Péter Bányász[1], Gréta Nagy[2], Ákos Molnár[3]

Empirical studies of COVID-19 related fake news[1]

DOI 10.17047/Hadtud.2023.33.E.20

Having caused a global pandemic in 2020, COVID-19 can be described as a paradigm-shifting event in many aspects of modern life. The strict pandemic response in the beginning has gradually dissipated over time as public support has declined. While different countries have had different approaches to managing COVID-19, all governments have fought a severe battle against fake news related to the virus, which in many cases has reduced the effectiveness of protection. The attitudes towards masking, lockdowns, and vaccination have become a political self-definition mechanism in many countries, influencing policy-making processes. Therefore, this study examines COVID-19-related fake news from three aspects: sentiment analysis, a network theory approach, and a survey.
Keywords: COVID-19, sentiment analysis, fake news, network theory, survey

COVID 19-hez köthető álhírek empirikus vizsgálata

A 2020-ban globális pandémiát okozó COVID-19 az élet számos tekintetében nevezhető paradigmaváltó eseménynek. A kezdeti szigorú járványügyi védekezés az idő múlásával, a lakosság támogatásának csökkenésével fokozatosan oldódott fel. A különböző országok eltérő gyakorlatot folytattak a COVID-19 kezelését illetően, azonban minden kormányzat komoly harcot folytatott a vírushoz köthető álhírekkel, amelyek sok esetben csökkentették a védekezés hatékonyságát. A maszkviseléssel, lezárásokkal, oltásokkal kapcsolatos attitűd számos országban vált politikai önmeghatározás eszközévé, amik kihatottak a politikai döntéshozatal folyamataira. A tanulmány ennek alapján a COVID-19-hez köthető álhíreket vizsgálja három aspektusból: szentiment analízissel, hálózatelméleti megközelítésből, illetve kérdőíves kutatás segítségével.

KULCSSZAVAK: COVID-19, szentiment elemzés, álhírek, hálózat elmélet, kérdőív

Introduction

A new type of virus emerged in China at the end of 2019 and quickly spread around the world, transforming the way the world as we know it is organized. Worldwide, there have been restrictions and lockdowns to slow the spread of the SARS-CoV-2 virus, commonly known as the coronavirus.

[1] University of Public Service, Faculty of Public Governance and International Studies, Senior Lecturer,
Nemzeti Közszolgálati Egyetem Államtudományi és Nemzetközi Tanulmányok Kar, adjunktus
Contact: e-mail: banyasz.peter@uni-nke.hu, ORCID: 0000-0002-7308-9304
[2] University of Public Service, Faculty of Public Governance and International Studies, student,
Nemzeti Közszolgálati Egyetem Államtudományi és Nemzetközi Tanulmányok Kar, mesterszakos hallgató,
Contact: e-mail: nagygretanke@gmail.com, ORCID: 0000-0001-5893-6985
[3] University of Public Service, Faculty of Public Governance and International Studies, student,
Nemzeti Közszolgálati Egyetem Államtudományi és Nemzetközi Tanulmányok Kar, mesterszakos hallgató,
Contact: e-mail: M.akos0911@gmail.com, ORCID: 0000-0002-7095-557X
[1] Supported by the the ÚNKP-21-2-II-NKE-142 New National Excellence Program of the Ministry of Innovation and Technology from the source of the National Research, Development and Innovation Fund

Coronavirus is the common name for species in the subfamily Orthocoronavirinae of the family Coronaviridae. The first coronaviruses were discovered in the 1960s. The first was a bronchitis virus that infected chickens, and then viruses were isolated from the nasal cavities of patients with colds, which were named human coronavirus 229E and OC43.[2] On 31st December 2019, an outbreak of pneumonia of unknown etiology was reported by Chinese health authorities to the World Health Organization (WHO).[3] The World Health Organization declared the epidemic a pandemic on 11th March 2020.[4] Coronavirus outbreaks have been connected to the deployment and development of 5G networks, which has been the basis of many conspiracy theories.[5]

The 5th generation mobile network or 5th generation wireless network, or 5G for short, is the 5th generation technology standard in telecommunications, after 1G (analogue), 2G (GSM), 3G, and 4G/IMT-Advanced, which started in South Korea in April 2019. By April 2020, a total of 70 operators in 40 countries will have made the new generation of mobile phone services available.[6] According to Swedish multinational networking and telecommunications company Ericsson, by 2025, 65% of the world's population will have access to the superfast Internet provided by 5G, and economic forecasts predict that the technology will have a significant impact on our overall internet use and the Internet of things, changing the direction of economic and technological innovation.[7] In addition to Ericsson, Chinese mobile and network equipment manufacturer Huawei is a significant contributor to the mobile market.

The development of 5G technology also carries a significant national security risk, as it could play an important role in intelligence gathering in cyberspace. One of the main actors in the trade war between the United States and China is Huawei, which is interested in building 5G infrastructure. The United States has been trying to isolate Huawei for years, claiming it would be a security risk if the Chinese were allowed to build fifth-generation mobile networks. Despite this, European governments do not want to ban Huawei for economic reasons, but they also want to minimize the potential risks, which is forcing the UK and the EU to balance the scales.[8] In Germany, on the other hand, there has been a strong domestic political debate on the issue, and in 2020, although former Chancellor Angela Merkel was pro-Huawei, many members of her own party demanded a Huawei prohibition. All these events leads us by necessity to psychological operations involving the cognitive dimension.[9]

Psychological operations influence the cognitive dimensions to influence a target group. This activity is based on an ancient concept of humanity, as Sun Tzu already discusses it in The Art of War (see the well-known principles: "Therefore the skilful leader subdues the enemy's troops without any fighting," and "The Moral Law causes the people to be in complete accord

[2] Umakanthan et al 2020.
[3] Coronavirus COVID-19 Dashbord, 2020.
[4] Coronavirus, WHO, 2020.
[5] Ahmed, Vidal-Alaball, Downing, Seguí 2020.
[6] Jing, Yu, Niyazbek, Chu 2020.
[7] 5G Made for Innovation: Transform Your Business, Ericsson.com, 2016.
[8] China v America, The Economist, 2020.
[9] Bányász, Pollner, Dobos, Palla, 2019.

with their ruler so that they will follow him regardless of their lives, undismayed by any danger.").

