

Media Exposure to Conspiracy vs. Anti-conspiracy Information. Effects on the Willingness to Accept a COVID-19 Vaccine

Raluca Buturoiu

 0000-0001-9841-0929

National University of Political Studies and Public Administration, Bucharest, Romania

Alexandru Cristian Dumitrache

 0000-0002-2744-3990

National University of Political Studies and Public Administration, Bucharest, Romania

Georgiana Udrea

 0000-0002-5692-4320

National University of Political Studies and Public Administration, Bucharest, Romania

Nicoleta Corbu

 0000-0001-9606-9827

National University of Political Studies and Public Administration, Bucharest, Romania

ABSTRACT: The COVID-19 pandemic opened the doors for a corresponding “infodemic”, associated with various misleading narratives related to the SARS-CoV-2 virus. As the way to stop the pandemic was unveiled, misleading narratives switched from the disease itself to the vaccine. Nevertheless, a rather scarce corpus of literature has approached the effects of these narratives on the willingness to take a vaccine against COVID-19. This study investigates how exposure to conspiracy narratives versus information that counter these narratives influences people’s willingness to get vaccinated. Based on an experimental design, using a sample of Romanian students (N=301), this research shows that exposure to factual information related to COVID-19 vaccines meant to debunk conspiracy theories leads to higher willingness to vaccinate. Furthermore, this study shows that young, educated Romanians consider distant others to be more influenced by conspiracy theories on this topic, and, therefore, more prone to exhibit hesitancy towards COVID-19 vaccination.

KEYWORDS: vaccine hesitancy; media exposure; disinformation; conspiracy theories; counter-conspiracy narratives.

INTRODUCTION

Since the start of the COVID-19 pandemic, the outbreak has been associated with a parallel “infodemic” (Bond, 2020), while the spread of fake narratives and conspiracy theories within various social media platforms has been compared with the intra-community transmission of the virus (Zarocostas, 2020). Multiple fake narratives, ranging from denying that the coronavirus exists to claims that its transmission is associated with the roll-out of 5G, have emerged online. Recently, the intensity of the general fake narratives addressing the virus fell back only to make room for the new “hit”: conspiracy theories towards the vaccine (EEAS Strategic Communications and Information Analysis Division, 2020).

Now that COVID-19 vaccines are available, herd immunity (which could be achieved through high vaccine acceptance rates) has become the primary objective for stopping this global crisis. However, while vaccine hesitancy and its causes have been previously researched (Burki, 2019; Conroy et al., 2009; Figueiredo et al., 2020; Loomba et al., 2021; MacDonald, 2015), research about the implications of conspiracy theories on individuals’ willingness to vaccinate against COVID-19 is rather scarce.

Measures, varying in aggressiveness, were taken by various local and international public administration institutions and social media platforms to tackle the spread of online conspiracy theories regarding the COVID-19 vaccine. Despite these efforts, fake narratives continue to be widely shared among internet users around the world (European Council, 2021).

This study aims to better understand the “information-related” factors that make people develop different vaccine acceptance levels. The importance of such an approach is that one main reason explaining vaccine-hesitant attitudes is linked to the high proliferation of conspiracy narratives, especially in the digital media ecosystem. In other terms, “the spread of false claims about the vaccines on social media is so troubling because it risks undermining public health efforts” (Bond, 2020), which means that, in a broader sense, the exposure to toxic and misleading narratives in the media erodes trust in COVID-19 vaccines, thus limiting the possibility of achieving herd immunity through vaccination.

Using an experimental design on a sample of 301 young Romanian citizens with the right to vote and higher education studies in progress, we found that exposure to factual information related to COVID-19 vaccines meant to debunk conspiracy theories leads to higher acceptance of self-vaccination. Moreover, our research also confirms that the Romanians in our sample consider distant others¹ to be more prone to accept or support conspiracy theories related to the COVID-19 vaccine, thus making them less willing to get a vaccine.

1 ‘Distant others’ refers to people in general, whereas ‘close others’ refers to family and friends.

