SCM
Studies in Communication and Media

FULL PAPER

# "My daily dose of sedation" The secret to success of the science communication podcast 'Coronavirus-Update' with the virologist Christian Drosten and its effect on listeners

# „Meine tägliche Beruhigungsdosis" Das Erfolgsgeheimnis des Wissenschaftskommunikations-Podcasts „Das Coronavirus-Update" mit dem Virologen Christian Drosten und dessen Effekt auf Hörer*innen

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## „Meine tägliche Beruhigungsdosis" Das Erfolgsgeheimnis des Wissenschaftskommunikations-Podcasts „Das Coronavirus-Update" mit dem Virologen Christian Drosten und dessen Effekt auf Hörer*innen

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**Abstract:** During the COVID-19 pandemic, a podcast with Christian Drosten, a German virologist, gained millions of listeners. Building on literature on science communication skills and first insights showing that exposure to virologists is related to cognitive, affective, and behavioral outcomes and pointing to parasocial phenomena (PSP) as an underlying mechanism, we conducted a qualitative content analysis of comments on the podcast on YouTube to explore relevant perceived skills for effective science communications, positive effects on listeners and the role of PSP as a possible driver for the effects. We found that next to Drosten's expertise, also communicative and personality traits were observed as relevant factors for the podcast's success. Additionally, the podcast can mainly benefit listeners through its affective effects like calming or reducing fear to cope with the situation. Engaging in PSP was observed as an underlying supporting process. With this study, we open new perspectives for science communication research regarding essential perceived skills for effective communication and positive affective effects as an addition to knowledge or behavioral effects.

**Keywords:** Science communication, podcasts, parasocial relationships, COVID-19.

**Zusammenfassung:** Während der COVID-19-Pandemie erreichte der Podcast mit Christian Drosten, einem deutschen Virologen, Millionen von Zuhörer*innen. Aufbauend auf Literatur zu erfolgreicher Wissenschaftskommunikation und ersten Erkenntnissen, die belegen, dass der Kontakt mit Virolog*innen mit kognitiven, affektiven und verhaltensbezogenen Effekten zusammenhängt, und die zusätzlich auf parasoziale Phänomene (PSP) mit den Virolog*innen hindeuten, haben wir eine qualitative Inhaltsanalyse von YouTube Kommentaren zum Podcast durchgeführt. Dadurch konnten relevante wahrgenommene Faktoren für effektive Wissenschaftskommunikation, positive Auswirkungen auf die Zuhörer*innen und die Rolle von PSP als mögliche Ursache für die Auswirkungen untersucht werden. Neben der Expertise von Drosten konnten auch kommunikative und persönliche Eigenschaften als relevante Erfolgsfaktoren des Podcasts beobachtet werden. Darüber hinaus konnte der

Podcast den Zuhörer*innen, vor allem durch seine affektiven Effekte wie Beruhigung oder Reduzierung von Ängsten, dabei helfen, die Situation besser zu bewältigen. Die Beteiligung an PSP wurde als ein zugrundeliegender unterstützender Prozess beobachtet. Mit dieser Studie bieten wir neue Perspektiven für Forschung im Bereich der Wissenschaftskommunikation in Bezug auf relevante Fähigkeiten für effektive Kommunikation und positive affektive Effekte als Ergänzung zu Wissens- oder Verhaltenseffekten.

