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RECEIVED 14 June 2024

ACCEPTED 05 September 2024

PUBLISHED 20 September 2024

CITATION

de Jong A, Dijkstra AM, MacLeod MAJ and
de Jong MDT (2024) Science communication
under pressure: perspectives of Dutch
researchers and journalists on COVID-19
communication challenges.
Front. Commun. 9:1449243.
doi: 10.3389/fcomm.2024.1449243

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Science communication under pressure: perspectives of Dutch researchers and journalists on COVID-19 communication challenges

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Introduction: Having access to information about science is essential for citizens to relate to global challenges. The COVID-19 pandemic is a clear example of how citizens' dependency on scientific information increased. This study aimed to gain an understanding of the challenges researchers and journalists encountered in communicating about COVID-19 and included an analysis of their roles and responsibilities in science-media interactions.

Method: Semi-structured interviews were conducted with experienced journalists ($n = 10$) and prominent academic researchers in fields relevant to COVID-19 ($n = 11$) in the Netherlands.

Results: Results show that the pandemic highlighted several challenges in science-media interactions. The pandemic's complexity, uncertainty, and large societal impact put pressure on researchers and journalists who dealt with the societal need for relevant information and combatting misinformation. In response to the challenges they encountered, researchers and journalists had frequent and ongoing interactions with each other. For researchers, this raised the issue of how to balance their responsibilities to inform and advise as public experts. For journalists, this highlighted the need to avoid reporter-source intimacy and remain independent and critical when reporting about science.

Conclusion: These findings raise new issues on the roles and responsibilities of researchers and journalists in urgent, fast-moving contexts such as those experienced during the pandemic and other global challenges. Successful responses to challenges such as dealing with misinformation and pre-prints require further reflection on the roles and responsibilities of both actors.

KEYWORDS

science journalism, COVID-19, challenges, science-media relationship, science-media interaction, science communication, scientist-journalist interactions

1 Introduction

Science journalism plays an important role in providing citizens with relevant information to relate to societal challenges. This was clearly visible during the COVID-19 pandemic when societies worldwide relied on scientific information about the nature and impact of the virus. An example of this role of science journalism was the widespread use of complex epidemiological models in news messages and on social media (Siegenfeld et al., 2020). Traditional media such as television, radio, and newspapers remained an important source of scientific information for many people during the pandemic (Metcalfe et al., 2020). Consequently, both academic researchers and journalists played important roles in keeping citizens up to date and may have influenced how well people understood and adhered to preventive measures.

The large role of scientific information in public opinion and public persuasion has already led to several published articles on science communication in the context of the COVID-19 pandemic. Several studies focused on the content of communication about COVID-19, showing that early messages concentrated on emergency responses, which shifted to more critical voices and exit strategies later on in the pandemic (e.g., Metcalfe et al., 2020; van Dijk and Alinead, 2020). A large-scale, international survey by Massarani et al. (2021) showed that the COVID-19 pandemic increased the workload of science journalists while promoting public interest in science.

Despite this interest in science communication throughout the COVID-19 pandemic, few in-depth studies about the interactions between researchers and journalists during this time have been published as yet. Previous studies have shown that, in general, researchers' and journalists' evaluations of their interactions with each other are better than expected (Peters et al., 2008). Nevertheless, collaboration problems and misunderstandings about roles and responsibilities still hinder effective science communication (Appiah et al., 2020; Dijkstra et al., 2015). Perspectives of researchers and journalists on the challenges they encountered in communication about COVID-19 and how this affected their roles and responsibilities remain underexplored.

In the Netherlands, the first case of COVID-19 was identified on February 27th, 2020 (Rijksoverheid, 2023). The Dutch government announced the first measures to contain the spread of the virus on the 9th of March 2020. This was followed by other measures, varying from mild behavioral advice, such as washing your hands and ventilating rooms regularly, to lockdowns and curfews (RIVM, 2023). After vaccinations became available, in total, over 80% of Dutch citizens 12 years and older were fully vaccinated against COVID-19 by December 2022 (RIVM, 2022). The Dutch Government decided to cancel the final advice to self-test and isolate when showing COVID-19 symptoms on March 10, 2023 (RIVM, 2023).

Several notable developments took place in the pandemic around the time we conducted our interviews, between September and November 2021. In the Netherlands, the COVID-19 vaccination campaign started on January 6, 2021, and by the end of November, an estimated 86% of citizens 12 years and older had received at least one dose of a COVID-19 vaccine (RIVM, 2021). In addition, during the summer of 2021, the government started implementing a 'corona entrance ticket', with which citizens could prove they were vaccinated, tested negative, or recently recovered from a COVID-19 infection. Throughout September till November, this entrance ticket became

mandatory in more places. At the same time, several restrictions regarding social contacts and working from home that had been eased during the summer came into effect again, slowly building up to a complete lockdown with a curfew starting on 19 December 2021 (RIVM, 2023).

With our study, we aimed to gain an understanding of how the COVID-19 pandemic, a situation characterized by an insatiable need for valid information, affected science-media interactions. With a series of interviews with researchers and journalists who were all deeply involved in the Dutch information provision about COVID-19, we analyzed their experiences and perceptions of their interactions. In particular, we investigated two research questions: (1) Which challenges did researchers and journalists encounter in the communication dynamics around COVID-19? (2) How did researchers and journalists view their roles and responsibilities during the pandemic?

2 Literature review

To answer our research questions we draw on literature about science-media interactions and science communication regarding COVID-19. First, we discuss literature on science-media interactions. Second, we discuss literature about communication regarding COVID-19.

2.1 Science-media interactions

Several challenges persist in science-media interactions despite researchers' and journalists' positive evaluations of their interactions (Dijkstra et al., 2015). One of the main barriers in science-media interactions, specifically concerning public health issues, is a lack of collaboration between researchers and journalists (Appiah et al., 2020). Disagreements about who should have control over news messages about science are a main cause of misunderstandings and a suboptimal collaboration between researchers and journalists (Peters, 2007). Dijkstra et al. (2015) uncovered specific misunderstandings, which they attributed to researchers being unaware of the expectations of journalists they interact with. Negative experiences and misunderstandings can be an important reason for researchers to be hesitant about future interactions with media (Dijkstra et al., 2015).