THE FIGHT AGAINST THE COVID-19 “INFODEMIC”: A BRIEF OVERVIEW OF THE PRESENT CONTEXT

On the 11th of March 2020, the World Health Organization (WHO) stated that the COVID-19 outbreak became a pandemic. With over 118.000 cases and 4291 deaths at that time, the coronavirus related outbreak was the first of its kind (World Health Organization, 2020a). There have since been 61.8 million cases, 1.4 million deaths worldwide (World Health Organization, 2020b) and on the 11th of December 2020, the COVID-19 vaccine, developed by the Pfizer/BioNTech pharmaceutical companies, was approved in the US by the US Food and Drug Administration (US Food and Drug Administration, 2020). Shortly after, on the 21st of December 2020, the European Commission issued a conditional marketing authorization for the same COVID-19 vaccine (European Commission, 2020b), following its positive evaluation by the European Medicines Agency (European Medicines Agency, 2020). Between the 27th and the 29th of December there occurred what is now known as the “EU Vaccination Days”, a public activation meant to create a buzz within all the EU member states around the first deliveries of the Pfizer/BioNTech vaccine and the first vaccinated Europeans (European Commission, 2021b). At that time, COVID-19 vaccines produced by 5 other manufacturers were still either under development or evaluation by the European Medicines Agency (European Commission, 2021e).

Even though there seems to be a joint agreement among international health institutions regarding the fact that vaccination is the only way to escape the current public health crisis, for this strategy to work, the need for herd immunity arises. Thus, vaccine hesitancy can prove to become a serious challenge in the process of reaching a certain percentage regarding the population’s vaccination rate, especially in the context of an ever-changing online landscape.

Vaccine hesitancy has been defined as the “delay in acceptance or refusal of vaccination despite the availability of vaccination services” (MacDonald, 2015, p. 4161). Although complex and bound by context, varying across time, place and vaccines, vaccine hesitancy is influenced by factors such as complacency, convenience and confidence, according to MacDonald (2015). While evidence suggests that vaccine hesitancy rates worldwide have continuously changed and evolved since 2015 (Figueiredo et al., 2020), some studies advocate that online misinformation can become an engine for an increasing level of vaccine hesitancy (Loomba et al., 2021, p. 1). A low rate of vaccination can have multiple causes, such as worries about the effectiveness and safety of a vaccine (Conroy et al., 2009) or a general feeling of doubt regarding the topic; however, it seems that “misleading health information on social media might push vaccine hesitancy to the point of disaster” (Burki, 2019, p. e258).

The capacity to spread and distribute ideas and opinions forms the basis of our activity regarding social media; however, this can sometimes prove more “like a curse than a blessing” (Tate, 2019). While the spread of rumours and misleading facts have been previously compared with the transmission of viruses through contacts within host populations (Kucharski, 2016; Zarocostas, 2020), the spread of the COVID-19 pandemic dis – and misinformation has been associated with a parallel pandemic that boosts the former original one (Bond, 2020). Experts from the WHO have warned the population about an alleged “infodemic” (Zarocostas, 2020), meaning a high proliferation of false and misleading information. Since the start of the pandemic, various fake narratives regarding the coronavirus have spread around the world, varying from the association of the pandemic with the roll-out of 5G networks to claims that facemasks can cause hypoxia or hypercapnia or that the virus does not exist (European Commission, 2021f). Also, nowadays, it seems that the general fake narratives addressing COVID-19 have lost some ground in order to make room for the new vaccine-related disinformation (EEAS Strategic Communications and Information Analysis Division, 2020).

Given that the COVID-19 vaccine issue is now highly visible in both national and international media and politics, discussions and debates around the topic are taking place everywhere. They can be found in various contexts and all kinds of social media groups. Many questions regarding this vaccine, its efficiency, or counter effects arise; thus, it becomes evident that problematic content about vaccination does not circulate only in vaccine discussion dedicated groups, as was previously the case (Bond, 2020). Impacts of fake narratives surrounding the vaccine against COVID-19 can vary across the world, depending on their popularity or on the public administration’s efforts to tackle the situation. Therefore, while some claims, often fuelled by the pro-Kremlin media (EEAS Strategic Communications and Information Analysis Division, 2020), such as “the vaccine could turn people into monkeys” (O’Neill & Manveen, 2020), may have little to no effect, others might cause a different outcome. For example, according to a recent public opinion survey, 35.7% of Romanians agree that the COVID-19 pandemic was specifically created to inoculate people with a microchip through vaccination (INSCOP Research, 2021).

Nevertheless, disinformation with regards to the virus and the vaccine is not new. Public institutions are aware of it and have taken various more or less effective measures to combat the phenomenon. For example, in the context of the ever-increasing intensity of the COVID-19 fake narratives, on the 10th of June 2020, the European Commission and the High Representative of the European Union launched a joint communication (European Commission, 2020a) on tackling online disinformation, meant to reinforce the *Code of Practice on Disinformation*: a self-regulatory code of practice launched in 2018, designed

to drive transparency among the social media platforms that adhere to it, by constraining them to publish monthly reports related to the measures they took to stop the spread of disinformation (European Commission, 2021c). The *Code of Practice* is currently signed by TikTok, Twitter, Google, Microsoft, Facebook, and Mozilla (European Commission, 2021d).