**Schlagwörter:** Wissenschaftskommunikation, Podcasts, parasoziale Beziehungen, COVID-19.

## 1 Introduction

During the worldwide COVID-19 pandemic, science communication became more important and present than ever. This was also the case in Germany. Suddenly virologists were the most requested advisors to politicians and omnipresent in traditional and digital media. The most prominent example is Prof. Dr. Christian Drosten, head of the Institute for Virology in Berlin, who was part of the podcast *Coronavirus-Update* of the NDR (North German Broadcasting). In this podcast, Drosten engaged in dialogue with a journalist about the current COVID-19 situation. The podcast quickly gained popularity, and Drosten became famous all over the country. Since February 2020, he has gained over one million followers on Twitter, people have created fan pages, and hashtags like #teamdrosten have spread. German Newspapers presented headlines like "Is this our new chancellor?" (Lau, 2020) and "The hero who never wanted to be one" (Wichert, 2020). In short, a hype arose around him. At the same time, deniers of the pandemic focused on him as a sort of enemy. To have a scientific podcast and a scientist gain this kind of positive attention and feedback, going beyond traditional science communication, was a new phenomenon during the pandemic in Germany (Wormer, 2020). Due to this popularity and the way people talked about the show and Drosten online, we became interested in what contributed to the success of the podcast. Research has already shown that different professional and personal skills can influence the success and effectiveness of science communication (Mercer-Mapstone & Kuchel, 2017). Therefore, we explored which skills were perceived as important by recipients in the case of Drosten and the podcast to make it stand out and keep listeners engaged to such an extent. Additionally, we investigated the effects media in the form of science communication can have on listeners during the pandemic and whether they can benefit from it to better cope with the situation. Science communication research often deals with knowledge and behavioral effects (Maier et al., 2014), but observing this positive hype around a scientific media format indicates that affective effects can play an important role, too. A survey study from Utz et al. (2022), for instance showed that exposure to virologists is not only related to (subjectively perceived and objectively measured) knowledge about COVID-19, but even more so to solace. In general, the effects were mediated by the asymmetric interaction with and relationship to the virologist (summarized as parasocial phenomena; Horton & Wohl, 1956; Liebers & Schramm, 2019).

To further elaborate on this idea, we use a bottom-up approach by analyzing actual listener comments about the podcast on YouTube as engagement indica-

tors. This helps us to identify what characteristics and perceived skills of Christian Drosten are potential important drivers for the podcast's success, what function the podcast has for listeners, and whether they can benefit from it in times of crisis. In this paper, we first look at the literature regarding relevant characteristics and skills required of scientists to perform effective science communication. Afterward, we give a short overview of the positive effects of science communication on recipients and its potential for coping and connect this literature to work on the parasocial nature of podcast and the potential benefits of parasocial phenomena. We then outline the results of an inductive qualitative content analysis of YouTube comments of 20 different episodes of the podcast *Coronavirus-Update* from February until the end of May 2020. In summary, with this paper we aim to explore which characteristics and skills are perceived as relevant by recipients for delivering successful science communication and the effects the podcast can have on recipients during the COVID-19 pandemic. Before turning to the theoretical background of our paper, we first give some background information on podcasts in general and the podcast the *Coronavirus-Update* in particular.

## 2. Research object – podcasts and the *Coronavirus-Update*

Podcasts can be defined "as an episodic series of digital audio files, which you can download, subscribe, or listen to" (Newman, 2019, p. 28) and they center around sound and the spoken word (Dowling & Miller, 2019, p. 180). They can be listened to on multiple platforms and across various devices (Newman et al., 2021) and have become "major players in the current media landscape" (Schlütz & Hedder, 2021, p. 2). What distinguishes podcasts from traditional radio experiences is the lack of obligation and responsibility. Podcasts are non-linear and listeners can pause or end the podcast at any time and the voice of the host can travel with the listener to different places and activities throughout the day. They are "combining the intimacy of radio with the mobility and personalization of digital media to create a new space for cultural interaction" (Wrather, 2016, p. 44). Additionally, podcasts are mostly listened to with a focused attention. A report about podcast usage in Germany e.g., showed that more than half of German listeners report that they give podcasts their undivided attention (Domenichini, 2018, p. 47). All of this leads to podcasts being a rather personal experience for listeners (Zuraikat, 2020, p. 42).

