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# COVID-19 vaccine hesitancy: analyzing anti-vaccine rhetoric on Greek Facebook

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## Abstract

**Purpose:** The distinction between beliefs and facts, as well as between science and pseudoscience, appears to be hazy in the post-truth era. This study draws inspiration from public discourse concerning the safety of COVID-19 vaccines during the pandemic, aiming to explore the narratives of COVID-19 vaccine skeptics within the Greek online public sphere.

**Methodology:** For the purposes of our study, we analyzed Facebook posts from users' pages and public groups during a three-month period (from September 2021 to November 2021), focusing primarily on content related to COVID-19 vaccination. By employing thematic analysis, we investigated the main themes upon which the anti-vaccination camp bases its rhetoric and the sources it uses to justify its claims.

**Findings:** Our findings suggest that in the Greek online context, the anti-vaccination discourse, as expressed on Facebook platform, is an amalgam of distrust towards institutional actors (politicians, the medical community, legacy media, the establishment in general) and concerns regarding the safety/complications of COVID-19 vaccination itself.

**Social implications:** Our study contributes to the existing body of academic literature addressing the impact of social media platforms on public opinion related to health matters. It underscores the potential and challenges associated with the unregulated dissemination of information within polarized digital contexts.

**Originality/value:** This study sheds light on the distinctive characteristics of anti-vaccine rhetoric, as expressed on social media, within the context of Greek society. It

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offers insights to scholars and researchers interested in the dynamics of social media discourse and its implications for public health communication.

**Keywords:** COVID-19; anti-vaccine movement; vaccine hesitancy; social media; Greece; thematic analysis

## 1 Introduction

The coronavirus disease (COVID-19) signified an unprecedented global health crisis with severe consequences on every aspect of our lives. Sparse data and fragmented scientific information – at least over the first phase of the COVID-19 pandemic (March–December 2020) – resulted in social disruption and an “infodemic” outbreak, which subsequently laid the ground for conspiracy theories to flourish.

One considerable aspect of this infodemic trend is the anti-vaccine movement, which was further consolidated by the technological affordances of the online public sphere during the coronavirus pandemic. Within the Greek context, COVID-19 vaccination opponents can be broadly divided in two groups; the moderate one including people who are prone to believe in conspiracy theories, follow the advice of parish priests and other figures of questionable motives who share anti-vaccination sentiments or oppose medical science, in general, and on the other hand, a radical one which is more organized, is linked to far-right extremism and has played an orchestral role in disseminating fake news and anti-vaccination propaganda, mainly by exploiting the social media platforms (Karakatsani 2022).

The most prominent anti-vaccine movement in Greece was the self-proclaimed “Guardians of the Constitution” (*Thematofilakes tou Syntagmatos*), which opposed vaccines and public health measures (masks, covid tests, etc.) in general (Halikiopoulou et al. 2022). This group’s narrative is based on Article 120 of the Greek Constitution, which declares among others, that observance of the Constitution is entrusted to the patriotism of the Greeks, who shall have the right and the duty to resist by any means against anyone who attempts to abolish it by force. It is worth mentioning that members of this group have been prosecuted after kidnapping a junior high school principal for implementing the guidelines for prevention and control of COVID-19 in schools.

Vaccine hesitancy has not raised in a vacuum. Numerous factors have contributed to this phenomenon, but a significant one is the tendency of social media platforms to propagate misinformation (Ennab et al. 2022; Lazer et al. 2021; Sule et al. 2023). Moreover, social media platforms have significantly influenced the polarization of debates surrounding COVID-19 vaccinations. These platforms facilitate the dissemination of vast amounts of information, which often proves difficult to verify (Schmidt et al. 2018), and simultaneously support the formation of echo chambers. The latter amplifies

exposure to information that aligns with the pre-existing views of users, thereby intensifying polarization (Alatawi et al. 2021; Jiang et al. 2021; Modgil et al. 2021).

Furthermore, research indicates a correlation between the prevalence of anti-vaccine sentiments and extensive reliance on social media as the primary source of COVID-19 information (Kourlaba et al. 2021; McKinley and Lauby 2021). Additionally, the acceptance of vaccine conspiracy theories correlates with increased consumption of health-related information via social media (Featherstone et al. 2019). Lee et al. (2022: 533) suggest that during times of uncertainty, the need to belong to or portray oneself as a holder of “secret knowledge” can lead to the adoption of conspiracy theories. Despite these views being common among anti-vaccination advocates, the urgency and anticipation surrounding COVID-19 vaccines as liberators and conquerors of SARS-CoV-2 have given new momentum to anti-vaccine perspectives during the pandemic.

To tackle the spread of misinformation, social media companies have implemented fact-checking practices involving both human and algorithmic methods. Despite these efforts, further measures are necessary to ensure the accurate dissemination of COVID-19 scientific information (Cotter et al. 2022; Gisondi et al. 2022). Studies indicate that correcting misinformation can paradoxically reinforce false beliefs through a “backfire effect”, where individuals strengthen their support for misconceptions (Liu et al. 2022). This precarious information landscape contributes to vaccine hesitancy, exacerbated by misinformation, thus leading to the erosion of public trust in vaccines (Carrieri et al. 2019).

Our study explores the intense debate on vaccine safety during the COVID-19 pandemic, focusing on Greece. We differentiate between “anti-vaccine” activists, who deny all vaccinations based on a unified ideology, and “vaccine-hesitant” individuals, who exhibit a spectrum of acceptance (from total acceptance to complete rejection) and concerns that are contextually influenced (Dubé et al. 2021; Larson et al. 2014: 2150; Opel et al. 2011: 419). Notably, many vaccine-hesitant individuals adopt a “wait-and-see” approach due to fears of long-term side effects from new vaccines (Raballo et al. 2022).

This research aims to identify the central themes used by those fundamentally opposing vaccines and those with legitimate safety concerns, analyzing how these groups contribute to a cohesive anti-vaccine presence online (Germani and Biller-Andorno 2022: 1). Additionally, we examine the sources utilized by vaccine skeptics to legitimize their views, based on an analysis of Facebook posts derived from Greek users’ pages and public groups from September to November 2021.

## **2 Vaccine hesitancy: questioning the “infallibility” of the medical science in the social media era**

Vaccine hesitancy, defined as the delay or refusal to accept vaccinations, has been identified by the World Health Organization as one of the top ten global health

threats of 2019. This reluctance undermines healthcare efficiency and public health, particularly during pandemics when concerns about vaccine safety and efficacy are heightened by rapid market authorizations and perceived insufficient testing.

The discourse around vaccine policy, especially prevalent on social media platforms, often frames the debate as a conflict between “the people” and the “elites”, reflecting broader societal mistrust in authorities during health crises (Smyrnaiois et al. 2021). This mistrust serves as a “stress test” for public confidence in government and its institutions (Gumbi and Baba 2024; Reeskens and Muis 2021).

Stavarakakis and Katsambekis (2020:7–8) make reference to the utilization of scientific expertise from the majority of populist political actors to validate political decisions during the pandemic, suggesting that “experts are not neutral agents” in this policy making process. This approach aligns with the “Evidence-Based Policy-making” (EBPM) strategy, which, while not new, is both praised and critiqued in the literature for its ability to legitimize policy through scientific endorsement (Cairney and Oliver 2017; Françoise et al. 2022).

During crises, the reliance on expert guidance can bolster the credibility of political decisions, especially in technically complex policy areas (Angelou et al. 2023; Dowling and Legrand 2023). This use of scientific expertise aims to foster a *fiduciary* trust among the public, assuring them that the government acts in their best interest (Dowling and Legrand 2023: 322).

Conversely, social media platforms often propagate alternative viewpoints, challenging the monopoly of scientific truth and complicating policy legitimacy (Dowling and Legrand 2023: 323; Kata 2010: 1715). Such platforms amplify voices that might not align with mainstream scientific consensus, especially during the initial, uncertain phases of a crisis like the COVID-19 pandemic (Larsco and Curato 2019).