An important distinction should be made between misinformation and disinformation, the former of which means unintended generation or dissemination of false information, while the latter is aimed at causing harm by spreading fake news.[10] The underlying motives of misinformation include common human factors such as making an impression on friends by appearing well-informed on the latest developments such as the decease of a celebrity, the news of whose departure one strives to be the first to share, for the seventh time now. Another essential motive is financial profit, as is the case with pay-per-click ads. By contrast, disinformation is often implemented by means of PSYOP run by national security agencies of foreign states, as was the case with the 2016 US national election or the BREXIT, for example.[11]

A post first appeared on social media in January 2020, suggesting that the spread of 5G could be responsible for the spread of the coronavirus - while also reinforcing some negative sentiments against China. The post rapidly became popular and, with other fake news, significantly boosted the virus-sceptic community.

The COVID-19-related infodemic[12] has significantly undermined individuals' trust in science and reinforced pseudoscientific theories.[13] The tendency has been increased by the particular way social networking sites' algorithms work, which has led to a mix of the most absurd conspiracy theorists, from the flat-earthers to the anti-vaxxers, who believe that the 5G networks cause the coronavirus and that vaccination is actually putting microchips in people so that the various agencies of Deep State can monitor them.[14][15]

Research has shown that social media users are more likely to believe various conspiracy theories about COVID-19, reinforcing, among other things, anti-vaccination and anti-masking.[16] As a result of such 5G-related fake news, in April 2020, in the UK, there were 77 cases of 5G transmitting stations being vandalized by people fearing the coronavirus to prevent the further spread of the virus. The spread of fake news regarding the pandemic, and the rejection of vaccinations, complicates the epidemic management significantly and may lead to new waves of outbreaks globally.[17]

[10] Stahl 2006.
[11] Kovács, Krasznay 2017.
[12] The term "infodemic" was originally created by David J. Rothkopf in 2003, during the SARS virus pandemic, by combining the words "information epidemic". The author wanted to draw attention to the fact that information overload and fake news can have serious consequences similar to those of the virus, increasing the number of illnesses and deaths. For more on this concept, see Z. Karvalics László: Infodémia – egy kifejezés újjászületése és dimenziói, 3 April 2020. https://iask.hu/en/from-infodemic-to-the-need-for-global-information-and-knowledge-governance-by-laszlo-z-karvalics/ (Accessed: 5 May 2022.)
[13] Hua, Shaw 2020.
[14] Popular conspiracy theories on the topic include Bill Gates, George Soros, Reptilians, the freemasons, etc.
[15] Allington, Duffy, Wessely, Dhavan, Rubin 2021.
[16] Romer, Jamieson 2021.
[17] Ullah, Khan, TahirAhmed, Harapan 2021.

In this study, we defined the following research questions:

RQ1: Is it possible to identify the main trends in the spread of fake news through sentiment analysis?

RQ2: Can we identify a relationship between fake news-related attitudes and educational level?

RQ3: Is it possible to identify the relationships between fake news spreaders based on a network approach?

Based on the above, we test three hypotheses:

H1: Users who post about "5G" AND "COVID" express a higher proportion of negative emotions.

H2: There is a relationship between educational attainment and belief in fake news.

H3: Network theory can be used to identify the spreaders of fake news.

Methodology

In our study, we analyse how 5G-related fake news has spread on social media. For this purpose, we analysed the spread of fake news through three different methodologies.

Sentiment analysis

The data we used to study linguistic effects was from online social platforms like Twitter, Facebook, and news portals. We used an online platform called SentiOne.

SentiOne (sentione.com) is a content-based web analytics platform that covers and recognizes 70 languages all across the globe. It is dedicated to crawling and analysing content presented and perceived on social media and other online channels. The SentiOne monitoring tool currently monitors over 20,000,000,000 mentions and gathers data from eight different types of sources, namely portals, blogs, Twitter, Facebook, Instagram, video, forums, and review sites. The mentions are divided into statements and articles, statements being automatically classified as either positive, or neutral, or negative with the use of SentiOne unique, proprietary algorithm. The platform's sentiment analysis is based on research by John R. Crawford and Julie D. Henry.[18] They analysed the Positive and Negative Affect Schedule (PANAS). Based on their study, SentiOne's developers created algorithms that help determine the author's emotional attitude to the discussed topic. The platform uses proprietary artificial intelligence algorithms to classify the posts' overall sentiment.

The interactive platform is built upon user-provided keywords and key phrases to look for the specific mentions that, either in themselves or within their context, contain those pre-given phrases that interest the user. The system gathers data in almost real-time yet has a memory that can go back up to 3 years. For quantitative research, data is structured by different focus points

[18] Crawford, Henry 2004.

and research parameters and is visualized in an interactive way. This technology also supports qualitative research, enabling in-depth analysis and categorizing all the indexed web contents.

Survey

The survey was filled in between 7th and 14th September 2021. Our survey was based on the research of Bitar and co-authors, who investigated the spread of COVID-19-related fake news in Yemen.[19] We updated the original survey before the vaccines were available and examined hypothetical vaccination intentions. We also needed to modify it to reflect the demographic characteristics of Yemen and Hungary, where, for example, khat and alcohol are popular drugs respectively.