At the beginning of the pandemic in 2020, various daily news podcasts were launched world-wide, "focusing only on the pandemic and its implications" (Newman & Gallo, 2020, p. 21). In Germany, the podcast the *Coronavirus-Update* with Christian Drosten started at the end of February 2020 when COVID-19 started to spread to Europe. The NDR contacted Christian Drosten due to his expertise about this specific type of virus, and he agreed to do a daily podcast about the situation in Germany. In the first phase, a new podcast episode was released every weekday, and the podcast quickly gained popularity. By end of March, the episodes had been streamed more than 15 million, and by May already 41 million times (Über 15 Mio. Abrufe: Der gewaltige Erfolg des "Coronavirus Update" mit Professor Christian Drosten, 2020). The podcast could be lis-

tened to across multiple platforms like streaming providers, the NDR online library, or YouTube and during the first COVID-19 phase in Germany, the podcast was constantly among the top three positions in the podcast charts of all streaming providers (Steenbuck, 2020). This is even more unique since it is a science communication podcast and not an entertainment podcast that typically dominates the charts. Additionally, during the peak of the podcast, producers received more than 10,000 letters per day from listeners (Kenya et al., 2020).

According to the NDR, the format was created to deliver scientific information based on which listeners can make good decisions for themselves (Über 15 Mio. Abrufe: Der gewaltige Erfolg des "Coronavirus Update" mit Professor Christian Drosten, 2020). The declared aim of the podcast was to inform, classify, and provide background information to as many people as possible and as profoundly as possible – without spreading unnecessary panic (NDR, 2020). One unique characteristic of the podcast was that the scientist was given a lot of room within the individual episodes "often without critical questioning of the present journalist" which differentiates it from other popular science journalism beyond the pandemic (Wormer, 2020, p. 468). Due to the popularity, content of the podcast was regularly reciprocated in other media.

## 3. Theoretical background

### 3.1 Science communication skills

As a member of society, citizens are frequently confronted with complex science-related issues like climate change and have to decide whether they accept proposed measures to deal with these issues. To help with these decisions, people require an understanding of relevant science to a certain degree, "especially to the extent that it pertains to the potential consequences of the available course of action" (Bruin & Bostrom, 2013, p. 14062). This help can be delivered through science communication. Mercer-Mapstone and Kuchel (2017) define it "as the process of translating complex science into language and concepts that are engaging and understandable to non-scientific audiences" (p. 2). Since the beginning of the COVID-19 pandemic, science communication in terms of public scientific statements have been in demand more than ever. Still, in many countries, attention was limited to only a few virologists that rose to popularity, like Anthony Fauci in the US, Neil Ferguson in Great Britain, and Christian Drosten in Germany (Stevis-Gridneff, 2020). But why did some scientists stand out and receive more attention than others?

Certainly, the main characteristic that qualifies scientists to act in science communication is their expertise in a certain field. Yuan et al. (2019) found source expertise to be an important factor for the outcome and effects of strategic communication. Additionally, attitudes toward a communicator with a higher level of expertise are more favorable (Maddux & Rogers, 1980). But despite this, scientists still face several barriers to delivering not only helpful but also successful science communication to the general public. Mercer-Mapstone and Kuchel (2017) defined multiple core skills for effective science communication. Here,

communicative skills are mentioned as specifically important; this includes language that is appropriate for the target audience, style elements like humor or body language, and encouraging a dialogue with the audience. Also, Yuan et al. (2019) argue that the communication style of a scientist is important for science messages since it can influence the attitudes and behaviors of recipients. They recommend polite communication as "a style that uses peaceful language in the attempt to reinforce recipients' autonomy or build closeness with them" (p. 270), which makes it possible for the communicator to build a stronger relationship with the audience (Goldsmith & MacGeorge, 2000). Arnold and Boggs (2020) likewise emphasize the importance of warm communication, which means using friendly language, like expressing friendliness, empathy, or compassion because it can influence the perception of health care providers, which may also be the case for scientists in public. Finally, Krauss (2015) expresses that not every scientist has the potential to become a so-called *celebrity scientist*, since often not only scientific accomplishments but also (or even more so) communication skills and personality traits matter to the audience (p. 25).