Importantly, while vaccine hesitancy is often associated with anti-science sentiments, research indicates that hesitancy stems not from a rejection of science but from concerns over transparency regarding vaccine safety and side effects (Hijazi et al. 2022; Hoffman et al. 2019). This skepticism is partly fueled by a shift towards a more participatory medical paradigm, where patients seek greater involvement in medical decision-making (Kata 2012).

### 3 Justification of resistance to institutional health mandates

Research on anti-vaccination content identifies prevalent themes, including the denial and devaluation of science, where the safety and efficacy of vaccines are questioned; the assertion of personal freedom under the slogan “my body, my

choice”, which challenges mandatory vaccination policies; conspiracy theories offering alternative explanations for government health measures; and a general mistrust in the establishment, linking low government trust to vaccine hesitancy (Connoway et al. 2022; Eslen-Ziya and Pehlivanli 2022; Paraskeva 2022; Wawrzuta et al. 2021). In effect, a study in Greece highlights deep-rooted conspiracy beliefs, merging unrelated political and medical conspiracy theories into a coherent narrative (Gemenis 2021).

Additionally, those skeptical about vaccines’ efficacy and safety often rely on sources from anti-vaccine websites, alternative health and news outlets, and social media (Connoway et al. 2022; Cossard et al. 2020). Surprisingly, some anti-vaccine advocates selectively use scientific information that supports their views, despite generally questioning the reliability of scientific research. This paradoxical strategy involves cherry-picking data from reputable scientific publications, presenting it out of context to manipulate public perception-exploiting the likelihood that most social media users will not verify these claims by reading the full studies (Connoway et al. 2022:13; Muric et al. 2021).

Conversely, other research shows that anti-vaccine discourse on platforms like Twitter often lacks a scientific basis, mainly consisting of personal anecdotes and subjective opinions without credible support, and frequently delivering vague criticisms of vaccines (Ngyyen and Catalan-Matamoros 2022). This highlights a significant discrepancy in the use and interpretation of scientific data within anti-vaccine narratives.

## 4 Research questions and methodology

For the purposes of our study, we analyze Facebook posts from users’ pages and public groups over a three-month period (from September 2021 to November 2021) focusing primarily on content related to the vaccination against COVID-19. Overall, 120 relevant posts from Facebook pages (users’ profiles) and 287 posts from group pages were coded and analyzed with the aim of providing insightful answers to our research questions. All posts are part of broader dataset created for the research aims of the European project EUMEPLAT, with the tool Crowdtangle. This tool gathers posts that correspond to a given query, but also provides users with a posts’ ranking based on the interactions received. The main limitation of this tool is that the ranking takes into account only public content, missing the opportunity to analyze private accounts and posts that are likely to get more engagement. According to Facebook, the “interactions” metric corresponds to the sum of all reactions to a post (Like, Love, Care, Haha, Wow, Sad and Angry), all comments on that post and all shares made of it. As a result, our final data set consists of the most popular-publicly

available- posts (as a proxy for attention) in the given time frame. While this approach enabled the collection of the most popular posts on Facebook, some of the collected posts were not directly related to the vaccination issue. In order to narrow the sample, we performed a data refinement by using key-words, such as COVID-19 vaccination, vaccines, side-effects, etc., as filters to remove posts that referred to other public policies to confront the pandemic. This procedure “cleaned” the data, resulting in the extraction of the most pertinent content for the objectives outlined in this research. The dataset was subsequently enhanced through the elimination of posts that expressed a positive stance towards the topic of COVID-19 vaccination. Our final sample of 407 posts consists entirely of posts raising doubts or rejecting the COVID-19 vaccination which makes it a substantial pool to identify and analyze patterns of reasoning for abstaining from COVID-19 vaccination and to conduct a thorough qualitative analysis.

The decision to monitor Facebook as the preferred digital medium for data gathering was primarily influenced by two key considerations. Firstly, it was chosen due to its significant relevance and utility among Greek citizens as a source of current affairs information. This trend is reflected in the platform’s top ranking as a news source, a new content consumption habit adopted by 46 % of survey participants, as reported in the most recent Reuters Institute Digital News Report (Kalogeropoulos 2023). Secondly, Facebook was selected, because despite mitigation efforts, it is widely recognized as a platform that plays a substantial role in the dissemination of misinformation related to vaccines on the internet, as evidenced by studies conducted by Silverman (2016) and Travers (2020).

The first research question goes as follows **(RQ1)**: What are the dominant themes and subthemes around which the COVID-19 vaccine skeptics organize their argumentation against COVID-19 vaccination and what are their implications regarding the political handling of the vaccination issue?

To address the initial research inquiry, we conducted a thematic content analysis using the six-phase guide framework outlined by Braun and Clarke (2006). Each post was manually coded in order to designate a thematic rationale/claim for not proceeding with COVID-19 vaccination grounded on the prevailing argument presented in the post. The primary argument was determined through a comprehensive consideration of the core message conveyed in the post.

We adopted an open coding methodology, wherein we refrained from employing pre-established codes and instead formulated codes based on the data itself. Subsequently, we proceeded to scrutinize the codes and endeavored to amalgamate those that exhibited clear thematic connections.

During this phase, the codes were organized into broader themes that appeared to furnish substantive responses to our research questions. Subsequently, we conducted a comprehensive review of these preliminary themes, ensuring their

consistency across the entire dataset. In instances where overlapping themes were identified, we merged them into new overarching themes. Additionally, we generated distinct sub-themes when necessary to encapsulate the essence of the data more comprehensively.

It is crucial to underline the active role of researchers in identifying themes or patterns within their data. Clarke and Braun (2013) assert that themes are not innately “grounded” in the data, passively awaiting discovery. Instead, it is the researchers who actively construct these themes through their analytical processes. The latter emphasizes the subjective but systematic approach used in qualitative research to distill meaningful patterns from the data.

Furthermore, it is not uncommon for certain themes to intersect. However, it is generally observed that the majority of data points, such as posts in a study, tend to highlight one theme more predominantly than others. For instance, consider a post that opposes vaccination on the grounds that its mandatory nature infringes on individual liberties and rights. Such a post might also express skepticism about the underlying motives of compulsory vaccination. Yet, if the language of the post employs negative terms like “junta” or “dictatorship”, researchers would typically categorize it under the theme of “violation of people’s rights”. This decision underscores the importance of nuanced analysis in the thematic categorization process, where the dominant tone and terminology guide the thematic classification.

In addition, in the context of the present study we tried to shed some light on the type and the diversity of the sources used by those raising concerns regarding COVID-19 vaccination to provide validity to their claims. Our second research **question (RQ2)** goes as follows: Which are the sources used by COVID-19 vaccine skeptics to justify their claims? Do they opt for solid facts (scientific publications) or do they rely on emotional justification?

## 5 Research findings

As it has already been discussed, vaccination hesitancy is not a new phenomenon in the Greek society. However, the recent outbreak of COVID-19 pandemic has obviously reignited anti-vaccine sentiments. In addition, the divisive character of the governmental measures imposed to combat the pandemic, as well as the lack of consensus on the part of the medical community regarding the efficacy of those measures, resulted in the questioning not only of vaccination as an efficient measure against the transmission of COVID-19, but to a generalized dissatisfaction with the governmental plan to handle the pandemic. The analysis of data revealed six main themes, further divided into relevant sub-themes (Table 1), being raised repeatedly within Facebook groups’ and users’ accounts comprising the research sample.

