid
39	¿Qué sabemos sobre los '17 fallecimientos de ancianos tras vacunarse' en una residencia de Yecla (Murcia)? Las muertes se produjeron debido a un brote de COVID-19 y no por la vacuna, según la residencia y la Consejería de Sanidad de Murcia
40	"Elon Musk me echó de Twitter": el meme que se viraliza como real en la red social



These hoaxes make up for the queries that will later be addressed in visualization. Furthermore, we found these channels affected by the hoaxes.

Table 2. Covid-19 Channels.

N	Channel	N	Channel
1	ellocodelacorralachannel	13	exponiendolaverdadoculta
2	chemtrailsaquintacolumna	14	infoburbuja
3	conscienciaterraplana	15	EIContrafuerte
4	laquintacolumnainternational	16	ejercitoremamente
5	Somosrealistas	17	elinvestigador_org
6	supercontagiadores	18	EIDiestro
7	covidland_espanol	19	PLANDEMIA_MUNDIAL_COVID
8	medicosporlaverdadar	20	PADRESPORLAVERDAD
9	LARECONQUISTA_ESP	21	medicosporlaverdadESP
10	paremosNewOrdenMundial	22	cienciaycovid
11	rafapalreal	23	ExponiendoLaElite
12	InfoVacunas		

From the hoaxes, several observations can be found. First, our method aims to be mostly automatic. Automation is prone to errors, which we aim to illustrate along with the positive results. In this screening, the automatic extraction yields some results unrelated to the at-hand topic; for example, Hoax 8 is about Climate Change instead of Covid-19, Hoax 40 is X/Twitter criticism, and so on.

The rest of the hoaxes play off several Covid-19 related issues like vaccines or masks. These are mostly examples of fearmongering, usually with the double objective of demeaning treatment effectiveness, as well as criticizing institutions. Points frequently mentioned are PCR tests, Vaccines and Masks; all science-backed or government-appointed effective methods of viral contention are harshly criticized. Hoaxes in these categories denote overwhelming distrust in official institutions, even the European Union at large. The origin of this distrust is unclear.

Though the presence of some channels could be seen as accidental, the affected channels have overlap with the topics. It is interesting to see channels like 'conscienciaterraplana', a flat-earth channel, focusing on crossing topics like Covid-19. Channels usually prefer to self-present as science-backed critical thinkers that go against the current consensus (cienciaycovid, somosrealistas, etc). Others have nationalistic hints, such as 'LARECONQUISTA_ESP' or 'ejercitoremamente'. There's also some channels that pose as legitimate news outlets posing for genuine information (EIContrafuerte, EIDiestro).

Visualizations have been extracted from all hoaxes, however, for the sake of clarity and correctness, we hand-pick three. Hoaxes 4, 9 and 34 show different graphs worth evaluating. Keep in mind that the graphs produced by our algorithms are still fed into the influence analysis, maintaining our end-to-end approach to automated analysis.

2.2 Climate change hoaxes and actors

We present the hoaxes found in Table 3. Compared to Covid-19, misinformation is more prevalent across time, thus many more disinformation can be found on this topic, thus the increased number.

Table 3. Climate change hoaxes. In spanish & portuguese

N	Hoax
1	No hay un "brote mortal" de malaria en Estados Unidos provocado por Bill Gates
2	Von der Leyen no pide comprar petróleo ruso para "salvar a Europa de Putin"
3	A Amazônia é o pulmão da Terra? Não, a ciência já o desmentiu
4	Una nevada "única" en Estados Unidos no significa que no exista el cambio climático
5	Greta Thunberg no hizo un llamado a tener guerras más sostenibles, es un «deepfake»
6	No hay registro de que el papa Francisco y Bill Clinton hayan pedido una «despoblación urgente» para salvar el planeta
7	Número de glaciares no mundo permanece igual desde o nascimento de Guterres?
8	La ganadería española cumple con la normativa europea, pero no reduce las emisiones de GEI desde hace más de una década
9	Gasolineiras absorveram parte da descida do ISP na margem bruta? Dados apurados indicam que não
10	Mapas de previsão meteorológica estão a ser alterados para criar alarmismo climático?
11	E falso. Temperaturas baixas no Texas ou gelo no deserto não provam "arrefecimento global"
12	União Europeia recuou na decisão de banir carros novos com motores de combustão a partir de 2035?
13	Lido no Facebook: "Cem empresas são responsáveis por 70% das emissões globais de CO2"
14	Impuestos, sueldos y cambio climático: los datos falsos y verdaderos de los debates de Baleares
15	El vídeo de Bill Gates "cortando una entrevista" sobre vacunas es falso y expertos señalan que está hecho con IA
16	China no está aumentando su consumo de carbón debido a la construcción de paneles solares
17	El documento "firmado por más de 1.600 científicos" sobre la emergencia climática: contexto y afirmaciones desinformadoras
18	Las falsedades del nobel Gaever para negar las evidencias del cambio climático
19	La Comisión Europea no ha anunciado "restricciones de agua para toda la población" ante la situación de sequía
20	El CO2 causa el calentamiento global, aunque respirarlo no afecte a la salud de las personas (título bueno)
21	La Agenda 2030 no es una maniobra de EEUU para someter al mundo
22	Cómo sabemos que el co2 sí causa el cambio climático
23	Lê-se no Facebook: "Principal fator de influência nas alterações climáticas é o Sol e não os gases atmosféricos"
24	Importações asseguram "60,7% do consumo energético europeu", destaca-se no Facebook
25	Líder do Fórum Económico Mundial defende abate de cães e gatos para combater as alterações climáticas?
26	El sello de la rana de Rainforest Alliance en alimentos no indica que contengan insectos
27	El origen del petróleo sí es fósil (aunque no viene solamente de la descomposición de los dinosaurios)
28	Es engañoso decir que el origen de los incendios sea que los agricultores no estén autorizados a "limpiar el bosque"
29	El Foro Económico Mundial no ha ordenado a los gobiernos "arrestar" a los negacionistas del cambio climático
30	No, esta foto de la NASA no muestra las nevadas actuales en Canadá y Estados Unidos: es de 2002
31	Alega-se no Facebook: Tirando a lenha e o carvão vegetal, "não existem combustíveis fósseis"
32	No solo es "la opinión" de expertos: cómo la comunidad científica llegó a un acuerdo respecto al origen del cambio climático
33	Que el mayor récord por calor en el planeta se produjera en 1913 no significa que el calentamiento global no exista
34	Un eventual enfriamiento del Sol no revertiría los efectos del calentamiento global
35	Por qué la nueva norma de la UE sobre microplásticos no prohíbe los campos de fútbol de césped artificial
36	Greta Thunberg no obligó a unos manifestantes a dejar de respirar por el clima
37	Nubes, estelas, radares y lámparas: no son fotos de manipulaciones ocultas del clima
38	El deshielo de Groenlandia ni es natural ni se está revirtiendo
39	No provocan incendios desde helicópteros para culpar al cambio climático
40	No, Repsol no está ofreciendo inversiones en petróleo y gas: suplantando a El Mundo y al presidente de la empresa para colártela
41	Nobel da Física provou que não existe aquecimento global? As alegações não têm fundamento científico
42	No son falsas víctimas ucranianas sino manifestantes contra el cambio climático
43	Es falso que España y 12 países más hayan firmado un acuerdo para abolir la agricultura por el cambio climático
44	El fundador del Foro Económico Mundial no escribió un libro con un plan para "eliminar" a 4.000 millones de personas hacia 2050
45	Fecho da refinaria de Matosinhos teve impacto nos "stocks" de gásóleo?
46	Filipinas no ha ordenado el arresto de Bill Gates por las vacunas contra la covid, se trata de un bulo
47	Es engañoso que las emisiones de gases de efecto invernadero hayan caído un 14 % en los últimos cuatro años
48	Imagens da Terra e da Lua divulgadas pela NASA provam que "o espaço é 'fake'", garante-se nas redes sociais
49	Manual para que no te cuelen desinformación durante la Cumbre del Clima COP28
50	El enviado de EE.UU. para el clima no habló de sacrificar a millones de humanos para salvar al planeta
51	Não, o termo "aquecimento global" não foi substituído pela expressão "alterações climáticas"
52	Prisão de Greta Thunberg em protesto na Alemanha "foi encenada"?
53	Data and Disinformation about the Spanish Minister Teresa Ribera, the Falcon jet, and her Bike Arrival to a Climate Meeting in Valladolid
54	El timo de las falsas inversiones en petróleo que usa caras conocidas para colártela
55	La Comisión Europea no ha dicho que vaya a «preparar restricciones de agua» para toda la población
56	Gelo na Antártida está a expandir-se e por isso não existe aquecimento global?
57	El CO2 antropogénico es la causa del calentamiento global, aunque su cantidad en la atmósfera sea pequeña
58	¿Cómo sabemos que el cambio climático actual no es igual que el 'Óptimo Climático Medieval'?
59	Greta Thunberg no ha pedido que se usen las centrales nucleares
60	La UE no ha pedido que la población deje de desayunar como medida para preservar el medio ambiente
61	La NASA no ha demostrado que la ganadería en Argentina no contamina



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N	Hoax
62	Los estudios que avalan el consenso científico sobre el origen antropogénico del cambio climático también incluyen análisis escépticos
63	Não, "sistema HAARP" não é responsável pelas alterações climáticas
64	El rápido calentamiento global es inducido por el hombre y no por el Sol y la Luna
65	La desinformación que usa los colores del mapa del tiempo de TVE para negar el cambio climático
66	No, Bill Gates no es el nieto del filántropo y asesor original de la Fundación Rockefeller, Frederick Taylor Gates: es un bulo
67	Alega-se nas redes sociais: "Aquecimento global é uma fraude"
68	Consenso sobre intervenção humana na origem do aquecimento global é de apenas 0,3%?
69	No, este vídeo de Bill Gates en el que se rehúsa a continuar una entrevista no es real: es un vídeo manipulado
70	Não, aumento da extensão de gelo marinho no Ártico não significa uma inversão da tendência
71	Bill Gates no pronosticó el brote de viruela del mono
72	El cambio climático influye en los incendios forestales, aunque no es el único factor responsable
73	Que existan patentes registradas sobre modificación climática no significa que funcionen (ni que modifiquen el clima)
74	La gráfica climática del palo de hockey, que representa un aumento de las temperaturas sin precedentes a partir del siglo XX, es fiable
75	La Unión Europea no ha votado en contra de un alto al fuego en Gaza
76	El CO2 de la atmósfera producido por los seres humanos es un pequeño porcentaje del total, pero suficiente para provocar una crisis climática
77	En 1961 y 2021 se registró la misma temperatura media, pero eso no niega el cambio climático
78	Bill Gates no ha dicho que va a inyectar vacunas anticovid-19 al ganado
79	Cuidado con la comparación sin contexto entre el uso de combustible de un avión y una explotación ganadera
80	No, Greta Thunberg no ha pedido usar "misiles biodegradables" ni "granadas veganas": el vídeo está manipulado
81	Qué sabemos sobre el cartel publicitario que dice "¿Futuro, o asesino del clima?" en alemán
82	Que aumenten los bosques no significa que no exista la deforestación
83	Qué dice y qué no dice el estudio sobre el aumento de hielo en zonas de la Antártida y por qué no significa que la crisis climática no sea real
84	La ley de cambio climático no prohíbe explorar minas de tierras raras
85	Qué sabemos sobre la detención del 'influencer' Andrew Tate y el papel de sus interacciones en redes sociales con Greta Thunberg
86	Contas do IUC. Automóvel que emite 148 gramas de CO2 por quilómetro paga "imposto de quase 700 euros"?
87	El Parlamento Europeo no ha pedido «prohibir» las vacunas covid
88	Las emisiones de CO2 de España y Estados Unidos están bajando, pero esto no demuestra que haya un "alarmismo climático"
89	Esta imagem mostra cartazes deixados no chão por estudantes que protestam contra as alterações climáticas?
90	Los bulos virales en torno a las protestas por la reforma de las pensiones en Francia
91	Dados da NASA revelam que "a temperatura média da Terra baixou desde 2016"?
92	Combustíveis fósseis. É falso que a Rússia tenha faturado mais 158% nos últimos dois meses do que no mesmo período em 2021
93	Las predicciones de subida del nivel del mar no han fallado, como asegura un podcast viral
94	La Unión Europea no ha puesto fin al cobro de la maleta de mano en los aviones
95	Empresa financiada por Bill Gates é responsável por surgimento de casos de malária nos EUA?
96	La teoría conspirativa de los 'chemtrails': preguntas y respuestas
97	Bill Gates no ha "pronosticado" que la próxima pandemia tendrá lugar en 2025 ni que esta será provocada por el virus "SEERS"
98	No, Antena 3 no ha usado el rótulo "el cambio climático provoca nevadas por el norte"
99	A NASA mente e "os satélites são um mito" pois não resistiriam às altas temperaturas no espaço?
100	No son políticos de la UE que festejen sus privilegios en la Eurocámara
101	Parlamento Europeu tem proposta de "taxa ambiental" de 20 cêntimos sobre "todos os produtos com embalagem"?
102	Diz-se no Facebook: É "mentira" que alterações climáticas possam afetar saúde cardiovascular
103	Los terremotos no pueden afectar al clima
104	Foi emitido um mandado de prisão dirigido a Bill Gates nas Filipinas?
105	No, Bill Clinton y el Papa Francisco no han pedido una "despoblación urgente" para salvar el planeta
106	Vídeo do TikTok em que Bill Gates abandona entrevista é verdadeiro?
107	No, ni España ni otros 12 países han firmado un "acuerdo climático global" para abolir la agricultura
108	Medio grado más de calor es imperceptible para los humanos, pero el planeta sí nota sus consecuencias
109	Biden no ha negado que el cambio climático sea un problema
110	Qué es y para qué sirve el secuestro de carbono
111	El Parlamento Europeo no ha aceptado la solicitud de Ucrania para entrar en la UE
112	Si has visto a Greta Thunberg desnuda en un vídeo es un "deepfake"
113	Vídeo prova que BP tem "esquema" para cobrar um litro a mais de combustível do que o realmente abastecido?
114	No, esta foto del festival de Glastonbury (Inglaterra) repleto de basura no fue tomada tras el reciente discurso de Greta Thunberg: es de 2015
115	Qué es la Agenda 2030 y qué dicen los bulos virales que desinforman sobre este plan impulsado por la ONU
116	Los otros cambios climáticos
117	El bulo de que la Unión Europea pide a la población que descarte el desayuno para preservar el medioambiente
118	Produção de bateria para carro elétrico polui mais do que um carro a combustão em 20 anos?
119	Este anuncio no anima a los alemanes a no tener hijos por su impacto en el clima, es el cartel de un reportaje de 2020
120	Quién está detrás del documento viral que señala que "no existe la emergencia climática"
121	La UE no ha anunciado que vaya a limitar el consumo de prendas de ropa a tres por persona al año por la Agenda 2030
122	No es cierto que el actual cambio climático tenga precedentes históricos, como dice Ayuso
123	Los modelos no han predicho que Groenlandia se quedaría sin hielo en 2022
124	Estas imagens da Terra foram captadas por missão espacial indiana a partir da Lua?
125	La NASA no ha admitido que el cambio climático se debe a la órbita terrestre
126	No es cierto que "hagas lo que hagas, no vas a cambiar nada" respecto al cambio climático, tal y como indica el youtuber Dalas
127	La Comisión Europea no planeó antes de la pandemia aprobar el pasaporte covid
128	Bill Gates no ha admitido en este vídeo que la vacunación fue un "terrible error"
129	Vacinas contra a Covid-19 "podem ser a forma de combater as crises climáticas", revela-se nas redes sociais
130	Los niveles de CO2 actuales son los más altos de la historia de la humanidad, pero no del planeta