The survey had three main sections. The first section included demographic questions such as gender, age, whether the respondents suffer from any illnesses, harmful addictions, etc. The second section looked at knowledge about fake news. In this section, we asked the respondents to rank seven fake news items on a Likert scale from 1 to 5 (1 strongly disagree to 5 strongly agree). The answer choices were coded and then given numbers from 1 to 5. This resulted in a score between 7 and 35 for each respondent. Using the SPSS statistical analysis software, we used median scores to classify respondents into clusters: those with a score from 1 to 19 on the scale were considered well informed about the COVID-19 fake news, while those with a score above 19 were classified as misinformed. The third section focused on attitudes towards COVID-19, which was further divided into three subsections. The first sub-section examined the perception of perceived susceptibility and how likely the respondent is to believe that the epidemic will start to spread again or that a close friend will be infected shortly. In the second sub-section, we examined perceived severity/threat, the extent to which the respondent perceives the epidemic as dangerous for themselves and their environment. We measured perceived worry and the respondent's attitude toward the epidemic in the third sub-section. Using SPSS, the responses were again clustered using a median. Individuals scoring below 29 points were placed in the low perception cluster, while those scoring 29 points or more were placed in the higher perception cluster.

We analysed the responses to the survey in SPSS using different methodologies such as cluster analysis, Kruskal-Wallis test, and cross-tabulation. The cross-tabulation values were checked with the Chi-squared and Cramer's V tests.

Network theory

The networks methodology helps to identify the dissemination patterns of different content, mapping multi-step relationships, and identifying influencers on a large scale. Combined with sentiment analysis, all this allows us to identify the most important news, determine how long it takes for a particular piece of news to spread, and based on this, how much time we have to intervene, possibly even start a counter-campaign. Furthermore, we can also identify the platforms on which we need to publish the correct information for different target groups.

[19] Bitar et al. 2021.

Another advantage of the approach is that we can discover bottlenecks in the spread that we can control, block or replace. Once identified, we can then take the appropriate decision to neutralize the influencer, which may be implemented not only through influencing but also by suspending the profile or, in more serious cases, arresting the person.

Network research helps us to see who are the most likely to spread the idea that the emergence of 5G is linked to the spread of coronavirus, or that 5G is harmful to health. In this article, we used a network research methodology to observe which social strata, users, and groups spread the belief of the connection between 5G and the coronavirus. We aimed to see who those users are who disseminate the information and what kind of social network this draws out by analysing the network research and the graphs that appear. For the network research, we used Netlytic, easy-to-use software that provides a wide range of knowledge. It is online community-supported text and social network analysis software that can automatically summarize and visualize public online conversations on social networking sites, including Twitter.

However, due to the constant production of data and tweets, the network is regularly changing, so for this part of the article, it should be emphasized that we are constantly referring to the period in question (usually seven days) as its validity for other dates is not relevant. The analysed period for this article was from 10th to 16th August 2022. Coloured items are clusters, and each colour represents a different cluster. This is the programmatic notation, meaning the set of points that define the network. The colouring better highlights the connectivity of a particular centred element.

In network research, graphs are visualized in terms of what type they are and what number of degrees they have. From this data, it is possible to tell which users are the ones who get the information to most people and are, consequently, the central elements of a network. In addition, there are network points that act as bridge elements. This is where you can find the users without whom the information would not spread to another network. The degree centrality calculation can be used to visualize and prove which are the central points without which a network would be incomplete or only marginally complete. Therefore, three main factors are considered in each figure: 1) the type of graphs, 2) focal points, and 3) average centrality.

The Network Research tool only uses recent data; thus, we have also used the literature to see how public opinion and sentiment on Twitter have changed over the past two years.

Results

The results of our empirical research are presented similarly to the methodology.

Sentiment analysis

We searched for COVID-related words and expressions and downloaded posts and web pages from the period from January 2020 to June 2021. We used the AND operator for the keywords, presenting only results containing both, so our keywords were "5G" AND "COVID." In this

research, these queries were run because they are language-independent and have the same meaning in each of the given languages.

For the search term "5G" AND "COVID", we identified 1,156,535 shares during the period under study, resulting in approximately 4.4 billion views.

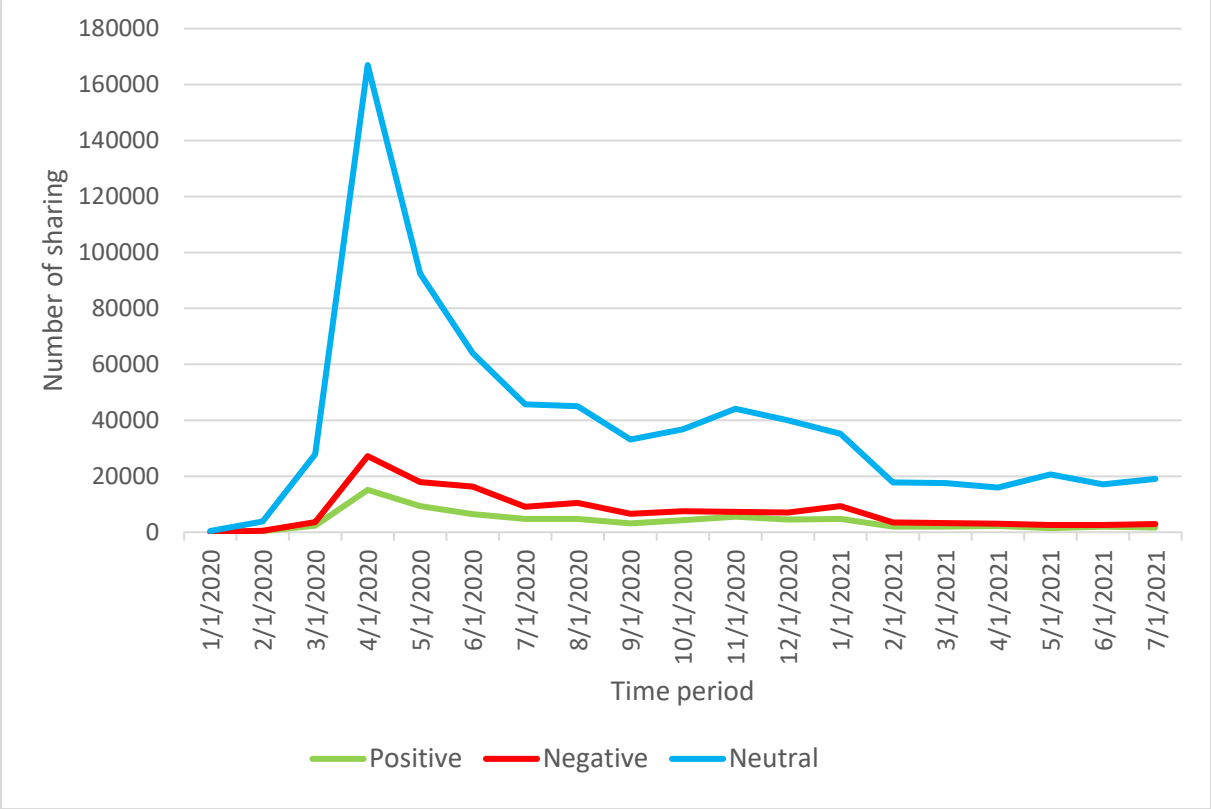

Figure 1
COVID and 5G- Number of shares by sentiment
(own edited, source: SentiOne)