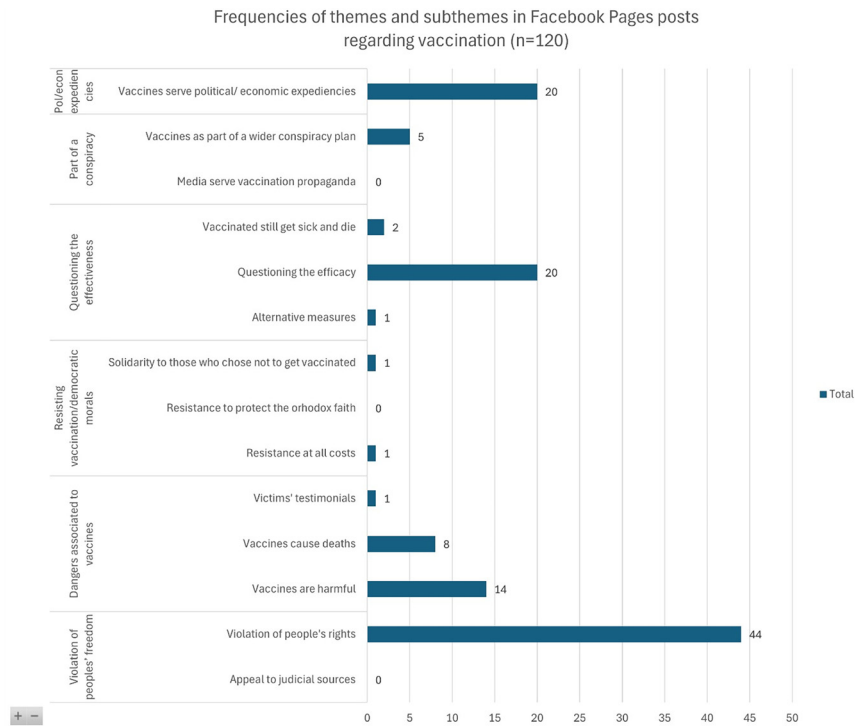
**Table 1:** Themes and subthemes of COVID-19 vaccine skeptics on Facebook groups’ and users’ pages.

Themes	Subthemes
1. Compulsory vaccination is a violation of people’s rights	1.1 <i>Appeal to judicial sources</i>
2. Individuals resisting vaccination as honorees of morals and social liberties	2.1 <i>Solidarity to those “being punished” for not getting vaccinated</i> 2.2 <i>Resistance at all costs</i> 2.3 <i>Resistance to vaccination is derived from the commitment to protect the Orthodox faith</i>
3. Questioning the effectiveness and/or the need for the vaccines	3.1 <i>Vaccines are questioned about (by experts)</i> 3.2 <i>Comparisons with other countries where the vaccination hasn’t been the primary strategy to cope with the pandemic</i> 3.3 <i>The vaccinated still get sick and die</i>
4. Dangers associated to vaccines	4.1 <i>Vaccines are potential harmful/have severe side effects</i> 4.2 <i>Testimonials from “victims”</i> 4.3 <i>Vaccines cause death</i>
5. Vaccines serve political/economic expediencies	
6. Vaccines as a part of a wider conspiracy plan	6.1 <i>Attacking the media for propagating the need for the vaccination</i>

The most frequent theme in all the posts having been coded is the “violation of people’s freedoms” ( $n = 114$  of the total sample), suggesting that the main arguments being articulated around COVID-19 vaccine hesitancy derive from the compulsory character of the vaccination. The second most frequent theme in the total sample incorporates issues of vaccine effectiveness ( $n = 65$ ), whereas conspiracy theme and the perception of vaccinations as tools of serving other expediencies also hold substantial place in the sample ( $n = 46$  and  $n = 36$  respectively, with significant variations among the Facebook groups’ pages and individual users’ pages). The most “deviant” themes seem to be that of “dangers associated to the vaccines” and another one concerning “honorees of social/democratic morals”. More precisely, the theme of “dangers associated with the vaccines” is quite prominent in the individual users’ pages posts ( $n = 23$ ), providing along with the equally distributed theme of vaccine efficacy the second most frequent theme, whereas it holds the fifth place in the Facebook groups’ posts ( $n = 19$ ) (see Figure 1). On the other hand, the “honorees of social/democratic morals” theme is the second most frequent theme in Facebook groups’ posts ( $n = 56$ ), whereas it is almost absent on individual users’ posts ( $n = 2$ ) (see Figure 2).

In the following section we present the main themes and subthemes found across Facebook users’ pages and Facebook groups’ pages, along with key narratives



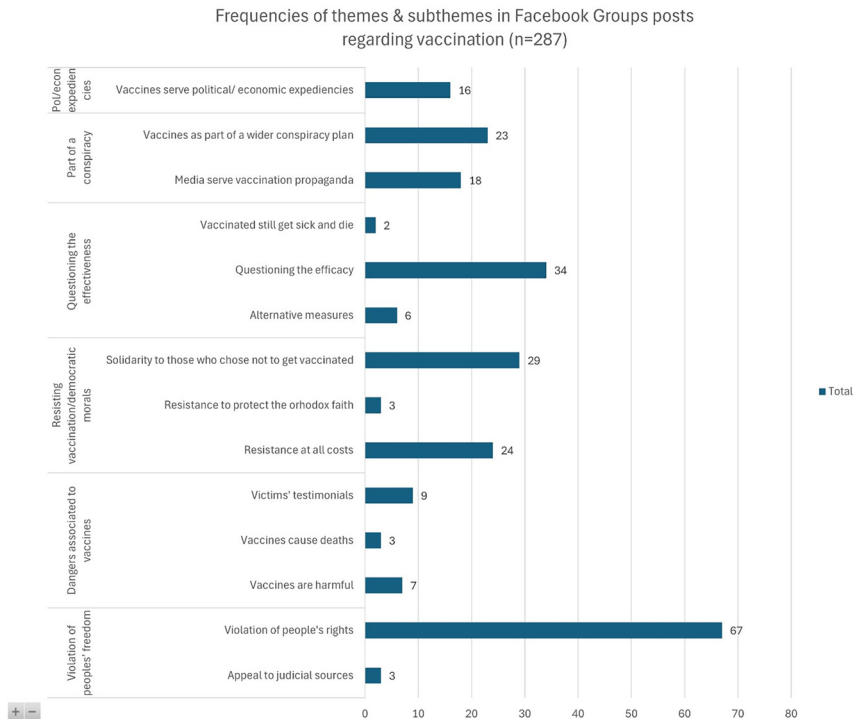


**Figure 1:** Frequencies of themes and subthemes in Facebook users’ posts regarding anti-vaccination/ hesitant stance towards COVID-19 vaccines.

from the original posts’ content (translated into English), indicative of the reasoning schemes upon which the identified themes were justified.

5.1 Compulsory vaccination is a violation of people’s rights

According to the research findings, a contentious aspect pertaining to the discourse on COVID-19 vaccination incorporates the government’s imposition of compulsory vaccination. Such discussions often incorporate terms like “junta”, “dictatorship” and “fascism”, reflecting a perceived infringement upon individual liberties by the governing authorities. The theme “compulsory vaccination is a violation of people’s rights” constitutes the predominant theme both in Facebook Groups Posts (*n* = 70) and in Facebook pages posts (*n* = 44). This climate of criticism towards the ruling class is exemplified in a Facebook post on sfak.news, which implicitly associates the Greek government’s pandemic response with fascist characteristics. This is a critical



**Figure 2:** Frequencies of themes and subthemes in Facebook groups' posts regarding anti-vaccination/ hesitant stance towards COVID-19 vaccines.

attitude that can be considered excessive in terms of its overall meaning but of great importance considering the multiple crises afflicting the country, including the declining confidence in institutions (Theocharis and van Deth 2015).

In addition, digital users who confront COVID-19 vaccines with skepticism argue that the vaccination is the “price” that citizens must pay to have some social perks, like freedom of moving, whilst at the same time they concede their freedom to the state governors. It is worth mentioning that especially in Facebook group posts under this theme are also included cases where digital users who haven't proceeded with the vaccination described instances of racist/discriminatory behavior from people who had chosen to get vaccinated. Contrary to this stance attributed to proponents of COVID-19 vaccination, some posts found on Facebook groups' pages clearly reveal a stance towards social unity, expressing a bluntly rejection of social division on the vaccination axis. This string of posts proclaims that the decision to proceed with vaccination rest upon every citizen and must be respected as a result of free will.

### 5.1.1 Appeal to judicial sources

To underscore the infringement upon human rights, opponents of vaccination also cited legal authorities ( $n = 3$ ). This is illustrated through the citation of remarks made by the President of the Union of Prosecutors and deputy prosecutor of the Supreme Court, who asserts that no individual may undergo a physical intervention, regardless of their status as a healthcare professional, particularly when such an intervention may pose risks to their bodily integrity. This statement underscores the absolutist nature inherent in compelling individuals to endanger their lives.