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N	Hoax
131	Los huracanes no son creados artificialmente por el ser humano
132	No, Greta Thunberg no ha pedido usar "misiles biodegradables" ni "granadas veganas": el vídeo está manipulado
133	No, Greta Thunberg no tuiteó en 2018 que "el fin de la humanidad por el cambio climático" llegaría en 2023: habló de "los próximos cinco años" como margen de acción
134	Governo da Alemanha financiou fundação de Bill Gates em 3,8 mil milhões de euros para garantir "controlo populacional"?
135	Bill Gates é neto do co-fundador da fundação Rockefeller, Frederik Taylor Gates?
136	Las renovables tienen una huella de carbono decenas de veces menor que las fósiles pese al impacto inicial de su construcción
137	Greta Thunberg no ha escrito un libro llamado "Vegan wars" en el que pide fabricar tanques sostenibles
138	Diz-se no Facebook: "Gronelândia não é afetada pelo aquecimento global provocado pelo homem"
139	ONU promove "a fome mundial" para "implementar 'A Grande Reinicialização'", descobre-se nas redes sociais
140	Desmatamento da Amazônia baixou 48% na Presidência de Jair Bolsonaro em comparação com Lula da Silva
141	La noticia de que en Sevilla se registraron 51 °C en 1876 no prueba que el cambio climático no exista
142	La historia de Bill Gates y el vendedor de periódicos "más rico del mundo": un bulo que se mueve internacionalmente
143	Glosario de terminología climática
144	Que España tenga más superficie forestal arbolada que hace 100 años no significa que los ecosistemas estén más sanos
145	Que haya cambio climático en otros planetas no significa que el de la Tierra lo esté causando el Sol
146	Es falso que no exista una «crisis climática real», como asegura el Nobel John Clauser
147	El hielo del Ártico no se expande ni ha alcanzado su nivel máximo en 30 años
148	Grupo de ativistas climáticos está a esvaziar pneus de carros SUV em Portugal. Configura um crime?
149	Não, onda de calor em 1949 não prova que o aquecimento global é uma invenção
150	Elon Musk baníu Greta Thunberg do Twitter?
151	Qué dice y qué no dice el estudio sobre el aumento de hielo en zonas de la Antártida y por qué no significa que la crisis climática no sea real
152	La UE no ha pedido descartar el desayuno para preservar el medioambiente
153	Cambio climático no es lo mismo que calentamiento global
154	El aumento de hielo marino en la Antártida no es una prueba válida para negar el calentamiento global
155	Las nubes sí afectan al clima, pero no han causado el cambio climático actual
156	El vídeo de las inundaciones en Madrid en 1966 no desmiente el cambio climático
157	Es falso que los récords recientes de temperatura se batieron porque la ESA "ahora mide la temperatura de la superficie y no la del aire"

These hoaxes will later be analyzed in the following sections. Furthermore, we found these channels affected by the hoaxes. There are many more channels affected by the analysis, reflecting the widespread width of climate disinformation. In this regard, we found international reach for these hoaxes (Table 4).

Table 4. Climate change channels.

N	Channel	N	Channel	N	Channel
1	ActiveClubXIV	62	FREEDOMFIGHTERSWW	122	realx22report
2	agentsoftruth	63	gatewaypunditofficial	123	redicetv
3	akademidergisii	64	GeneralMCNews	124	redlistupdatesuk
4	AltSkull48	65	GenWarz	125	RedPillDealer4833
5	AntiVac	66	geoingenierieinfo	126	RevealedEye
6	anto_boyle_channel	67	gintaras_fpublic	127	sapereaudelt
7	artwithaim	68	greatreject	128	shadowman2020
8	asprievakcinacija	69	gregoryroose	129	SicilianGorillian2
9	atsibudimas	70	GutmenschenKeule	130	sntx_cosmic
10	AusraBiguzaite11	71	haberinizolsungangalargrubu	131	soberaniajusticiasocial
11	ayyildizhabertr	72	haberw	132	son_dakika_haberr
12	bagelsandshadeshow	73	hiddeninplainsight1	133	son_dakika1
13	BBCisTheVIRUS	74	hispanospatriotas	134	sotten
14	BrainlessChanel	75	insider_amigo	135	STFNREPORT
15	BritainFirst	76	insiderpaper	136	stopconfinamiento
16	BritishNursingAllianceSpeak	77	intelslava	137	stopmanipulacionclimatica
17	CACUKsupport	78	intheboxWithJohnLawrence	138	SunflowerSociety
18	cadizcontraelpasaportecovid	79	jordansather	139	supercontagadores
19	canalcristianosporlaverdad	80	JotvingisLietuvis	140	surf_noise_eng
20	candlesinthenight	81	JustDudeChannel	141	TakeOurCountryBack
21	CaptKylePatriots	82	KanekoaTheGreat	142	the_Right_People
22	CHDEurope	83	LA_BITACORA	143	The_Storm_Q17
23	chemtrailsaquintacolumna	84	LARECONQUISTA_ESP	144	TheBigConspiracy
24	chiefnerd	85	LauraAbolichannel	145	TheConspiracyHole
25	childcovidvaccineinjuriesuk	86	laverdadlibre	146	TheEndOfEverything1
26	CIG_telegram	87	marioamenti	147	thegoldenone
27	concienciagalactica	88	MartinCostelloNews	148	TheGreatResetTimes



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N	Channel	N	Channel	N	Channel
28	conscienciaterraplana	89	medicosporlaverdadar	149	TheLightTruthPaper
29	coronapsyopscam	90	meghUpdates	150	ThePatriotAU
30	CoronavirusPlushie	91	mincevicus	151	thepeopleslawyerchannel
31	covid19vaccinevictims	92	MurderTheMedia	152	theresistanceengland
32	COVID19VACCINEVICTIMSANDFAMILIES	93	nastikatube	153	theriotimes
33	CovidCrimestoppers	94	naujoji_pasaulio_tvarka	154	TheSovereignSoul
34	covidland_espanol	95	neadeqatus	155	TheTruthFairy
35	craigkelly	96	negacionistasmx	156	TommyRobinsonNews
36	darkuniverse09	97	neofeminismo	157	totaldisclosure
37	davidickeofficial	98	No_BS_News	158	trabajadoresportalibertad
38	despiertaUruguay	99	noalavacuna	159	Triada_oscura
39	dokuz8haber	100	node_of_time_en	160	trumpintel
40	dotconnectinganons	101	Not_On_The_Beeb	161	truthwins888
41	Dr_Angel_Ruiz_Valdepe_as	102	nuevahumanidadhuelva	162	UKcitizen2021
42	Dr_DavidMartinWorld	103	OPERAC_ENJAMBRE	163	ultrasnotreds2
43	dr_judymikovitss	104	PADRESPORLAVERDAD	164	UncleSamsNYPBs
44	DrMikeYeadon	105	paremosNewOrdenMundial	165	unitednationalistfront
45	DrPaulMarik	106	PatriotVoiceOfficial	166	uyan2021
46	DrTenpenny	107	PLANDEMIA_MUNDIAL_COVID	167	Uyanis_Turkiye
47	eduardomenoni1	108	PlantBasedNews	168	VaccineInjuriesca
48	ejercitoremnante	109	police_frequency	169	vacunas peligrosas
49	elaullido	110	PrivateCanadianNews	170	vakcinudiskusijos
50	ElContrafuerte	111	professor_patriot_official	171	varlinas
51	ElDiestro	112	protest	172	vaziyetcomtr
52	elinvestigador_org	113	ptpatriots	173	victoriaenluz
53	ellocelacorralachannel	114	publicannouncement602967921	174	VigilantFox
54	elpuebloxlaverdad	115	QAnon17_Awakening	175	WeaponizeConspiracy
55	euskalnews	116	qanonplus	176	wolfchannel2
56	ExponiendoLaElite	117	QlobalChangeUSA	177	worlddoctorsalliance
57	exponiendolaverdadoculta	118	QNewsOfficialTV	178	worldwidewakeup
58	Fall_of_the_Cabal	119	rafapalreal	179	zeeemedia
59	FionaRoseDiamond	120	realDonaldjTrump	180	zoomerwaffen08
60	flayfm	121	RealRebelNews	181	ZoroKanalas
61	ForoPXLVE				

With triple the hoaxes and several more channels for research, this section becomes more challenging to analyse. It stands to reason that Climate change, which has been a long-standing topic of interest for disinformation spreaders, to have this extended interest in terms of volume and width.

There are still some errors in the retrieval algorithm. Take hoax 1 for example, talking about malaria. Other hoaxes are tangentially related to climate change, for example hoax 112 discussing photos on Greta Thunberg, a prominent climate change activist; however, despite the personality being an activist there's no claim made about climate itself. Hoax 134 for instance, talks about population control, which is a popular proxy topic for talking about climate change as a conspiracy, however the hoax itself makes no assertions about climate either.

Many climate change hoaxes aren't specifically mentioning "climate change" or "global warming", instead they focus on normalizing extraordinary climate events. Take for instance hoax 38, which tries to normalize the Greenland defrosting. However, these are scarce, most of the misinformation targets policy and political entities; these can be easily found across the entire list, attacking institutions like the European Union, NASA and other well-respected entities. This is shared between hoaxes on



climate change and Covid-19; many of these conspiracy theories are disproportionately attacking established institutions, muddling their reputation through questionable claims.

Scientific well-reported facts are dismissed as false, such as defrosting, CO2 emissions and so on. As well as institutional attacks, this seems to be a recurrent theme across topics, so it begs the question: which motivates the other? Do misinformation actors distrust institutions because they disbelieve scientific facts? Or is it the other way around? We find these questions interesting, but find it difficult to respond.

More observations are repeated from Covid-19 channels, however this time they extend internationally. Patriotic channels, fake media outlets, skeptic communities. Some repeat appearances are 'rafapalreal' or 'ejercitoremante', which points toward that misinformation actors are transversal, following several conspiracies simultaneously. This last assertion tracks out, because some affected channels are 'noalavacuna' or 'supercontagiadores'. The channel selection is also composed of several far-right figureheads such as 'thegoldenone' or 'qanonplus'; as well as reactionary dogwhistles such as 'RedPillDealer4833' with the red pill manosphere analogy, or 'truthwins888' with the use of 88 which is shorthand for HH or Heil Hitler.

As before, visualizations have been extracted from all hoaxes, with three of them hand-picked for examination. Hoaxes 18, 43 and 74 illustrate some patterns worth examining. In Section 3, they are commented in detail.

2.3 Gender issues hoaxes and actors

We present the hoaxes found for LGBTIQ+ and gender issues in Table 5.

Table 5. Gender issues Hoaxes. In spanish & portuguese

N	Hoax
1	¿Qué sabemos de este vídeo en el que la policía alemana separa a dos niños de sus padres por supuestamente "no aceptar la doctrina LGBTI"?
2	¿Qué sabemos de esta imagen de dos mujeres trans "robando" el primer y segundo puesto de una carrera de ciclismo femenina?
3	El bulo de que el PP retiró la bandera LGBTI del ayuntamiento de Valencia el 17 de junio de 2023
4	Greta Thunberg no hizo un llamado a tener guerras más sostenibles, es un «deepfake»
5	Disney no se arrepiente de apoyar ideas LGBTI porque le haga perder dinero
6	El cartel que pide excluir a «las mujeres biológicas» del 8M no es de una convocatoria verídica
7	El papa no ha legalizado las bodas homosexuales
8	El bulo que asegura que Kristian Nairn, actor de 'Juego de Tronos', ha mostrado su "transición a mujer"
9	Vox y PP no han "prohibido" utilizar banderas LGBTI en espacios públicos en Nàquera, el acuerdo se refiere a los edificios municipales
10	El Partido Popular no retiró la bandera LGBTI del Ayuntamiento de Valencia el 17 de junio, fue el anterior Gobierno
11	El cuerpo no es un reloj y la mayoría de las mujeres no tiene la regla cada veintiocho días
12	Cuando los bulos se convierten en un "arma para la deshumanización" de las personas trans
13	¿Qué sabemos de la luchadora que derrota a otras mujeres en este vídeo, a quien acusan de ser trans?
14	No es una agresión a una chica trans por inmigrantes en España
15	Cuidado con los vídeos de hombres que dicen haber hecho el cambio de sexo registral "de un día para otro" para "beneficiarse" de la ley trans
16	No, la foto de esta niña no es de Ucrania: es una refugiada afgana fotografiada en Pakistán en 2014
17	Una trans asesina a tres prostitutas hace más de 30 años en Estados Unidos: por qué no decir dónde y cuándo ha ocurrido un suceso puede generar desinformación
18	Ministério da Defesa trocou bandeira nacional por bandeira LGBTQIA+?
19	Assédio sexual na Universidade de Coimbra. Denúncia "sem nomes" é válida em processo legal?
20	Exército do Brasil vai criar "unidade especial de batalhão LGBT"?
21	No, el PP no ha presentado un recurso de inconstitucionalidad contra la 'ley trans' el Día del Orgullo LGBTI: ese día se ha publicado en el BOE su admisión a trámite
22	El bulo de que el presupuesto de más de 20.000 millones de euros del plan estratégico de Igualdad se destinará a "charlas feministas"
23	La joven trans víctima de agresión sexual en Valladolid recibió asistencia legal por ser menor y no por "declararse mujer"
24	Miss Colômbia disse em concurso que "homens" não deviam concorrer contra "mulheres verdadeiras"?