As it can be seen in Figure 1, most shares are found to be neutral, which can be attributed to three factors:

- artificial intelligence examines the shared content based on context, evaluating the expressions it contains in terms of positive and negative aspects, and then deciding which sentiment to attach to it based on the results. However, if the number of positive and negative expressions is approximately equal, the algorithm labels it as neutral.
- Users often simply reshare the content without any explanation or comment, so AI cannot analyse the new context.
- A more recent emerging new phenomenon is the intentional use of terms and phrases in the content shared for the express purpose of disinformation, to overload or poison the meaning of words, and deliberately create a different emotional context.

The figure shows that the number of shares related to the terms "5G" AND "COVID" significantly increased from March 2020, reaching a record 230,000 shares in April, which coincides with the previously cited destruction of 77 5G towers. If we compare this with the territorial spread of the sharing (see Figure 2), it is not surprising that the dominant location of the sharing is the UK: overall, there are 317,313 shares for the two search terms above, which, narrowed down to April 2020, meaning more than 80,000 shares.

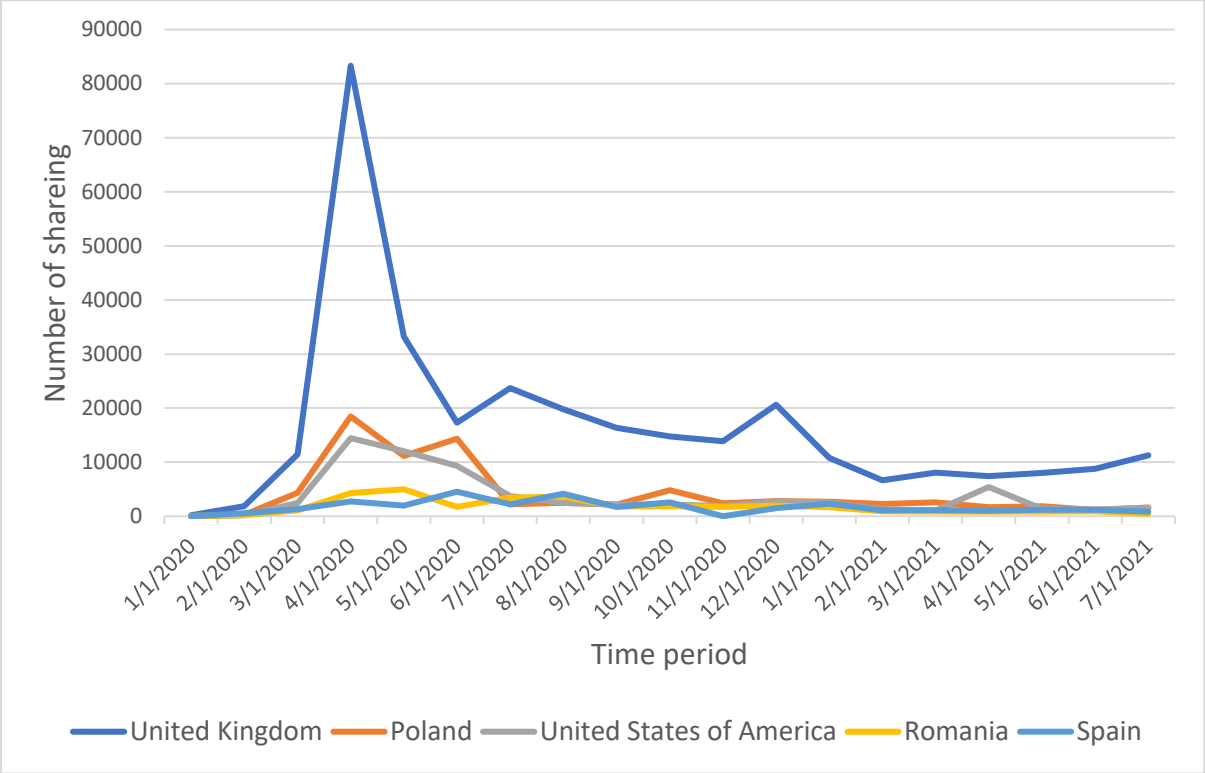

Figure 2
COVID and 5G- Number of shares by top five countries
(own editing, source: SentiOne)

Survey

The survey was filled in by 202 people, more than half of the respondents (64.4%) were women. Based on educational qualifications, 67.3% of the respondents have a high school degree, 10.4% have a primary school certificate, and only 22.3% have a university degree.

As a first step, we used a cross-tabulation to examine the relationship between gender and gullibility and between education and gullibility. However, our results showed no correlation between the variables in either case.

Next, we used cluster analysis to create two different clusters based on the SPSS dendrogram. The two groups were named according to their responses to the concern questions, less concerned (96 people) and more concerned (106 people) (see Figure 3). Afterward, the

clusters were tested first by cross-tabulation and then by the Kruskal Wallis test. This was compared with gender, age, and education variables.