## 5.2 Individuals resisting vaccination as honorees of morals and social liberties

Another main theme that is prominent in anti-vaccination Facebook groups' posts ( $n = 56$ ) is the construction of anti-vaxxers self image (us) and what they are against/or what they fight for. Over this populist dichotomy, us versus them, the anti-vaxxers present themselves as proponents of democratic values that should be respected in every democratic state and, express their solidarity to all public figures that stand along with them.

### 5.2.1 Solidarity to those “being punished” for not getting vaccinated

After a governmental decision that rendered the medical personnel who refused to get vaccinated under job suspension, the anti-vaccination community expressed through multiple messages its solidarity to those servants of the medical science, that didn't betray their medical oath. This subtheme is predominantly found in the content of Facebook groups' posts ( $n = 29$ ), whereas only one case of this theme appears on Facebook users' pages.

... THE NEUROSURGEON EVRYVIADIS BAIRAMIDIS WHO HAD PERFORMED THE 1ST BYPASS BRAIN SURGERY IN GREECE GOT SUSPENDED! The man, who, although he is not allowed to enter the hospital of Mytilene where he worked until August 31st, goes there every day and sees his patients' exams sitting on a bench! (...).

Another case that seems to attract the interest of the anti-vaccine community and stands out as a symbol for the opponents of the vaccination is a famous Greek actor, Aris Servetelis, who took the decision to abstain from the theatrical play “Rhinoceros”, objecting to the compulsory vaccination of the audience, a measure forced by the government in November 2021; “Bravo to Aris Servetelis for being against measures that divide society”, “Good on you dude for not accepting to become a \* rhinoceros of the system !!!”, are some indicative posts of the days following the actor's decision to leave the troupe.

### 5.2.2 Resistance at all costs

A popular issue among those who didn't choose to get vaccinated against COVID-19 is the economic burden of their decision not to get vaccinated, since the state forces specific measures for their entrance in public places and in employment settings, such as the obligation to perform rapid tests. Coded under the label "resistance at all costs" ( $n = 24$ ), posts within this line are mainly found in Facebook groups pages with digital users adopting emotional language to unite the members of the group under the common cause until the ultimate victory:

My friends, because in the last few days there are many tragic measures that will be forced additionally against the unvaccinated, I have this to say: do not be afraid, whatever they impose on us, please keep your head high, we are fighting for our freedom, for a better future for our children, we will not succumb to them (...) It's time to stay close to each other and show solidarity to colleagues who were forced to be vaccinated, to those who were fired, to health workers suspended, to the unemployed ...

Another common trend that seems to be predominant in anti-vaccination messages on Facebook groups' pages is the call to boycott those store owners who chose to comply with the governmental measures against the non-vaccinated citizens.

### 5.2.3 Resistance to vaccination is derived from the commitment to protect the orthodox faith

Contrary to what we might have expected, religious reasons for vaccine resistance were noted in a few cases and only in religious Facebook groups' accounts ( $n = 3$ ). The relevant discourse is clearly dominated by anti-vaccination sentiments through critical content that, sometimes, goes against even the high ranking members of the Greek Church. That is the case of the group "I love Christ" which opposes the viewpoint of the Abbot of the Holy Monastery of Vatopedi, Archimandrite Ephraim, who requested that all citizens be vaccinated after his recovery from the coronavirus.

## 5.3 Questioning the effectiveness and/or the need for the vaccines

Questioning vaccines' effectiveness is the second more prevalent theme of the content coded in Facebook users' pages ( $n = 23$ ) and the third more frequent theme in Facebook groups' posts ( $n = 42$ ). This strain of posts includes experts' quotes that raise questions on the safety or the effectiveness of the vaccines, information on other

countries' strategy to cope with the pandemic (especially cases where the vaccination was not seen as a panacea), as well as hard data that show that even vaccinated people get sick and even die.

### 5.3.1 Vaccines are questioned about (by experts)

In terms of vaccines effectiveness, the disseminated content on the relevant anti-vaccination pages is based on scientific arguments derived from doctors' accounts whose posts are reproduced by Facebook users. In a post of such type, the arguments of a Greek doctor, who questions the efficacy of the vaccines, are re-disseminated within a Facebook group in an attempt to convince the online users that "the vaccinated person [...] chooses and transmits the DELTA variant of the coronavirus, [since] with the increased reproducibility that DELTA variant has, it creates an increased viral load in the AstraZeneca vaccinated".

Within the digital confines of a Facebook group page dedicated to an anti-vaccine movement, guided by a physician who has emerged as an emblematic figure within the anti-vaccination community, a group member inquires:

Since herd immunity cannot exist and since under 70 years old the mortality is 0.03 % (data by Ioannidis) and the mortality of the delta mutation is also extremely low at all ages (0.03 % data by Kouvelas), why do we have to destroy the economy, the social cohesion and divide the Greeks, so to convince them to get the vaccine? (note: Ioannidis and Kouvelas are established professors in the medical field that hold a critical stance regarding the severity of COVID-19 and the need for vaccines).

Furthermore, this string of posts especially in Facebook users' pages may also include the reproduction of legacy media content where official statements are made regarding the need of multiple vaccines' doses to provide prolonged immunization. Overall, this theme is present in 20 posts falling under the broader theme of questioning the effectiveness of COVID-19 vaccination in Facebook pages' posts (individual users) and in 34 cases of the posts analyzed from Facebook groups' pages.

### 5.3.2 Comparisons with other countries where the vaccination hasn't been the primary strategy to cope with the pandemic

Another strain of posts that questions the effectiveness of vaccines as a measure to cope with the pandemic includes references to other countries which chose to employ different strategies to handle the pandemic, and such content is mainly found in Facebook groups' posts ( $n = 6$  versus 1 case noted in individual users' pages). For example, India is presented as a successful case, where natural immunity was chosen as measure to cope with the virus, instead of the vaccination. In the Facebook group

called “Alliance of Greek Scientists for Human Rights – Phaedon Vovolis” it is evidently displayed the viewpoint that: “India (where according to studies at least 2/3 of the population is infected) shows us that the way out of the pandemic lies in natural immunity. The medical community should focus on effective treatments and not think unilaterally, especially about vaccines [...]”.

In the same vein, some posts share the experience of countries where lockdowns were not seen as a primary strategy to combat the virus, nor the exclusion of the unvaccinated people from all social activities.

### 5.3.3 The vaccinated still get sick and die

References to the comparative mortality rate of vaccinated individuals and the proportion of vaccinated individuals admitted to Intensive Care Units (ICUs) relative to their unvaccinated counterparts also form a distinct subtheme, found in the messages of those holding a hesitant stance towards vaccination ( $n = 4$  of the total sample). This query is articulated as follows: “A simplistic inquiry ...! We, the unvaccinated, have been barred from all indoor facilities nationwide, under the pretext of a pandemic predominantly affecting the unvaccinated. Consequently, the question arises: who is responsible for the transmission of the virus, especially when even those who are fully vaccinated are susceptible to infection?”

## 5.4 Dangers associated to vaccines

The adverse side effects of vaccination is a recurring topic within the Facebook groups’ and users’ accounts of the sample ( $n = 42$ ). However, as it is observed in the distribution of the subthemes of our sample, Facebook groups’ posts tend to emphasize the emotional aspects of the issue by providing more space to testimonials from the victims or their relatives ( $n = 9$  versus  $n = 1$ ), while individual users tend to rely more on the “hard data”, referring to the harmful effects of vaccination ( $n = 14$  versus  $n = 7$ ) and highlighting the percentage of people that have lost their lives after proceeding with the vaccination against COVID-19 ( $n = 8$  versus  $n = 3$ ).

### 5.4.1 Vaccines are potential harmful/have severe side effects

For instance, in users’ pages, the EMA announcements about possible side effects from Johnson & Johnson and AstraZeneca vaccines are reproduced with the aim of highlighting the dangers of vaccines. This kind of posts usually incorporates links to websites where relevant announcements can be read and evaluated from the digital users.