Social media platforms are also taking measures to stop the proliferation of fake narratives regarding the COVID-19 vaccine. For example, starting from the 8th of February 2021, in accordance with the World Health Organization and other leading health institutions, Facebook is removing false claims regarding the coronavirus or its vaccine from its platforms, namely Facebook and Instagram, in an attempt to aggressively fight back against anti-vaxxers (Facebook, 2021). Similarly, Twitter labels or removes content that stresses false claims regarding an alleged global conspiracy behind the COVID-19 vaccine (Twitter, 2021).

CONSPIRACY THEORIES VERSUS FACTUAL INFORMATION: EFFECTS ON INDIVIDUALS' WILLINGNESS TO VACCINATE

Problematic content regarding vaccination and the COVID-19 vaccine explicitly continue to linger on social media platforms. Such content might take various forms, from fabricated to manipulated content, from satire to propaganda. Nonetheless, for the purpose of this research particularly investigating the role of conspiracy theories, previously defined as narratives that associate mysterious groups of people with far-reaching events (Jolley & Douglas, 2017, p. 1), we further refer to this problematic content either in terms of disinformation or conspiracy theories and narratives. More specifically, disinformation and conspiracy theories “are attempts to explain the ultimate causes of significant social and political events and circumstances with claims of secret plots by two or more powerful actors” (Douglas et al., 2019, p. 4).

The potential of factual information in tackling conspiracy theories has been already studied in relation to various fake narratives on a wide range of topics. For example, Banas and Miller (2013) conducted an experiment based on the work put forward by Papageorgis and McGuire (1961). Their experiment refers to the inoculation theory which proved that exposure to factual information increases an individual's resistance to subsequent conspiracy theories. Other studies have also demonstrated that individuals have positive attitudes towards a vaccine when they have been previously exposed to vaccine related factual information (e.g., Loomba et al., 2021). However, when an individual is first exposed to an anti-vaccine conspiracy theory, the negative impact can be permanent (Jolley & Douglas, 2017; Uscinski et al., 2016). Similarly, Jolley and Douglas (2014) discovered a correlation between a high Measles, Mumps, Rubella

(MMR) vaccination hesitancy rate in UK and the vaccine's alleged connection with autism occurrence. Jolley and Douglas (2014) found individuals' attitudes towards vaccination were as a result in line with the type of information they were exposed to: exposure to anti-vaccine conspiracy supporting material correlated with a negative attitude towards vaccination. In the present context, recent studies have also proved that exposure to disinformation has caused a significant decline in people's intention to vaccinate against COVID-19 (Loomba et al., 2021; Romer & Jamieson, 2020; Roozenbeek et al., 2020). On the other hand, exposure to mainstream media information, specifically in the form of print news stories is associated with higher vaccination intentions in the USA (Romer & Jamieson, 2021).

Moreover, it seems that individuals who rely on social media platforms in order to get information on COVID-19-related topics are less likely to get a vaccine than those who rely on more traditional news sources (Bond, 2020). Besides, evidence from the early days of the COVID-19 outbreak in the US suggests that people who used online news stories as a source of information had more accurate opinions regarding protection from the disease. In contrast, the use of Facebook for the same reason was correlated with a higher rate of believing in fake narratives about the coronavirus and its alleged treatments (Jamieson & Albarracín, 2020). Moreover, according to a recent survey Gandhi (2021) found that more than 40% of Americans consider Facebook to be distrustful, while a high proportion (73%) agree that social media networks should fact-check all the available content on the platform. Thus, people's loss of trust in Facebook and in the content available on the platform could suggest that shared news on Facebook could have a lower impact than regular news. In Romania's case, this context is of utmost importance since Facebook, with over 12 million registered accounts, is the most widely used social media platform (NapoleonCat, 2021). Given this background, we hypothesize that:

- H1: Exposure to factual information about vaccination meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic leads to higher acceptance of self-vaccination.
- H1a: Facebook shared factual information about vaccination meant to debunk conspiracy theories and promote vaccination as a pandemic solution is less effective than the content shared itself (online news story).

