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A Content Analysis of COVID-19 Pro-Vaccine and Anti-Vaccine Internet Memes in Poland

Abstract

Faced with Covid-19 people are overwhelmed with information coming from governmental or health care sources but also from social media and digital communication platforms. The Internet and especially social media are often inundated with unreliable or even false information regarding COVID-19 and vaccination against it. This seriously impacts the public health, since misinformed people may be hesitant towards the health-related measures enforced by the governments and health authorities, which, in turn, contributes to their vaccine hesitancy.The aim of the paper is to investigate the Internet memes created and popularized in Poland by supporters and opponents of COVID-19 vaccinations. The data for the study include memes published between December 2020 (vaccinations become available in Poland) to May 2021 and comes from the most popular, publicly accessible social networks and meme pages with the greatest number of followers. The content analysis relays on such variables as whether the meme is pro- or antivaccine, what persuasive appeals (emotion, fear, rationality) are used, number of reactions and shares. Additionally, the analysis looks at the thematic content of the memes and tries to specify whether the pro- and anti-vaccination memes contain more gist than verbatim information. The analysis aims to define persuasion methods that pro-vaccine and anti-vaccine groups use in their memes.

Keywords: content analysis, memes, Covid-19, persuasion methods

Introduction

Social media enable people to access information about the current state of affairs almost instantaneously. Moreover, as a communication medium, they make spreading information easy and inexpensive. As suggested by Rubin and Wilson (2021: 131), al that leads to a situation in which people are under the misapprehension that they are experts in almost any field and do not need to consult their decisions with

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more experienced, acknowledged specialists. This refers not only to politics, finance, and culture but also to health issues which, in the age of the Covid-19 pandemic, have dominated the information circulated amongst people. Houlden *et al.* (2021: 1991) state that online communication platforms have recently been overflown with misinformation concerning Covid-19, which, in turn, may have serious health implications. In their study, the researchers, among others, point to studies by Brennen *et al.* (2020) and Cuan-Baltazar *et al.* (2020) that support the claims and draw similar conclusions. The misinformation regarding Covid-19 is associated predominantly with lack of trust in governmental sources of information and broadly understood science (Han *et al.* 2021; Soveri *et al.* 2021). As a consequence, people are confused and do not follow the official line of medical advice and are not willing to wear protective face masks or take the Covid-19 vaccination.

With the significant growth of social media users in Poland (Table 1), the problem of misinformation and distrust in official sources of information increases. According to the forecast concerning the growth of social network users in Poland (Statista Aug 13, 2021), the number of active social network users is expected to reach 32.11 million individuals in 2026. This indicates a probable increase of 5.88 million new users from 26.23 million already active users in July 2021.

Table 1. Social media use in Poland (https://datareportal.com)

YEAR / POPULATION	SOCIAL MEDIA USERS	% OF THE TOTAL POPULATION
January 2021/37,82 m	25.90 m	68.5%
January 2020/37,87 m	19.00 m	50%
January 2019/38,07 m	18.00 m	47%
January 2018/38,14 m	17.00m	45%

It is apparent that people in Poland predominantly turn to the Internet and social media when searching the information concerning Covid-19 and the vaccination against it. According to statistical data provided by *Statistics Poland* in 2020, 68.5% of Poles considered the Internet a reliable source of information about Covid-19 (https://stat.gov.pl/covid/). Interestingly, every third Pole (37.2%) obtained information about Covid-19 on social networks. Due to that, Poles' attitudes towards, for instance, vaccination against Covid-19 appear to be more and more influenced by such sources. The claim can be supported by the results of the Flash Eurobarometer 494 survey *Attitudes on vaccination against COVID-19* (Ipsos European Public Affairs May 2021). The survey was conducted in all European Union member countries between 21 and 26 May 2021 and included 26106 interviews in total (1020 in Poland).