### 5.4.2 Testimonials from “victims”

An alternative approach to discussing the negative consequences of vaccination that eschews empirical evidence lies, as noted earlier, in emphasizing personal narratives, making an appeal to users’ emotions. This method entails showcasing accounts from ordinary individuals, detailing how vaccines have impacted their daily lives. For instance, an athlete appears to give an interview on a digital-born news website about the side effects of the vaccination that halted his progress in the athletics sector.

### 5.4.3 Vaccines cause deaths

Deaths following COVID-19 vaccination are a recurrent theme on the Facebook groups’ accounts under investigation: A hallmark example can be observed in a post disseminated through sfak.news Facebook page, where the reportage revolves around the unfortunate demise of a 31-year-old individual subsequent to receiving a vaccination. Within the confines of the aforementioned post on sfak.news’ Facebook page, an inclination towards skepticism regarding vaccinations and government policies aimed at addressing the ongoing pandemic is conspicuously underscored: “Finally, 31-year-old Kostas Mastrovassilis from Rhodes, who was diagnosed with thrombosis after his vaccination, died. Read what he wrote by himself shortly before he passed away. He blames the Prime Minister and explains step by step what happened”.

## 5.5 Vaccines serve political/economic expedencies

The distrust towards the vaccination is also related to the financial aspect that lies behind the manufacture of vaccines, a process which is argued to involve financial interests concerning a whole industry ( $n = 36$  of the total sample). Online users, who question the effectiveness of the policy measures aimed at protecting citizens against coronavirus, talk about an “inciting new civil war between vaccinated and unvaccinated people” against a background of a “big business” that is believed to have been set up between pharmaceutical companies and government actors based on selling vaccines.

Frequently, these posts employ valence framing as well as negative terms, such as “criminals” and “gang”, to convey the notion that the vaccination program prioritizes various interests over the well-being of the public. An example of such a sentiment might be: “SCANDAL: The European Union declines to disclose its contracts with

pharmaceutical companies regarding coronavirus vaccine procurement to Members of the European Parliament (MEPs)!”

Another indicative post on this thematic goes as follows: “Common criminals those who recommend the 3rd ‘booster’ dose of mRNA vaccines. Their recommendations do not rely on any kind of ‘science’, but serve political mandates and expedencies”.

## 5.6 Vaccines as a part of a wider conspiracy plan

According to research findings, the interconnectedness between conspiracy theories and pandemic vaccination is a schema of argumentation that mainly occupied the messages of Facebook groups’ pages and to a lesser extent the messages of individual users’ pages ( $n = 41$  versus  $n = 5$ ).

This string of posts articulates opposition to the policy measures to combat the pandemic by doubting about the motives behind the implemented policies. Many posts along this line claim that COVID-19 provides for the ideal excuse for “bio-political experiments on millions of citizens” to take place, transforming Greece into a “field of experimentation”. There are also posts within this theme where the mandatory character of the vaccination is related to a wider plan of “enslavement of the society”, as according to the anti-vaccine camp’s rationale the number of people faced with severe side effects after their vaccination provides evidence for questioning the claim that the vaccines serve the public health. Some posts use even more emotionally laden language talking about “an invisible world war, a global genocide”.

### 5.6.1 Attacking the media for propagating the need for the vaccination

Last but not least, the legacy media was seen as the ideal vehicle for the implementation of this conspiracy plan, since they propagate the governmental positions. This subtheme is only found among the posts of Facebook groups’ pages ( $n = 18$ ) and among other, media were accused of terrifying the population by presenting falsified data on the actual number of people lost their lives over COVID-19. An indicative post of this strain by a user suggests:

Guys, the media says that 85% of the patients hospitalized in ICUs and deaths are from us, unvaccinated people. Why don’t we sue them for spreading fake news? There is a law. If they are lying, we can ask for heavy compensation and put them in jail, according to the law. Are they such idiots that they go out and lie in public?

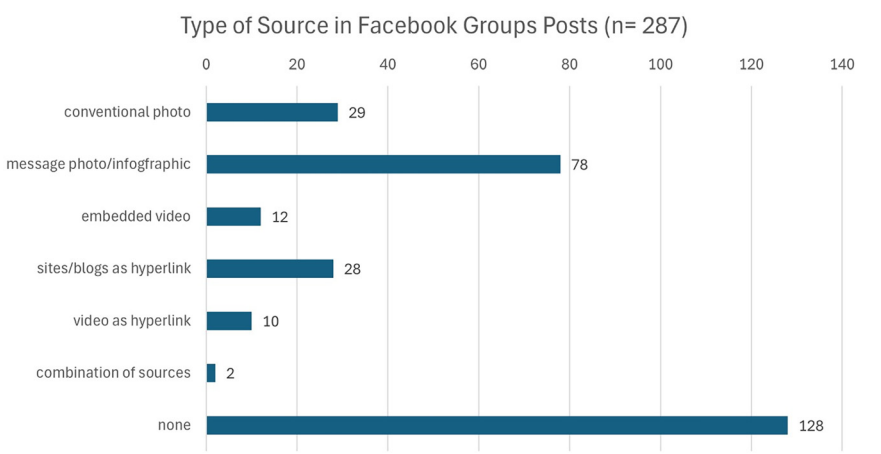


### 5.7 How do COVID-19 vaccine skeptics “prove” the validity of their claims?

Individuals and groups on Facebook who adopt a skeptical stance towards vaccination tend to draw upon specific sources to substantiate their viewpoints. These sources primarily encompass the following categories: (1) message photos/infographics, (2) conventional photos, (3) embedded videos within posts, (4) hyperlinks to YouTube videos or other external video sources redirecting online users to relevant webpages, and (5) hyperlinks to news sites or blogs that lead users to additional textual content related to the subject matter discussed in the Facebook post.

Our research findings indicate that there seems to exist a discernible variation in the favored sources employed by Facebook groups and individual users who hold these skeptical views. To be more precise, when examining the pages of Facebook groups, it becomes evident that message photos/infographics are the most employed type of source ( $n = 78$ ). These message photos/infographics serve as potent tools for conveying the reasoning of the COVID-19 vaccination skeptics’ camp, as they take on various semantic forms. These forms often involve succinct critiques of the COVID-19 pandemic management by policymakers and the raising of critical questions concerning the safety and efficacy of vaccinations (Figure 3).

For instance, a post criticizing the decision of the Prime Minister to impose additional restrictive measures on those citizens who remain unvaccinated mentions: “What a shame we suffered! He cut us off from the theaters and the cinemas halls and thinks we will run to do the vaccinations. Oh he has straw in his head ...”.

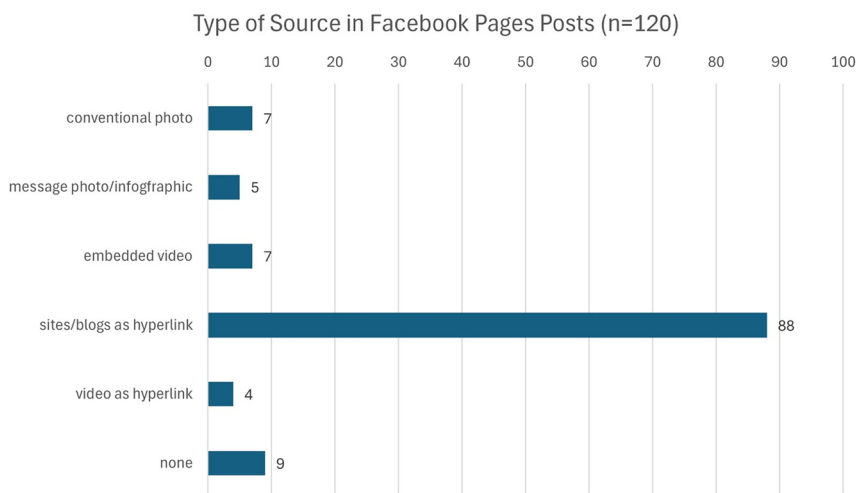


**Figure 3:** Type of sources used in Facebook groups’ posts to justify anti-vaccine/hesitant stance towards COVID-19 vaccination.