Knowledge about the roles and responsibilities of researchers and journalists can help to manage expectations for science-media interactions. Peters (2008) distinguished three types of science communication that researchers can be involved in: popularization of science, meta-discourse about science, and the application of scientific expertise on current issues in society. When popularizing science, the roles of researchers include educating audiences and promoting a positive image of science (Peters, 2008; Lo and Peters, 2015; Dijkstra et al., 2015). In meta-discourse about science, the main role of researchers is to reflect on risks and issues in the science-society relationship (Peters, 2008). Peters (2008) described the role of researchers applying scientific expertise as public experts acting as public communicators or (policy) advisers.

The role of public experts applying scientific knowledge to comment on current issues in society seems especially relevant in the context of the COVID-19 pandemic. In a Q-sort study exploring the

specific roles of researchers as policy advisers, Spruijt et al. (2013) identified six roles: the autonomous scientist, the pragmatist, the action-oriented expert, the engaged expert, the instrumental expert, and the deliberator. Other studies have also ascribed researchers roles of experts who provide information about their research or offer insights on topics related to their field of expertise (Allgaier et al., 2013; Dijkstra et al., 2015).

Roles for science journalists evolved from cheerleaders, highlighting and explaining new developments in science, to gatekeepers and watchdogs with a more critical stance and, more recently, to a wider plurality of roles (Bos and Nuijens, 2020; Fahy and Nisbet, 2011). Various studies show that journalists tend to describe their roles as critical and independent, whereas scientists prefer journalists to take on more supportive roles, such as civic educators or science popularizers (e.g., Peters, 2007; Larsson et al., 2019). Dunwoody (2021) adds that science journalists decide which stories are newsworthy based on traditional considerations of what will get audiences' attention, and not based on the content areas they cover.

An important trend described in the current literature on the science-media relationship is the process of medialization of science (also called mediatization or mediaization), which refers to the ongoing tightening of the mutual relationship between science and (mass) media (Franzen et al., 2012). From the 1990s onwards, scientists have increasingly taken up active roles in reaching out to audiences, often supported by their research institutes (e.g., Rödder, 2009; Franzen et al., 2012). Medialization of science has made researchers more aware of the benefits of engaging with media (Franzen et al., 2012).

A main concern regarding the medialization of science is that researchers may adapt to the norms and values of media, and use those norms and values in decisions about their research, while these decisions should primarily be based on scientific values (Franzen et al., 2012; Allgaier et al., 2013). Several studies indicated that research institutions play an important role in the medialization of science by managing their media visibility via their communication departments, (Franzen et al., 2012; Ivanova et al., 2013). These communication departments have made it easier for journalists to find researchers who are willing to interact with them. According to Franzen et al. (2012), the active role of research institutions might result in potentially over-optimistic media coverage of science.

In addition, according to various authors, a combination of increased availability of and reliance on press release materials may lead to journalists becoming less critical of their sources (McKinnon et al., 2018; Schäfer and Painter, 2020). For example, McKinnon et al. (2018, p. 574) found that journalists tended to rely on a small group of trusted sources, a phenomenon called journalists' 'trust portfolio'. Albæk (2011) also found that journalists generally contact scientists they already know, to not only comment on their own work but also on issues less closely related to their area of expertise. Traditionally, editors try to prevent such reporter-source intimacy, by rotating which topics journalists cover so their relationship with sources will not get too close (Dunwoody, 2021). Even though the benefits of having specialized science reporters are nowadays seen as evident, reporter-source intimacy may still pose a risk to independent and critical coverage of science.

Recently, misinformation has become an important challenge in science-media interactions. The spread of misinformation including disinformation that is intentionally false as well as possibly accidentally

incorrect information- has historically raised concerns for science communication (Scheufele and Krause, 2019). However, the increasing use of social media has drastically accelerated the spread of misinformation, including misinformation about science (Dunwoody, 2021). In addition, mainstream media play an important role in the spread of misinformation, and, to a large extent, citizens hold news media accountable for the creation, spread, and prevention of misinformation (Tsfati et al., 2020; Lima et al., 2022). The increase in misinformation has motivated scientists and journalists to respond by adapting their practices, including an increased focus on fact-checking and longer-form journalism (Dunwoody, 2021). These adaptations often involve increased interactions between researchers and journalists as well, which is in line with the trends of the medialization of science and increasing reporter-source intimacy.

Effectively communicating about uncertainty is another continuous challenge in science-media interactions. In 1999, Dunwoody already described how researchers and journalists decided on representations of scientific uncertainty to the public together, through a process of negotiation (Friedman and Rogers, 2023). Additionally, in cases where scientists disagree about the degree of uncertainty, such as in controversial science, journalists have more possibilities to interpret scientific uncertainty. Moreover, negotiations about how to interpret and represent scientific uncertainty may also be influenced by the medialization of science since researchers become more strategic in their communication with journalists (Friedman and Rogers, 2023).

In all, literature shows that researchers and journalists may take on various roles in science-media interactions. During the COVID-19 pandemic, researchers were often expected to take more distance from their own research projects to publicly reflect on and apply research developments in their discipline. For journalists, the complexity of the pandemic may have complicated their responsibility to report critically and independently. The processes of medialization of science and increasing reporter-source intimacy make researchers and journalists more dependent on each other. Communication challenges of the pandemic, including dealing with misinformation and uncertainty, may have further accelerated these processes in science-media interactions.

2.2 Science communication about COVID-19

To date, several studies analyzed the role of science communication during the COVID-19 pandemic. Metcalfe et al. (2020) studied communication about COVID-19 in 11 countries during the first 10 weeks of the pandemic. They identified four phases in media communication about COVID-19, corresponding to different phases in the spread of the virus: (1) rising concerns, (2) implementing restrictions, (3) reflecting critically on the situation, and (4) discussing how to get back to a "new normal." They found that in most countries public trust in governments and science initially rose, but over time this trust declined again. They also argued that a fear of negative reactions has likely made researchers hesitant to collaborate with journalists to communicate about COVID-19 (Metcalfe et al., 2020).

Van Dijck and Alinead (2020) analyzed public debates about COVID-19 in the Netherlands during the first 4 months after the outbreak. They distinguished two phases in the public debate: an emergency response phase and a smart exit strategy phase. During the emergency response phase, the government emphasized its reliance

on trusted health experts, while criticism from experts and non-experts was mainly voiced in opinion articles in news media and on social media. During the smart exit strategy phase, strategies to prevent the spreading of the virus without high-impact measures, such as lockdowns, were being developed. The government faced more criticism and gradually became aware of the need to involve different types of experts in decisions about the pandemic. In this phase, social media increasingly contributed to the circulation of information about the pandemic (van Dijck and Alinead, 2020).