With regard to Covid-19 vaccination and the fight against the pandemic, it turns out that only 26% of the interviewed Poles *totally agreed* with the statement that "a vaccine is the only way to end the pandemic", and only 19% with "I believe vaccines authorized in the European Union are safe". What is more, 55% of the Polish respondents were totally dissatisfied with the way Polish government has "handled the vaccination strategy" and as many as 58% considered public authorities to be "not sufficiently transparent about Covid-19 vaccines". When it comes to the sources of information people in Poland trust, the survey revealed that only 11% of the surveyed people would use governmental sources, and as many as 51% in total rely on the information coming from colleagues, friends, family as well as media, websites or online social networks. It is equally important that as many as 22% of surveyed Poles claim that they actually do

not know whom they can trust or where to look for reliable information concerning Covid-19 treatment or the vaccination against it. All the above data indicate that the abundance of information concerning the disease in association with the lack of stable and trusted source of information make people rely mostly on their closest friends and online sources that influence people into following particular lines of thought. Since we live in the so-called "visual culture" in which visual content carries significant as well as nonsignificant or trivial information (Evans and Hall 1999: 2), memes become accessible tools for both the authors and the recipients of the information concerning Covid-19 or the vaccination against it. Nonetheless, as pointed by Basch *et al.* (2021: 2), continuous exposure to Covid-19 memes can lead to misinformation and further confusion.

Memes

The term 'meme' in its current use is far from the original meaning. It was first coined by Richard Dawkins (1976) who, in order to explain the processes of cultural evolution, described memes as small cultural units of transmission that by way of imitation spread from person to person. Today, the concept of a meme is generally understood as a joke or pun spread throughout the Internet. Merriam-Webster Online Dictionary provides a definition of a meme as "an amusing or interesting item (such as a captioned picture or video) or genre of items that is spread widely online especially through social media." As specified by Shifman (2014: 41), memes are digital objects that share certain common visual or formulaic features which are continuously imitated, modified and shared by the Internet users. They are limited in communication, yet their impact, due to mass popularity, can have serious consequences for their recipients (Milner 2016: 14). As Milner (2016: 40) points out, memes are important not only due to their undeniable mass popularity and spread that is often greater than any individual text can have, but also because by using multimodal elements, they aim at collective response and reaction. Their goal is to comment, interpret or mock current situations or social affairs. Since they are easily accessible via social media, they are more and more commonly used by various social movements to promote their ideologies, criticize individuals and institutions or manipulate people into certain actions and behaviours (Ross, Rivers 2017; Shifman 2014). With the growing reliance on information from social media, memes play an important role in shaping people's opinions and attitudes towards political, social and health issues. More than ever, faced with the Covid-19 pandemics and the lockdowns, people not only search the Internet for information concerning medical treatment, vaccination, and safety precautions but they also try to find materials that would reduce their anxiety and provide humorous content to reduce stress caused by negative experiences related to Covid-19 pandemic (Akram *et al.* 2021: 8). Basch *et al.* (2021: 2) points out, however, that despite the general intentions of memes to be humorous, they may enhance and promote inaccuracy and misinformation. This, in turn, may lead to a lack of trust in science and modern medicine as well as strong belief in the detrimental side effects of Covid-19 vaccination.

Aims and data

Covid-19 pandemics and the lockdowns have led people to search the Internet for information concerning medical treatment, vaccination and safety precautions. Very often, however, people do not care whether

the sources they use are reliable and verifiable. What is more, most people want to get the information at a glance. All that makes Internet memes a possible source of information that is easy to understand and does not require elaborate reading of complex texts.

The aim of the paper is to investigate the Internet memes created and popularized in Poland by supporters and opponents of Covid-19 vaccinations and identify the characteristics of pro-vaccination compared with anti-vaccination memes. In order to do that, the author analyses 80 memes published within six months from December 2020 (when vaccinations became available in Poland) to May 2021. The memes come from the most popular, publicly accessible social networks and meme pages with the greatest number of followers (data as of May 2021). The author takes into account the memes using only the Polish language, which focus exclusively on the topic of Covid-19 vaccination and do not touch upon any additional (e.g. political, cultural or financial) matters. Although such frames limit the number of memes, they ensure that the analysis does not stray from the main subject. The paper discusses how the attitudes towards the Covid-19 vaccination are expressed through social media, and memes in particular. Figures 1 and 2 provide the examples of pro-and anti-vaccination memes that are included in the study.