Another form of message photo/infographic consists of a screenshot depicting the title, subtitle or even the lead paragraph of a news article derived from a news website. This type of “message photo/infographic” usually complements - at a visual level- the written message of the online user making the overall content of the post more attractive. A relevant post emphasizes the case of a well-known journalist who even though had been vaccinated three times fell ill and thus presented, according to the embedded photo message, the TV news bulletin with symptoms of coronavirus causing panic among his colleagues. Above the message photo, the online user ironically commented: “One of those who point the finger at you ... One of those who talked about herd immunity, about a wall of immunity and other such nonsense ...”.

To an extent, Facebook group pages utilize traditional photographs ( $n = 29$ ) or hyperlinks ( $n = 28$ ) directing users to news websites or blogs of dubious credibility as a means of substantiating the claims made in their posts. In most instances, these sources, namely websites and blogs, encompass a diverse array of alternative news outlets wherein content creators have devised strategies to articulate viewpoints that are either absent or minimally represented in mainstream media. It is noteworthy that Facebook group users seldom incorporate hyperlinks from established media entities such as [lifo.gr](http://lifo.gr), [zougla.gr](http://zougla.gr), [tanea.gr](http://tanea.gr), [newsbeast.gr](http://newsbeast.gr), or [news247.gr](http://news247.gr) into their posts, a practice that occurs only in exceptional cases.

However, it is important to note that users predominantly rely on external links to news websites or blogs, particularly favoring alternative news sources, when seeking



**Figure 4:** Type of sources used in Facebook users’ posts to justify anti-vaccine/hesitant stance towards COVID-19 vaccination.

to substantiate their arguments against vaccination ( $n = 88$ ). This observation aligns with the outcomes of our thematic analysis, as it reveals that skeptics of COVID-19 vaccination perceive mainstream media as tools of the dominant elite, employed to disseminate pro-vaccination propaganda containing fabricated information about the severity of the pandemic and the necessity of vaccines. In rare instances, digital users' posts may direct readers to mainstream media platforms. The use of conventional photographs for this purpose is less common ( $n = 7$ ), often serving to enhance the emotional impact of the accompanying written content (Figure 4).

## 6 Discussion and conclusion

We conducted an analysis of 407 posts from various anti-vaccine Facebook groups and individual pages with the objective of revealing the prevalent anti-vaccine rhetoric that surged during the COVID-19 pandemic. Our findings indicate that the primary concern within the anti-vaccine community revolves around the compulsory nature of vaccinations, which they perceive as a direct infringement on human rights. This sentiment was identified as the central theme in 114 posts, suggesting that it serves as a unifying element among members of these groups, casting themselves as defenders of democratic values and portraying their stance as a form of rebellion.

The second theme, labeled as “honorees of democratic values,” was notably prevalent in posts from group pages, whereas individual pages frequently highlighted doubts about vaccine efficacy and associated risks, indicating a significant engagement with the scientific aspects of vaccination. This distrust towards the efficacy and potential adverse effects of COVID-19 vaccines has fostered the development of alternative theories. These theories propose that the vaccines are tools for political and economic gain by the establishment, thereby providing fertile ground for conspiracy theories.

In contrast to previous research (Connaway et al. 2022), our analysis reveals a notable lack of hyperlinks to peer-reviewed journal articles, which would provide a scientific grounding for the anti-vaccination claims. This suggests that in the Greek context, scientific authority was represented more through specific physicians, whose statements were widely circulated rather than through direct appeals to the scientific literature.

Our study also highlights a recurring strategy within the anti-vaccination community to enhance the credibility of its claims by prominently featuring links to alternative websites and blogs that propagate narratives not aligned with mainstream media. These sources often emphasize vaccines' side effects and portray

individuals as victims of vaccination policies. Such narratives are bolstered by quotes from purported experts, who are depicted as courageous defenders of civil liberties and public health.

Additionally, the discourse on the safety and efficacy of COVID-19 vaccination reflects a broader mistrust toward scientific expertise, particularly considering Greece's strategy to place experts at the forefront of pandemic policymaking. This mistrust is evidenced by a slight decline in trust towards experts in Greece before and after the pandemic, a trend that reflects the broader political climate of distrust (Angelou et al. 2023).

Furthermore, the severe measures imposed on those opting out of vaccination are viewed suspiciously by the anti-vaccination community, perceived as serving undisclosed interests rather than public health. Previous studies have underscored the importance of trust between the public and health authorities in ensuring compliance with health measures during crises like the COVID-19 pandemic (Dupras and Williams-Jones 2012).

Our findings illuminate the complexity of vaccine refusal as a context-dependent social phenomenon, emphasizing the importance of understanding local vaccination cultures (Dubé et al. 2021). The economic conditions in Greece, akin to those in low-income countries, suggest that vaccine refusal may serve as an expression of dissatisfaction with prevailing socioeconomic conditions.

In summary, our analysis underscores the role of social media as public forums where distrust towards established authorities is openly expressed. This observation is particularly relevant considering the initial successful response to the pandemic in Greece, which was later questioned through alternative narratives on social media. Our research has implications for the implementation of evidence-informed policies aimed at mitigating adverse outcomes, suggesting a need for a more multidisciplinary approach in expert committees to address compliance issues related to social fatigue effectively. Moreover, the findings highlight the necessity for the medical community to strategically combat anti-vaccination sentiments by rebuilding trust in medical expertise, suggesting that the depoliticization of medical science should be a priority (Lavazza and Farina 2020).

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# Appendix

Main themes of the COVID-19 vaccine skeptics’ camp on Facebook groups’ and users’ pages with posts as examples.

Theme	Quote
1. Dangers associated to vaccines	“Who forced the unfortunate young man to get vaccinated and for what reason? Why was he cursing the Prime Minister a few hours before he took his last breath? All the answers in the video below ... ”
2. Questioning the effectiveness and/or the need for the vaccines	By: Dimitrios Gakis BECAUSE THEY RUSHED TO DISPUTING MY WRITINGS ... #It is a given that the vaccines were constructed based on the original strain in which there was efficacy. #The DELTA strain, however, penetrates them. #The vaccinated person, therefore, is obvious, that he chooses and transmits DELTA. That’s why it prevailed quickly AND in our country (less than two months) ... #And with the increased reproducibility it has, it creates an increased viral load in the Astra Zeneca vaccinated. Which is, on average, 251 times higher than the control group studied by the Oxford researchers. This is what the study CLEARLY shows. #Where is the inaccuracy? #Don’t we understand that DELTA has increased reproduction? But everyone accepts it! #Don’t we understand, that when we continue to vaccinate with a vaccine that does not stop DELTA, we create super transmitters due to the increased viral load in the nasopharynx of the VACCINATED, who considers himself safe, and privileged and does not comply with the recommended measures to avoid the transmission of the infection? #Why don’t we understand that conditions have changed with Delta and a vaccine UPDATE against this new strain is required? #WHY DO WE DENY IT AND INSIST ON BUYING AND USING VACCINES BASED ON THE OLD STRAIN? #And if you don’t like my “narrative”, based on which you put in “suspension”, the health workers, the Oxford study with the excessively increased viral load in the noses of the vaccinated Vietnamese health workers, with Astra Zeneca, is your problem ... #Unless you think of me as your problem, highlighting your problem ... Then you have a different kind of problem ... #Do the rest of you think we don’t see the statistics globally? (See the curves in my post four days ago)
3. Vaccines serve political/economic expedencies	“What a business are the vaccines after all, so that, in the year 2021, a “new Mengele: and indeed, a Greek, named ILIAS MOSIALOS, will appear in the global scientific

(continued)