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N	Hoax
25	Este combate no es entre "un gigante hombre trans" y "una joven chica", son dos luchadoras de jiu-jitsu
26	El bulo de que Gabi Garcia es trans y ha matado a la luchadora Bárbara Nepomuceno en combate
27	Sede da ONU trocou as 193 bandeiras nacionais por bandeiras arco-íris do "orgulho 'gay'"?
28	Las desinformaciones sobre el acuerdo entre Vox y PP, las banderas LGBTI y las concentraciones contra la violencia machista en Náquera (Valencia)
29	La imagen de un hombre en un desfile del Orgullo vistiendo una camiseta con el mensaje "los niños trans son sexy" es falsa
30	É proibido erguer bandeiras LGBTQIA+ durante as cerimónias da JMJ?
31	Abortar no provoca más problemas de salud mental que no hacerlo
32	Imagem mostra sala de aulas em Portugal com a bandeira LGBT e do movimento "Black Lives Matter"?
33	El bulo transfobo que se repite país a país: Michelle Obama, Brigitte Macron y, ahora, Begoña Gómez
34	No, el Ministerio de Igualdad no ha "encargado" una campaña contra la violencia de género en la que aparece la reina Letizia como una "mujer maltratada"
35	Greta Thunberg no obligó a unos manifestantes a dejar de respirar por el clima
36	El Tribunal Europeo de Derechos Humanos no anuló el matrimonio homosexual
37	Quando era homem não ganhava nada, diz Ventura sobre atleta trans que venceu oito troféus no feminino. É verdade?
38	Bulos de la campaña para el 19J en Andalucía
39	No son falsas víctimas ucranianas sino manifestantes contra el cambio climático
40	No, no es cierto que se haya censurado el beso LGBTI de la película 'Lightyear' en Cines Yelmo
41	Disney vai abrir rede de clínicas pediátricas para crianças transgênero?
42	No es un supuesto activista LGBTI «indignado», sino un humorista en un vídeo parodia
43	Este vídeo de una madre que arranca una bandera LGTBQ+ de una clase es una recreación "humorística" con actores
44	No, Público no ha publicado un artículo titulado "sexo empoderante" sobre una campaña del Ministerio de Igualdad sobre "las otras penetraciones"
45	La bandera que lleva el alumnado en este colegio de Argentina no es la del colectivo LGBTI, sino la del cooperativismo
46	Las cifras sobre los delitos sexuales no reflejan necesariamente su evolución real: se denuncian menos y más tarde que el resto
47	No es un montaje de Photoshop: Cepssa sí ha puesto la bandera LGBTI en sus gasolineras
48	¿Qué sabemos sobre si el tirador de Illinois es una mujer trans? Las autoridades afirman que usó ropa de mujer para huir
49	No, los detenidos por agredir a una pareja homosexual en Elche (Alicante) no son "menas magrebies"
50	Las cifras sobre los delitos sexuales no reflejan necesariamente su evolución real: se denuncian menos y más tarde que el resto
51	Italia no ha eliminado el tercer género de los DNI: nunca ha existido esta opción
52	La Generalitat no pidió a las mujeres que prueben a usar el velo islámico
53	Greta Thunberg no ha pedido que se usen las centrales nucleares
54	No, este supuesto sorteo de una tarjeta regalo de 750€ por el Día Internacional de la Mujer no es de Shein
55	Las preguntas que nunca te has atrevido a hacer sobre sexo
56	¿Puede perder sus derechos el colectivo LGBTI en Madrid?
57	El papa Francisco no porta en estas imágenes una cruz con los colores de la bandera LGBTI
58	Los fondos europeos en materia de violencia de género no se reparten en función del número de denuncias de cada país
59	No, Público no ha publicado un artículo titulado "sexo empoderante" sobre una campaña del Ministerio de Igualdad sobre "las otras penetraciones"
60	No, el hombre de esta foto no lleva una camiseta durante un desfile del Orgullo LGBTI en la que pone que "los niños trans son sexys": la imagen está manipulada
61	La desinformación que vincula un supuesto embarazo en el módulo de mujeres de una prisión de Alicante con la ley trans
62	España cayó de posición en un ranking internacional de bienestar de la mujer aunque mejoró su puntuación
63	Desinformaciones sobre la foto de una mujer embarazada en la explosión de un hospital infantil de Mariupol (Ucrania)
64	Escola de Medicina de Harvard promove curso para pediatras identificarem "bebês LGBTQIA+?"
65	Esta foto muestra una manifestación de ciclistas, no una marcha del Orgullo
66	El Gobierno español no considera discapacitadas a todas las víctimas de violencia de género
67	Es falso que en España sea legal cambiarse de género cada 6 meses
68	No, la ley trans no establece "un subsidio para personas trans mayores de 65 años": se trata de una propuesta rechazada y estaba destinada a quienes "no superen la renta mínima"
69	Quem levantar a bandeira LGBT no Mundial de Futebol [do Qatar] vai ficar preso por 7 a 11 anos, alerta-se nas redes sociais
70	Drumi no está promocionando una tarjeta regalo de 800 euros por el Día Internacional de la Mujer, es una estafa
71	La bandera LGBTI no incorporó los colores de Ucrania en señal de apoyo frente a Rusia
72	No, ningún "portavoz del Mundial de Catar" ha declarado que enseñar la bandera LGBTI estará penado con "entre siete y once años de cárcel" a 29 de junio de 2022"
73	La historia de la niña que aparece rescatada por tres personas diferentes: pasaba de unos brazos a otros tras un bombardeo en Siria
74	La "boda LGTBQ+" entre una mujer militar y otra activista en Ucrania no es real, se trata de una acción reivindicativa
75	La ONU no ha publicado un informe que pide legalizar la pederastia y la Agenda 2030 tampoco la promueve
76	Lido no Facebook: "Governo obriga polícias e câmaras municipais a hastear a bandeira LGBT"
77	Preguntas y respuestas sobre la fusión de los delitos de agresión y abuso sexual en la ley del 'solo sí es sí' y su relación con el Convenio de Estambul
78	Cuidado con la cuenta trol @TrinidadNovo que se hace pasar por "feminista, socialdemócrata y animalista"
79	Escocia, Alemania y Australia no están revirtiendo sus leyes trans, pese a lo que afirma Borja Sémper
80	Es falso que en Alemania una familia perdiera la custodia de sus hijos por estar en contra del colectivo LGBTI
81	El vídeo viral de una agresión a una chica trans es antiguo y se grabó en Bélgica
82	De "binário" a "homem trans" ou "queer". Registo de género nas Conservatórias em Portugal inclui 20 opções?
83	Los bulos virales en torno a las protestas por la reforma de las pensiones en Francia
84	Estacionamento prioritário para casais LGBT será obrigatório até 2024?
85	Nos preguntáis si Biden violó el Código de la Bandera de EEUU al colocar el emblema LGBTI en la Casa Blanca
86	Este vídeo del Arco del Triunfo de París decorado con un arcoiris gigante por el mes del Orgullo es una recreación digital
87	La bailarina Sophie Rebecca no ha sido contratada por la Royal Academy of Dance o admitida por ser mujer trans
88	Glenique Frank, mujer trans, no ganó la maratón de Londres: quedó en el puesto 6.182 de la competición no profesional
89	La ley de solo sí es sí no exigirá un contrato de consentimiento sexual
90	La ley trans y los términos 'madre' y 'padre': no se eliminan ni cambian por 'progenitor gestante' o 'no gestante' del Código Civil sino que conviven
91	La modelo Bella Hadid no ha mostrado su apoyo a Israel en este vídeo
92	¿Qué sabemos sobre la campaña 'El verano también es nuestro' del Ministerio de Igualdad?
93	ONU disse que cristãos que não aceitem legalização da pedofilia vão ser "expulsos da sociedade"?



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N	Hoax
94	Campeonato Mundial de Fútbol Femenino marcado por "estadios vacíos"?
95	Não vou competir contra um homem. Miss EUA boicota concurso Miss Universo por causa de conconrente "trans"?
96	El cambio de sexo registral no permite eludir una condena por violencia de género
97	Las desinformaciones sobre las indemnizaciones por cese a los altos cargos del Ministerio de Igualdad
98	No, esta foto de dos niños paseando entre hombres desnudos no es de la celebración del Orgullo LGTB de 2023 en Madrid: está tomada en Londres y se difunde desde al menos 2022
99	Cuidado con el perfil de Twitter Valentialiente que ha tuiteado que "poco se habla de los derechos trans de los fetos": es una cuenta trol
100	Netflix no ha eliminado una serie de dibujos animados con contenido LGTB en la que uno de sus personajes es de género no binario
101	No, esta imagen no muestra a "un tío que, gracias a la nueva ley trans, puede sentirse mujer y jugar en la liga femenina", al contrario: es un hombre trans que no puede jugar en un equipo masculino porque aún no se le reconoce como hombre
102	La inhibición de la fertilidad no es un efecto secundario de la vacunación
103	El Ministerio de Igualdad no organizó un "Día de la Diversidad de las Vaginas"
104	Los artículos que alertan de que más del 82% de las embarazadas vacunadas sufrirán abortos se basan en un estudio erróneo
105	Dois atletas trans venceram corrida de bicicletas exclusivamente para mulheres?
106	Los bulos sobre series y contenidos inclusivos en las plataformas de 'streaming'
107	Rezár frente a una clínica abortiva no está prohibido, como afirma Catalán (UPN), pero puede ser delito si deriva en acoso
108	Si has visto a Greta Thunberg desnuda en un vídeo es un "deepfake"
109	Novedades sobre la menstruación y la vacuna de la covid 19
110	No, esta foto no muestra cómo "han quedado las calles de Madrid" después de "las fiestas del Orgullo" LGTBI de 2022: la imagen circula desde, al menos, 2019
111	¿Qué sabemos sobre la supuesta "abogada transgénero canadiense que alega discriminación porque un ginecólogo rechazó tratarla al tener genitales masculinos"?
112	Orgullo LGBTQ+: los bulos que desinforman en redes sociales sobre las personas del colectivo en 2023
113	La ONU no ha pedido despenalizar la pedofilia, es un informe tergiversado
114	Italia no incluye el género no binario en su carné de identidad
115	La UE no sancionará al Real Madrid por negarse a apoyar a la comunidad LGTB
116	No existen registros de la 'Asociación Transgénero Anti-Ciencia': el cartel viral procede de una cuenta parodia
117	La niña ensangrentada no fue herida en Ucrania, sino en Siria hace 4 años
118	El detenido por agresión sexual a una reportera no es su novio
119	Catar no impondrá penas de cárcel por mostrar la bandera LGTB en el Mundial de fútbol
120	Nos preguntáis si unas «bomberas feministas» incendiaron accidentalmente un parque en Canadá
121	No hay registros de que Giorgia Meloni haya declarado el mes del "Orgullo Familiar" para contrarrestar el Orgullo LGTB en Italia
122	El vídeo de una mujer arrancando una bandera LGTB de un aula es ficticio
123	Cuidado con el perfil de Jennytrans17 que asegura que las trans son "las verdaderas mujeres": es una cuenta trol
124	¿Qué sabemos sobre el cartel supuestamente del Banco Santander con motivo del 8-M, Día Internacional de la Mujer? Desde la entidad afirman que no es suyo
125	No, este sorteo de Druni por el Día de la Mujer no es real: es un timo
126	No hay fotos que prueben que el asesino de Texas era trans
127	Lidl niega que vaya a despedir a una empleada de su supermercado por llamar 'caballero' a una mujer trans en repetidas ocasiones
128	Dato mata relato: un recopilatorio para combatir las principales desinformaciones sobre feminismo de 2023
129	El bulo del estreno en España de la película 'Corpus Christi' que "muestra a Jesús y a sus discípulos como homosexuales"
130	Soria no gastó 20.000 euros en un taller feminista ni lo pagó el plan de Igualdad
131	No, este supuesto sorteo de un brazalete por el Día Internacional de la Mujer no es de Pandora
132	Miguel Esteves Cardoso escreveu frase homofóbica contra "manifestação do orgulho gay"?
133	El Foro Económico Mundial no ha pedido despenalizar la pedofilia
134	Orange no patrocinaba la lona de Vox que "tira a la basura" la bandera LGBTQ+ o el logo feminista
135	ONU recomienda que "as crianças devem ter parceiros sexuais"?
136	Este vídeo no demuestra que en Alemania separan a hijos de sus familias por estar en contra del colectivo LGTB
137	No, este vídeo de varias personas teniendo sexo en la calle ni es del Orgullo ni fue grabado en Madrid: es de un festival sobre prácticas eróticas en Estados Unidos
138	¿Qué sabemos sobre las denuncias de los pinchazos en discotecas?****
139	Catar no organiza ejecuciones públicas a homosexuales
140	El Ministerio de Igualdad no ha lanzado una campaña a favor del "sexo empoderante" para "visibilizar otras penetraciones", es un montaje
141	La sede de la ONU no ha cambiado las banderas de los países miembro por las del Orgullo LGTB, es la plaza de Rockefeller Center
142	¿Qué sabemos sobre la supuesta quedada del colectivo gay "Sevilla no se calla" del próximo sábado en la puerta del Ayuntamiento, para piropear" a la Virgen de las Mercedes?
143	André Ventura sugere que movimentos LGBT "querem descriminalizar o sexo entre pessoas e animais"
144	Bulos que usan fotos de personas trans para acusarles de ser el autor del tiroteo de Texas (EEUU)
145	El Ayuntamiento de Granada no ha anunciado una ordenanza contra el colectivo LGTB para sancionar sus atuendos
146	¿Qué sabemos del caso de "transfobia" que se produjo en un establecimiento de Lidl en Málaga y de que la empresa vaya a despedir a la trabajadora que se vio implicada?
147	Escola de inglês em Almada só dá aulas a homossexuais?
148	La Generalitat aporta fondos al Alto Comisionado de Derechos Humanos de la ONU, pero el Gobierno central y el vasco también
149	No, una mujer transgénero no ha ganado la maratón de Londres 2023

We analyze these hoaxes in detail in the following sections. Associated with these hoaxes, we present the channels in Table 6. As with climate change, we found many more channels with international reach.

Table 6. Gender issues Channels.

N	Channel	N	Channel	N	Channel
1	AFLDSOrg	74	SETexasProudBoys	146	insider_amigo
2	ActiveClubXIV	75	STFNREPORT	147	insiderpaper