Figure 1. Example of an anti-COVID-19 vaccination. The image is a public domain work. Source: https://demotywatory.pl/5043817/. [Translation: Covid-19 vaccination is effective and completely safe, however, it has one, small side effect]

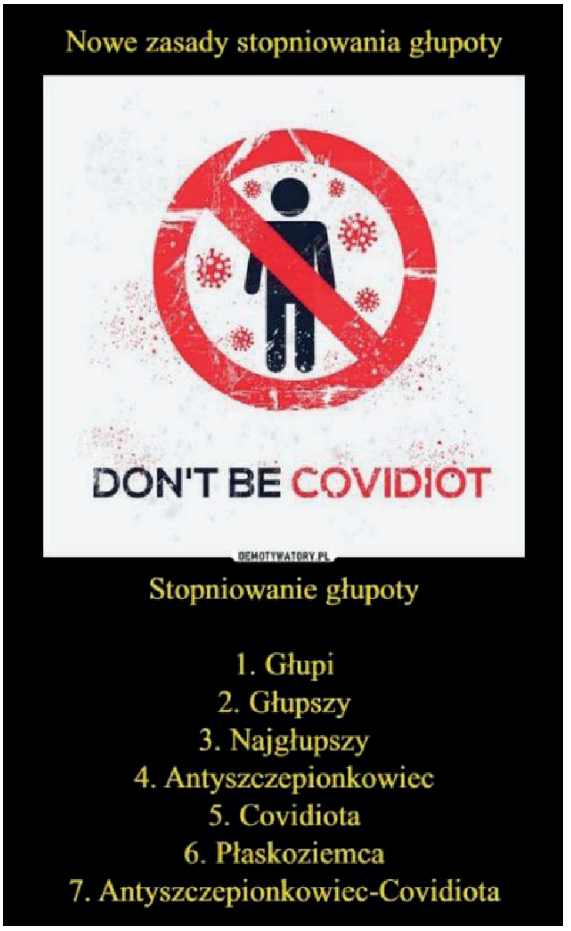

Figure 2. Example of a pro-COVID-19 vaccination. The image is a public domain work. Source: https://demotywatory.pl/5071661/. [Translation: Gradation of stupidity: 1. Stupid 2. More stupid 3. The most stupid 4. Anti -vaccinationists 5. Covidiot 6. Flat-earther 7. Anti -vaccinationists-Covidiot]

Method and procedure

The study adopts quantitative content analysis and attempts to evaluate and compare the memes from the perspective of their thematic engagement and manipulation techniques.

The first part of the analysis aims at depicting thematic differences between pro- and anti-vaccination memes. The thematic content analysis of the material is based on 14 categories which are modelled on Bean (2011):

1. Vaccine-preventable diseases (whether the subject is incuded in the memes, and is used to support or discard the vaccination)
2. Logical fallacies / faulty thinking (errors in reasoning that are deliberately used to support or discard the vaccination)

3. Vaccine injury/safety/autism (whether the subjects are used in the memes to support or discard the vaccination)
4. Informed decisions (whether the memes suggest making decisions concerning vaccination based on knowledge and reliable information)
5. Vaccine effectiveness
6. Out-group is danger to society (whether the memes mention the out-group)
7. Conspiracy theories (whether the memes refer to or use conspiracy theories about Covid-19)
8. Stupidity/gullibility (whether the memes present the out-group members as naive, easily deceived and too willing to believe everything they are told)
9. Appeal to nature / nature is better
10. Scientific method (whether the memes use trustworthy, scientific sources)
11. Civil liberties (whether the memes refer to civil liberties to support their anti- or pro-vaccination message)
12. Ignorance (whether the memes accuse the out-group members of ignorance of effects of vaccination)
13. Nondescript / ominous (whether the memes aim at scaring the viewers)
14. Victimhood (whether the memes suggest that taking or not taking vaccines hurts, damages, or makes people suffer)