The spread of misinformation during the COVID-19 pandemic received special attention. Already in February 2020, Director-General of the World Health Organization Ghebreyesus stated “We’re fighting an infodemic,” referring to the overload of information about COVID-19 that made it hard to filter out misinformation (United Nations, 2020). Several studies have demonstrated the negative impact of COVID-19 misinformation, showing that those who believe misinformation are less likely to accept COVID-19 vaccines (Singh et al., 2022) and less likely to engage in health-protective behavior, such as social distancing and washing hands (Allington et al., 2021). Singh et al. (2022) also found that citizens in poorer regions were more likely to encounter and believe COVID-19 misinformation. Regarding the origin of misinformation, Himelein-Wachowiak et al. (2021) highlighted that 66% of known bots discussed COVID-19 and likely spread misinformation, and Dabran-Zivan et al. (2023) showed that Arabic, Hebrew, and Russian search results included a larger percentage of misinformation than results in English.

The issue of uncertainty in science communication received attention in relation to the COVID-19 pandemic as well. Scientific uncertainty is an especially important issue in epidemiology since it concerns phenomena on the boundaries of existing knowledge and serves as a basis for actions that need to be taken quickly (Broadbent, 2011). In addition, during the pandemic, new evidence overturned scientific findings relatively often. Dries et al. (2024) studied how the way a communicator explains uncertainty in such situations affects citizens’ trust in the communicator. When uncertainty was communicated initially, they found that trust in communicators decreased less when scientific findings were overturned (Dries et al., 2024).

Few studies, so far, have focused on the roles of researchers and journalists. Leidecker-Sandmann et al. (2022) conducted a content analysis of German news coverage of COVID-19 to study which scientific experts were included and how that compares to coverage of previous pandemics. They concluded that during the pandemic, journalists selected a larger diversity of expert voices and favored scientific experts with more expertise. Marín-González et al. (2023) studied researchers’ experiences with media contacts during the pandemic through a survey and interviews. They found that researchers had increased media contacts and felt co-responsible for meeting citizens’ needs and counteract misinformation by providing accurate and trustworthy information about COVID-19.

Massarani et al. (2021) conducted a survey to collect the experiences of science journalists ($N=633$) who covered news about COVID-19. Despite the increased workload and difficulties related to lockdowns, most journalists assessed their interactions with scientists as positive. They perceived scientists to be more available, open, and talkative during the pandemic. In addition, Beattie (2022) analyzed the roles of press gallery journalists during daily governmental press briefings about COVID-19 in Aotearoa New Zealand. The results from their semi-structured interviews showed that journalists said their main three roles were holding the government to account,

disseminating information about public health, and producing news (Beattie, 2022).

Finally, Litvinenko et al. (2022) studied how the roles of science journalists who reported about COVID-19 in Russia were affected by political pressures on science and media. Science journalists covering COVID-19 experienced an increase in their workload, comparable to colleagues in other countries, but challenges were intensified by political pressures and self-censorship.

In this paper, we build on these studies to gain an understanding of how COVID-19 affected the roles and responsibilities of researchers and journalists in science-media interactions.

3 Method

Our research questions addressed challenges that researchers and journalists encountered in the communication dynamics around COVID-19 and their views on their roles and responsibilities. Therefore, we conducted semi-structured interviews with researchers and journalists between September and November 2021. Semi-structured interviews can collect in-depth information concerning personal experiences and allow for follow-up questions to be tailored toward the expertise of the participants (Johnson and Rowlands, 2012). Ethical approval for the study was obtained from the ethics committee of our university (211064).

3.1 Participants

First, we created a longlist of potential participants for our study, making sure to include people with diverse professional backgrounds. We focused on journalists who had written multiple news articles about COVID-19 and researchers with expertise in epidemiology, virology, modeling, and related areas who were mentioned as sources in news articles. These lists were complemented with names suggested by our participants. This resulted in a longlist of 26 researchers and 20 journalists, of which 16 researchers and 13 journalists were contacted via e-mail with a request to participate in an interview. The reasons for the exclusion of potential participants were unavailability and a lack of response to the e-mail and a reminder. In three cases, unavailable participants provided the contact information of someone else within their organization, who was included in the sample instead. Our final sample consisted of 11 researchers and 10 journalists.

All researchers had several to many years of experience in one or more research fields relevant to the COVID-19 pandemic, and many held prominent positions in the public debate about COVID-19 in the Netherlands. Our sample consisted of seven full professors, one medical specialist, two assistant professors, and one post-doc researcher. Their areas of expertise include epidemiology, infectious disease modeling, microbiology, virology, intensive care, and legal philosophy. Alongside their research positions, several researchers held additional relevant roles as medical practitioners, as part of national governmental advisory committees (e.g., Health Council, Outbreak Management Team), and as part of international organizations that provided advice about the pandemic (e.g., World Health Organization, Red Cross).

Among the journalists were four science journalists employed by national newspapers, three freelance science journalists, one data

journalist, and two general journalists employed by national newspapers. In addition to their contributions to newspaper articles, most researchers and several journalists also had experience with other media, including radio programs, podcasts, and television talk shows. The researchers usually had ample media experience discussing their own work in public as well as commenting on aspects of the pandemic they had not researched themselves.

3.2 Interview guide and procedure

The interviews were structured using an interview protocol with main questions and topics for further discussion, which can be found in [Supplementary material \(data sheet 1\)](#). The interview protocol was created through an iterative process between the authors, based on topics identified in the literature review. After a short introduction, the participants were asked about their experience with communicating about COVID-19 and what they thought went well and what went less well. Following this, they were asked to describe their own role and the roles of other stakeholders they had interacted with. Finally, the participants were encouraged to share which challenges they encountered in science communication about COVID-19. At the end of the interviews, we also asked the participants to comment on the use of scientific models, based on a data visualization from a news article. The results of that part of the interviews are not included in this article.

The interviews took between 26 and 68 min, with an average of 46 min. The interview protocol was tested in the first two interviews, and minor changes were applied. The main questions were the same for each interview, while the follow-up questions were adapted based on the expertise of the participant. Because of the restrictions on meeting in person, all interviews were conducted online via videoconferencing software, such as Microsoft Teams and Zoom. Before taking part in the interviews, participants were asked to read and digitally sign an informed consent form. Five participants provided verbal consent during the interview.

3.3 Data analysis

The interviews were recorded and automatically transcribed using Microsoft Teams and Amberscript. After all interviews were conducted, the transcripts were manually corrected and pseudonymized. Using thematic analysis, themes within the transcripts were identified, analyzed, interpreted, and reported ([Braun and Clarke, 2006](#)). A combination of deductive and inductive coding was used to identify themes. The transcripts were coded on the paragraph level in ATLAS.ti.