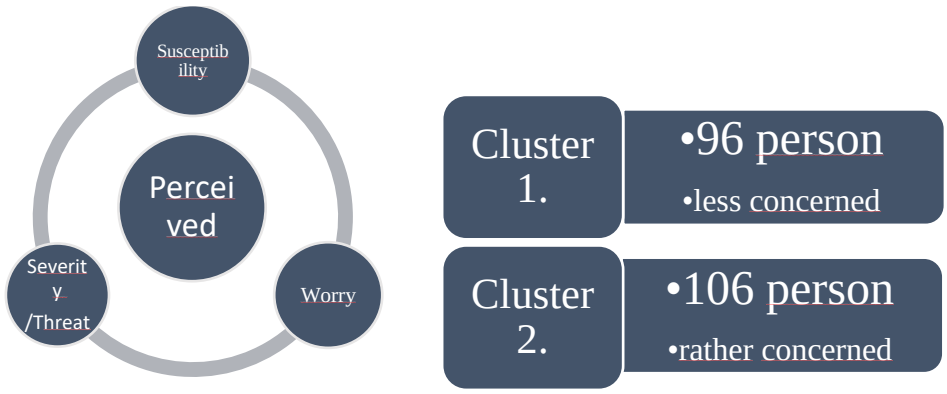

Figure 3
Clusters of concern
(own editing)

The cross-tabulation analysis showed a correlation in two categories (see Table 1 below), as gender (q=0.002) and age (q=0.252). The Cramer's V test found a strong correlation in both cases (gender: 0.223 and age: 0.117). There was no significant correlation for education in either the cross-tabulation (q=0534) or the Kruskal-Wallis test (q=0.930). However, it is interesting to note that age does not affect clustering either (q=.665), contrary to the cross-tabulation showing a significant relationship between the two variables. However, for gender, the Kruskal-Wallis test also shows a correlation (q=.002) with the ranks obtained. It is possible to say that the less worried cluster had a higher score (Ar= 112.84), which indicates that women are more likely to belong to the rather worried cluster (Ar=91.23). This is because women were coded with a number 1 while men were coded with a number 2 in the analysis, so where a lower score was obtained, women were more likely to be in the cluster.

Table 1
Results of the cross-tabulation and Kruskal-Wallis test
(own editing)

Cross-tabulation and Kruskal-Wallis test	Clusters of concern			
	Statistical relation		Average of ranks	
	Level of significance	Cramer's V	Less concerned	Rather concerned
Gender	0.002	0.223	112.84	91.23
Age	0.252	0.117	102.88	100.25
Education	0.534	0.079	101.81	101.22

We should point out that the statistical correlations we obtained are only valid for respondents, and our survey cannot be considered as representative.

Network theory

In 2020, popular hashtags such as #5GKILLS, #5Gconspiracy, and #5GCoronavirus spread on Twitter, mainly spreading nothing but fake news and conspiracy theories. The literature has also addressed this issue, and its use is necessary to reflect on what was happening in 2020 because, as we will write later and as visualized by Netlytic, by 2022, the number of people who boldly write that there is a link between 5G and the coronavirus is mostly negligible. It may also be relevant to mention the psychological correlation regarding the "curious human nature": the former unknown has now become known, and people have responded to the coronavirus. In contrast, 5G has become an integral part of their every day without any problem.

Ahmed and co-authors surveyed more than 6000 Twitter users, and their network research showed that in April 2020, more than 10,000 tweets were made about the coronavirus outbreak being linked to 5G deployment.[20] The network they extracted showed that this topic was spinning worldwide, so this fake news spread almost as fast as the virus.

In our study, the results were quite different. Netlytic's network research software found 1650 posts for the keyword "5G and COVID" - earlier hashtags like #5GCoronavirus, #5GKills, and #5GConspiracy were considered "dead" searches as no one really used them from 2021 onwards, so we could not extract any meaningful data from them in August 2022. The most popular post is now tweeted out by @_suaveguapo, with nearly 60,000 likes: "Remember when ya was saying 5G was giving us COVID? I ain't forget". The most recent post was also on a similar theme on 10th August 2022; @lyric__m described it as a "fever dream" that people saw a link between COVID-19 and 5G.

The program helped us to see which users in the top ten posters have achieved the highest ranking. Interestingly, @pedrolluzz scored 36% out of 1650 posts, even though he only had 49 followers on 16th August 2022. Looking at his profile, we could see that he shares tweets in Spanish, which are mostly conspiracy theories, so this user fits the pattern as most people who use the terms 5G and coronavirus together are the ones interested in such topics. Based on this, it can be argued that only a small group of people are still be engaged with the idea that coronavirus can be linked to 5G and its use in 2022 (see Figure 4).

[20] Ahmed, Vidal-Alaball, Downing, Seguí 2020.

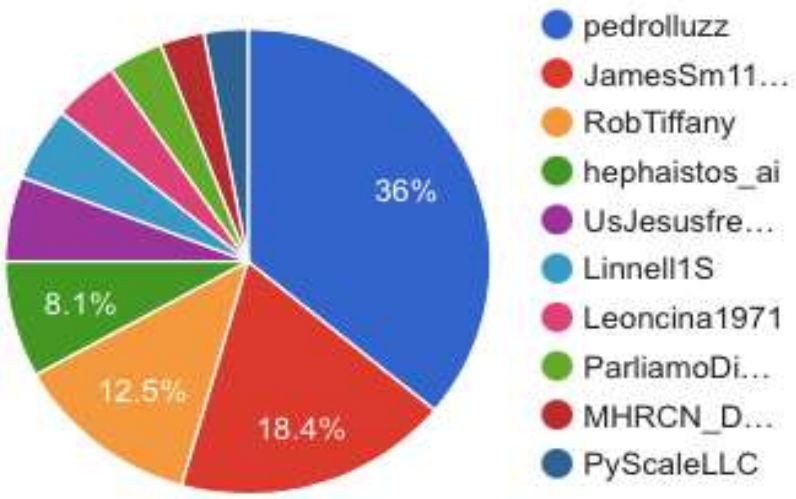

Figure 4
Source Data: Top Ten Influencers
(source: Netlytic, Accessed: 16 August 2022.)