Each meme was evaluated separately by one coder - the author, and 10% of the material was evaluated by an independent coder to ensure the reliability of the evaluation of the material for analysis. Next, Cohen's kappa interrater reliabilities were calculated for categorical variables (Cohen, 1960). The Cohen's kappa statistic was used to measure to what extent the author's evaluation of the material agreed with the evaluation of the second coder. The result of the test indicated moderate to perfect agreement. This meant that the authors evaluation was balanced and well founded.

In the evaluation process, each meme may represent more than one theme. The memes which include the vaccination supportive messages are treated as pro-Covid-19 vaccination memes, and the memes that contain discouraging messages are treated as anti-Covid-19 vaccination memes.

Possible differences between the pro- and anti-Covid-19 vaccination memes are measured with the use of chi-square tests (with Yates correction that is used for small sets of data), which allow evaluating the proportion differences on each category's role as far as pro- and anti-Covid-19 vaccination is concerned.

In the second part of the analysis the author wants to find out what persuasive techniques are used in both types of memes, whether they appeal to the emotional side of the memes' recipients, their fears, or maybe they try to rationalize the matter. Focus is also put on the style of the memes, whether they employ sarcasm - use words that mean the opposite of what the memes' authors want to express. The above mentioned variables are coded and evaluated by two independent raters who used the codebook inspired by and modelled on Harvey *et al.* (2019). Each variable is evaluated for each meme with the use of a 0–7 points scale where 0 means 'completely/absolutely not' and 7 means 'completely/absolutely yes' (see: Table 2). After individual evaluation, the coders discuss their answers to the questions and establish a shared evaluation of each meme.

Table 2. Variables in the analysis of memes' persuasive techniques.

VARIABLE	QUESTION	SCALE
APPEAL TO EMOTIONS	Is the meme emotional? Does it appeal to emotions (both positive and negative)	from 0 –'completely/absolutely not' to 7 'completely/absolutely yes
APPEAL TO FEAR	Does the theme appeal to fear? Is fear a tactical move to persuade the recipients?	from 0 –'completely/absolutely not' to 7 'completely/absolutely yes
APPEAL TO RATIONALITY	Does the meme appeal to rationality, knowledge or logic?	from 0 –'completely/absolutely not' to 7 'completely/absolutely yes
LEVEL OF SARCASM	How sarcastic is the meme?	from 0 –'not sarcastic at all' to 7 'very sarcastic'

It is also important for the study to calculate the number of false statements (the information that is incorrect and is given with the intent to mislead) that appear in both types of memes. Each meme's total number of statements (sentences or phrases that are used) and the number of false statements (sentences or phrases that provide a false, incorrect information) are calculated separately and later on added to specify the numbers for the whole material. The statement is understood in the study as a sentence, a phrase or word, depending on the stylistic character of the meme.

Results

It has been observed that out of 80 memes that were selected and analyzed, 61.25% were anti-Covid-19 vaccination memes. When it comes to the number of false statements, it turns out that the mean percentage (MP) of false statements in all pro- and anti-vaccination memes is equal to 19.56% with standard deviation (σ) – a measure of how numbers spread out – equals 1.15. Interestingly, the number of false statements is considerably bigger amongst anti-Covid-19 vaccination memes (the mean percentage (MP) of false statements amounts to 35% with standard deviation (σ) = 1.19) than pro-Covid-19 vaccination memes (here MP = 2.72% σ = 0.7).