A first version of the codebook was created based on themes that occurred in the interview protocol and the literature review. The codebook was adapted by inductively adding codes for newly identified themes. Thereupon, the codes were divided into four code groups: *evaluation*—concerning how participants evaluated their experiences and interactions with the other party, *roles*—for descriptions of the roles and responsibilities of researchers and journalists, *challenges*—for the challenges the participants encountered, and *examples*—when participants mentioned specific examples.

After the first transcripts were coded, a second coder independently coded two transcripts, using the codebook with explanations and examples of coded segments as a guide. Based on differences in coding, several codes and code groups were adapted to ensure consistent coding. After these adaptations to the codebook, another researcher independently coded two different interviews, and the intercoder agreement was calculated. The intercoder agreement resulted in the following Cohen's kappa scores per code group: Challenges: 0.5, Evaluation 0.6, Roles: 0.8, and Examples 0.9. These scores show a moderate to almost perfect agreement between the coders. The final version of the codebook, with explanations and 'examples of how the codes were used, can be found in [Supplementary material \(data sheet 2\)](#). Finally, the remainder of the transcripts were coded and subthemes were identified. The themes and subthemes are described in-depth in the results.

4 Results

In this section, we first describe eight main challenges that researchers and journalists encountered in communicating about the pandemic. Thereupon, we describe how researchers and journalists viewed their interactions, focusing on their roles and responsibilities. To refer to quotes from participants we use the letter R for researchers and J for journalists, combined with the number of the interview.

4.1 Challenges in communication about COVID-19

Both researchers and journalists encountered various challenges in their communication about COVID-19. [Table 1](#) shows the types of challenges and how often they were mentioned during the interviews, exemplified with quotes. The challenges are complexity, societal impact, uncertainty, limitations of science, information load, misinformation, balance, and trust. According to the interviewees, the combination of, and interaction between, the challenges made communication about COVID-19 especially complicated. The most commonly mentioned challenges among both researchers and journalists were the complexity, uncertainty, and societal impact of the pandemic. Overall, the challenges researchers and journalists mentioned overlapped considerably, though they experienced some challenges differently. Below, the challenges are discussed in more detail.

Researchers' most frequently mentioned challenge was *complexity*. One researcher described several elements that made communicating about the COVID-19 pandemic complex: "Journalists are looking for ready-made answers, but we cannot give them those. Especially in the beginning of the crisis, but it remains difficult now as the crisis becomes increasingly complex, you do not get the time and space to highlight the nuances" (R9). Several researchers struggled with the limited time and space they had to explain such a complex topic. For this reason, some researchers decided to only interact with written media.

Journalists also stated that dealing with the complexity of the COVID-19 pandemic was a big challenge for them. One journalist found it challenging to write about complex science in a way that news consumers could understand, by simplifying but keeping the essence

TABLE 1 Challenges discussed by researchers and journalists, with frequency of mentions and selected exemplary quotes.

Challenge	Frequency and example from researchers	Frequency and example from journalists
Complexity	50 mentions. "What makes this so difficult is that it's about a very complex question. The knowledge develops slowly over time, and that knowledge does not develop unambiguously, but in all kinds of research pointing in different directions." (R1)	27 mentions. "On the one hand you want to communicate as clearly as possible, without making your story too complicated (...), but on the other hand there is a danger of losing nuance or being reductive because you want to explain it in a simple way." (J9)
Societal impact	34 mentions. "It's societally relevant and it plays a direct role in everyone's daily lives. With COVID-19, science gets very close to daily life, and to politics and medical professionals and to scientists themselves." (R7)	29 mentions. "Eventually [COVID-19] arrived in the Netherlands and we noticed in our own reactions, but definitely also in the reactions of our readers and in our surroundings, that people wanted to know everything about this. They wanted to know what to expect and that almost automatically directed us towards science" (J1)
Uncertainty	31 mentions. "You have to clearly say we do not know how long it will take, but we can determine that it's going to be a problem. So we already have to take action based on that uncertain information. Actually the emphasis in that type of communication was always on there is a lot of uncertainty and that's why we have to act, because if you guess wrong we have a much bigger problem." (R10)	48 mentions. "You always have to explain that there's uncertainty. So, for example, if there is a margin of uncertainty in a graph, you always have to explain that there is uncertainty, that it's not a fixed line, because that can create false expectations." (J4)
Balance	11 mentions. "I'm not a fan of those false balance situations in talk shows, where a scientist is put opposite someone with an opinion who looks at it differently. That's not how it works, that does not help." (R10)	21 mentions. "You always have different viewpoints within science. (...) It's good to know where information comes from and to know if scientists tend to exaggerate or downplay results. That's an extra challenge, it's important to include that in your reporting." (J10)
Misinformation	11 mentions. "There's a risk to be tempted to provide quotes that are too quick and simple. (...) You cannot always prevent your words from ending up in someone else's frame. (...) You have certain programs where they use a piece of your interview, but with someone else's story." (R11)	6 mentions. "One of the hardest things we encountered is to what extent we should pay attention to wrong information. A lot of laypeople and "do it yourself" virologists demanded attention. (...) We always looked if those people had a right to speak. If they were critical scientists that work at a university we allowed them a stage, but not for [people who deliberately spread misinformation]." (J3)
Information load	14 mentions. "There is an enormous amount of publications. For each publication that says yes, you'll find another one that says no, there are always exceptions." (R6)	21 mentions. "I thought I'm adding more information to this big pile, but I do not know if anyone does anything with it. So I think it's a challenge to really reach people. How do you get the attention?" (J5)
Limitations of science	23 mentions. "You continuously have to recalibrate the models, you have to keep discussing and criticizing your assumptions in order to move forward. I also see a call for long-term models from society and politics, but that's just not possible. With COVID the truth is so varying that you can look a few weeks into the future at most." (R8)	22 mentions. "There are limits to science and it's important to indicate where those boundaries lie and where they do not lie." (J6)
Trust	7 mentions. "If [models] are used to provide a false sense of security about quantitative information or the exact course of a trend, I think it can diminish trust in models, so that could be harmful." (R4)	8 mentions. "There is a certain group of people that just does not trust in mainstream media. Even though they are there to weigh information, to put it in perspective and to guard if everything goes right. That distrust is also a task for journalists, to expose policies." (J7)

intact. Similarly, another journalist stated: "Sometimes, there is very specialized information that is relevant, but then you have to explain very clearly why it is relevant. (...) I always want to show that it's not as simple as it seems" (J4).