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N	Channel	N	Channel	N	Channel
3	AltSkull48	76	SicilianGorillian2	148	joinmiFight
4	AntiVac	77	SunflowerSociety	149	jordansather
5	AntiVaxAus	78	TakeOurCountryBack	150	marioamenti
6	Anti Feminist Gang	79	TheBigConspiracy	151	markacollett
7	Antivaxxforms	80	TheConspiracyHole	152	mediaandcensoring
8	AwakenedOutlaw	81	TheEndOfEverything1	153	medicosporlaverdadar
9	BBCisTheVIRUS	82	TheGreatResetTimes	154	meghUpdates
10	BLUEPRINT Q	83	TheLightTruthPaper	155	mha haber
11	BrainlessChanel	84	ThePatriotAU	156	mincevicus
12	BritainFirst	85	TheSovereignSoul	157	mindcontrolmonarchmkultra
13	BritishNursingAllianceSpeak	86	TheTruthFairy	158	monitoestepario
14	CHDEurope	87	The Storm Q17	159	mpeinovich
15	CIG telegram	88	The Zionist Effect	160	nastikatube
16	COVID19VACCINEVICTIMSAND FAMILIES	89	TommyRobinsonNews	161	naujoji pasaulio tvarka
17	CaptKylePatriots	90	Triada oscura	162	neadeqatus
18	CovidCrimestoppers	91	TruthHammer	163	negacionistasmx
19	Daily Clout	92	TruthIsStillHateSpeech	164	neofeminismo
20	DrJaneRuby	93	UKcitizen2021	165	neolduhaber
21	DrMikeYeadon	94	UncleSamsNYPBs	166	node of time en
22	DrPaulAlexander	95	Uyanis Turkiye	167	nuevahumanidadhuelva
23	DrPaulMarik	96	VaccineInjuriesca	168	oldworld42
24	DrSimoneGold	97	VigilantFox	169	orlaredchan
25	DrTenpenny	98	WeaponizeConspiracy	170	paremosNewOrdenMundial
26	Dr DavidMartinWorld	99	ZmogusAntanasZemaitis	171	police frequency
27	EIDiestro	100	ZoroKanalas	172	professor patriot official
28	ExponiendoLaElite	101	afldsc	173	protest
29	FREEDOMFIGHTERSWW	102	agentsoftruth	174	ptkRelm
30	FaithAndFolk2	103	akademidergisii	175	ptpatriots
31	Fall of the Cabal	104	akincilarkarargahi	176	publicannouncement602967921
32	ForoPXLVE	105	ancereport	177	qanonplus
33	GenWarz	106	anto boyle channel	178	r turkey
34	GeneralMCNews	107	artwithaim	179	rafapalreal
35	GoodLionNews	108	asprievakcinacija	180	realDonaldjTrump
36	GutmenschenKeule	109	awakenedworlduk	181	realx22report
37	HarveyRisch	110	bagelsandshadeshow	182	redicetv
38	InformationEqualsDecisions	111	cadizcontraelpasaportecovid	183	returnofthesacred
39	IntheboxWithJohnLawrence	112	canal antifeminista	184	risingrxce
40	JotvingisLietuvis	113	canalcristianosporlaverdad	185	rothschildbankingfamily
41	JustDudeChannel	114	candlesinthenight	186	saintsandscholars
42	KanekoaTheGreat	115	chiefnerd	187	sancakgundem
43	LARECONQUISTA_ESP	116	childcovidvaccineinjuriesuk	188	sapereaudeit
44	LA BITACORA	117	cienciaycovid	189	sntx cosmic
45	LauraAbolichannel	118	concienciagalactica	190	son dakika_haberr
46	MartinCostelloNews	119	conscienciaterraplana	191	sotten
47	MissFreedomSeeker	120	coronapsyopscam	192	supercontagiadores
48	MurderTheMedia	121	covid19vaccinevictims	193	surf noise eng
49	NemesisParis	122	covidland espanol	194	the Right People
50	No BS News	123	craigkelly	195	thegoldenone
51	Not On The Beeb	124	darkuniverse09	196	thepeopleslawyerchannel
52	OPERAC ENJAMBRE	125	davidickeofficial	197	theresistanceengland
53	OdeToPower2	126	despiertauroguay	198	theriotimes
54	OfficialRedPillNews	127	dokuz8haber	199	totaldisclosure
55	PADRESPORLAVERDAD	128	dotconnectinganons	200	toyotadshk
56	PLANDEMIA MUNDIAL COVID	129	eduardomenoni1	201	trumpintel
57	PatAltNorthWest	130	ejercitoremante	202	truthwins888
58	PatAltScotland	131	ellocodelacorralachannel	203	ultrasnotreds2
59	PatriotVoiceOfficial	132	euskalnews	204	unitednationalistfront
60	PatrioticAlternativeOfficial	133	familiasporlaverdadcolombia	205	vacunaseligrosas
61	PlantBasedNews	134	flayfm	206	vakcinudiskusijos
62	Pornuestrosninos	135	gatewaypunditofficial	207	varlinas
63	PrivateCanadianNews	136	generationidentitaire	208	vaziyetcomtr
64	QAnon17 Awakening	137	greatreject	209	virtudnacional
65	QNewsOfficialTV	138	griffincomtr	210	whitelaborstrikeww
66	QlobalChangeUSA	139	haberalert	211	wolfchannel2
67	Qnews	140	haberbiz	212	worlddoctorsalliance
68	RadioGenoa	141	haberinvarmi TR	213	worldwidewakeup
69	RealDonaldTrumpo	142	habermedya	214	yaylahaber



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N	Channel	N	Channel	N	Channel
70	RealRebelNews	143	hiddeninplainsight1	215	zaferpartililer
71	RedPillDealer4833	144	brahimhaskologlu	216	zeeemedia
72	RevealedEye	145	infoburbuja	217	zoomerwaffen08
73	RogerHodkinson				

Unlike previous hoax tables, the gender-related hoaxes have been mostly correctly identified with fewer errors than usual. There are some outliers like Greta Thunberg disinformation again, but this could be traced to sexism too. Some hoaxes, at first glance, seem unrelated; however this is far from the truth, take for instance hoax 75 where pedophilia is mentioned. Pedophilia and LGBTIQ+ are separate topics but within far-right rhetoric, queer identities are usually falsely associated with attraction to minors, which is a common hoax divulged in far-right circles. So, in the end it seems that hoaxes found remain mostly on-topic.

This comes at a cost. Gender-related misinformation is a huge scope, bigger than climate change even, as it includes transphobia, sexism, homophobia and so on. The result is a mixed bag of hoaxes touching every sub-topic about these issues. We'll delve first into transphobia, which is one of the most prevalent sub-topics. A lot of transphobic disinformation comes from sport competitions, overall gender reassignment legislation and panic over children. There's plenty of hoaxes relating to LGTB symbols, like flags (and their legislation) and their inclusion in everyday lives, as well as LGTB pride day. Other hoaxes signal to sexism, especially attacking the "Women's day" and feminism movements. There's very little direct homophobia, usually present by proxy in hatred towards LGBT symbols/movement.

Finally we observe the channels discovered along these hoaxes. The volume of channels is larger than before, despite the same number of hoaxes. Aside from the increased volume of channels, we observe similar traits in the collection as with climate change disinformation and Covid-19. There's a lot of overlap with Anti-vaxx movements.

We chose three hoaxes from the list to analyse in full, these being hoax number 19, 47 and 89. They are considered interesting, with illustrative trends.



3. Visualization assessment

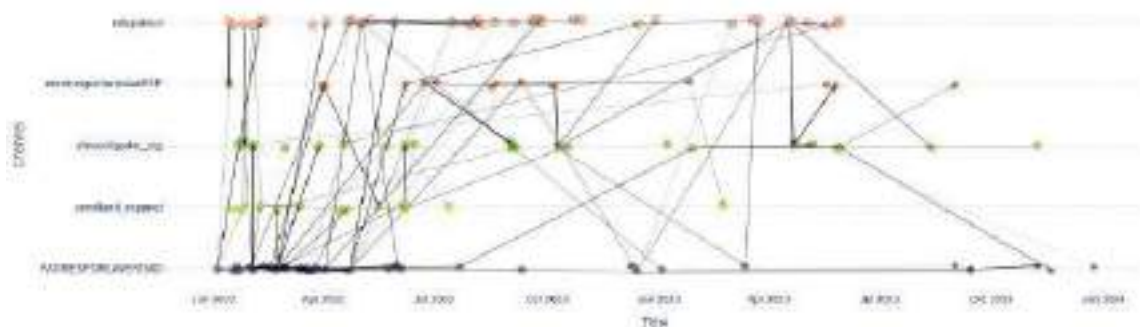
From the chosen hoaxes, we have selected a few to be visualized, as well as the overall dynamics of dissemination. Each topic has its separate analysis, with a final analysis of common trends. Some comments about cascade visualizations.

- Visualizations contain only the channels detected by the algorithm. We seed messages across all channels mentioned in the previous section, but only a few may appear. Not all channels talk about the same hoaxes and this is reflected in cascades.
- Arrows indicate link strength. The more opaque, the strongest the chance of them being linked together. Usually, when completely black, it represents a copy-paste, repost or similar interaction. Some interactions are so weak that have been removed from the graph, despite not shown, they are still a tree.
- Dot size represents the amount of views in log scale, larger dots are vastly more influential.
- Color is randomized to distinguish between channels.

3.1 Covid-19 cascades and influence

We begin our analysis on Hoax 4: “[Translated] Beware of the video about the Queen Elizabeth II COVID-19 positive that included an image of ivermectin: there is no evidence of what she is ingesting and the emission’s network assured it was an error.”. This alludes to “Queen Elizabeth II is taking ivermectin to counter COVID-19.”. Figure 1 shows the cascade for this hoax.

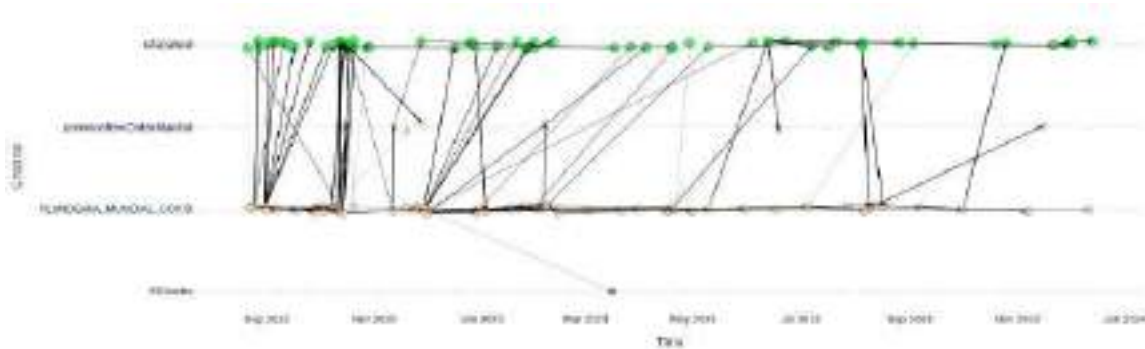
Figure 1. Hoax 4 Covid-19: Cuidado con el vídeo sobre el positivo en Covid-19 de la reina Isabel II que incluye una imagen de la ivermectina: no hay pruebas de que lo esté tomando y la cadena que lo emitió asegura que fue un error



Five channels have been found to have interest in this hoax. First, we observe a large influential wave of messages from the “PADRESPORLAVERDAD” channel; they published a large amount before mostly dropping the topic after June’22. However, they began a widespread campaign across rafapalreal, medicosporlaverdadESP and so on, where their messages show to have very strong relations to outer channels.

Their publishing ignited discussion frequently in rafapalreal, which is another massively influential channel that kept the topic going until around June’22. In this intermediate period, links and messages are rarer, but still very prevalent. Interestingly, most

Figure 3. Hoax 34 Covid-19: Pfizer no comercializó la vacuna de la covid sin comprobar su eficacia.

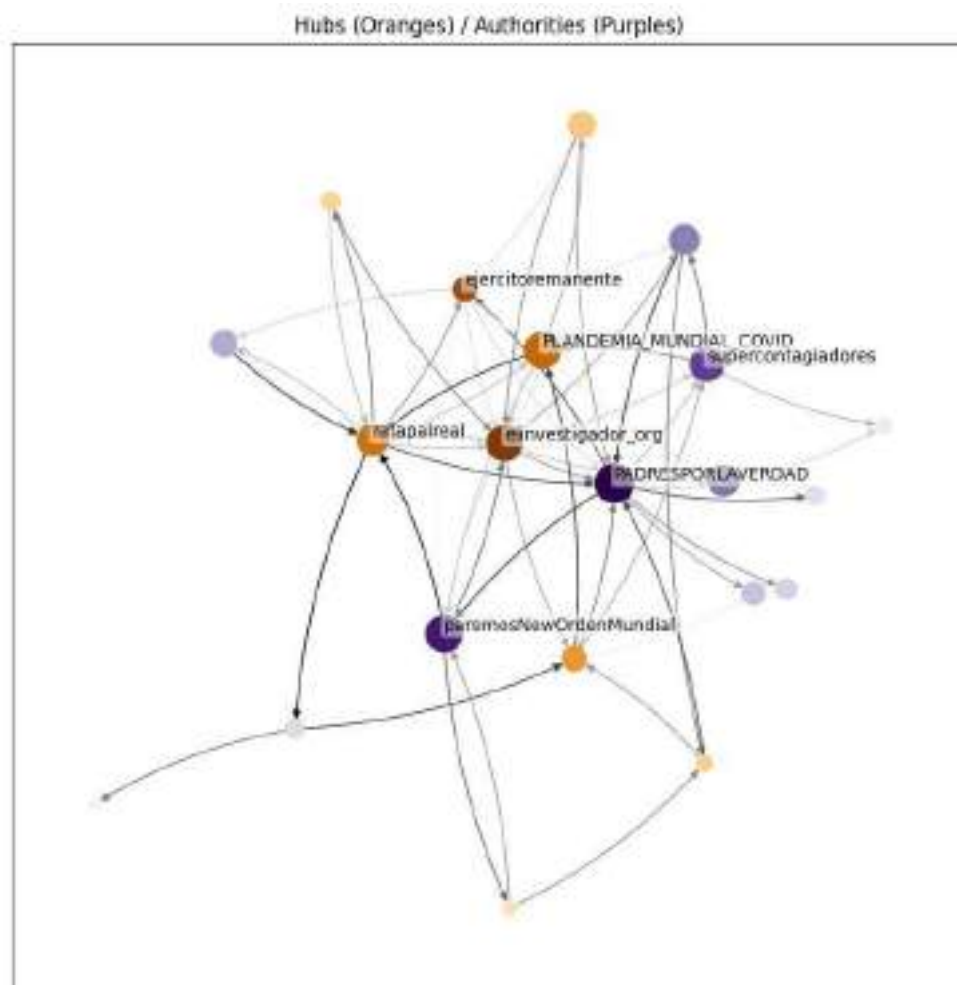


The last example visualization shows a very steady spread of disinformation, where interest is strictly maintained through the entire timeline. This timeline has four channels, however two are extremely relevant while the others barely present any messages. “Rafapalreal” and “PLANDEMIA_MUNDIAL_COVID” contain the entire discussion around this topic, effectively being quarantined to both channels. In this context one channel acts as a sender and the other as a receiver. “PLANDEMIA_MUNDIAL_COVID” constantly and consistently produces messages that link to “rafapalreal”, with barely any inverse interaction. We have seen this trend previously, with “rafapalreal” acting as an aggregator of content and another channel emitting constantly. However, unlike the previous situation, the hoaxes interest never wavers over time, disappearing only due to the data cutoff point.

Despite being contained to these two channels, they have accumulated many views as evidenced by dot size. We conclude that, despite the limited reach of this hoax, it is equally influential in the outside community judging by views, especially due to “rafapalreal”’s outreach with many nodes of larger size.

If evaluated together, some dynamics appear. The transmitter-receiver analogy used earlier, may have grounds for some large-scale dynamic, some channels being authorities that people rely on that people refer to (in order to spread it), and other acts as hubs that accumulate authorities’ knowledge. This is further visualized in Figure 4, where we aggregate all cascades to find the influence flow across the entire timeline. The figure depicts a “who-copies-whom” network, where nodes represent channels and edges indicate influence—that is, when one channel publishes a hoax, another channel tends to publish it as well. The size and saturation of a node indicate its importance within the network: larger and darker nodes are more influential than smaller and lighter ones. Finally, purple nodes are classified as authorities (channels that tend to initiate the propagation process), while orange nodes are classified as hubs (channels that primarily spread or aggregate information originating from authorities).