According to Loomba et al. (2021), it seems that individuals' willingness to vaccinate increases when the safety of close others is at stake, rather than when it comes to own health. However, when it comes to various forms of fake news (conspiracy theories included), few studies have concentrated on analyzing its third person effect (TPE) perception (for exceptions, see Corbu et al., 2020; Jang & Kim, 2018; Ștefăniță et al., 2018). Nevertheless, in Romania, people considered

their friends and family to be more influenced by fake news than themselves (Ștefăniță et al., 2018), thus having the perception that close others are more vulnerable to conspiracy theories. Therefore, in the context of the willingness of close others to vaccinate, we hypothesize that:

- H2: Exposure to factual information about vaccination meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic leads to the perception that close others are less willing to get a vaccine. This might be the case, as people exposed to debunking information become arguably more aware of conspiracy theories and their misleading potential.
- H2a: Relative to the content, exposure to a Facebook shared story (either meant to debunk conspiracy theories or conspiracy-based) leads to the perception that close others have even lower levels of vaccine acceptance.

A similar argument supports perceptions about people in general. Recent evidence suggests that, at least in Romania, there is a solid TPE perception in own ability to detect fake news and that “this effect is stronger when people compare their fake news detection literacy to that of distant others than to that of close others” (Corbu et al., 2020, p. 165). Similarly, in the USA, studies have shown that the same outcome is relatable to political affiliation, in that both Democrats and Republicans considered each other’s to be more influenced by fake news than their in-group, and definitely more susceptible to become victims of conspiracy theories than themselves (Jang & Kim, 2018). Thus, in the context of the willingness of distant others to vaccinate, we assume that:

- H3: Exposure to factual information meant to debunk conspiracy theories around the virus and the vaccines leads to the perception that distant others are less willing to get a vaccine.
- H3a: Relative to the content shared itself, exposure to a Facebook shared story (either meant to debunk conspiracy theories or conspiracy-based) leads to the perception that people, generally, have lower levels of vaccine acceptance than in the case of information coming in the form of an online news story.

Lastly, in the context of own perception of self and others regarding the ability to detect fake news or an alleged immunization to the phenomenon, in Romania, a standard mental narrative could be identified: “I am aware that there are many fake news around, but it is surely them – my close friends and people in my network – who are mainly affected, as I am generally more aware” (Corbu et al., 2020, p. 176). This reasoning could also be adapted to individuals’ perception of conspiracy theories’ ability to alter judgment or opinions on the COVID-19 vaccine.

METHODOLOGY

EXPERIMENTAL DESIGN

To test the hypotheses, we set up a 2x2 between-subjects experiment, plus a control condition. The four experimental conditions are based on manipulated news stories, as follows: factual information about the virus and the vaccines meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic vs. conspiracy-based information stating that the virus was manufactured in a lab and that vaccines could have serious dangerous effects such as autism and even death. People in the control condition did not receive any stimuli. These stories were also manipulated regarding the way they circulated in the public space – via online newspapers or via Facebook shared online news story. Thus, the four experimental conditions are: factual information about the virus and the vaccines meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic posted via online newspapers (N=43); factual information about the virus and the vaccines meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic shared via Facebook post (N=61); conspiracy-based information stating that the virus was manufactured in a lab and that vaccines could have serious dangerous effects such as autism and even death posted via online newspapers (N=62); conspiracy-based information stating that the virus was manufactured in a lab and that vaccines could have serious dangerous effects such as autism and even death shared via Facebook post (N=60), and control condition (N=75).

SAMPLE

The experiment is based on a sample of 301 educated Romanian citizens with the right to vote, enrolled in a social sciences university in Romania. The mean age in the sample was 24.05 ($SD=6.67$). The sample was skewed to some extent in the sense that women were overrepresented (79.7%). Data was collected during November 16 and December 3, 2020. At that time, no vaccine against COVID-19 had been authorized; on December 21 2020, the European Commission granted a conditional marketing authorization for the COVID-19 vaccine developed by BioNTech and Pfizer, making it the first COVID-19 vaccine authorized in the EU (European Commission, 2021a). 27 – 28 – 29 December 2020 were marked as the EU vaccination days; December 27, 2020 represented the day when the vaccination program was launched in EU27 (European Commission, 2021b).

PROCEDURE

The questionnaire was created and distributed using Qualtrics Survey Software and comprised four parts: informed consent, a pre-test part consisting of demographics, moderators, and control variables, a random assignment to one of the four conditions (exposure to either conspiracy-based or anti-conspiracy news story shared via online newspapers or Facebook) plus control condition (no exposure), and a post-test part containing the dependent variables and the manipulation checks. Randomization was successful with regards to gender ($F(4, 296)=.20, p=.94$), self-perceived religiosity ($F(4, 296)=.117, p=.33$), frequency of going to the church ($F(4, 296)=.52, p=.72$), and self-perceived incidence of fake news ($F(4, 294)=.16, p=.96$). At the end of the survey, participants were debriefed and thanked.