We can see that another profile, @cstrateges, dominates in terms of in-degree centrality, with a reached base of nearly 300 degrees. This is also a Spanish-language account, but here we are talking about a follower base of more than 46,000 and an official organization. Examining its tweets, we observed that they draw attention to the fact that there is no link between the coronavirus and 5G (see Figure 5).

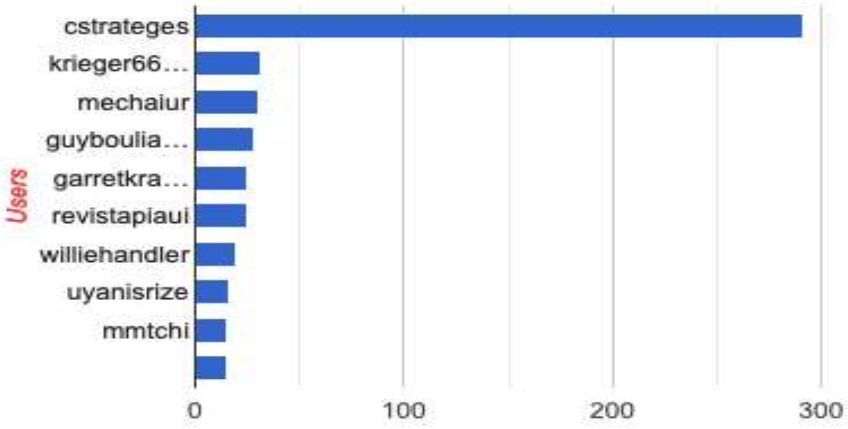

Figure 5
Network: Top 10 Users- based on In-degree centrality
(source Netlytic, Accessed: 16 August 2022.)

However, @pedrolluzz reappears among the out-degree centrality top profiles, with a 36-degree reach base. Thus, fake news still has a narrow readership or at least a search user base, especially in Spanish-speaking territories, as both profiles share arguments and posts in this language (see Figure 6).

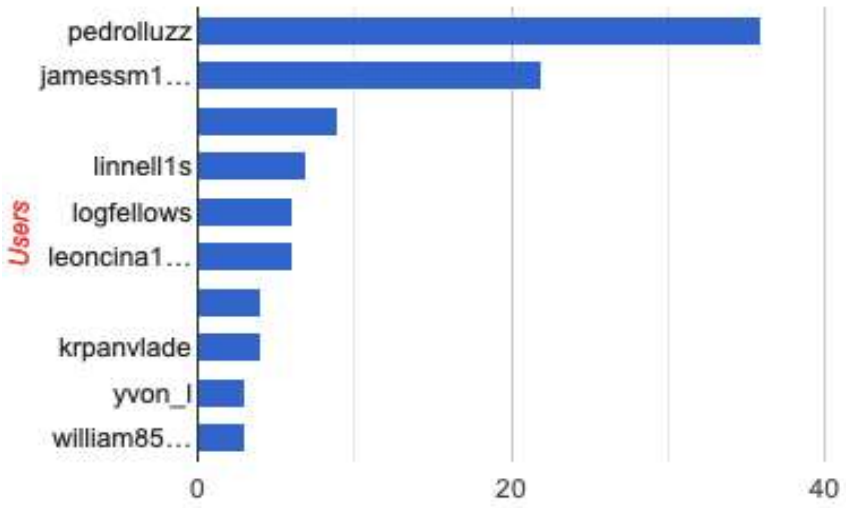

Figure 6
Network: Top 10 Users -based on Out-degree centrality
(source: Netlytic, Accessed: 16 August 2022.)

Our star graph image became a "decentralized network" with different degrees of "in-degree" and "out-degree." In the orange interface (see Figure 8), we can see that the central actor is again @cstrateges (who appeared among the top "in-degree" users), so his posts reach the most people directly and indirectly. The credibility and follower base of the profile also contributes to this. Again, this suggests that the trend in 2022 is that 5G has nothing to do with the spread of the coronavirus. The connection networks also clearly show (See Figure 7) that their posts indirectly report on separate factors such as @fred_connect and @yvon_l. Both profiles share news in Spanish, so once again, we observe that the perceived link between 5G and the coronavirus is, to some extent, most dominant in this region.

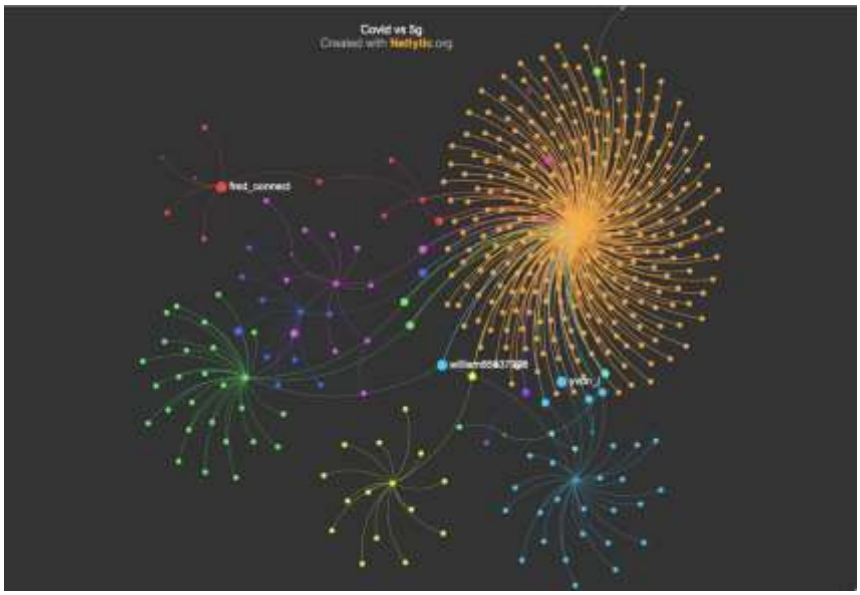

Figure 7
Graph based on the keywords: "5G" and "COVID"
[source: Netlytic, Accessed: 16 August 2022]