Figure 4. Covid-19 hubs and authorities



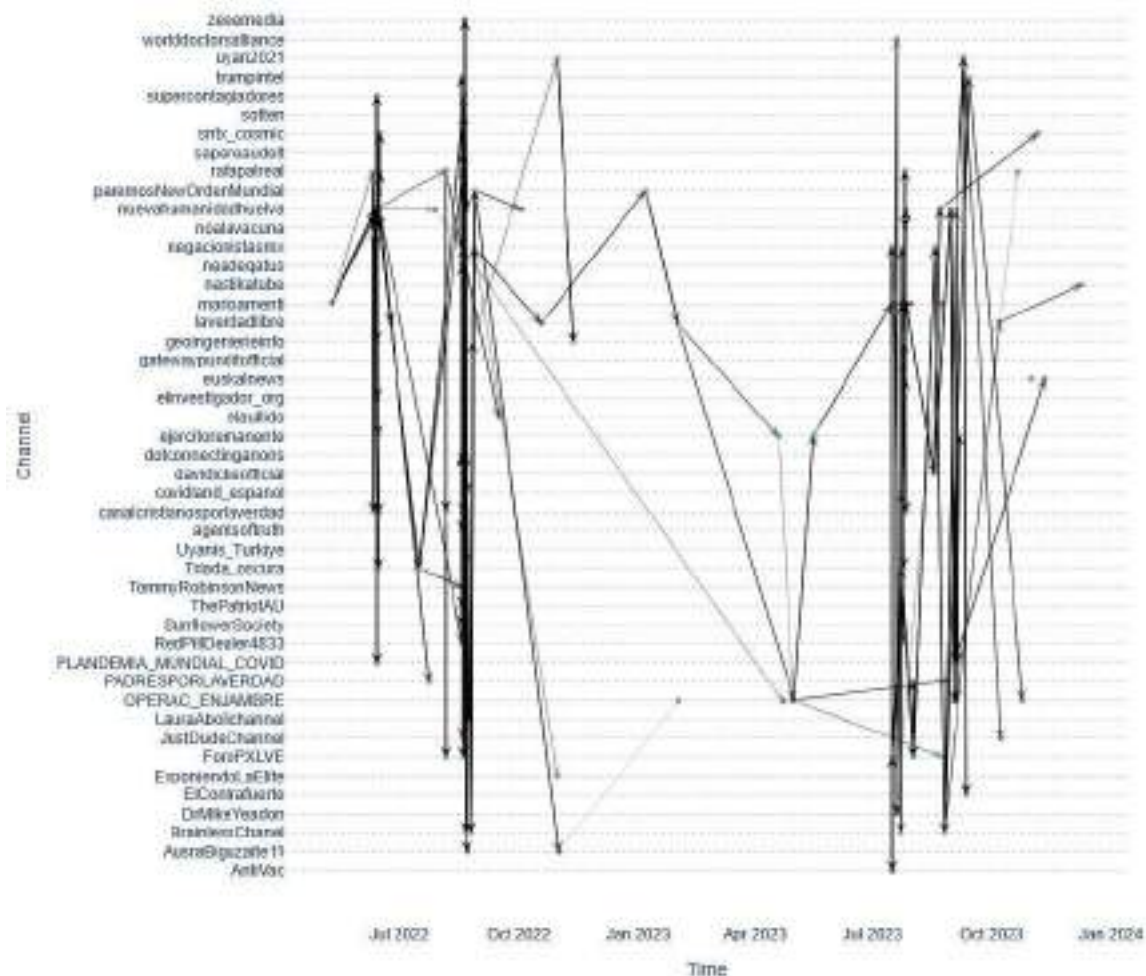
This final observation reveals some super-influential channels.

“PADRESPORLAVERDAD” is extremely central to this graph, with a large number of channels referring to it (arrows pointing towards it). The other way around, we observe “elinvestigador_org” as another hub. Only the most influential have been drawn on the graph for the sake of visualization, however, “rafapalreal” also appears as a hub, confirming our previous observations. This network represents the most influential channels of the telegram environment during the mid-2021 to late-2024.

3.2 Climate cascades and influence

The analysis begins on Hoax 18: “[Translated] *The lies of Nobel Giaeever to deny climate change evidence.*”. This alludes to the figure of Ivar Giaeever, nobel prize, who is a common figure amongst climate deniers being himself a figure of authority with climate denier opinions. Figure 5 shows the cascade for this hoax.

Figure 5. Hoax 18 Climate: *Las falsedades del nobel Giaeever para negar las evidencias del cambio climático*



The graphs generated by the climate change topic are much wider than before. On Covid-19 the search was restricted to a few channels, however, as the search is now free, there are many more channels affected by the hoax. This is a common feature to all visualizations explored in this subsection. The added width of exploration makes for harder analysis.

The cascade for the aforementioned hoax is, instead, about a figure of authority: Ivar Giaeever. His denier claims are numerous, not a singular particular claim. Therefore, what we visualize here is his influence on the climate change discourse across time. Using this frame for analysis, we observe three particular points of interest. June '22, September '22 and late July '23. These three points are characterized by the overwhelming vertical density of posts in the graph. At each one, a lot of channels begin discussing heavily about Giaeever. There are gaps in the discourse surrounding this figure, from October '22 to July '23 there is almost no mention of his, with sporadic interest being shown at best.

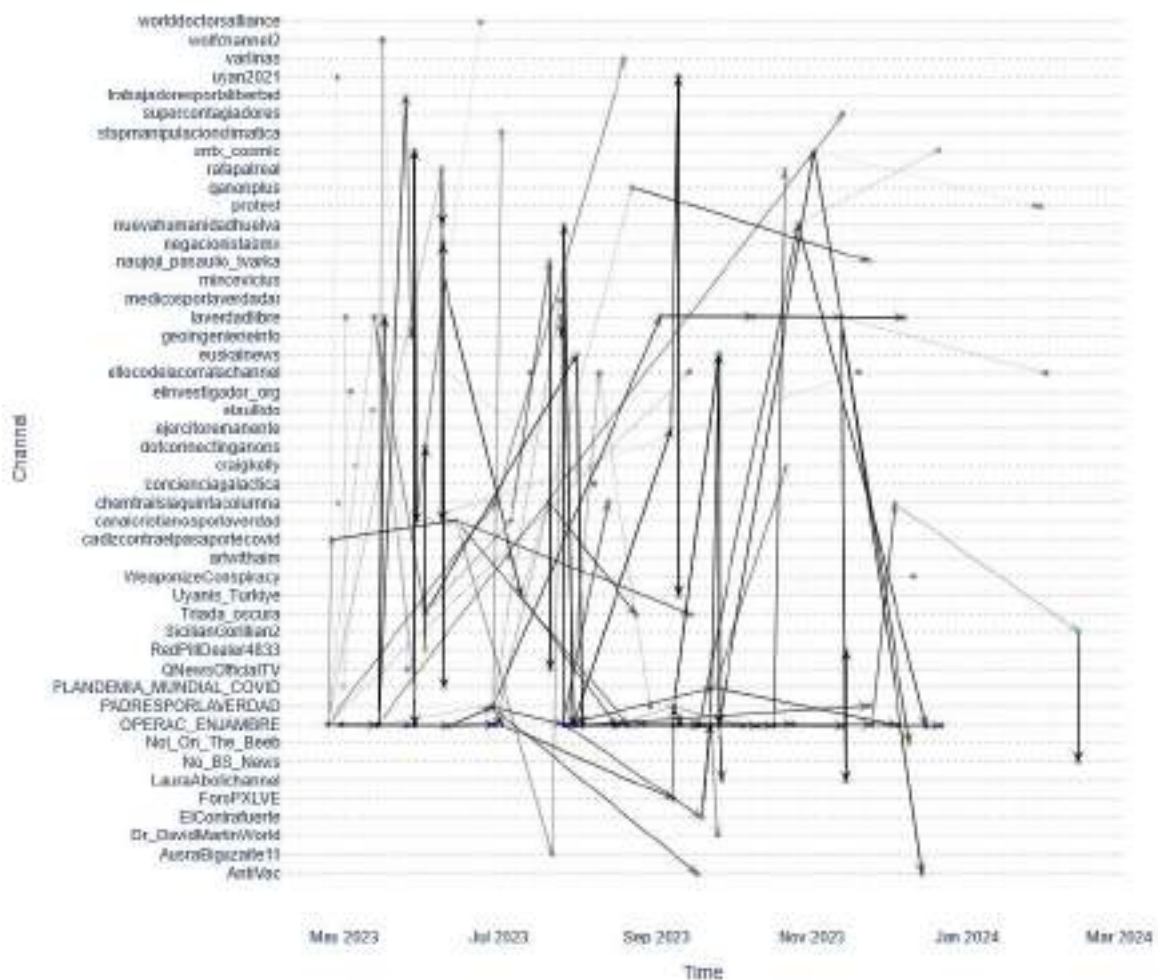
There are no clear influencing posts or receivers, just overwhelming cross-posting across channels. We found that most messages during these interest spikes are mostly copy-pasted across channels; meaning they have been spammed across multiple channels. This is particularly interesting during the September '22 spike,

where the messages are mostly identical, but translated across the international community.

It is likely that someone (or a group) has jointly decided to discuss Giaeever across several forums simultaneously to foster discussion and reinforce climate change denial. The triggering incident, if there's any, for these interest spikes are undetermined.

Next is Hoax 43: “[Translated] *It's fake that Spain and 12 additional countries have signed an agreement to abolish agriculture due to climate change.*”. This hoax alludes to a fake bill passed by European countries. Figure 6 illustrates the discourse of this hoax:

Figure 6. Hoax 43 Climate: *Es falso que España y 12 países más hayan firmado un acuerdo para abolir la agricultura por el cambio climático*



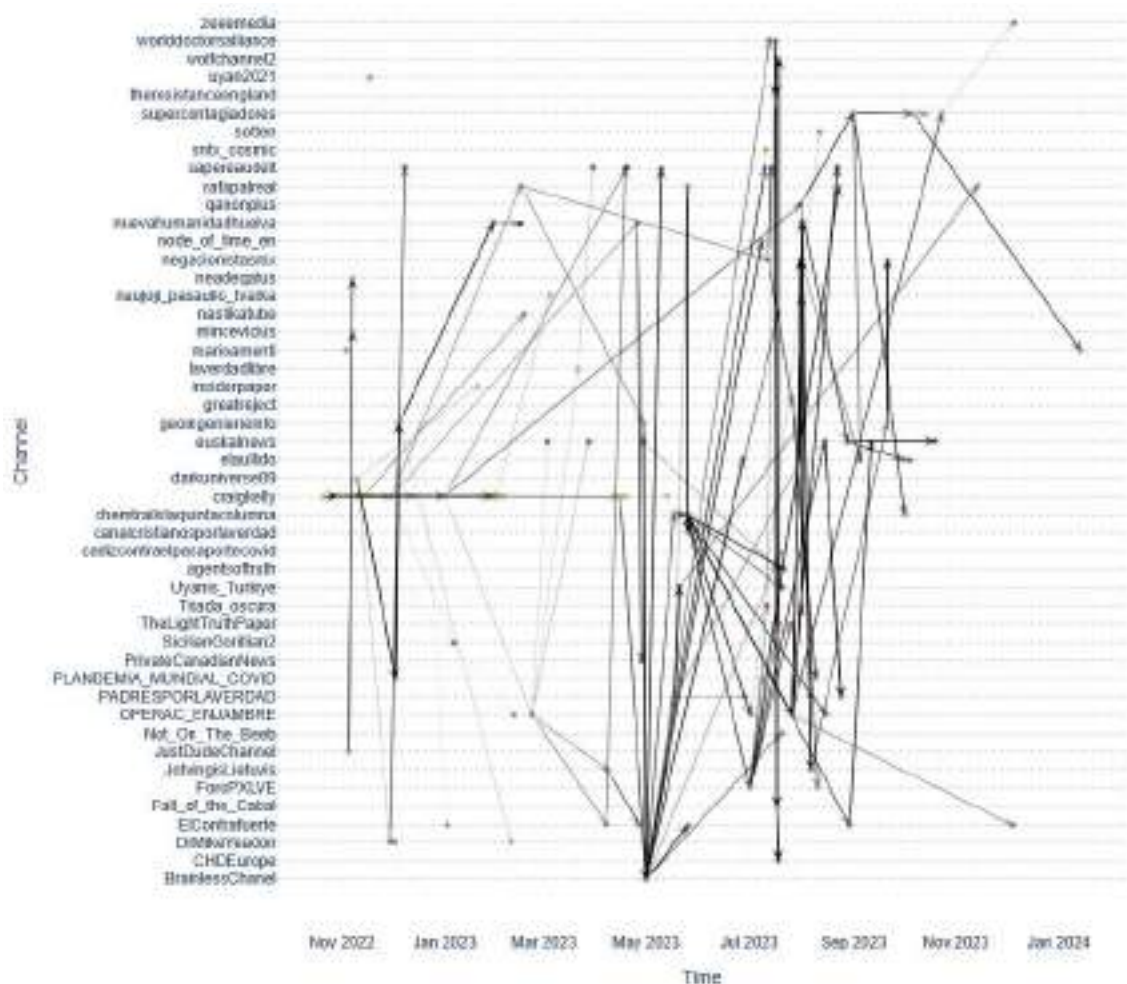
Aside from the width of the graph we find some added insights. In particular, in this graph we find a clear discourse leader: “OPERAC_ENJAMBRE”. This channel is the most prolific when talking about this topic, most of its posts influencing outwards the discord from channel to channel; but it also is influenced by other forums in a similar amount. In this sense, it is ambivalent, being both influenced actor and disseminator.

Other prolific channels include “laverdadlibre” for example, but none come close to the designated discourse leader. In fact, we observe that the first message of this hoax was published by the leading channel, which is not usually the case.

Aside from a leader, we find no more meaningful insights, as the hoax is quite short-lived, being fact-checked around June '23 by outlets like [Maldita.es](#) and [Newtral.es](#), which matches the beginning of the life-cycle of the hoax; and finally dies down by January 2024. Compared to other hoaxes, this one is relatively short-lived, considering the time window extends to March '24. Such targeted hoaxes to particular fake legislations end up dying out in favor of newer hoaxes.

Finally we show Hoax 74: “[Translated] *The hockey stick climate graph that represents an unprecedented rise in temperature since the XX century, is reliable.*” (Figure 7). The hockey stick climate graph⁵ alludes to a popular series of data where temperature increases dramatically when observing time from the year 1000 to 2000 (or actuality). The hoax alludes that this particular data is fake, probably used to manipulate the masses.