According to these findings, it can be challenging for scientists to gain attention from the public and possible success can not only be affected by both professional skills and personality traits. During the pandemic, a rather exceptional situation, scientists suddenly got a lot of attention. They were demanded like never before, and some virologists achieved international popularity like Christian Drosten. Therefore, with the first research question, we seek to identify which characteristics and perceived skills of Drosten were drivers for the podcast's success by investigating what users appreciate about him in the comments:

> *RQ1: Which skills and characteristics of Drosten and the podcast are positively highlighted by listeners and potentially contributed to its success?*

### 3.2 Effects of and coping with science communication

Prior work has already found that science communication can have cognitive, attitudinal, affective, and behavioral effects (Maier et al., 2014). Some of these effects could also play a role when listening to the podcast with Drosten. For instance, exposure to science communication can positively affect general factual science knowledge or specific scientific topics, e.g., in the context of global warming (Kimmerle & Cress, 2013; Zhao, 2009). At the same time, it can positively influence general beliefs about science and its comprehensibility (Maier et al., 2014, p. 95).

Research concerning affective effects of science communication has mainly focused on risk perceptions and the effectiveness of fear appeals (Maier et al., 2014), such as evoking frightening outlooks of the future due to global warming. During the beginning of the pandemic, uncertainties paired with fear were already very high and did not have to be evoked. Instead, it was important to cope with the stress triggered by the pandemic.

Lazarus and Folkman (1984) differentiate between problem-focused coping, which focuses on addressing the problem causing the stress, and emotion-based

coping, where coping aims to regulate the stress-induced emotions, often including downregulation of negative feelings (Folkman & Moskowitz, 2004). Media can be an important tool to apply these coping strategies (Wolfers & Schneider, 2020), but the coping literature is often primarily focused on emotion-focused coping with media as a form of escapism (Halfmann & Reinecke, 2021; Katz & Foulkes, 1962). Utz et al. (2022) found that in times of the pandemic, science communication from virologists induced positive emotions such as solace, characterized by relieved sorrows and a more positive look towards the future, indicating that the podcast might be used for emotion-focused coping.

Engagement with science communication could also form a more problem-focused coping strategy because knowledge about the virus and how to contain it helps to solve the problem. Eden et al. (2020) found in a study about coping through media during COVID-19 that anxious individuals also used media for problem-focused coping, which was positively related to their well-being (p. 14). Listening to the problem-focused podcast could therefore offer a way to cope better with their current situation. However, important to note is that the mentioned effects of science communication are highly dependent on how science and research are portrayed (Maier et al., 2014, p. 96). The focus of this study lies on the podcast of Christian Drosten, a format where the scientist had more room than usual to express himself and that has never been in the focus of science communication to this extent before. Therefore, with the second research question, we want to investigate whether this podcast managed to also induce some of the same positive effects for listeners during the pandemic, and whether people imply as much in the comment sections.

> *RQ2: What effects of listening to the podcast do users write about in the comments and can they benefit from them in times of the pandemic?*

### 3.3 The possible role of parasocial phenomena

Parasocial interaction (PSI) and parasocial relationships (PSR) refer to the perception of asymmetrical interpersonal relationships between people and media characters (Horton & Wohl, 1956; Turner, 1993). Dibble et al. (2016) differentiate between PSI as a single exposure between the recipient and the media figure and PSR as "the more enduring, long term, and usually positive, one-sided intimacy at a distance that users develop toward media performers on repeated encounters" (p. 24). Since the boundaries between PSI and PSR are often fluent and the terms often have been used interchangeably, we follow Liebers and Schramm (2019) and use parasocial phenomena (PSP) as an umbrella term. Research has mostly looked at PSP with fictional media figures; non-fictional figures have become more important with social media and influencers, focusing on the entertainment and marketing industry (Liebers & Schramm, 2019). On social media, the interactions and relationships are not as one-sided as with TV or movies because fans can like or comment on posts from the media figure. Even when the media figure occasionally reacts on these comments, these relationships are still characterized by a larger asymmetry than interpersonal relationships, for example with friends.