One particular type of complexity involved the necessity to clarify the process of science during the pandemic. This was difficult, especially for journalists who were not specialized in covering science: "The biggest challenge is to (...) understand how science works. I notice that a lot of journalists do not understand how the scientific process works" (J3). A researcher added that the need to communicate about scientific information that was developing during the pandemic was especially challenging: "Not only the outbreak is emerging, but also the information streams and science are emerging. So this is a whole new aspect of emerging science communication" (R8).

For both researchers and journalists, *societal impact* was the second most common challenge. Journalists were acutely aware of the large impact of COVID-19 on citizens' daily lives and, consequently their need for information. This sentiment was echoed by multiple researchers, for example, one of them stated: "The big challenge here is that it affects everyone, so everyone wants to do something with it." (R11).

Due to the large societal impact, public debates about the pandemic became more polarized over time. Concerning the polarization surrounding the pandemic, researchers and journalists experienced an increase in threats and hateful reactions. One journalist took this into account as follows: "You have to be more aware that threats are becoming more realistic. That also means you have to be extra conscious about what you write. (...) you have to think about how to word something and whether certain terms can

be perceived as stigmatizing. You have to think about that a bit more than with lighter topics” (J9).

Dealing with *uncertainty* was the third main challenge. Researchers mentioned several types of uncertainty. One researcher, for example, argued that uncertainties in model predictions should be explained and normalized since they are indications: “They are no truth, but a way to integrate the knowledge we have to make the most useful predictions. Well, try to explain that!” (R4). Nevertheless, some researchers experienced this more positively, especially for longer background articles in newspapers: “Especially during the first wave, when everything was new [...] I could really contribute to [the audience’s] understanding” (R2).

Journalists, for whom uncertainty was the most commonly mentioned challenge, struggled with this too. One journalist described the challenge of dealing with the general uncertainty of scientific information when there is a need for certainty as follows: “Every article, whether it’s a pre-print or peer-reviewed, is the state of what we currently know, with a little bit of the vision of a research group. (...) Therefore, you have to write about the conclusions in a very nuanced way, and that clashes with journalism and with what people want in a pandemic. They just want to know what’s going on” (J7).

One of the clearest ways in which journalists needed to take uncertainty into account in their reporting about COVID-19 was by explaining the margins of uncertainty in graphs. For example, one journalist argued that not describing those margins of uncertainty could lead to false expectations (J4, see Table 1). Other examples included the need to mention uncertainties about the effectiveness of vaccines and other preventive measures. One journalist emphasized the importance of nuance in those situations, stating: “If you say vaccinations work, period, and someone reads another message that the effectiveness of vaccinations wears off after half a year, then they do not believe it anymore. So you have to be open about it in a balanced way, so people do not think that it’s nothing” (J6).

Regarding the challenge of maintaining *balance* in communicating about COVID-19, some researchers found it difficult to balance how they talked about new developments over time. One researcher said he tried to limit how often he appeared on TV, taking into account that if he changed his opinion, everything would get weighed and audiences would not know what to do with his information (R6). Other researchers tried to prevent imbalance by providing nuanced expectations as much as possible. However, this can also have negative consequences when actions need to be taken quickly to prevent a large break-out, as was discussed: “Researchers always want to demonstrate nuances, and rightly so, but sometimes it’s gone further than demonstrating nuance and became downplaying the seriousness. So you have to explain the consequences of [rising trends]” (R9).

Journalists found creating balance in their reporting about different perspectives on the pandemic especially challenging. One journalist exemplified how he dealt with the polarization within the Dutch scientific community about the effectiveness of facemasks during the beginning of the pandemic, by writing a piece including three arguments in favor and three arguments against, to let the reader form their own opinion about it (J4). In addition, during the pandemic, information from various scientific disciplines was needed, but certain disciplines received disproportionate attention. One journalist elaborated: “In hindsight, I believe I leaned too much on the weight that virologists had as main players in the debate, which meant

that other parties could not really interfere” (J8). He further explained that it was sometimes hard to distinguish between legitimate concerns that were raised and the spread of misinformation.

Concerning this challenge, the concept of ‘false balance’ came up multiple times during the interviews with researchers. One researcher described situations in which an expert is contrasted with a conspiracy theorist, stating: “Of course, you always have to listen to counter-arguments, but creating the image that those are two equal ways to look at it does not do justice to the topic” (R5). A journalist also noted his disappointment when noticing instances of false balance, such as letting a professor and a celebrity with no relevant expertise debate the effectiveness of lockdowns (J3).

Both researchers and journalists found it difficult to deal with *misinformation* during the pandemic, but they experienced this challenge differently. For researchers, the main concern was that their statements would be misinterpreted or deliberately misused to support ideas they disagreed with. One researcher explained that others had cut and pasted information he provided to use it for different arguments than intended (R7). Another researcher preferred longer interviews to add nuance, so the outcome would not be different than intended (R8).

In contrast, when journalists talked about misinformation, they mainly referred to difficulties with identifying misinformation from legitimate criticism and finding balance in how much attention they paid to misinformation. In the quote in Table 1, a journalist explains that their newspaper did not report all criticisms, but did pay attention to scientists with differing views (J3). Another journalist saw the amplification of fake news on social media as harmful, though social media also made it easier to find good information by following relevant experts on Twitter (now X) (J6). It is notable that for journalists, misinformation was the challenge that was explicitly mentioned the least often. Nevertheless, journalists saw fact-checking and avoiding misinformation as an important element of their work, also in relation to the challenges of maintaining balance and dealing with the information load of the pandemic.

Both researchers and journalists struggled with *information load* throughout the pandemic. The pandemic sparked large amounts of new scientific publications, which both researchers and journalists found difficult to filter through to find high-quality information. This also made it harder to identify misinformation. For example, one journalist received much more information than normal and needed to continuously assess whether certain findings were right, important, and well-supported (J8). This was especially complicated during the pandemic, because of the large need to get information across quickly.

Due to the pressing need for information, both researchers and journalists noticed an increase in the amount of pre-print publications during the pandemic. As exemplified by a journalist: “Sometimes you read a pre-print and you think that’s important news (...), but then it turns out there were limitations in the methods that I could not see” (J3). In another example, a researcher summarized several aspects that made dealing with the information load during the pandemic especially complicated: “Currently a lot of information gets published in pre-prints, so you have a very short time to react. The speed, timeliness, and multitude of information come together. So much good research is done that it’s impossible to keep up with everything. But there’s also a lot of bad research that gets public. (...) It’s important that the good stories get to the forefront on time” (R8).