STIMULI

The stimuli were two types of posts: a news story posted via online newspapers vs. a news story shared on Facebook. The stories posted on the online newspaper's page had the same visual format, but the content followed either the anti-conspiracy or the conspiracy-based framing. The stories shared on Facebook were accompanied by high engagement metrics, in the form of comments (309), shares (21), and reactions (467), which were held constant across the two conditions involving Facebook news stories (see Appendix).

MANIPULATION CHECKS

We used four manipulation check variables to test whether the stimuli were perceived as intended. People receiving an online news story answered significantly different to those receiving a Facebook shared news story regarding whether that particular story was shared on Facebook or not ($F(1, 219)=18.92, p<.01$). At the same time, people receiving factual information about the virus and the vaccines meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic answered significantly different to those receiving conspiracy-based information stating that the virus was manufactured in a lab and that vaccines could have serious dangerous effects such as autism and even death regarding the following items: 'The news story tackles vaccination as a solution to the pandemic' ($F(1, 218)=37.68, p<.01$); 'The news story tackles the very serious effects of vaccination including autism' ($F(1, 217)=210.22, p<.01$); 'The news story confirms the truth that the virus was manufactured in a lab' ($F(1, 219)=121.93, p<.01$). People in the control group did not receive any news story.

MEASURES

- *Acceptance of self-vaccination* was measured on a Likert scale from 1 (very unlikely) to 7 (very likely); respondents were asked whether they “would get a vaccine if one was available” ($M=3.86$, $SD=2.31$).
- *Perception regarding ‘close others’ willingness to get a vaccine* was measured on a Likert scale from 1 (very unlikely) to 7 (very likely); respondents were asked whether they think “their family and friends would get a vaccine if one was available” ($M=3.82$, $SD=1.94$).
- *Perception regarding ‘distant others’ willingness to get a vaccine* was measured on a Likert scale from 1 (very unlikely) to 7 (very likely); respondents were asked whether they think “people in general would get a vaccine if one was available” ($M=3.78$, $SD=1.57$).

FINDINGS

We found significant effects of exposure to factual information posted via online newspapers on people’s self-vaccination acceptance. Specifically, compared to those who were not exposed to any news story (people in the control group), the exposure to factual information about vaccination meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic leads to higher acceptance of self-vaccination (i.e., people are more prone to get vaccinated when exposed to such information) ($b=.926$, $SE=.46$, $p<.05$). This holds true only for the information posted via online newspapers, therefore H1 was validated for this particular type of media content. To be more specific, our findings show that people develop higher levels of vaccine acceptance when exposed to factual, anti-conspiracy information from online news stories. However, relative to the news stories shared on Facebook, we found no significant effects regarding the greater effectiveness of the information posted via online newspapers, thus H1a was validated, in the sense that online news stories are the only type of content that could increase people’s willingness to get vaccinated, while the same information, via Facebook, is not powerful enough to elicit the same effect. This could be explained by the fact that people find information from social media less trustworthy than the information from other news sources (Jurkowitz & Mitchell, 2020). For descriptives, see Table 1.

In terms of effects of news exposure on people’s perception about the willingness of close others to get a vaccine, we found no statistically significant effects. Thus, H2 and H2a were invalidated.

On the other hand, we found significant effects of exposure (irrespective of the source) to both factual and conspiracy-based information on people’s perception towards others’ willingness to get a vaccine. Findings at this level show that

both the exposure to factual information about the virus and the vaccines meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic and the exposure to conspiracy narratives (irrespective of the source) make people more aware of the misleading potential of conspiracy theories, thus leading to the perception that people in general are less willing to get a vaccine (in all the experimental conditions, the exposure to media information – irrespective of its form and source – led to the perception that other people are less willing to get a vaccine; all of them are significant at $p < .1$).