Tukachinsky and Stever (2019) distinguish between various phases in the development of PSRs. Whereas a certain amount of exposure to a media figure is needed to develop PSP, in the experimentation phase people also seek more exposure to the media figure. Many of the factors identified as important in the initiation phase do apply less to audio-only science podcasts, e.g., physical attractiveness, similarity between oneself and the character, or screen-size and eye contact. Especially in health contexts, credibility of the media figure has emerged as predictor of PSP (Liebers & Schramm, 2019; Phua, 2016). Due to the high media presence of Drosten in the beginning of the pandemic and his credibility, it can thus be expected that people are likely to form parasocial bonds with him.

### *3.3.1 Podcasts and PSP*

Even before the debut of podcasts, research had already explored PSP in auditory media experiences, specifically regarding radio hosts of talk radio shows (Rubin & Step, 2000). According to Zuraikat (2020), podcasts are especially well-suited for evoking PSP. Foremost, they are a rather personal sound experience based on human voice (MacDougall, 2012, p. 167). One major aspect of the development of PSP is the feeling that the listener gets of 'being there' with the host (Zuraikat, 2020, p. 46). The often-direct address of the listener and the possibility of having the host in one's ear can create a rather intimate feeling and foster the illusion of a parasocial experience (Hilmes & Lindgren, 2016; Schlütz & Hedder, 2021). Additionally, Lindgren (2016) suggests that the connection can be induced by the host engaging with the listeners in a conversational manner (p. 11). With this, podcasts are able to take "the power of the parasocial relation to a new level" (MacDougall, 2012, p. 179) and are well-suited for building PSP (Schlütz & Hedder, 2021). This might be so especially for PSP with scientists because the podcast episodes are longer than standard radio or TV interviews. The consistency of the podcast over an extended period of time allows them to become "a regular and dependable event, to be counted on, planned for, and integrated into the routines of daily life" (Horton & Wohl, 1956, p. 216) and fosters PSP (Dibble et al., 2016; Zuraikat, 2020). While battling a pandemic, where people must quarantine and socially distance from actual relationships, the likelihood of engaging in PSP could even increase. In fact, during the early stages of the pandemic, news and pandemic related podcasts were very popular and became a key part of many lockdown routines (Newman & Gallo, 2020). Utz et al. (2022) showed in a survey study that exposure to virologists in Germany can lead to the development of PSP. We expect to see indications for this also in the comments on the podcast episodes.

### *3.3.2 Benefits of PSP*

PSP can lead to "several cognitive and affective consequences, such as greater engagement, enjoyment, identification, and loyalty" (Chan-Olmsted & Wang, 2020, p. 15; Perks & Turner, 2019) and can be used to countervail social deficits (Derrick et al., 2009; Jarzyna, 2020). For example, when dealing with social chal-

lenges like anxiety or loneliness, engaging in parasocial behavior has been shown to significantly improve measures of well-being (Cole & Leets, 1999; Greenwood & Long, 2009). This should be especially the case during a pandemic that required social distancing.