Chi-square tests were conducted to evaluate the percentage differences in each type of theme as a function of pro- and antivaccine memes. Generally, the choice of topics used by both types of memes is not statistically significant (although the data from the sample may seem to suggest the opposite), and both groups use a broad variety of themes (Table 4). The results of the tests reveal that there are two statistically significant categories, namely – *stupidity/gullibility* and *ignorance*. Both themes are predominantly used in pro-vaccination memes. The tendency is to show the anti-vaccination movements as stupid and ignorant, and the people who are opposed to Covid-19 vaccination as uneducated and narrow-minded (Figure 3).

Figure 3. Pro-vaccination memes referring to ignorance and stupidity. The image is a public domain work. Source: https://wyborcza.pl/andrzejrysuje/178695216/; https://demotywatory.pl/5048664/; (https://wyborcza.pl/andrzejrysuje/178695216/
[Tłumaczenie: vaccine … oh, no way. It can be detrimental to health]
[Tłumaczenie: No, mRNA vaccine does not change your genome. Pity, this could have been a chance for you]

What is also important is that a range of themes is used only by one of the two types of memes. Such a situation makes it impossible to perform the chi-square tests. Nevertheless, the avoidance of particular topics also sheds some light on the character of the memes and their thematic tendencies and preferences. To these belong themes referring to *vaccine-preventable diseases*, *appeal to nature/nature is better*, *scientific method* used in the process of the development of Covid-19 vaccines, *civil liberties* and *non-descript/ominous* theme. Anti-Covid-19 vaccination memes do not expound about the vaccine-preventable diseases topic so as not to remind their readers that historically speaking, all types of vaccinations have brought more good than potential risk or danger. Surprisingly, pro-vaccine memes avoid a much broader range of themes, which may suggest that their authors are not entirely confident about the matter. None of the pro-Covid-19 vaccination memes uses the *scientific method* theme. This supports the aforementioned Eurobarometer 494 survey, which revealed that people in Poland have little knowledge concerning the scientific and health measures behind the vaccination. Pro-Covid-19 vaccination memes are also not *ominous* in their character, as they do not use people's fears to convince them that vaccination will be beneficial for them. Anti-Covid-19 vaccination memes tend to have an ominous, non-descriptive character to scare people of the vaccination. They also try to convince people about the vaccine's lack of effectiveness in an irrational and emotional way, often using the argumentation of *civil liberties*. The detailed analysis and the statistical significance of the thematic differences between pro- and anti-Covid-19 vaccination is presented below in Table 4.

Table 4. Chi-square tests on themes as a function of pro- and antivaccine memes

THEME	PRO-COVID-19 VACCINATION MEME	ANTI- COVID-19 VACCINATION MEME	
VACCINE-PREVENTABLE DISEASES	6	-	
LOGICAL FALLACIES/FAULTY THINKING	12	9	The chi-square statistic is 4.0586. The p-value is .043947. Significant at $p < .05$. The Fisher exact test statistic value with Yates correction is 0.067. The result is not significant at $p < .05$.
VACCINE INJURY/ SAFETY/ AUTISM	6	21	The chi-square statistic is 4.6906. The p-value is .030328. Significant at $p < .05$. The chi-square statistic with Yates correction is 3.6984. The p-value is .054465. Not significant at $p < .05$.
INFORMED DECISIONS	6	4	The chi-square statistic is 2.1744. The p-value is .140328. Not significant at $p < .05$. The chi-square statistic with Yates correction is 1.2715. The p-value is .259483. Not significant at $p < .05$.
VACCINE EFFECTIVENESS	2	12	The chi-square statistic is 4.2792. The p-value is .038582. Significant at $p < .05$. The chi-square statistic with Yates correction is 3.121. The p-value is .07729. Not significant at $p < .05$.
OUT-GROUP IS DANGER TO SOCIETY	7	3	The chi-square statistic is 4.8614. The p-value is .027464. Significant at $p < .05$. The chi-square statistic with Yates correction is 3.4499. The p-value is .063254. Not significant at $p < .05$.
CONSPIRACY THEORIES	7	18	The chi-square statistic is 1.7705. The p-value is .183315. Not significant at $p < .05$. The chi-square statistic with Yates correction is 1.173. The p-value is .278781. Not significant at $p < .05$.