Table 1. Descriptives regarding the acceptance of self-vaccination, by experimental condition

Experimental condition	Mean	N	Std. Deviation
Control	3.55	71	2.190
Factual information posted via online newspapers	4.48	40	2.276
Factual information shared on Facebook	3.97	60	2.292
Conspiracy-based information posted via online newspapers	3.69	59	2.416
Conspiracy-based information shared on Facebook	3.86	58	2.373
Total	3.86	288	2.310

Source: Authors

Specifically, the exposure to factual information about vaccination meant to debunk conspiracy theories and promote vaccination as a solution to the pandemic shared via Facebook ($b = -.620$, $SE = .28$, $p < .05$) has almost the same impact as the exposure to conspiracy narratives posted via online newspapers ($b = -.593$, $SE = .28$, $p < .05$), leading people to believe that distant others have lower levels of vaccine acceptance. Thus, H3 was validated and H3a was invalidated (for descriptives, see Table 2). The two types of content that had no significant effect are still marginally significant (for $p < .1$), which makes us believe that, with stronger or repeated exposure to such information, people’s perception about other’s intention of vaccinating themselves could be influenced by any type of content concerning conspiracy theories, regardless of the medium, and the type of information (both conspiracy and factual information). This could be assimilated to a third person effect: by priming the conspiracy theory subject people become more aware of the issue of conspiracy beliefs that other might hold, and project onto them a lower willingness to vaccinated, when compared to the control group.

Table 2. Descriptives regarding people’s perception about the others’ willingness to get a vaccine, by experimental condition

Experimental condition	Mean	N	Std. Deviation
Control	4.20	69	1.481
Factual information posted via online newspaper	3.68	40	1.639
Factual information shared on Facebook	3.58	60	1.465
Conspiracy-based information posted via online newspapers	3.61	59	1.520
Conspiracy-based information shared on Facebook	3.72	58	1.715
Total	3.78	286	1.566

Source: Authors

A possible explanation is that media might function as awareness raising tools. Exposure to proper, factually based information has the potential to make people more aware of the dangers associated with various forms of problematic content, mainly in the context of the current pandemic. In other words, these findings shed light on the importance of the media themselves in the fight against wide-spread information pollution.

DISCUSSION

Given the parallel “infodemic” (Bond, 2020; Zarocostas, 2020) surrounding the pandemic and its potential effects on people’s willingness to get vaccinated against COVID-19, our research aimed at better understanding the “information-related” factors that affect people’s intention to vaccinate in order to protect themselves and others. The findings we provide are illustrative for the young, educated Romanians’ attitudes and perspectives in times of severe health crisis, when public health communication efforts aimed at raising people’s awareness towards the benefits of large-scale vaccination were intense, but no vaccine was yet approved. The first COVID-19 vaccine authorization became effective in both the US and the EU ten days apart, at about one or two weeks after our data collection. In this context, we were eager to unveil if, relative to factual information, exposure to conspiracy-based information induced a decline in people’s intent to accept vaccination. Also, we wanted to acknowledge the potential link between the information sources that people use (online newspaper news versus Facebook post) and their levels of vaccine acceptance.

In line with recent studies (Loomba et al., 2021; Romer & Jamieson, 2020; Roozenbeek et al., 2020), our findings show that factually correct information intended to debunk conspiracy narratives and promote vaccination as a solution in eradicating the virus is associated with a rise in vaccination intent.

However, this holds true only for those people who were previously exposed to such information via online newspapers when compared with those in the control group who received no news story. In different words, people's exposure to factual information debunking conspiracy theories about vaccination posted via online newspapers has the potential to increase their willingness to accept a vaccine against COVID-19. Besides validating our first hypothesis for this particular type of content, this is an important result assessing what makes certain information content more likely to influence citizens' self-vaccination acceptance, which can be further used to design more effective public health communication strategies. Given that public health communication activities play an essential role in influencing people to achieve and promote protective, prosocial behaviour, it is important to understand that well documented narratives about vaccination that focus on real facts and accurate evidence from relevant experts may be the safest avenue to engage vaccine hesitant publics and achieve successful herd immunity.

Furthermore, our results showed no significant effect of the factual information about vaccination posted on Facebook on people's vaccination intent, which is in line with H1a in the sense that factual information is more effective in persuading people to vaccinate than Facebook post of the same content. Specifically, content meant to debunk conspiracy theories about vaccination and to promote large-scale inoculation as a solution to the pandemic is only effective as an online news story. When used as a Facebook post, the same content elicits no significant effect. One possible explanation could be that people trust much less the information received via social media (Gandhi, 2021; Jurkowitz & Mitchell, 2020), which does not influence their decision about vaccinating themselves any longer.

Regarding the exposure to factual information about vaccination meant to debunk conspiracy theories on people's perception about close others' willingness to receive a vaccine, we found no statistically significant effects. Similarly, our findings provided no important correlations to support our initial assumption that, relative to the content shared itself, exposure to a Facebook shared story (irrespective of its conspirative or anti-conspirative nature) fuel the perception that people's close others show an even lower intent to accept a COVID-19 vaccine. Thus, H2 and H2a were invalidated; this could be explained with reference to the main hypothesis supporting the TPE perception, in the sense that the magnitude of effects grows with social distance (Lee & Park, 2016), especially since hypotheses about distant others were validated in our study.