Figure 7. Hoax 74 Climate: La gráfica climática del palo de hockey, que representa un aumento de las temperaturas sin precedentes a partir del siglo XX, es fiable



Again, there is a large breadth of channels in our analysis, but we find some interesting patterns. First, “craigkelly” is a foreign channel, filled with English-speaking users. This channel acts as an influencer on the earlier stages of the hoax from its inception to

⁵ An iteration of the graph: commons.wikimedia.org/wiki/File:T_comp_61-90.pdf (Note: There are multiple versions of this graph, but the hockey-stick shape prevails)

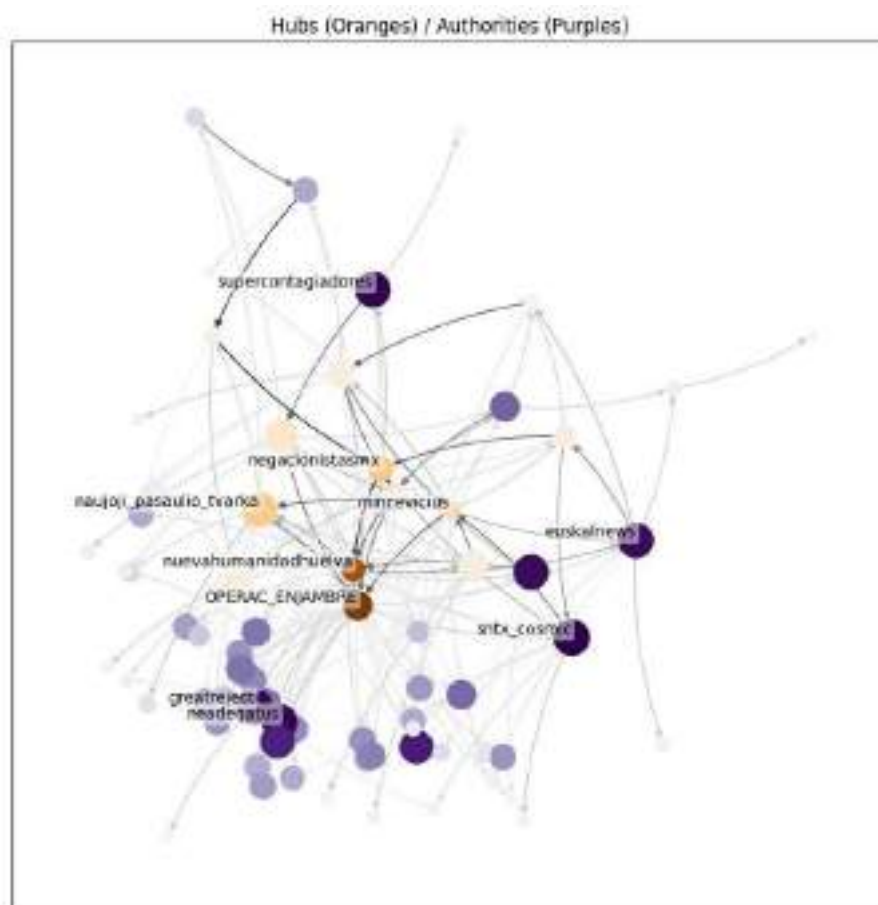
May '23. Aside from some individual messages posted between November '23 and May '23 (like "PLANDEMIA_MUNDIAL_COVID" in October '23 or "Nuevahumanidadhuelva" in March '23) there is almost no discourse in the Iberian peninsula involving this particular hoax. We entertain the thought that this particular hoax is completely imported from abroad from Anglo-Saxon countries. First, it spawned abroad, then Spanish and Portuguese speaking countries imported this hoax, which is self-evident by "craigkelly" density of comments and the absence of iberian discourse.

Finally, after May '23, the hoax became more widespread, with extremely influential messages from both anglosaxon channels ("brainlesschannel" in May '23) and spanish-speaking channels ("chemtrailsquintacolumna" in early June '23). These super-influential messages spread across the entire graph, almost defining the discourse in its entirety.

To conclude the analysis of hoax 74, it is alarming how misinformation has become increasingly global, to the point of being outright imported from other countries (such as slavic for this analysis). This phenomenon requires further study.

We show the primary actors across all hoaxes in Figure 8, where we examine again the hubs and authorities of climate change discussion. Here we observe the main actors (named vertices) of discourse. In this scenario we find very few hubs, people that consult authorities to publish information, while we find many more authorities.

Figure 8. Climate change hubs and authorities

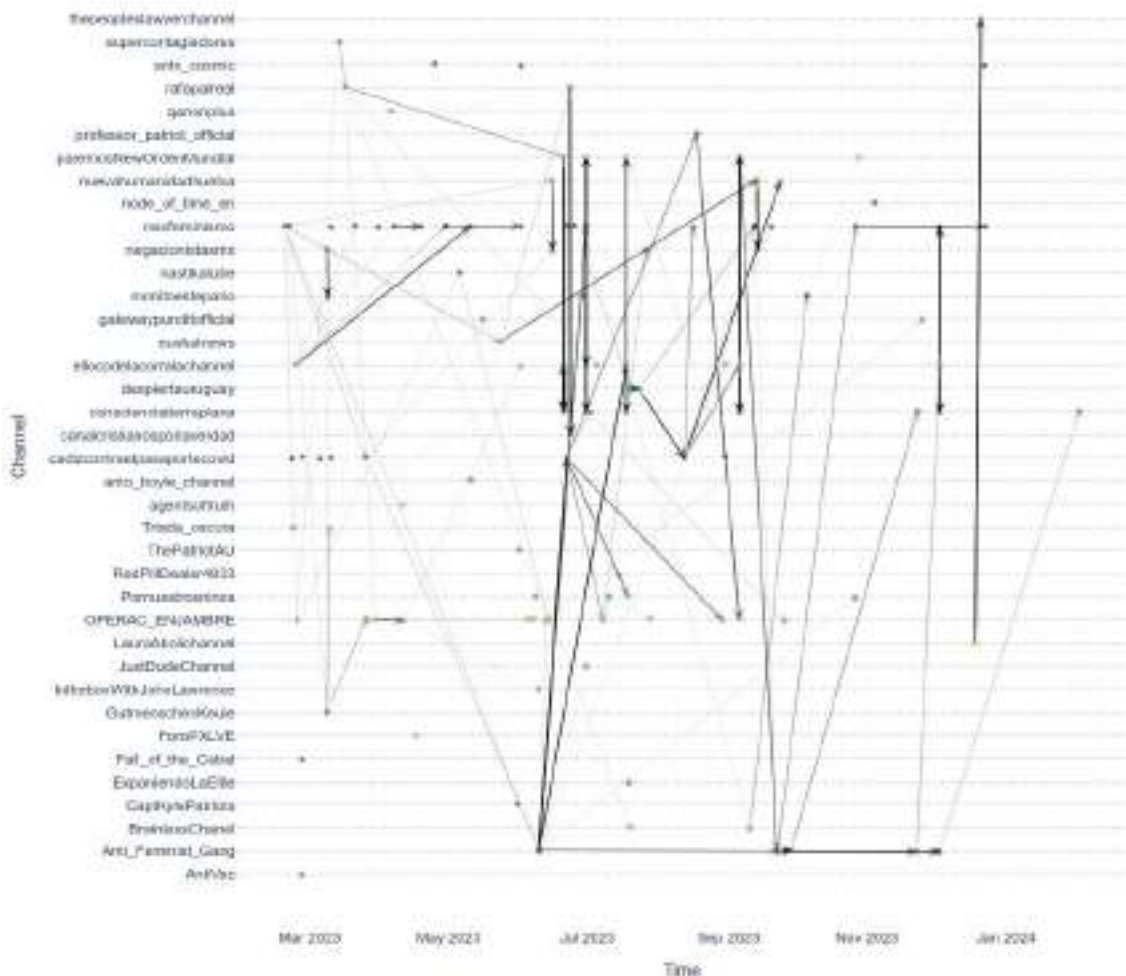


This imbalance of authorities and hubs is an important point. This means that the misinformation on this topic is frequently ‘cross-pollinated’, where channels ‘make up’ new hoaxes on a regular basis without a clear pattern. There are still some important hubs like “OPERAC_ENJAMBRE” or “nuevahumanidadhuelva” but they aren’t nearly as influential as the largest authorities (like “greatreject”, “euskalnews” or “supercontagiadores”).

3.2 Gender issues cascades and influence

Finally, the graphs for the last set of hoaxes are explored. We begin with hoax 19 depicted in Figure 9: “[Translated] *Sexual aggression in Coimbra University. Is denunciation without names valid during legal processes?*”. This alludes to the hoax that, in Portugal, a sexual violence denouncement can be carried out without naming the victim/aggressor. It is a common trend amongst misogynistic forums to attack laws protecting women’s rights to safety. This hoax falls in line with this particular train of thought.

Figure 9. Hoax 19 Gender: Assédio sexual na Universidade de Coimbra. Denúncia "sem nomes" é válida em processo legal?



With this in mind, it stands to reason that the channel “neofeminismo” is the most active around this hoax at the beginning of this hoax lifecycle. This channel is a hotspot for anti-feminist rhetoric, which again, is expected for this hoax. However, other comments don’t fall neatly into this category. For example “cadizcontraelpasaportecovid” is a Covid-19 skeptic group, another completely different topic, but it has still been detected to talk about this issue. Later in the timeline, we find cross-posting during June ‘23 from channels “paremosNewOrdenMundial” and “conscienciaterraplana” which are both conspiracy-theory centric. This is also true for “OPERAC_ENJAMBRE”, which also frequently posts about these issues too. So, it seems that misogyny is widespread in conspiracy theory adjacent channels, as well as covid-denier communities.

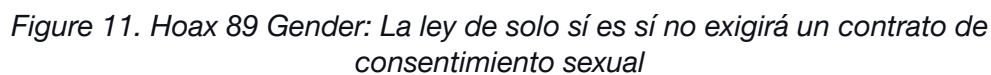
The spread of this hoax however is quite subdued. Take note of the low similarity all across the timeline. Thin, transparent lines denote low similarity between posts, meaning that the misogyny trend is loosely connected, but ever-present in these communities. Another reading could be that, because of their loosely related connection to misogyny, their messages aren’t influenced by other channels, instead being influenced mostly by offline opinions. Most of the cascades we have studied so far have many high-similarity connections between messages, so we deem this propagation unusual. We conclude that we do not find this hoax to be evenly propagated at all, instead being disseminated sparsely across time.

Hoax 47 is depicted in Figure 10: “[Translated] *Not a photoshop montage: Cepsa has hung the LGBTI flag on their gas stations*”. This references the common upheaval caused by hanging LGBTI flags, usually carried by homophobia, transphobia and queer-centric hate-speech.

We observe that contagious messages (showing high similarity and high number of outward edges) begin 4 months after the first message on this topic is found. Another example of disjointed discourse. However, this dynamic changes from September ‘22 onwards, where there are many examples of influential messages.

It appears that “ForoPXLVE” leads the discussion, however it is usually influenced by outward channels. On this note, “ForoPXLVE” is a sub-group of “Padres por la verdad” whose influence is negligible in this graph. Most of the crossed activity of this hoax goes from March ‘23 to October ‘23, where very high cross-posting and influence is shared across the entire graph.

Finally, on Figure 11, we analyse hoax 89: “[Translated] *The ‘Only yes is yes’ law won’t demand a sexual consent contract.*” This alludes to a specific law in Spanish courts, that requires enthusiastic consent from both parties to be considered consensual relationships. Right-wing pundits usually rally their followers by claiming that sex will be preceded by a written contract, sometimes in mockery, sometimes (like this hoax) completely straight.



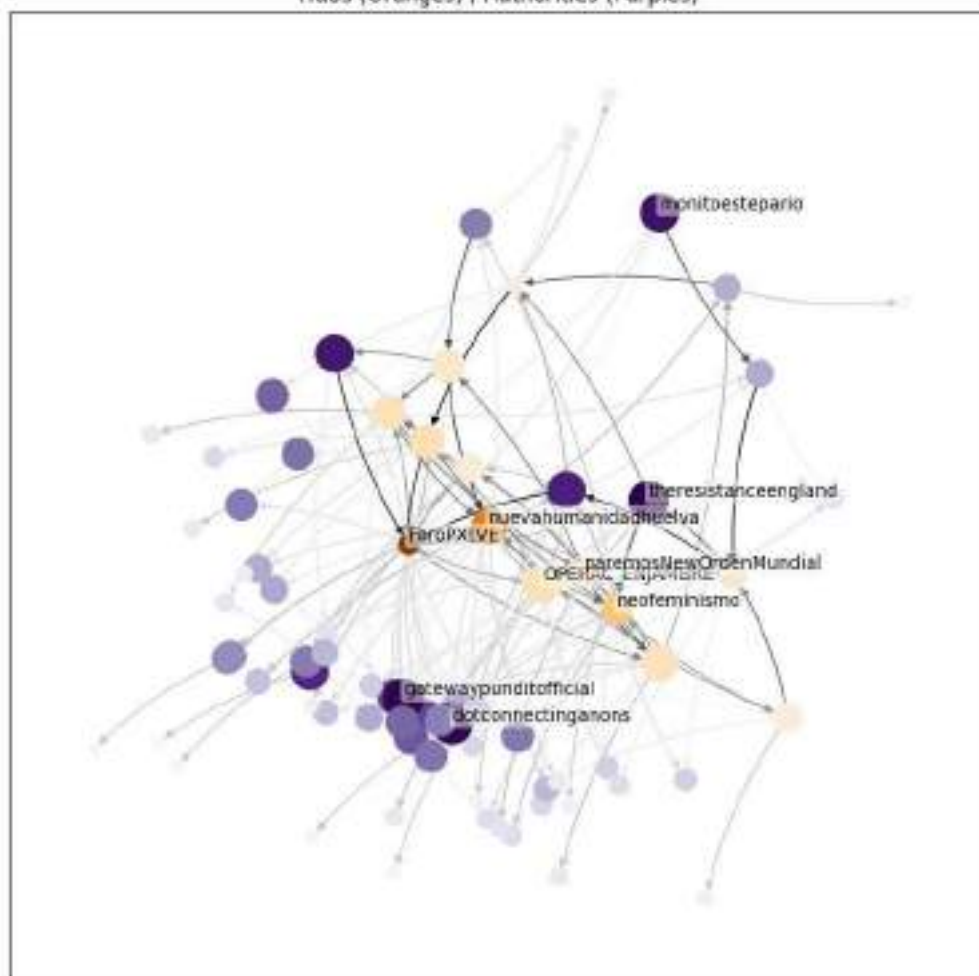
Therefore, taking this narrative into question, it comes as no surprise how “neofeminismo” is the most frequent poster in this hoax again. It’s useful to visualize how the observations from this graph match the observations from the previous misogyny hoax. A heavily disconnected discourse, a mixed bag of actors, it matches step by step. There are some additional observations worth noting. For instance, “ForoPXLVE” reposts frequently in “PADRESPORLAVERDAD” which is expected. Discourse seems even more sparse than before, with some cross-posting associated between channels and little else.

One notable mention is “medicosporlaverdadar” which has a fairly influential message early on in the graph. This is an Argentinian channel vinculated to “medicosporlaverdad” and “PADRESPORLAVERDAD”. In this representation, a hispanic non-iberian channel, has influenced discourse around the issue before it arrived to the iberian peninsula. This is quite the finding, as it proves how interconnected online social networks are, and the *dangers of international misinformation movements*.

Finally, in Figure 12, we show hubs and authorities for gender-issue discourse. As with the previous graph on climate change, the prevalence of authorities is overwhelming. The only hubs “nuevahumanidadhuelva” and “ForoPXLVE” seem to mostly aggregate information about other channels. On the other hand, we see known names, like “PADRESPORLAVERDAD”, “neofeminismo” or “OPERAC_ENJAMBLE” which protagonize some of the discourse.

All taken into account, we draw the same conclusion as with climate change hoaxes, with little variation. This, in itself, is a worthwhile consideration, tightly linking two vastly different topics of discussion under the same explanations may point to the similar ways in which misinformation operates regardless of topics.

Hubs (Oranges) / Authorities (Purples)



4. Stance detection analysis

The proliferation of misinformation in digital media environments has created an urgent need for systematic approaches to detect and analyze false or misleading content. Disinformation has become one of the main communicative challenges, affecting public perception and decision-making in critical areas such as politics, health, and environment (Organización Mundial de la Salud 2022). It can appear by mistake or with intention, and in times of crisis it compromises social response. Different actors, including governments, political parties, media, corporations, and individuals, act as producers or amplifiers of false content (Salaverria 2025).