Theme	Quote
	community??? How much money can the pharmaceutical companies producing the vaccines distribute, so that the pharmaceutical companies producing drugs not only do not supply us with their products, but, even worse, through “Mengele’s” mouth, the official State proclaims that the unvaccinated they will be left to die in ICUs, while drugs will only be given to the vaccinated ...”
4. Vaccines as a part of a wider conspiracy plan	“(...) We are at the end of the game, it’s just a matter of resistance until the whole edifice of lies collapses. This will undoubtedly happen, because the combination of “vaccine findings” and vaccine damage can no longer be kept secret, and even lies and a corrupt media system will no longer help. Given this, the criminal elites have no choice but to step on the pedal. WAIT and DON’T GIVE UP is the motto now! They are in a time crunch, NOT us ... Please distribute this text everywhere, ignorance and panic among the populace are the most powerful weapons of the elites. The backbone and tenacity are ours. IF WE HOLD OUR POSITION and DO NOT RETREAT, the entire criminal system will COME DOWN GLOBALLY. And this is delayed.”
5. Compulsory vaccination is a violation of people’s rights.	“Mandatory vaccination for SARS-CoV-2: totalitarianism and the rape of democracy and morality, one step before the final takeover We are heading full speed towards the perversion of Western civilization and a return to the Middle Ages”
6. Individuals resisting vaccination as honorees of morals and social liberties	“Please be all proud. NO! We will not cry that we are not allowed to enter cafes and restaurants. We support our choice with pride and not with a whimper. Anyone whining should get vaccinated and leave us alone. We have chosen our path and we will support it with dignity. What should the health workers who lost their jobs say? Is it allowed to talk about stupid coffees and that we won’t get new shoes? STANDING and PROUD we will fight, not like crying villains! We all suffer, we all suffer, but we stand by our choice. Come on let’s move and not quit. Let’s do a <i>boycottage</i> in the market and only buy the essentials. That’s the only way we’ll be heard. We should start to put into force a strategic plan, otherwise it doesn’t work. I salute you and appreciate your struggle. GO FORWARD with COURAGE!.”

## References

- Alatawi, Faisal, Lu Cheng, Anique Tahir, Mansooreh Karami, Bohan Jiang, Tyler Black & Huan Liu. 2021. A survey on echo chambers on social media: Description, detection and mitigation. *arXiv:2112.05084*. <https://doi.org/10.48550/arXiv.2112.05084>.
- Angelou, Angelos, Stella Ladi, Dimitra Panagiotatou & Vasiliki Tsagkroni. 2023. Paths to trust: Explaining citizens' trust to experts and evidence-informed policymaking during the COVID-19 pandemic. *Public Administration* 1–18. <https://doi.org/10.1111/padm.12962>.
- Braun, Virginia & Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3(2). 77–101.
- Cairney, Paul & Kathryn Oliver. 2017. Evidence-based policymaking is not like evidence-based medicine, so how far should you go to bridge the divide between evidence and policy? *Health Research Policy and Systems* 15(35). <https://doi.org/10.1186/s12961-017-0192-x>.
- Carrieri, Vincenzo, Leonardo Madio & Francesco Principe. 2019. Vaccine hesitancy and (fake) news: Quasi-experimental evidence from Italy. *Health Economics* 28(11). 1377–1382.
- Clarke, Victoria & Virginia Braun. 2013. Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist* 26(2). 120–123.
- Connoway, Karien, Hannah Keal, Milandr  van Lill & Marina Joubert. 2022. Increasingly polarised or finding common ground? Exploring pro- and anti-vaccine rhetoric on two South African Facebook pages. *Journal of Science Communication* 21(5). A04.
- Cossard, Alessandro, Gianmarco De Francisci Morales, Kyriaki Kalimeri, Yelena Mejova, Daniela Paolotti & Michele Starnini. 2020. Falling into the echo chamber: The Italian vaccination debate on Twitter. In *Proceedings of the International AAAI Conference on Web and Social Media*, vol. 14, 130–140.
- Cotter, Kelley, Julia R. DeCook & Shaheen Kanthawala. 2022. Fact-checking the crisis: COVID-19, infodemics, and the platformization of truth. *Social Media + Society* 8(1). 1–13.
- Dowling, Melissa-Ellen & Tim Legrand. 2023. “I do not consent”: Political legitimacy, misinformation, and the compliance challenge in Australia’s Covid-19 policy response. *Policy and Society* 42(3). 319–333.
- Dub ,  ve, Jeremy K. Ward, Pierre Verger & Noni E. MacDonald. 2021. Vaccine hesitancy, acceptance, and anti-vaccination: Trends and future prospects for public health. *Annual Review of Public Health* 42. 175–191.
- Dupras, Charles & Bryn Williams-Jones. 2012. The expert and the lay public: Reflections on influenza A (H1N1) and the risk society. *American Journal of Public Health* 102(4). 591–595.
- Ennab, Farah, Maryam Salma Babar, Abdul Rahman Khan, Rahul Jagdishchandra Mittal, Faisal A. Nawaz, Mohammad Yasir Essar & Sajjad S. Fazel. 2022. Implications of social media misinformation on COVID-19 vaccine confidence among pregnant women in Africa. *Clinical Epidemiology and Global Health* 14. 100981.
- Eslen-Ziya, Hande & Ezgi Pehlivanli. 2022. The search for alternative knowledge in the post-truth era: Anti-vaccine mobilization during the COVID-19 pandemic in Turkey. *Cogent Social Sciences* 8(1). <https://doi.org/10.1080/23311886.2022.2130213>.
- Featherstone, Jieyu, D., Robert A. Bell & Jeanette B. Ruiz. 2019. Relationship of people’s sources of health information and political ideology with acceptance of conspiratorial beliefs about vaccines. *Vaccine* 37(23). 2993–2997.
- Fran oise, Margaux, Cl a Frambourt, Paige Goodwin, Fabian Haggerty, Marjolaine Jacques, Maya-Lhanze Lama, Clara Leroy, Augustin Martin, Raquel Melgar Calderon, Jean Robert, Elena Schulz-Ruthenberg, Lina Tafur, Mona Nasser & Louisa St uwe. 2022. Evidence based policy making during times of uncertainty through the lens of future policy makers: Four