In this respect, our data show that people's perception towards distant others' vaccination intent is significantly influenced by their exposure (irrespective of the source) to both factual and conspiracy-based information. More specifically, we found that exposure to factual information shared on Facebook and conspiracy

information in the form of an online news story are both significant at $p < .05$, and exposure to conspiracy information shared on Facebook and factual online information are only significant at $p < .1$. The sample we used in this study is an educated one, which means that people are intrinsically less likely to believe conspiracy theories. Therefore, a possible explanation could be that by being exposed to both conspiracy narratives and grounded science-based messages (irrespective of their form and source) educated people become more informed and thus more reflective and aware of the misleading potential of conspiracy theories. By understanding more of the current context people will tend to reflect more, maybe turn less emotional about the pandemic or the vaccines. This may ultimately lead to increasing levels of vaccine acceptance in their own case and, at the same time, to the perception that other people will display lower levels of vaccine acceptance (by creating a sort of third person perception, that the others are not that well informed/ equipped to deal with this complicated situation). Our findings (validating H3) are in line with recent evidence that suggests a solid TPE among Romanians concerning their own ability to detect fake news or misleading information (Corbu et al., 2020; Ștefăniță et al., 2018). Naturally, this effect is always stronger when people compare their own capacities (whether is fake news detection literacy, general media influence, or vulnerability in front of conspiracies) to those of distant others.

CONCLUSIONS

The next major step in fighting and containing SARS-CoV-2, the virus responsible for the worldwide pandemic is, undoubtedly, mass vaccination and immunization. Even though the widespread acceptance of a vaccine against COVID-19 in overcoming the current pandemic is essential, it is also a challenging public issue. As our findings show, this challenge may become even more accentuated in today's digital ecosystem populated by various forms of problematic content hindering factual data about the pandemic, the virus, and the vaccines containing it (Burki, 2019; Loomba et al., 2021). Equally, the spread of conspiracy theories regarding the vaccine (that fuel confusion and concerns) have the potential to seriously impede its high uptake among the public (O'Neill & Manveen, 2020).

In this context, the need for factual information in relation to vaccines' safety and effectiveness is of utmost importance. Based on our results and on previous research (Banas & Miller, 2013), we argue that, when confronted with factual information, people's resistance to subsequent conspiracy theories increases. Following the same line, there are studies showing that people may develop positive attitudes towards a vaccine if previously exposed to vaccine-related factual information. Yet, the opposite reasoning is also true, i.e., if first exposed to anti-vaccine conspiracy theories, the negative impact can be permanent (Jolley

& Douglas, 2017; Uscinski et al., 2016). Our study shows that, at least among young, educated people, exposure to conspiracy narratives only influence peoples' perceptions about others' willingness to take the vaccine, but not themselves. Vaccination communication efforts should, therefore, complement and endorse other immunization components. Policymakers and political leaders should place health communication interventions among their top priorities and benefit from reliable media coverage in order to improve people's access to authentic data, combat rumours that disseminate misleading and false information and contribute to the building of a functional health system.

In conclusion, an aspect beyond doubt is that people's willingness to accept a COVID-19 vaccine (whether for self or other's benefit) is not fixed or static. It is rather volatile, constantly evolving, and deeply shaped by current information and perceptions around the available vaccines, the risk of contracting the disease, the potential adverse events following immunization, the evolution of the epidemic, and many others alike. Still, as our study emphasizes, a rise in vaccination acceptance may be obtained by exposing people to factual information which may be helpful not only by increasing vaccination knowledge and awareness, but also by making people realize the misleading potential of conspiracy narratives and plots. Thus, an effective media communication of factually correct vaccine-related information remains crucial to limit conflicting claims about vaccination, prevent vaccine-sceptical attitudes to escalate, and help citizens understand more of the problematic times they are living in. Enhanced knowledge and familiarity with all these sensitive topics may ultimately make citizens becoming more inclined to adopt rules and promote a socially respectful behavior (i.e., take a vaccine and contribute to achieving community-level immunity).