Climate disinformation presents particularly complex challenges, taking many forms from direct denial to confusing or alarmist narratives. It includes subtle discourses that recognize the problem but reduce urgency and promote inaction through concepts such as delayism (Fernández Reyes 2024), inactionism and obstructionism (Sánchez & Martín n.d). International institutions like the IPCC and the UN warn that some disinformation is intentional to slow social response (Blanco et. al. 2021), which erodes trust in science. In Spain, one of the most vulnerable countries, while social networks are often considered primary spaces for fake news (Rodrigo-Cano & Del Río Álvarez 2021), traditional and digital news media play equally important roles as they can both share scientific information or amplify disinformation narratives.

This document presents two complementary Large Language Model-based approaches to automated dis- information detection, both applied to climate change narratives within the Iberian digital media ecosystem. The first approach employs thematic clustering before classification to improve the automated detection of disinformation narratives. The second approach implements a stance detection pipeline that leverages a comprehensive database of verified fact-checks from the IBERIFIER fact-checkers network.

The stance detection pipeline builds upon evidence-based verification by integrating artificial intelligence techniques with established fact-checking work. The system's primary objective is to detect instances of previously fact-checked disinformation in news articles and analyze whether these articles support or refute the debunked claims. This approach enables researchers and policymakers to study the spread and persistence of misinformation within digital media ecosystems, specifically for the Iberian context.

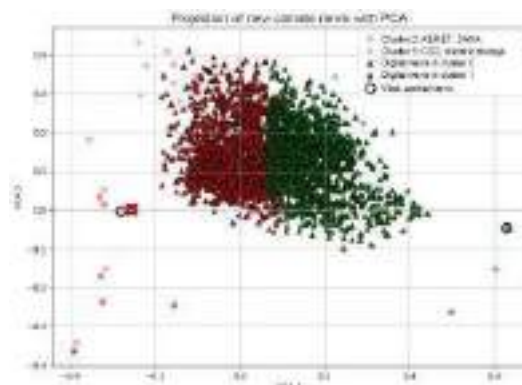
Both systems address specific challenges associated with natural language processing in multilingual environments. The technical implementations combine multiple computational approaches including Large Language Models, Retrieval Augmented Generation (RAG) with hybrid retrieval methods, thematic cluster- ing, and specialized stance detection techniques to ensure robust performance across different languages. This document presents the methodological foundations, technical architecture, and operational characteristics of both approaches, focusing on their complementary strengths and performance in detecting climate-related misinformation.

4.1. Thematic clustering for Narrative Detection

Clustering techniques group related elements together. Here, we analyse the stance of texts surrounding weather and climate change discourse. The clustering divided the fakes into two semantic groups. Cluster 0 included affirmations linked to local weather events such as the DANA and references to the AEMET, while cluster 1 focused on structural discourses related to CO2 and climate change. This second cluster was considered a transversal and timeless narrative, not connected to specific meteorological events.

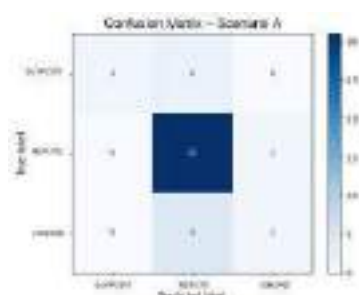
After projection of the 3,006 selected news items onto the semantic space, and after applying stratified filtering, 2,395 news remained (Figure 12). Of these, 930 belonged to cluster 0, centered on local meteorological phenomena, and 1,465 to cluster 1, related to climate change and CO2 emissions. The values of cosine similarity indicated a clear difference: cluster 1 reached higher semantic similarity (max 0.65, mean 0.35) than cluster 0 (max 0.53, mean 0.14). For that reason, cluster 1 was chosen for main analysis.

Figure 12. Projection of digital news in the semantic space created from verified fakes. The news appear as triangles with colors according to their cluster. The shaded circles show the reference fakes, and the crosses mark the centroids of each group.



Classification Performance Results (Figure 13): Scenario A gave the best results: $F1 = 0.79$, with strong performance in REFUTE ($F1 = 0.90$). Scenario B had lower accuracy ($F1 = 0.46$), and scenario C was intermediate ($F1 = 0.58$). The results demonstrate that thematic clustering, especially combined with semantic filtering, improves the narrative precision of the system.

Figure 13: Confusion matrix for scenario A: news close to the fake. Most of the news labeled as REFUTE were classified correctly by the model. The IGNORE and SUPPORT classes were less precise.



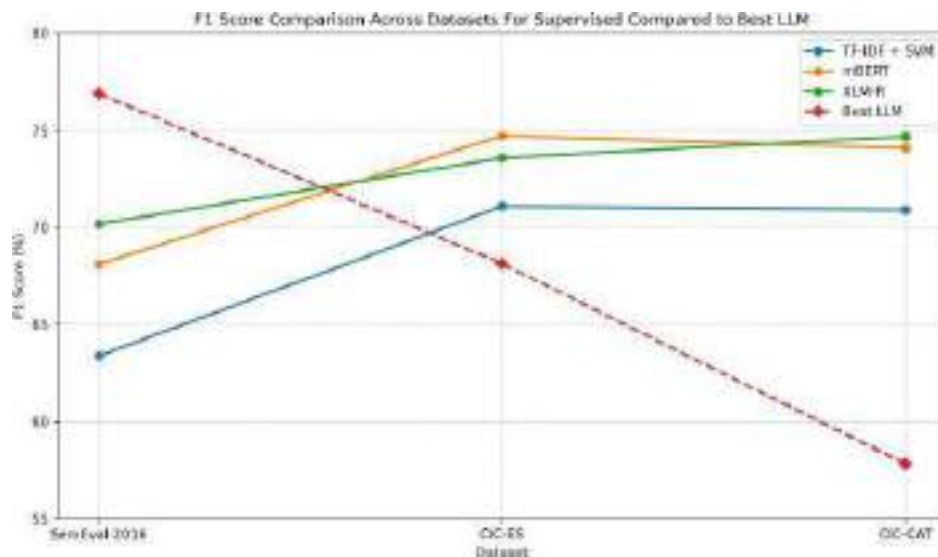
The superior performance of Scenario A ($F1 = 0.79$) compared to scenarios without clustering demonstrates the effectiveness of combining thematic organization with semantic similarity filtering. The strong performance in the REFUTE category ($F1 = 0.90$) indicates that the system successfully identifies news articles that contradict climate disinformation narratives. This approach proves particularly valuable for detecting content that actively counters false climate claims.

4.2. Generative approach for stance detection

We evaluate generative LLMs for multilingual stance detection across five prompting strategies, four models, and two datasets (SemEval-2016 in EN; CIC in ES/CAT). Performance is reported as macro-F1 over favor /against.

Evaluation of Open-Source LLMs. With English-only prompting, few-shot and the mCoS consistently outperform other schemes on small models. Qwen-7B (mCoS) yields the best small-model averages (SemEval: 72.21%; CIC: 50.82%) and exceeds prior SOTA on CC (78.88%) and HC (77.60%); Mistral-7B few-shot leads CIC-ES (53.10%). Prompting in the dataset's native language (ES/CAT) lowers scores: the best in-language mCoS reaches CIC-ES: 48.99%, CIC-CAT: 50.23%, CIC Avg: 49.61%, indicating a strong English bias. This summary is visualized in Figure 14.

Figure 14: F1-score comparison across supervised baselines (TF-IDF + SVM, mBERT, XLM-R) and the best-performing generative LLM setup for each dataset.⁶



Scaling up improves results substantially. Qwen-72B (mCoS) attains 76.89% on SemEval and 62.98% CIC average, surpassing SOTA in most categories (e.g., CC: 88.55%, CIC-ES: 68.14%, CIC-CAT: 57.82%); Mistral-24B also posts gains (AT: 74.15% with mCoS; HC: 87.72% with few-shot). Against supervised baselines, Qwen-72B (mCoS) outperforms all finetuned models on SemEval, but on CIC the

⁶ While the LLM surpasses all baselines on the English SemEval-2016 dataset, it underperforms on the multilingual CIC-ES and CIC-CAT datasets.

finetuned encoders (mBERT/XLM-R) exceed 74%, remaining superior in non-English settings. (See Tables 7–9 and Fig. X.)

Table 7: English Prompting results⁷.

Model	Prompting	LA	AT	CC	FM	HC	SemEval Avg	CIC-ES	CIC-CAT	CIC Avg
Mistral-7B	Zero-Shot	50.53	23.55	74.04	54.81	61.94	56.29	48.77	43.28	48.77
	Few-Shot	66.77	25.82	74.88	58.08	60.38	60.05	53.10	44.52	48.81
	Chain-of-Thought	51.58	26.21	<u>76.05</u>	55.98	55.19	55.09	46.81	41.40	44.11
	Chain-of-Stance	46.69	31.98	70.99	61.65	<u>67.08</u>	59.26	51.95	<u>47.44</u>	<u>49.70</u>
	COLA	64.28	<u>37.10</u>	58.10	<u>62.26</u>	64.46	<u>63.86</u>	49.96	46.16	48.06
Qwen-7B	Zero-Shot	52.27	34.99	67.38	68.37	75.08	64.13	35.56	36.35	36.00
	Few-Shot	58.39	49.28	64.23	66.62	68.75	65.59	45.53	43.70	44.62
	Chain-of-Thought	53.85	27.46	67.85	67.76	72.77	62.39	32.97	34.08	33.53
	Chain-of-Stance	57.09	60.84	78.88	68.77	77.60	72.21	<u>52.59</u>	49.05	50.82
	COLA	<u>59.68</u>	51.86	59.43	62.95	<u>76.41</u>	68.27	44.73	48.31	46.52
Stance Reasoner (SOTA)		74.30	72.00	60.00	74.00	76.10	75.10	49.50	55.40	52.45

Ablation Study of Modified Variant of Chain of Stance. We ablated each step of the modified CoS using Qwen-72B on SemEval-2016 and CIC (Table 10). The full CoS yields the best CIC results (CIC-ES: 68.14%; CIC Avg: 62.54%), and removing steps generally degrades performance, indicating additive value. Exceptions are dataset-specific: on CIC-CAT, every ablation slightly improves over the full method (best 59.28% when dropping Context Understanding); on SemEval-2016, removing Context Understanding gives the top average (78.06%). Effects vary by target with no consistent pattern. Notably, removing Logical Inference has no impact anywhere, so it can be omitted for efficiency without loss. Overall, most steps help, but gains are dataset and category-dependent; the full pipeline, minus Logical Inference, is the most reliable.

Table 8: In-Language Prompting results⁸.

Model	Prompting	SemEval Avg	CIC-ES	CIC-CAT	CIC Avg
Mistral-7B	Zero-Shot	56.29	47.55	49.90	<u>48.73</u>
	Few-Shot	60.05	47.25	<u>50.11</u>	48.68
	Chain-of-Thought	55.09	45.95	47.68	46.82
	Chain-of-Stance	59.26	<u>48.28</u>	46.38	47.33
	COLA	<u>63.86</u>	45.52	42.79	44.16
Qwen-7B	Zero-Shot	64.13	35.30	42.55	38.93
	Few-Shot	65.59	47.06	46.99	47.03
	Chain-of-Thought	62.39	31.66	42.49	37.08
	Chain-of-Stance	72.21	48.99	50.23	49.61
	COLA	68.27	41.30	41.55	41.43
Stance Reasoner (SOTA)	Few Shot	75.10	51.60	50.60	51.10

Table 9: F1-scores of supervised baselines versus best-performing LLM setups.
Qwen-72B for the SemEval- 2016 and CIC corpus using CoS method.

⁷ F1 scores (in percentages) for each prompting method and model across all SemEval-2016 targets and CIC datasets. The Stance Reasoner baseline is included for comparison. SemEval Avg is the average F1 over the five SemEval categories; CIC Avg is the mean of CIC-ES and CIC-CAT scores. Bold indicates the best score in each column. Underline is the best score per model. Bold and underlined surpasses SOTA.

⁸ F1-scores (in percentages) for each prompting method across SemEval- 2016 and the CIC. Bold indicates the best score in each column. Underline is the best score per model. Bold and underlined surpasses SOTA.



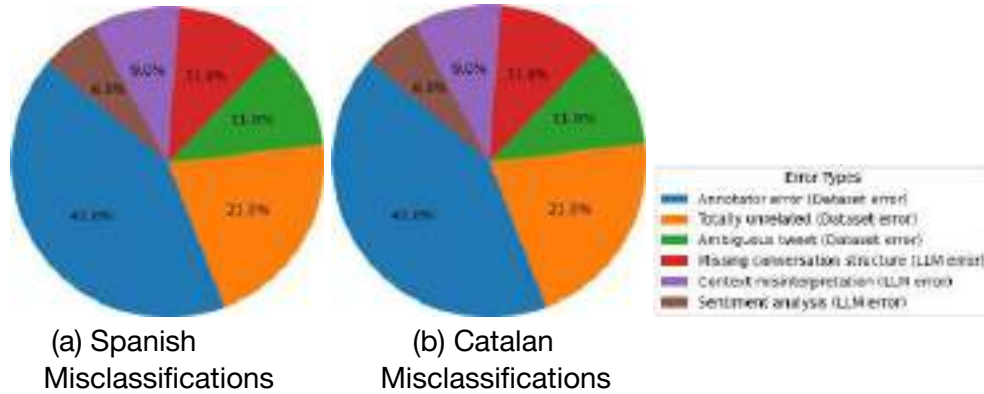
System	SemEval-2016 Avg ⁹	CIC-ES ⁷	CIC-CAT ⁷
TF-IDF + SVM	63.38	71.09	70.90
mBERT (msl 256, batch 32, lr 5e-5, 5e)	68.10	74.72	74.08
XLM-R (msl 128, batch 16, lr 2e-5, 10e)	70.17	73.57	74.68
Best LLM (for comparison)	76.89	<u>68.14</u>	<u>57.82</u>

Dataset and LLM Logic Analysis. We manually analyzed 100 Spanish and 100 Catalan tweets from the CIC dataset, focusing on misclassifications made by the Qwen-72B model under the modified CoS prompting method (previously the best-performing setup). The annotator—a native Catalan speaker and trained NLP engineer—categorized each error as either dataset-related or model-related.

Dataset-related error categories included: annotator error (incorrect labels), totally unrelated (not about the independence movement), and ambiguous tweets (too vague for reliable labeling). Model-related errors were: missing conversation structure (reply-dependent meaning), contextual misinterpretation (failure to capture cultural/political nuance), and sentiment analysis error (misreading tone or intent).

For Spanish tweets, most errors were dataset-related: 42% annotator errors, 21% unrelated, and 11% ambiguous. Only 26% stemmed from model reasoning (Figure 15). Catalan tweets showed a similar pattern: 39.4% annotator errors, 18.2% unrelated, and 13.1% ambiguous (Figure 15). Correcting annotation issues and removing unrelated tweets reclassified 42 of 100 Spanish and 39 of 100 Catalan misclassifications.

Figure 15: Pie charts showing the distribution of labeled misclassifications for Spanish and Catalan tweets in the CIC dataset using the Qwen-72B Chain-of-Stance method.