- recommendations to harmonise and guide health policy making in the future. *Archives of Public Health* 80(140). <https://doi.org/10.1186/s13690-022-00898-z>.
- Gemenis, Kostas. 2021. Explaining conspiracy beliefs and scepticism around the COVID-19 pandemic. *Swiss Political Science Review* 27(2). 229–242.
- Germani, Federico & Nikola Biller-Andorno. 2022. How to counter the anti-vaccine rhetoric: Filling information voids and building resilience. *Human Vaccines & Immunotherapeutics* 18(6). 2095825.
- Gisondi, Michael, A., Rachel Barber, Jemery Samuel Faust, Ali Raja, Matthew C. Strehlow, Lauren M. Westafer & Michael Gottlieb. 2022. A deadly infodemic: Social media and the power of COVID-19 misinformation. *Journal of Medical Internet Research* 24(2). e35552.
- Gumbi, Khadijah Sanusi & Yahaya T. Baba. 2024. Political trust and legitimacy crisis in the age of COVID-19: An assessment of the EndSARS protest in Nigeria. *Frontiers in Political Science* 6. 1334843.
- Halikiopoulou, Daphne, Marina Saoulidou, Evelyn Karakatsani & Konstantinos. Vlamis. 2022. *Far-right populism and anti-vax movements in Southern Europe. A comparison of Spain, Greece, Portugal and Cyprus*. 89 Initiative. [https://89initiative.com/wp-content/uploads/2022/07/4\\_Greece\\_Far-right-populism-and-anti-vax-movements-in-Southern-Europe-A-comparison-of-Spain-Greece-Portugal-and-Cyprus.pdf](https://89initiative.com/wp-content/uploads/2022/07/4_Greece_Far-right-populism-and-anti-vax-movements-in-Southern-Europe-A-comparison-of-Spain-Greece-Portugal-and-Cyprus.pdf) (accessed 17 December 2023).
- Hijazi, Rana, Anat Gesser-Edelsburg, Paula Feder-Bubis & Gustavo S. Mesch. 2022. Hesitant and anti-vaccination groups: A qualitative study on their perceptions and attitudes regarding vaccinations and their reluctance to participate in academic research – an example during a measles outbreak among a group of Jewish parents in Israel. *Frontiers in Public Health* 10. 1012822.
- Hoffman, Beth L., Elizabeth M. Felter, Kar-Hai Chu, Ariel Shensa, Chad Hermann, Todd Wolynn, Daria Williams & Brian A. Primack. 2019. It's not all about autism: The emerging landscape of anti-vaccination sentiment on Facebook. *Vaccine* 37(16). 2216–2223.
- Jiang, Julie, Xiang Ren & Emilio Ferrara. 2021. Social media polarization and echo chambers in the context of COVID-19: Case study. *JMIRx Med* 2(3). e29570.
- Kalogeropoulos, Antonis. 2023. Greece. In Nic Newman, Richard Fletcher, Kirsten Eddy, Craig T. Robertson & Rasmus Kleis Nielsen (eds.), *Reuters Institute Digital News Report 2023*. Oxford: Reuters Institute for the Study of Journalism.
- Karakatsani, Evelyn. 2022. Greece social briefing: Greek society in 2021 and COVID-19 pandemic. *Weekly Briefing* 46(3). GR) December 2021. <https://china-cee.eu/2022/01/11/greece-social-briefing-greek-society-in-2021-and-covid-19-pandemic-evelyn-karakatsani/> (accessed 10 December 2023).
- Kata, Anna. 2010. A postmodern Pandora's box: Anti-vaccination misinformation on the Internet. *Vaccine* 28(7). 1709–1716.
- Kata, Anna. 2012. Anti-vaccine activists, Web 2.0, and the postmodern paradigm – an overview of tactics and tropes used online by the anti-vaccination movement. *Vaccine* 30(25). 3778–3789.
- Kourlaba, Georgia, Eleni Kourkouni, Stefania Maistrelli, Christina-Grammatiki Tsopela, Nafsika-Maria Molocha, Christos Triantafyllou, Markela Koniordou, Ioannis Kopsidas, Evangelia Chorianopoulou, Stefania Maroudi-Manta, Dimitrios Filippou & Theoklis E. Zaoutis. 2021. Willingness of Greek general population to get a COVID-19 vaccine. *Global Health Research and Policy* 6(3). <https://doi.org/10.1186/s41256-021-00188-1>.
- Larsco, Gideon & Nicole Curato. 2019. Medical populism. *Social Science & Medicine* 221. 1–8.
- Larson, Heidi, J. Caitlin Jarret, Elisabeth Eckersberger, David Smith & Pauline Paterson. 2014. Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007–2012. *Vaccine* 32(19). 2150–2159.
- Lavazza, Andrea & Mirko Farina. 2020. The role of experts in the Covid-19 pandemic and the limits of their epistemic authority in democracy. *Frontiers in Public Health* 8. 356.



- Lazer, David, Jon Green, Katherine Ognyanova, Matthew A. Baum, Jennifer Lin, James Druckman, Roy H. Perlis, Mauricio Santillana, Matthew Simonson & Ata Uslu. 2021. *Social media news consumption and COVID-19 vaccination rates*. The COVID States Project. <https://www.covidstates.org/reports/social-media-news-consumption-andcovid-19-vaccination-rates> (accessed 10 May 2024).
- Lee, Hyelim, Andreu Perez Loarre & Kim Jeong-Nam. 2022. A duality of belief in conspiracy theories amplification: How active communicative actions work differently by trust in the Trump and Biden administrations. *Online Media and Global Communication* 1(3). 524–550.
- Liu, Juan, Carrie Reif-Stice & Bruce Getz. 2022. The mediating role of comments' credibility in influencing cancer cure misperceptions and social sharing. *Online Media and Global Communication* 1(3). 551–579.
- McKinley, Christopher, J. & Fanny Lauby. 2021. Anti-vaccine beliefs and COVID-19 information seeking on social media: Examining processes influencing COVID-19 beliefs and preventative actions. *International Journal on Communication* 15. 4252–4274. <https://ijoc.org/index.php/ijoc/article/view/17714>.
- Modgil, Sachin, Rohit Kumar Singh, Shivam Gupta & Denis Dennehy. 2021. Confirmation bias view on social media induced polarisation during Covid-19. *Information Systems Frontiers* 26. 417–441(2024).
- Muric, Goran, Yusong Wu & Emilio Ferrara. 2021. COVID-19 vaccine hesitancy on social media: Building a public Twitter data set of antivaccine content, vaccine misinformation, and conspiracies. *JMIR Public Health Surveillance* 7(11). e30642.
- Nguyen, An & Daniel Catalan-Matamoros. 2022. Anti-vaccine discourse on social media: An exploratory audit of negative Tweets about vaccines and their posters. *Vaccines* 10(12). 2067.
- Opel, Douglas, J., Rita Mangione-Smith, James A. Taylor, Carolyn Korfiatis, Cheryl Wiese, Sheryl Catz & Diane P. Martin. 2011. Development of a survey to identify vaccine-hesitant parents: The parent attitudes about childhood vaccines survey. *Human Vaccines* 7(4). 419–425.
- Paraskeva, Marilena. 2022. *The Covid-19 anti-vaccination movement in Cyprus: An investigation of its discourses (AMID)*. (GreeSE Paper No. 179. Hellenic Observatory Papers on Greece and Southeast Europe). <https://www.lse.ac.uk/Hellenic-Observatory/Assets/Documents/Research/Cyprus/Projects-2021-22/AMID-Policy-Brief.pdf> (accessed 7 December 2023).
- Raballo, Andrea, Michele Poletti & Antonio Preti. 2022. Vaccine hesitancy, anti-vax, COVID-conspiracy: From subcultural convergence to public health and bioethical problems. *Frontiers in Public Health* 10. 877490.
- Reeskens, Tim & Quita Muis. 2021. A new democratic norm(al)? Political legitimacy amidst the COVID-19 pandemic. In Emile Aarts, Hein Fleuren, Margriet Sitskoorn & Ton Wilthagen (eds.), *The new common*, 189–195. Cham: Springer.
- Schmidt, Ana Lucía, Fabiana Zollo, Antonio Scala, Cornelia Betsch & Walter Quattrociocchi. 2018. Polarization of the vaccination debate on Facebook. *Vaccine* 36(25). 3606–3612.
- Silverman, Craig. 2016. This analysis shows how viral fake election news stories outperformed real news on Facebook. *BuzzFeed News*. <https://www.buzzfeednews.com/article/craigsilverman/viral-fake-election-news-outperformed-real-news-on-facebook> (accessed 9 November 2023).
- Smyrniaos, Nikos, Charis Papaevangelou & Panos Tsimpoukis. 2021. Anti-vaccination and covid-sceptic movement on Greek-language social media: A form of far-right propaganda. *Ephemerion*. <http://ephemerion.eu/2304> (accessed 13 January 2024).
- Stavrakakis, Yannis & Giorgos Katsampekis. 2020. *Populism and the pandemic: A collaborative report*. Loughborough University. <https://hdl.handle.net/2134/12546284.v1> (accessed 7 May 2024).
- Sule, Sahana, Marisa C. DaCosta, Enrin DeCou, Charlotte Gilson, Kate Wallace & Sarah L. Goff. 2023. Communication of COVID-19 misinformation on social media by physicians in the US. *JAMA Network Open* 6(8). e2328928.

- Theocharis, Yannis & Jan W. van Deth. 2015. A modern tragedy? Institutional causes and democratic consequences of the Greek crisis. *Representation* 51(1). 63–79.
- Travers, Mark. 2020. Facebook spreads fake news faster than any other social website, according to new research. *Forbes*. <https://www.forbes.com/sites/traversmark/2020/03/21/facebook-spreads-fake-news-faster-than-any-other-social-website-according-to-new-research/?sh=9d0ea046e1a9> (accessed 7 October 2023).
- Wawrzuta, Dominik, Mariusz Jaworski, Joanna Gotlib & Mariusz Panczyk. 2021. What arguments against COVID-19 vaccines run on Facebook in Poland: Content analysis of comments. *Vaccines* 9(5). 481.
- World Health Organization. 2019. Ten threats to global health in 2019. <https://www.who.int/emergencies/ten-threats-to-global-health-in-2019> (accessed 23 November 2023).