Pavelko and Myrick (2020) found that a PSR with the hosts of *My Favorite Murder*, a true crime comedy podcast in which often problems with addiction, depression or other disorders were discussed, was positively related to coping with mental illness. A virologist gaining that much popularity is a new phenomenon that goes in the direction of *celebrity scientists* (Martinez-Conde et al., 2016) and opens the possibility of scientists as partners for PSP. There is not much research on scientists in relation to PSP. Sherman-Morris (2005) looked at possible PSRs with meteorologists and found that a PSR predicted the likelihood of taking shelter during a tornado when the meteorologists recommended doing so. Klotz (2011) additionally showed that interactions with meteorologists on social media could strengthen the PSRs with their local weathercasters and further increase adherence to their warnings. Utz et al. (2022) found indirect positive effects of exposure to virologists via PSP on knowledge and solace. We thus, in the last research question, also explore whether there are positive effects of PSP expressed in the comments.

> *RQ3: Do listeners express statements that indicate PSP with the virologist, and can this relationship endorse possible positive effects?*

## 4. Method

### 4.1 Data collection

As we did not have access to audience letters that were sent to the NDR but still wanted to concentrate on the recipients' perspective, we decided to focus on YouTube comments on the episodes. The podcast was frequently featured in the German YouTube trends and the creator of the NDR podcast mentioned in an interview that it was specifically interesting to observe how heavily YouTube is used as a podcast platform (*Über 15 Mio. Abrufe: Der gewaltige Erfolg des "Coronavirus Update" mit Professor Christian Drosten*, 2020). Another reason for focusing on YouTube for data collection was that the comment section offered users a simple way to express remarks and opinions that can be directly linked to listening to the podcast, which is not the case for other platforms. Therefore, the self-reports can offer important insights.

We collected the comments of all podcasts between the beginning of February until the end of May, starting with the first episode, with the help of the package tuber in R (Sood, 2020). In the beginning, the podcast aired on weekdays but not on the weekend. To reduce material and coding effort, we took a sample of two podcasts each week and systematically switched days during the course. When the podcast changed its rhythm to only air every other day, we also reduced the collection to one podcast every week, which finally resulted in 20 episodes. Within the individual episodes, we focused on the 200 most liked comments, as those

comments were perceived as most relevant for the study, given that they received the most support from other users and are the most visible.

### 4.2 Data analysis

To answer the research questions, we conducted an inductive qualitative content analysis (Mayring, 2014). As a first step, two coders immersed themselves into the comments through a first active reading to identify meanings and patterns of the content (Braun & Clarke, 2006). This inductive data-driven approach "allows identification of possible patterns to emerge and to be shaped" (Sanderson & Truax, 2014, p.339). Throughout this process, both coders developed an initial category system based on the first impression of the material. After that, both coders met and reviewed their categories and agreed on a unified category system, with which both coded a small sample of the material. After meeting again, any differences left were resolved until reaching consensus. Refinement of the categories was continued until new observations did not add substantively to existing categories (Sanderson & Truax, 2014). One coder then used the final category system as a template for coding the material. We decided not to code comments that were not directly related to the podcast or Drosten and were more general about the pandemic, resulting in 2,908 coded statements. After that, the second coder (author) coded a subset of ten percent of the data units as recommended by O'Connor and Joffe (2020). The subsample of comments was selected randomly for every episode. We compared the codings using the comparison tool of the software MaxQDA that we used for all of the coding (VERBI Software, 2019), which showed a strong comparison, with the intercoder coefficient Kappa being k = .68 (Brennan & Prediger, 1981). Through the data analytic process, four major categories with several subcategories emerged: Drosten as an expert, competent communicator, and human; Effects on listeners; Drosten as a new media figure and celebrity; and Criticism. Table 1 provides an overview of all categories along with the frequencies of each category. All quotes in the results section are originally in German and have been translated by the researcher to English for the paper.