Limitations of science, as a challenge, was sometimes related to the information load. Several researchers and journalists perceived the relatively long time it takes to get scientific results as a limitation during the pandemic. In addition, researchers tried to explain specific limitations of science in their messages. One researcher stated: “I try to explain clearly that we make a prognosis based on very few data points that can change. As soon as you add a few data points the problem is a lot bigger or smaller” (R10). This quote also indicates that uncertainty is an important part of limitations of science as a challenge.

Journalists struggled with the limitation that even researchers knew very little about COVID-19, due to the novelty of the virus. As one journalist said: “I found it challenging that there’s a lot we do not know and that scientists do not know. It is difficult to package that in a good story for the public” (J1). Some researchers believed they also had a role in this, for example, one of them stressed the importance of mentioning the context and managing expectations when describing scientific findings (R7).

Several journalists wanted to show the limitations of science in their news articles, as one journalist explained: “I think it’s good to show that researchers are not always right, and not because science is just an opinion, because that’s a danger, that people do not believe anything anymore, but to show how science works” (J2). Another journalist noticed that limitations and processes of science were more visible during the pandemic, since, over time, scientists visibly adapted their convictions based on research data (J3). Many researchers agreed that it is important to explain the process and context of science: “I think one of the biggest challenges is to let the public know that what you explain is only a part of the whole, and the context in which results are found is always a lot larger. So findings are less absolute than the public often believes, I think” (R7).

Trust, as a challenge, was mentioned the least. Most researchers discussed how the (uncareful) use of models could lead to distrust among the public and a false sense of security, as exemplified by the quote in [Table 1](#). Journalists’ discussions of trust focused more on how to gain and maintain the trust of their audience throughout the pandemic. For example: “Of course, there is noise from 100 channels, so how do you get attention and how do you make it clear that you are a reliable source? [...] For some people the distrust begins there already” (J5). This journalist attempted to address distrust by showing what she did and what her sources were. Another journalist (J6) emphasized the importance of giving precise information about what is and is not known at the moment to prevent future distrust.

The interaction between the eight challenges described above made communicating about COVID-19 even more complex. The combination of the complexity and uncertainty of the available information and the large societal impact of the pandemic was considered especially challenging. For example, one researcher explained: “You encounter the problem that you need to communicate about a complex topic, for which the knowledge is not definitive yet and which is pretty controversial. That is quite scary” (R1). In addition, the combination of the challenges related to uncertainty, limitations of science, information load, and misinformation complicated researchers’ and journalists’ attempts to find quality information about the pandemic.

Even though both researchers and journalists encountered the same eight challenges, they had different perspectives on those challenges. Researchers attempted to use their expertise to contribute to public debates about COVID-19 in responsible and conscientious

ways. Journalists’ main concern was to find out what their audience wanted and needed to know and to provide accurate and understandable information in response. As one journalist said: “The main challenge is to write clearly about science. The news consumer needs to understand what you write, even when you have to write about complex science” (J6).

4.2 Science-media interactions during the pandemic

Despite the encountered challenges, both researchers and journalists were generally satisfied with their interactions during the pandemic. Several researchers and journalists described continuous collaborations they had throughout the pandemic. For example, a researcher explained that certain journalists would call him back after a few positive experiences: “There is a mutual trust, where I know that you ask sensible questions and I can contribute in a useful way” (R2).

Multiple journalists expressed gratitude that many researchers took the time to talk to them. On the one hand, journalists saw being accessible to answer questions as an important responsibility of researchers. On the other hand, a few journalists mentioned that certain researchers were very eager to get media exposure, despite not always having good information to share. For example, one journalist stated: “You notice that there are people who are very eager to appear in the media, who you can always call, which is helpful, but then they tell you things which you question in hindsight” (J1). Another journalist also described experiences with researchers who tried to oversell their own research, however, he emphasized that this happened less frequently during the pandemic (J3).

Both researchers and journalists emphasized that the pandemic required varied reporting, as one researcher exemplified: “I think that in this case multiple journalists and multiple types of journalistic reporting are important” (R2). A journalist who shared this opinion explained: “Throughout the crisis, you try to keep a consistent line, whilst also continuously questioning that line. I never had the illusion that I could report about all aspects of the whole crisis by myself” (J10). Below, we describe the reflections of researchers and journalists on their own and each other’s roles and responsibilities during the pandemic, particularly in light of the challenges of communicating about COVID-19.

4.2.1 Roles and responsibilities of researchers

Most researchers saw providing information and explaining complex topics as their main responsibilities during the pandemic. As part of this, several researchers emphasized the need to share the limitations and complexities of science as well. For example, one researcher said: “My role as an expert is mainly to explain what we know and what we cannot know, what the most important uncertainties are, and how that affects which choices we make” (R4). This emphasis on sharing what is unknown matches with the challenges of uncertainty and limitations of science that researchers encountered during the pandemic.

Journalists agreed that informing and explaining should be the main roles of researchers. They also highlighted that researchers should critically assess the quality and importance of their own research and clarify the limitations, as one journalist said: “I think experts should be open and indicate the limitations in research, but

also just share their knowledge in an honorable way” (J3). Another journalist (J7) added that it may be easier for researchers to indicate what is missing in a study conducted by others in their field, which can help journalists verify their ideas about it. Thus, journalists hoped that researchers could help them to indicate the limitations of their own and other researchers’ work.

Nevertheless, researchers held different opinions on whether they should purely inform people without value judgment or whether their role should include convincing people to adhere to preventive measures as well. Some researchers were strongly in favor of one of those options, while others expressed more uncertainty about their appropriate role during the pandemic. For example, one researcher mentioned the importance of explaining why it is important to adhere to preventive measures but also gave an example of a researcher who appeared in the media to support an interest group, stating: “In that case, you are acting more from political interests, you have already taken a stance and that’s a grey area for the general scientific debate, explanation, and truth-finding. So, I did not want to cross that boundary” (R2).

The tension between researchers’ responsibility to inform without value judgment and to take a stance in societal debates was discussed less among journalists. Nevertheless, several journalists emphasized that researchers should stick to their expertise. For example, one journalist (J1) explained that he created the habit of checking if the person he interviewed had the expertise and authority to answer the questions he asked. In addition, some journalists would like researchers to take a stance in public debates, as exemplified by one journalist: “Experts should contribute to the debate, based on their expertise. I think it’s important they also dare to speak up when it’s necessary” (J9).