LIMITATIONS AND FURTHER RESEARCH

We have to acknowledge that such results are significant only with reference to young, educated people. Thus, in a broader context, it becomes necessary to take into account the important role the media play in raising awareness of the dangers associated with conspiracy theories about the virus and the vaccines among educated people. We also acknowledge that as the sample was insufficiently diverse, we cannot generalize results at the level of an entire population. It might be the case that education, influencing people's beliefs about conspiracy narratives, play a key role in this type of effects. Additionally, results are bound to the Romanian context. We could not emphasize enough the need for future comparative research, investigating possible predictors of vaccine acceptance. Further studies could also explore the possible variables that might moderate these effects, specifically education and any beliefs (including belief in conspiracy theories about vaccines and vaccination).

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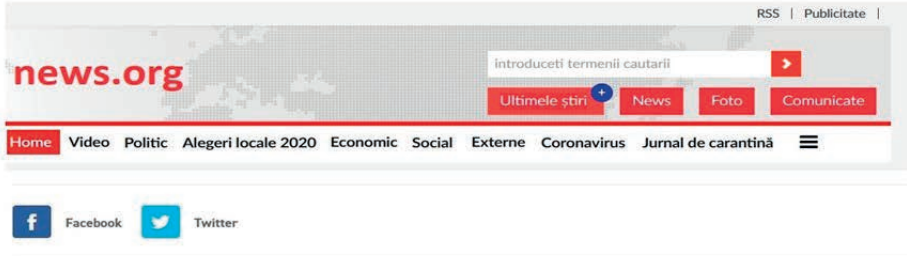
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APPENDIX. EXPERIMENTAL CONDITIONS

FACTUAL INFORMATION POSTED VIA ONLINE NEWSPAPERS (RO)



Coronavirusul și pericolele nevaccinării

Recent, mai mulți experți virusologi, printre care reprezentanți ai Organizației Mondiale a Sănătății, s-au declarat uimiți de nebunia lumii în care trăim. Prin prisma propriilor experiențe, oamenii de știință au demontat ideea falsă că acest virus a fost creat în laborator, iar gestionarea pandemiei ar fi un experiment de manipulare la nivel mondial. Cel mai periculos, însă, este faptul că oamenii ar putea refuza să se vaccineze, știut fiind faptul că vaccinurile sunt singura soluție reală de a pune capăt pandemiei. „Medicamentele ar trebui să fie disponibile pentru toată lumea”, a declarat reprezentantul Organizației Mondiale a Sănătății...

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FACTUAL INFORMATION POSTED VIA ONLINE NEWSPAPERS (EN)

Coronavirus and the dangers of non-vaccination

Recently, several virology experts, including representatives of the World Health Organization, said they were amazed by the madness of the world we live in. In the light of their own experiences, scientists have debunked the false claims that this virus was manufactured in a lab and the pandemic management is a global manipulation experiment. However, the most dangerous thing is that people may refuse to get vaccinated, despite the fact that vaccines are the only real solution to end the pandemic. “Drugs should be available to everyone”, the representative of the World Health Organization said...

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FACTUAL INFORMATION SHARED VIA FACEBOOK (RO)



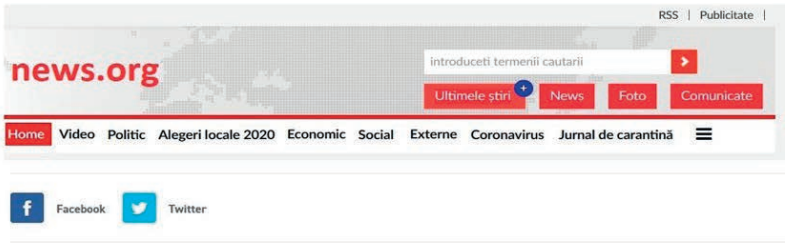
The image shows a Facebook post from user Gabi Popescu, posted 10 hours ago. The post features a news article from 'news.org' with the title 'Coronavirusul și pericolele nevaccinării'. The article's text, written in Romanian, discusses the surprise of scientists who have debunked the false claim that the coronavirus was lab-manufactured. It highlights the danger of people refusing vaccination and notes that vaccines are the only real solution. The article also mentions that medicines should be available to everyone. The post has 467 reactions (likes, hearts, and emojis) and 309 comments and 21 shares. At the bottom of the post are buttons for 'Like', 'Comment', and 'Share'.

FACTUAL INFORMATION SHARED VIA FACEBOOK (EN)

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CONSPIRACY-BASED INFORMATION POSTED VIA ONLINE NEWSPAPERS (RO)



Așa zisul virus și pericolele vaccinării

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CONSPIRACY-BASED INFORMATION POSTED VIA ONLINE NEWSPAPERS (EN)

The so-called virus and the dangers of vaccination

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