In the full datasets, the most frequent Spanish errors were Against→None (151), Favor→None (150), and Against→Favor (97). In Catalan, the largest errors were Against→Favor (330), Favor→Against (183), and Against→None (115). Notably, the model often over-inferred pro-independence stance from Catalan-language tweets.

RT @JCM Cat: La resposta de la GC que ha difo's l'escamot de suport! Ara, el paio no s'acosta a l'artefacte, eh!

(Translation: The GC response that the support squad has spread! Now, the guy doesn't go near the artifact, huh!)

⁹ Supervised scores are reported from (Zotova et al. 2021).

This tweet was originally labeled as None, yet the model predicted it as Favor. In its mCoS reasoning, the model inferred a high probability of a pro-independence stance, citing the language, sociopolitical context, and skeptical tone. Notably, the model explicitly justified its prediction as follows:

The stance most logically supported by the text is FAVOR towards the Catalan independence movement. Here's why:

Language and Context: The tweet is written in Catalan, which is a strong indicator of alignment with the Catalan independence movement. The use of Catalan language in this context is significant because it is often associated with Catalan nationalism and the independence movement.

Content and Tone: The tweet shares a response from the Mossos d'Esquadra (Catalan police) regarding an incident involving an independentist group. The tone is skeptical and critical of the police's actions, which suggests a supportive stance towards the independentist group. The phrase "eh!" at the end of the tweet adds a dismissive tone, indicating that the author does not fully trust or accept the police's response.

While the reasoning appears coherent, the prediction overlooks the fact that language use alone is not a reliable indicator of political stance. The tweet does not explicitly express support for independence, and the model's overreliance on linguistic and tonal signals—such as assuming Catalan equals Favor—demonstrates a form of stereotyping.

Overall, results indicate that dataset noise—labeling inconsistencies and low-quality annotations—accounts for a substantial share of misclassifications, overshadowing model reasoning flaws. This contrasts with the better-curated SemEval-2016 dataset, where prior work (Taranukhin et al., 2024) identified far fewer annotation errors.

Table 10: Ablation study of the modified CoS reasoning steps on Qwen-72B. Results are F1 scores (in percentages) for SemEval-2016 and CIC datasets. Bold numbers are ablations that outperformed the Full CoS Method.

Configuration	LA	AT	CC	FM	HC	SemEval Avg	CIC-ES	CIC-CAT	CIC Avg
Full CoS	68.12	74.14	88.55	72.17	77.82	76.89	68.14	57.82	62.54
Without Context Understanding	66.58	74.84	86.90	74.00	84.33	78.06	62.35	59.28	60.82
Without Viewpoint Extraction	68.58	71.15	89.11	70.83	76.55	75.96	66.66	58.42	62.39
Without Sentiment Analysis	67.30	72.04	88.73	72.41	77.49	76.29	66.72	58.36	62.54
Without Stance Comparison	68.61	52.38	84.62	72.75	79.02	75.04	60.17	58.42	59.30
Without Logical Inference	68.12	74.14	88.55	72.17	77.82	76.89	68.14	57.82	62.54

4.2.1 Discussion

The results of this study demonstrate that instruction-tuned LLMs can be highly competitive with supervised methods in English, but their effectiveness decreases in multilingual contexts. On the SemEval-2016 dataset, Qwen-72B with mCoS prompting achieved a macro-F1 of 76.89%, surpassing supervised baselines and showing that generative models, when guided by well-structured prompts, can match or exceed fine-tuned approaches without labeled data. In contrast, performance on the Catalonia Independence Corpus (CIC) averaged 62.98%, falling short of fine-tuned multilingual



baselines such as mBERT and XLM-R, which achieved over 74%. This suggests that while larger LLMs benefit from broader pretraining and demonstrate stronger generalization, fine-tuning remains critical in low-resource and culturally specific settings.

Prompting strategies played a decisive role across experiments. Few-shot and mCoS prompting consistently outperformed zero-shot, CoT, and COLA methods, particularly for smaller models. The strength of the mCoS method lies in decomposing stance detection into structured reasoning steps, which both improved performance and enhanced interpretability. By generating contextual background information about the tweet, its author, and audience before proceeding to sentiment and stance evaluation, mCoS provided models with implicit world knowledge that improved classification accuracy, especially in Spanish and Catalan. This aligns with supervised approaches that incorporate external knowledge sources and highlights the importance of contextual grounding in multilingual stance detection. Another advantage of mCoS is transparency: by exposing intermediate reasoning steps, it allows researchers to pinpoint where the model's logic fails and refine prompts accordingly.

At the same time, our analysis uncovered systematic biases. In CIC-CAT, the model often inferred proindependence stance solely from the use of Catalan language, reflecting a linguistic bias rooted in pretraining data. While the reasoning appeared coherent, predictions frequently relied on language as a proxy for political stance, illustrating the risk of stereotyping and underscoring the need for multilingual fairness audits when deploying LLMs in politically sensitive contexts.

Dataset quality emerged as another major factor influencing results. Manual error analysis showed that around 60% of misclassifications in both Spanish and Catalan stemmed from incorrect labels or unrelated tweets, with an additional 11–13% too ambiguous for reliable human annotation. This suggests that LLM performance was likely underestimated due to dataset noise. These problems stem from the CIC dataset's semi-automatic annotation strategy, which assigned stance labels at the user level rather than per tweet. In contrast, SemEval-2016 was manually labeled at the tweet level, offering greater reliability. This finding highlights the critical importance of high-quality, carefully annotated datasets for both training and evaluation, especially in tasks where stance can be subtle or ambiguous.

Taken together, the findings suggest that stance detection is a particularly challenging but valuable benchmark for LLM evaluation. Unlike common reasoning tasks, it requires models to integrate tone, emotion, cultural nuance, and sociopolitical context—making it especially suitable for testing higher-order reasoning and multilingual robustness. Given its real-world applications in areas such as misinformation detection, political analysis, and content moderation, the consequences of misclassification are nontrivial, and stance detection deserves greater attention in benchmark design.

Nevertheless, several limitations constrain the present study. The evaluation was limited to four open-source LLMs, five prompting methods, English, Spanish, and Catalan data, and tweet-length inputs. Results may not generalize to other languages, scripts, or longer and more formal texts. Moreover, the manual error audit covered

only 200 tweets, representing a fraction of the CIC dataset. Broader re-annotation and expansion to more diverse languages would strengthen future analyses.

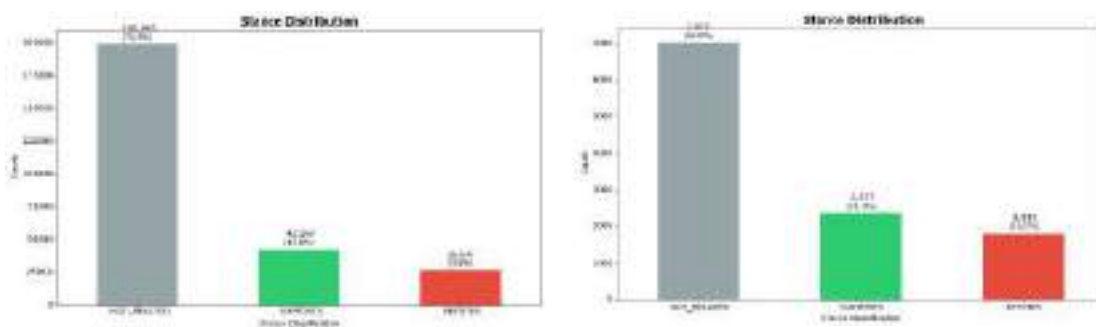
Finally, ethical considerations must be taken into account. Misclassifying stance in politically sensitive domains risks reinforcing polarization or enabling text-based censorship. Biases, such as associating Catalan language use with pro-independence stance, illustrate the dangers of cultural stereotyping. In addition, the environmental costs of running large-scale inference with massive models raise questions about sustainability and responsible research practices. Greater transparency and accountability—through open datasets, shared prompts, and interpretable reasoning methods—are essential to ensure that stance detection systems can be applied fairly and responsibly in real-world contexts.

These results were used to determine our course of action for the full Iberifier pipeline, which used our modified Chain-of-Stance prompting methods, which yielded the overall best results in English, Spanish, and Catalan and we used the Qwen2.5-72B-Instruct model which achieved the highest scores in a multilingual context. The model implementation details were applied the same as the methodology section.

4.3. Stance Detection Pipeline with Hybrid Retrieval

This analysis processed 16,249 articles from 1,594 newspapers collected between January and April 2025, including both national and regional sources and providing broad geographical coverage across Spanish-speaking countries. The system extracted 326,671 statements and 267,712 (82%) successfully matched with relevant fact-checks and received stance classifications from 5,516 unique fact-checks from five organizations: EFE Verifica, Maldita.es, Newtral, Polígrafo, and Verificat (see Figure 16).

Figure 16: Stance distribution for all sources and Iberifier digital media list.



(a) All sources (n=267,712 stance results)

(b) Iberifier digital media list (n=11,195 stance results)

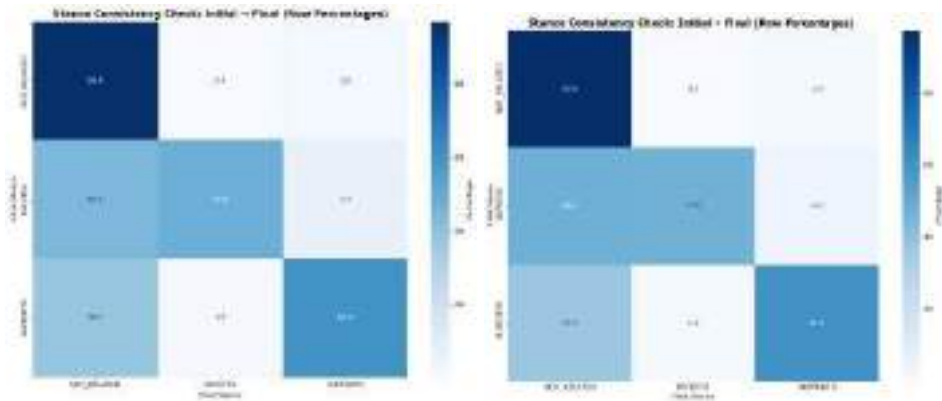
4.3.1 Dataset Comparison

All stance distributions use FINAL stance after consistency validation. Initial statement-level classifications (SUPPORTS 20.1%, REFUTES 15.1%, NOT_RELATED 64.7%) were refined through article-context re-evaluation to produce more conservative final stances. To validate stance classifications, the pipeline re-evaluates stances using full article context:

- Consistency rate: 82.1% (all sources), 81.8% (Iberifier digital media list)
- Change types: Most changes are clarifications (NOT_RELATED → SUPPORTS/REFUTES)
- Critical reversals: SUPPORTS ↔ REFUTES occur in only 2.3% of cases

Table 11 presents key metrics for both datasets and Figure 17, the change per label in both the full dataset and the dataset filtered using the Iberian digital media list.

Figure 17: Stance transition matrices showing consistency validation results. Diagonal dominance indicates high consistency rates (82.1% all sources, 81.8% Iberifier digital media list). Most changes represent clarifications from NOT_RELATED to specific stances rather than critical SUPPORTS↔REFUTES reversals.



(a) All sources (n=214,062)

(b) Iberifier digital media list (n=9,034)

Table 11: Dataset overview. Stance distributions use FINAL stance after consistency validation.

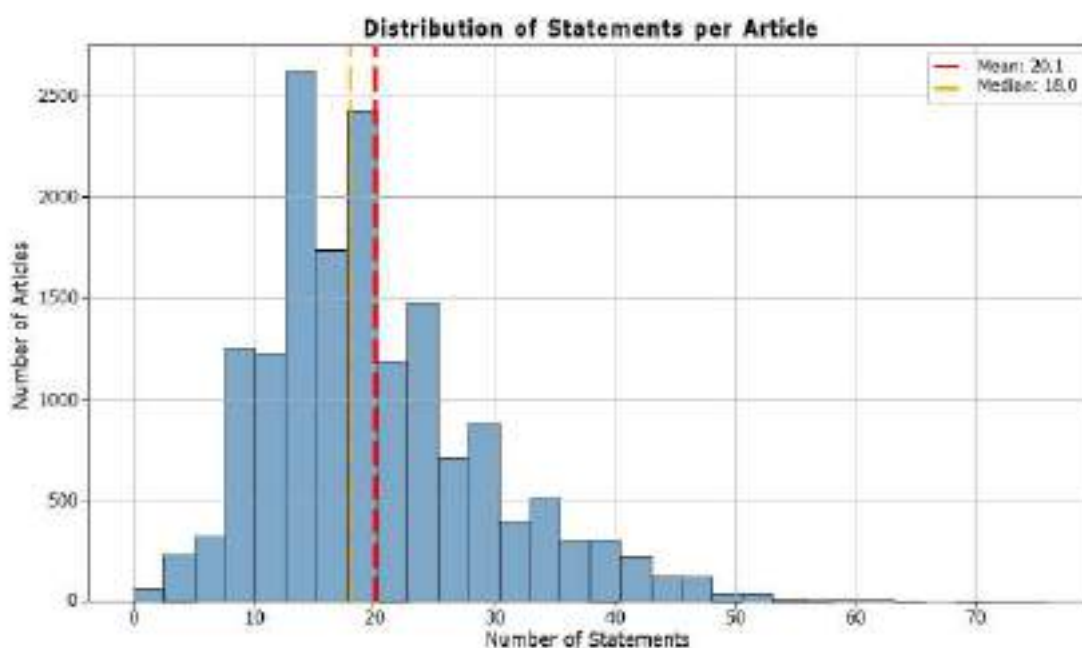
Metric	All Sources	Iberifier digital media list
Total articles	16,249	643
Total newspapers	1,594	84
Total statements	326,671	13,882
Avg statements/article	20.1	21.6
Stance Distribution (FINAL)		
SUPPORTS	15.8%	15.9%
REFUTES	9.9%	10.1%
NOT_RELATED	74.3%	74.0%
Consistency Validation		
Consistency rate	82.1%	81.8%

4.3.2 Analysis of stance detection

Of the 326,671 total extracted statements, 267,712 (82%) successfully matched with relevant fact-checks and received stance classifications.

The extraction of claim statements from news articles shows that on average an article contains 20.1 statements (all sources), 21.6 statements (Iberifier digital media list), see Figure 18.

Figure 18: Distribution of statements per article (all sources, $n=16,249$ articles).



The type of fact-checks retrieved were primarily False (49%), Explainer (26%) and Misleading (15%), see Figure.

Across all sources, 15.8% of statements SUPPORT fact-checks classified as “Falso” (see Figure 19) in legitimate media channels. To examine whether supporting and refuting stances vary in their placement throughout news articles, we analyzed the position of each stance-bearing statement within its article (0% = beginning, 100% = end). This analysis investigates whether media outlets strategically position fact-check-related content in prominent locations (headlines, leads) or bury it in later paragraphs.

Figure 19: Stance distributions by fact-check qualification type (all sources). Critical finding: 15.8% of statements SUPPORT fact-checks classified as “Falso” (debunked claims), indicating problematic misinformation propagation through