4.2.2 Roles and responsibilities of journalists

Most journalists agreed that their main role is to critically assess information. As one journalist stated: “I’m looking for critical truth finding, of course. (...) I find it important to show everything (...) and sometimes I do not write down everything experts say, because I think they are wrong” (J4). Another added that journalists should be critical to a reasonable extent: “You should not go too far by being critical for the sake of being critical, it should be a legitimate critique, there has to be a basis for it” (J9). Similarly, some journalists emphasized their responsibility to serve their audience and critically question researchers, for example: “We’re there to ask questions, not to explain (...). We work in service of our readers and not in service of science, in my opinion” (J3).

In contrast, other journalists saw explaining complex information as their main responsibility: “I see my role as someone who explains concepts and a kind of translator between science and the general public” (J5). Nevertheless, many journalists stressed that they worked in service of their audience by finding and explaining information that is relevant to them. As one researcher explained, being critical of science could also be a part of this task: “[Mainstream media] are there to weigh things and put them in perspective. (...) It’s also the task of science journalists to signal if things go wrong in science” (J7).

Many researchers saw explaining and informing as important responsibilities of journalists during the pandemic: “With complex information that is understandable for science journalists, they have the role to explain the conclusions, argumentations, and uncertainties as clearly as possible” (R1). Nevertheless, several researchers also mentioned that journalists should critically assess information. One researcher explained that he was surprised that journalists did not question why data from certain experiments requested by the Dutch

government had never been made public, concluding: “Go and look for more critical voices as well” (R6). Another researcher shared this opinion: “For the press, it’s important that they independently acquire and explain information, and that they make international comparisons and uncover unclarity and incongruities” (R5).

5 Discussion

5.1 Main findings

We analyzed challenges that Dutch researchers and journalists encountered in communication dynamics around COVID-19 and how this affected their roles and responsibilities. Our study uncovered eight specific challenges, namely: complexity, societal impact, uncertainty, limitations of science, information load, misinformation, balance, and trust. Both researchers and journalists struggled most with the complexity, uncertainty, and societal impact of the pandemic. The combination of these three challenges made the pandemic an exceptional context for science communication and science journalism.

Due to the novelty and societal impact of the virus, audiences needed clear information and quick answers to contain the spread of the virus. Thus, both researchers and journalists had to adapt their dissemination and practices. As an example, to provide audiences with new information as soon as possible, researchers and journalists used pre-print articles, which were not yet peer-reviewed, more frequently than usual. Several journalists would normally never use pre-prints but made exceptions in this situation. In retrospect, such practices may not have been ideal, as research suggests that pre-prints can be a source of misinformation and research misconduct (Collins and Alexander, 2022; Henke, 2024). Journalists found it difficult to judge the quality of pre-prints, which Flerackers et al. (2021) and Massarani et al. (2021) reported as well. Our study adds insight into how journalists addressed this difficulty, by asking researchers for expert advice to assess the reliability of pre-print articles before referring to the content.

Researchers tended to willingly help journalists assess the quality of published and pre-print articles by other researchers, through continuous collaboration with certain journalists throughout the pandemic. Thus, in line with Marín-González et al. (2023) we found that researchers felt co-responsible to avoid and counter misinformation by providing clear messages. Nevertheless, several contributions of researchers had been misused to support arguments they disagreed with. This misuse of contributions shows that misinformation remains a relevant challenge, but also that journalists face unique challenges in such contexts in interpreting and assessing scientific information.

The spread of misinformation and misuse of researchers’ quotes further complicated journalists’ decisions on what research to select from the overload of information. Since it was not always clear which researchers had relevant expertise during the pandemic, journalists had difficulty distinguishing between misinformation and legitimate criticisms. That made the task of balancing different viewpoints from researchers with different areas of expertise especially complicated. By asking researchers they knew for expert advice on the reliability of articles and pre-prints, journalists attempted to overcome these problems and select the best available information. However, it also increased their reliance on a small group of trusted sources, risking an

increased reporter-source intimacy which may have led to less critical coverage of science (cf. [Dunwoody, 2021](#)).

Due to the large amount of attention to misinformation during the pandemic in the literature as well as in public debates, it is surprising that misinformation was one of the least commonly mentioned challenges in our interviews. Nevertheless, both researchers and journalists were clearly aware of misinformation and the need to avoid accidentally spreading false information. In the aforementioned discussions about the use of pre-prints, dealing with information overload, and creating balance in reporting, misinformation seems to have become part of the context of these challenges. Avoiding and dealing with misinformation seemingly became part of several communication practices during the COVID-19 pandemic, instead of being addressed as a separate challenge.

Regarding the impact of the COVID-19 pandemic on science-media interactions, our study confirmed findings from previous studies. As in the survey by [Massarani et al. \(2021\)](#), journalists saw the increased public interest and understanding of science as a positive effect of the pandemic. Several journalists also voiced their appreciation for the availability and cooperation of researchers during the pandemic. This increased willingness of researchers to interact with journalists is consistent with the process of medialization of science (e.g., [Allgaier et al., 2013](#); [Franzen et al., 2012](#)).

We found that both researchers and journalists experienced an increase in hateful reactions and threats from audience members. In addition, several researchers felt disrespected during appearances on talk shows, leading them to decline further invitations. As reported in other COVID-19 studies, therefore, researchers hesitated to express their views on the pandemic to avoid risks caused by negative reactions ([Metcalfe et al., 2020](#); [Marín-González et al., 2023](#)). For journalists, this adds to the negative effects of the pandemic described by [Massarani et al. \(2021\)](#), such as the increased workload and the exhaustive coverage of the pandemic, which were also confirmed in our interviews.

Researchers saw informing audiences and explaining scientific findings and their contexts as important responsibilities for themselves and for journalists, which corresponds with findings from [Allgaier et al. \(2013\)](#), [Dijkstra et al. \(2015\)](#), and [Lo and Peters \(2015\)](#). During the pandemic, both researchers and journalists stressed the need to highlight the uncertainties and limitations of scientific knowledge in news messages. In response to the challenges of the complexity, uncertainty, and societal impact of the pandemic, emphasizing what is not yet known was important.

A new finding from our study concerns the tension in how researchers dealt with their advisory responsibilities. Most researchers would normally prefer to keep their contributions as informative and objective as possible, fitting with a role as autonomous scientist ([Spruijt et al., 2013](#)). However, during the pandemic, many researchers also felt responsible for convincing people to adhere to preventive measures based on their knowledge. Some researchers chose to try to remain purely informative, whereas others actively took initiative to advise policymakers and broader audiences via (social) media. Several researchers attempted to find a balance between these two responsibilities, by sharing what they considered to be the best actions to take based on their expertise, without becoming too activist. This raises the question of what the ideal balance would be between

informing and advising for researchers who act as public experts (cf. [Peters, 2008](#)).