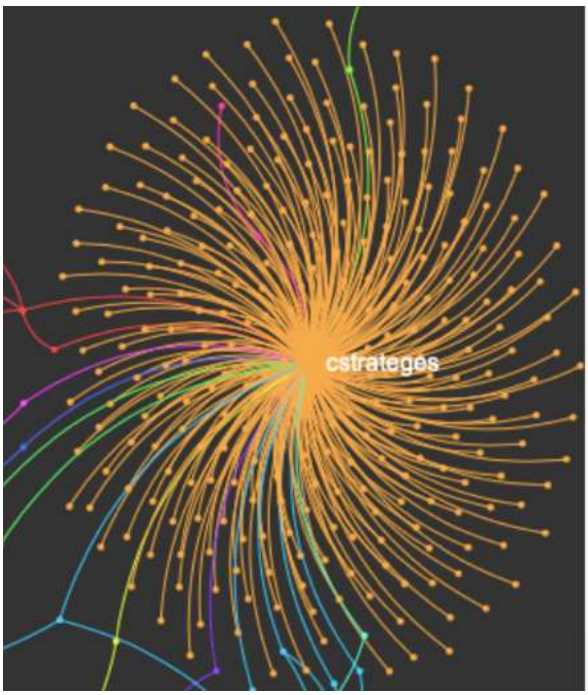

Figure 8
The center user of the "Star Graph"
(source: Netlytic, Accessed: 16 August 2022.)

The network research, therefore, revealed that there is still a general dichotomy in people in 2022. Certain accounts, mostly propaganda outlets, still claim that 5G has something to do with the creation of the coronavirus and has a relatively large reach. However, it is also true

that accounts that publish facts have a higher distance, and more people are now concerned with truth than conspiracy theories. This contradiction can be observed in Figure 9. The "sentiment" of the 1,650 tweets was visualized, dominated by tweets with a positive and negative tone with a 40-60% split in favour of the negative. It is also interesting to note that there was a high level of inappropriate language used, so it can be concluded that people will still attack each other in 2022 if they see a tweet they disagree with.

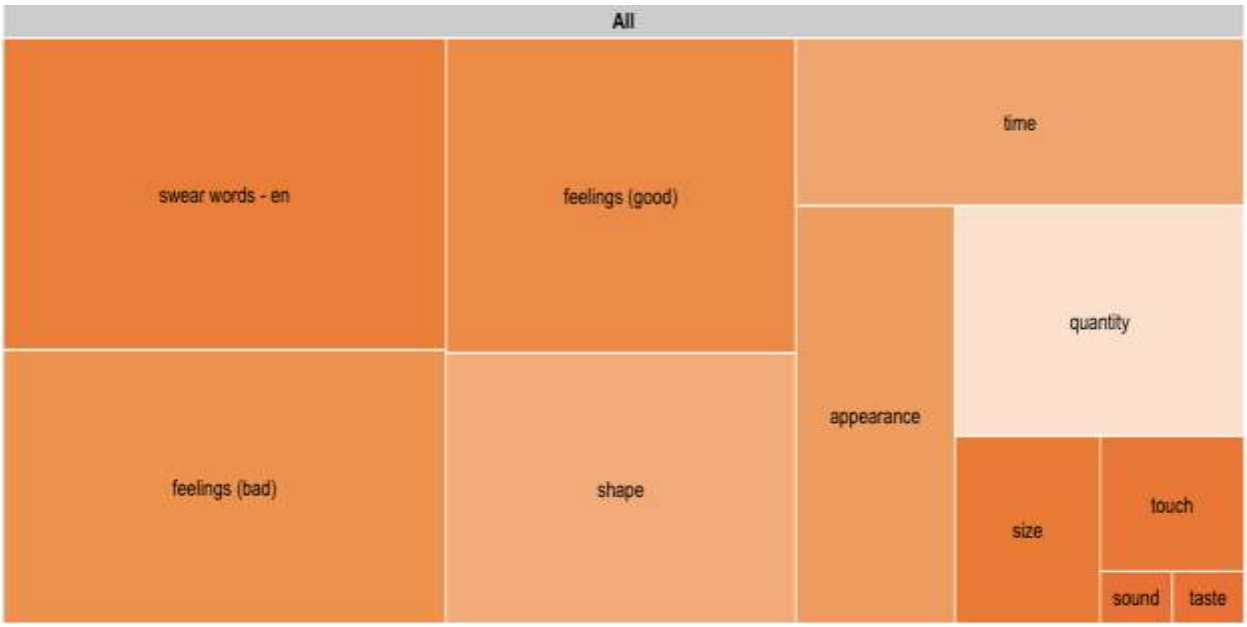

Figure 9
Impressions regarding "COVID and 5G"
(source: Netlytic, Accessed: 16 August 2022.)

The research in August 2022 was complicated by the fact that the spread of official information and the expert refutation of the link between the coronavirus and 5G largely eliminated tweets claiming an indirect link between the two. Today, both the coronavirus and 5G have become so normalized that conspiracy theorists and the average user are now focusing on completely different topics and news daily. This proves that as fast as fake news or news spreads on the Internet, the next big sensation comes just as quickly; hence two years later, in 2022, the connection between 5G and the coronavirus has almost lost its topicality on Twitter.

Just because of the military relevance of the topic, we can mention an interesting case of detecting fake news using network theory regarding the Ukrainian-Russian war that broke out in 2022. On 6th May 2022, the media world erupted over reports that the Russian naval frigate, the Admiral Makarov had been sunk by a Neptune missile. The news quickly went viral on Twitter, where it spread to the mainstream media. Enthusiastic amateurs, using open-source intelligence, found out within days that the post was a hoax and the ship had not sunk.

Conclusion

We believe that fake news represents a critical threat to modern democracies, as it is often used by the national security agencies of foreign states during psychological operations to undermine democratic institutions. As COVID-19 has shown, it also has very serious consequences for the control of the epidemic, and it is therefore crucial priority to be able to defend against it effectively.

Our study investigated the spread of COVID-19-related fake news on social media. We conducted three different empirical studies, also aimed at proposing new methodologies for researchers working on this topic. As indicated in the presentation of the survey results, our results are of limited interpretation.