THEME	PRO-COVID-19 VACCINATION MEME	ANTI- COVID-19 VACCINATION MEME	
STUPIDITY GULLIBILITY	12	5	The chi-square statistic is 9.2197. The p-value is .002394. Significant at p < .05. The chi-square statistic with Yates correction is 7.595. The p-value is .005853. Significant at p < .05.
NATURE/NATURE IS BETTER	-	1	
SCIENTIFIC METHOD	-	1	
CIVIL LIBERTIES	-	3	
IGNORANCE	9	4	The chi-square statistic is 6.0762. The p-value is .013701. Significant at p < .05. The chi-square statistic with Yates correction is 4.6395. The p-value is .031244. Significant at p < .05.
NONDESCRIPT OMINOUS	-	8	
VICTIMHOOD	2	10	The chi-square statistic is 2.9008. The p-value is .088537. Not significant at p < .05. The chi-square statistic with Yates correction is 1.9094. The p-value is .167029. Not significant at p < .05.

As far as the emotional aspect of the memes and especially their appeal to emotions and fears are concerned, it turns out that both pro-vaccination and anti-vaccination memes do appeal to emotions and predominantly address their readers' feelings. Still, the analyzed pro-vaccination memes generally appeal to positive emotions, whereas anti-vaccination ones try to appeal mainly to fears. Pro-vaccination memes refer to the readers' rationality and common sense much more often than anti-vaccination memes do. The appeal to emotions is, in general, less common in both types of memes. However, when the authors of the anti-Covid-19 vaccination memes want to play on emotions, they tend to appeal to fear of the meme's recipients. The analysis also revealed presence of sarcasm in both types of the memes. Nonetheless, it has been used much more often in pro-Covid-19 vaccination memes than in the anti-vaccination ones and was directed at the opponents of Covid-19 vaccination.

The detailed data are presented in Table 5 below.

Table 5. Mean scores for each variable

	PRO-COVID-19 VACCINATION MEMES	ANTI-COVID-19 VACCINATION MEMES
APPEAL TO EMOTION	MP = 3.51, σ = 1,52	MP = 3.04, σ = 1.27
APPEAL TO FEAR	MP = 1.00, σ = 1.41	MP = 2.71, σ = 1.45
APPEAL TO RATIONALITY	MP = 2.25, σ = 2.42	MP = 1.67, σ = 1.13
DEGREE OF SARCASM	MP = 3.51, σ = 2.31	MP = 2.32, σ = 1.67

Conclusions

The study attempts to offer insights into the strategies of persuasion applied in memes published between December 2020 to May 2021 to express pro- and anti-Covid-19 vaccine information. Despite particular limitations of the study, namely, the small number of the memes accepted for the analysis caused by the use of only Polish language memes concerned purely with the Covid-19 vaccination topic, the results of the analysis stand in agreement with the Eurobarometer 494 survey's conclusions and reveal mixed attitudes towards Covid-19 vaccination in Poland, and especially on Polish social media. This is visible when we look at the pro- and anti-vaccination memes and how they try to convince their viewers. Predominantly, the anti-Covid-19 vaccination memes' driving force is lack of trust in health care system and science and concern about the vaccination's safety and adverse effects. The content of both types of memes shows a relatively low level of literacy of both the authors of the memes and their recipients when it comes to health issues and the fight with Covid-19. Very often they are based on fears and scientifically unsupported pieces of information that are intended to play on people's emotions. Memes that are often used as humorous tools that help to develop coping mechanisms to fight stress, anxiety or tension play here a detrimental role. It can be concluded that Covid-memes, especially anti-Covid-19 vaccination memes and, thus, social media information, instead of promoting vaccination and engaging vaccine-hesitant Poles, clearly compromise the efforts to promote vaccination.

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