In line with journalists' preferred roles as critical gatekeepers and watchdogs (cf. [Fahy and Nisbet, 2011](#); [Bos and Nuijens, 2020](#)), journalists emphasized the need to be critical and independent, both for themselves and for researchers. Regarding their responsibility to inform their audience and explain complex information, journalists highlighted the need to work in service of their audience and not in service of science. Notably, in the context of the pandemic, several researchers also emphasized that it was important for journalists to be independent and critical. This finding is in contrast with the work by [Larsson et al. \(2019\)](#) and [Peters \(2007\)](#), who found that researchers prefer journalists to be less critical and cover science in a positive way.

5.2 Theoretical and practical contributions

Researchers and journalists encountered specific challenges in providing clear information about the COVID-19 pandemic as soon as possible. One of the main ways to address these challenges, especially for dealing with the information load and pre-print publications, was through establishing long-term relations. These relations helped to avoid further spreading of misinformation, but it also increased science journalists' reliance on certain researchers they knew well. Relying on a select group of trusted sources can complicate journalists' ability to report critically and independently about science (cf. [McKinnon et al., 2018](#); [Dunwoody, 2021](#)). This poses an additional risk to the quality of science journalism, which is already under pressure.

In order to address the challenges they encountered during the pandemic, researchers and journalists needed to understand their own and each other's roles and responsibilities. Most researchers would normally prefer to stick to their expertise and provide purely factual information. However, in the context of the pandemic, researchers considered whether they should take on a more persuasive role to encourage citizens to adhere to preventive measures. This finding raises the need for deeper discussion on the role of researchers and journalists in situations like these, particularly to what extent it is productive for researchers to commit to taking strong stances in public in situations in which the scientific information is uncertain but important for scientific and political decision-making ([Harvard and Winsberg, 2021](#)). The question of what role both actors should take on is also relevant in relation to different global challenges, such as the climate crisis. Training researchers to reflect on their responsibilities when appearing in media can help in defining roles. Alternatively, researchers and journalists could discuss their expectations before an interview takes place.

Our findings show that researchers were more positive about journalists being independent and critical of research about COVID-19 than would be expected from previous studies ([Larsson et al., 2019](#); [Peters, 2007](#)). Given the stakes involved, this runs against expectations. Researchers could have been expected to tolerate less criticism from journalists. But this instead might signal the fact that scientists were factoring in the scientific uncertainty of the situation, the existence of misinformation, and the fact that the consequence of scientific decisions would be large. In such cases, journalistic criticisms were useful to building trust in scientific results. In addition,

researchers gained substantial experience in dealing with media during the pandemic, while many already had prior experience as well. Therefore, we expect that they have acquired a better understanding of the processes and values of journalism, which is a recognized consequence of the medialization of science (Allgaier et al., 2013; Franzen et al., 2012).

For other topics, we expect that, despite context-dependency, researchers and journalists might encounter challenges similar to the eight we identified for the COVID-19 pandemic. In particular, we expect this applies to topics with a large societal impact for which scientific knowledge is emerging or contested, such as climate change or artificial intelligence. Such topics, as with COVID-19, also require researchers and journalists to be aware of their own and each other's roles and responsibilities. Such awareness can help them avoid common complications in science-media interactions and provide good quality science information (Appiah et al., 2020; Dijkstra et al., 2015; Peters, 2007).

5.3 Limitations and suggestions for further research

Some limitations should be acknowledged. The interviews were conducted in the Netherlands and mainly focused on the experiences of researchers and journalists with written media, especially national newspapers. Further research could provide additional insights into communication about COVID-19 in other countries and different media. Furthermore, our study aggregated reflections of researchers and journalists on their direct interactions with each other. These interactions are a small part of how news messages are formed and distributed. We recommend further research on other aspects of this process, including the influence of press offices, governments, and social media on news coverage.

Though we interviewed researchers and journalists with various relevant areas of expertise, we could not include researchers from all fields of relevance to public discussion and policy during the pandemic. For example, our sample did not include researchers in pharmacovigilance, which would have been relevant considering the heated discussions and misinformation about vaccine safety. We prioritized researchers in various fields of epidemiology who regularly appeared in media throughout the pandemic. Since many participants held prominent positions in the public debate about COVID-19 in the Netherlands, we believe they could provide a good overview of their fields and the broader context.

Furthermore, the interviews were conducted in 2021, while the pandemic was still ongoing and received major news coverage, as was the case in 2022. This study, therefore, does not cover experiences throughout the full duration of the COVID-19 pandemic. Future research can enrich our understanding of interactions between journalists and researchers throughout the pandemic and afterwards, to see if the pandemic has caused lasting changes. Finally, we recommend further exploring how new developments in other areas as generative artificial intelligence and climate change affect challenges and roles or responsibilities in science-media interactions. In a context in which scientific information is essential to solving global challenges, additional research could provide further insight into how researchers, as public experts, should balance their responsibilities of informing and advising.

5.4 Conclusion

To conclude, our study increased understanding of researchers' and journalists' experiences with communication dynamics during the COVID-19 pandemic in the Netherlands, highlighting challenges that impact science-media interactions. The urgent need for information and the complexity and uncertainty of emerging scientific information complicated communication about COVID-19, leading to an increased information load, misinformation, and the use of preprints. Researchers and journalists addressed these challenges through continuous collaboration. However, this collaboration also increased journalists' reliance on a limited number of trusted researchers, challenging critical coverage of science. Nevertheless, both researchers and journalists saw independently and critically informing citizens as journalists' main responsibility, indicating an increased understanding of journalistic values among researchers, in line with the process of medialization of science. Researchers questioned whether they should keep their contributions to the public debate about COVID-19 purely informative or persuade citizens to prevent the spread of the virus.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving humans were approved by the BMS Ethics Committee (domain humanities and social sciences), University of Twente. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written or verbal informed consent to participate in this study.

Author contributions

AJ: Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. AD: Conceptualization, Formal analysis, Funding acquisition, Methodology, Supervision, Writing – review & editing. MM: Conceptualization, Formal analysis, Funding acquisition, Methodology, Supervision, Writing – review & editing. MJ: Conceptualization, Formal analysis, Methodology, Supervision, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This research has received funding from the University of Twente's BMS COVID-19 fund.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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