The findings of our research are as follows:

R1: Users who post about "5G" AND "COVID" express a higher proportion of natural emotions.

R2: Among the respondents to the survey, there is no correlation between educational attainment and belief in fake news.

R3: Network theory can be used to identify patterns that can be used to detect the connection between the spreaders of fake news.

Our research shows that the dissemination of fake news, the way messages are spread, has a significant impact on the acceptance of that fake news. Disinformation campaigns related to COVID-19 and the Ukrainian-Russian war are effective in influencing masses of people, which fact presents severe challenges to decision-makers. In a democracy based on the rule of law, political actors are constantly monitoring the changing public opinion and forming their decisions on this basis. The absurd fake news we examine portrays a dark vision for the future, so improving the public's immunity against fake news should be a priority for all governments.

REFERENCES

5G Made for Innovation: Transform Your Business, Ericsson.com, 15 March 2016. https://www.ericsson.com/en/5g (Accessed: 20 June 2022.)

Ahmed, Wasim, Vidal-Alaball, Josep, Downing, Joseph and Seguí Francesc López 2020. COVID-19 and the 5G Conspiracy Theory: Social Network Analysis of Twitter Data. *Journal of Medical Internet Research* 22 (5): https://doi.org/10.2196/19458

Allington, Daniel, Duffy, Bobby, Wessely, Simon, Dhavan, Nayana and Rubin, James 2021. Health-Protective Behaviour, Social Media Usage and Conspiracy Belief during the COVID-19 Public Health Emergency. *Psychological Medicine* 51: 1763–69. https://doi.org/10.1017/S003329172000224X

Bányász Péter, Pollner Péter, Palla Gergely and László Dobos 2019. Lélektani műveletek a közösségi médiában. In *Hálózatok a közszolgálatban*, 111-133. Budapest: Ludovika Egyetemi Kiadó

Bitar et al. 2021. Misinformation, Perceptions Towards COVID-19 and Willingness to Be Vaccinated: A Population-Based Survey in Yemen. bioRxiv, https://doi.org/10.1101/2021.02.25.432838

China v America, The Economist, 18 July 2020. https://www.economist.com/leaders/2020/07/18/china-v-america (Accessed: 20 June 2022.)

Coronavirus, WHO, 3 December 2020. https://www.who.int/westernpacific/health-topics/coronavirus (Accessed: 6 May 2022.)

Coronavirus COVID-19 (2019-nCoV), COVID-19 Dashbord, 3 December 2020., https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6 (Accessed: 12 April 2022.)

Crawford, John R. and Henry, Julie D. 2004. The Positive and Negative Affect Schedule (PANAS): Construct Validity, Measurement Properties and Normative Data in a Large Non-Clinical Sample. *The British Journal of Clinical Psychology* 43 (3): 245–65. https://doi.org/10.1348/0144665031752934

Hua, Jinling and Shaw, Rajib 2020. Corona Virus (COVID-19) "Infodemic" and Emerging Issues through a Data Lens: The Case of China. *International Journal of Environmental Research and Public Health* 17 (7): 2309. https://doi.org/10.3390/ijerph17072309

Kovács László and Krasznay Csaba 2017. „Mert övék a hatalom”: Az internet politikát (is) befolyásoló hatása a 2016-os amerikai elnökválasztás során. *Nemzet és Biztonság* 10, (3): 3–15

Motoko: As Coronavirus Spreads, So Does Anti-Chinese Sentiment, The New York Times, 30 January 2020. https://www.nytimes.com/2020/01/30/world/asia/coronavirus-chinese-racism.html (Accessed: 20 June 2022.)

Nem félni kell az 5G-től és tiltakozni ellene, hanem kutatni, Telex, 9 November 2020. https://telex.hu/tudomany/2020/11/09/magyar-tudomany-unnepe-akademia-5g-halozat-karos-egeszsegugyi-hatas-radiofrekvencia (Accessed: 20 June 2022.)

The Myth of Makarov, Velenta OSINT, 8 May 2022. https://www.velenta.co.uk/post/the-myth-of-makarov (Accessed: 10 August 2022.)

Reichert: 5G Coronavirus Conspiracy Theory Leads to 77 Mobile Towers Burned in UK, Report Says, CNET, 11 August 2021. https://www.cnet.com/health/5g-coronavirus-conspiracy-theory-sees-77-mobile-towers-burned-report-says/ (Accessed: 20 June 2022.)

Romer, Daniel and Jamieson, Kathleen Hall 2021. Patterns of Media Use, Strength of Belief in COVID-19 Conspiracy Theories, and the Prevention of COVID-19 From March to July 2020 in the United States: Survey Study. *Journal of Medical Internet Research* 23 (4): e25215. https://doi.org/10.2196/25215

Stahl, Bernd Carsten 2006. On the Difference or Equality of Information, Misinformation, and Disinformation: A Critical Research Perspective. *Informing Science: The International Journal of an Emerging Transdiscipline* 9 083–096.

Sun, Jing, Yu, Qing, Niyazbek, Muheyat and Chu, Fayuan 2020. 5G Network Information Technology and Military Information Communication Data Services. *Microprocessors and Microsystems*, 15., 103459. https://doi.org/10.1016/j.micpro.2020.103459

Ullah, I., Khan, K. S., Tahir, M. J., Ahmed, A. and Harapan H. 2021. Myths and Conspiracy Theories on Vaccines and COVID-19: Potential Effect on Global Vaccine Refusals. *Vacunas* 22 (2): 93–97. https://doi.org/10.1016/j.vacun.2021.01.001

Umakanthan et al 2020. „Origin, Transmission, Diagnosis and Management of Coronavirus Disease 2019 (COVID-19), *Postgrad Med J* 96: 753–758.

Z. Karvalics László: Infodémia – egy kifejezés újjászületése és dimenziói, 3 April 2020. https://iask.hu/en/from-infodemic-to-the-need-for-global-information-and-knowledge-governance-by-laszlo-z-karvalics/ (Accessed: 5 May 2022.)