Table 1. Frequency of codes in the different categories

| Categories | Subcategories | Frequency (within the categories) | Total |
|---|---|---|---|
| **1. Drosten as an expert, communicator, and human** | Appraisal for information value and uniqueness | 496 (55%) | 895 (31%) |
| | Appraisal for expertise | 145 (16%) | |
| | Appraisal for comprehensibility | 143 (16%) | |
| | Appraisal for characteristics beyond expertise | 111 (12%) | |
| **2. Effects on Listeners** | Gratitude | 780 (58%) | 1339 (46%) |
| | Support | 236 (18%) | |
| | Continuity & anticipation | 152 (11%) | |
| | Calming Effects | 121 (9%) | |
| | Trust | 50 (4%) | |
| **3. Drosten as a new media figure and celebrity** | Heroic admiration | 118 (54%) | 217 (7%) |
| | Fandom | 37 (17%) | |
| | Role Model | 37 (17%) | |
| | Leading figure | 25 (12%) | |
| **4. Critisism** | | | 457 (16%) |

## 5. Results

### 5.1 Drosten as an expert, competent communicator, and human

In the first research question, we asked what characteristics and perceived skills seem to be crucial for people in the comments and therefore likely for the podcast's success. People praised Drosten for his professional expertise and the uniqueness of the podcast compared to other media offers. Besides that, his communicative talents and personal characteristics were also highly praised.

#### *Appraisal for expertise, information value, and uniqueness*

When writing about Drosten in the comments, many people praised his expertise. Listeners mentioned that he has *great expertise*, is a *very good scientist*, or even a *luminary in corona research*. Here it was the professional side about Drosten that seemed to impress people and make them like the podcast and listen to it. In the comments, they felt the need to give him credit for that and underline his professional expertise:

> *Professionally he cannot be topped. [E33 (Episode 33)]*
>
> *Drosten is the best virologist there is in the field of coronaviruses. [E40]*

But even more worth mentioning for people was the uniqueness of the podcast and its content. Listeners put a lot of effort into positively distinguishing the podcast from other media offerings by calling it *the best current source on the sub-*

*ject*. People argued that other shows tend to focus on sensation-seeking rather than information, whereas this podcast was doing the opposite. Listeners also mentioned that due to the flood of information concerning the virus, they sometimes felt overwhelmed. Some, therefore, reduced their listening to this podcast alone. They expressed that they were getting all the information they needed from the podcast because according to them there was no other source this informative and profound:

> *Prof. Christian Drosten, […] who finds the right words between hysteria and ignorance in contrast to the politicians' blah blah that the news usually presents us. [E1]*

> *Finding your way through the jungle of information is not easy. In my opinion, if you listen to this podcast, you do not need any more information! [E9]*

### *Appraisal for comprehensibility and characteristics beyond expertise*

Another reason people seemed to like to listen to the podcast is that it is comprehensible despite the complex topics. Listeners highly appreciated the perceived unique talent of Drosten to explain scientific facts in a way everyone can understand. He apparently used *plain*, *clear*, and *vivid* language, making it easier to follow and making users like to listen to him. They appreciated the mixture of highly scientific and accessible language, which according to listeners, make Drosten stand out:

> *I think Prof. Dr. Drosten is very talented in explaining things in a really understandable and logical way. [E31]*

> *If I had had this man as my biology teacher, I might have passed the Abi [highest school-leaving certificate in Germany]. He can explain incredibly vividly. That makes it fun to listen and learn. [E21]*

But apparently it was not only his way of explaining things that made listeners express positive statements about Drosten; people also referred to the human behind the scientist and wrote about characteristics beyond his professional expertise that made him likable. Most often, people referred to him as *sympathetic, pleasant,* and *charismatic* and as a "*great guy"*, not only professionally but personally. Listeners also expressed that they especially liked the *calm* and *cool* nature he showed during the podcast and that he always stayed *patient*. People also appreciated that he is very *down-to-earth* and *unpretentious* despite his status. What additionally seemed to impress listeners is that Drosten clearly expressed if he did not know something, if e.g., it was not his field of expertise or if he made a mistake, which listeners perceived as very *honest*. Lastly, they also recognized him as an *empathetic* human being who is sincerely compassionate concerning the situation and the affected lives:

> *The pleasant, unpretentious nature of Mr. Drosten brings me great pleasure. [E17]*

*I might be wrong, but the Prof. seems to have a special empathy for us humans. [E11]*

*It is also charming how this man says that he cannot comment on certain things due to lack of information. Not a 'blithering idiot' or unnecessarily 'busybody'. [E32]*

## 5.2 Effects on listeners

In the second and third research questions, we asked what kind of effects the podcast can have on its listeners, whether people show signs of possible PSP with the virologist in the comments and whether they benefit from all of this during the pandemic. In the comment sections of the episodes, we found different effects that people wrote about. Those ranged from gratitude and the emergence of trust to benefits like calming, a sense of continuity and anticipation related to the podcast.

### *Gratitude and emergence of trust*

People felt the need to express to Drosten how thankful they were for him doing this podcast. Some just generally thanked him, others did it specifically for his engagement, the information he provided, or that he took the time to do this almost daily:

*There are situations where the word thank you is not enough. [E1]*

*I am so grateful for this podcast. Many thanks to the NDR and especially to Prof. Drosten, for still finding the time to educate the population in a reasonable way. [E8]*

People reacted with gratitude, but they also mentioned how important Drosten became for them regarding *trust*. Listening to the podcast seemed to inspire confidence in Drosten and his words according to multiple people mentioning how much they trust him by now. Some even wrote that he is the *only one left* who can still be trusted. In comparison to other news about the pandemic, Drosten was apparently assigned a special status in terms of trust, since listeners felt that they can rely on him:

*You are the only one I still trust! [E40]*

*For me, Mr. Drosten is the only one I really trust in this crisis. [E9]*

### *Calming effects – Drosten as a lifeline*

Another positive effect people shared is that listening to the podcast can calm them down. They reported, that after listening to the newest episode, they slept *more peacefully,* and some even called the podcast their *daily dose of sedation* or that they panicked less when listening to it. Some users also claim that it gave them the strength to get through the day and the courage to keep going in these uncertain times. This calming seemed to be accompanied by reducing fears. Peo-

ple reported being *less scared* of other news concerning the pandemic but also the pandemic itself. Some even expressed that Drosten was an enormous *mental help* and *emotional support* for them during the pandemic. It seems that he functioned as a sort of lifeline for many people during the crisis and apparently was able to ease the feeling of being faced with an unmanageable crisis. According to listeners, all of this was also additionally transferred through the sound of Drostens' voice, which was labeled as very pleasant, calming, and relaxing:

> *[…] and especially in times like these you are (as I read in the comments, not only for me) an enormous mental help. [E8]*
>
> *You give me strength to make it through the day at the moment. [E15]*
>
> *Especially in the early days, your podcast took away my fear, calmed me down. [E42]*

### *Sense of continuity and anticipation*

Many people expressed that they listened to the podcast daily, and sometimes waited desperately for the new episode. Some called it their *highlight of the day* or *daily pleasure* and expressed feeling anticipation. Some people even mentioned that they got *nervous* if they thought there was no new episode or that it felt weird if there was a pause. Others expressed that they *missed* the podcast on those days since it became a part of their daily routine. Multiple people even compared it to a German children's show called *The Sandman*. Watching this show is a pre-bedtime ritual for children in Germany. Some even joked that the podcast is *addictive,* and they will feel *withdrawal symptoms* if the podcast ever ends. They expressed the hope that the podcast will keep on going after the pandemic. The daily release of the podcast seemed to provide listeners with stability and pleasure in these uncertain times:

> *Waited all day for the podcast. [E15]*
>
> *Already panicked a bit that nothing will come today. [E18]*
>
> *Professor Drosten's tentative 'hello' has become the highlight of my day... [E32]*

### *Support and advocacy for Drosten*

Another aspect that stood out in the comments and not reported in science communication literature so far but is in research concerning PSP with athletes/teams and supporting them also in times of crisis (Sanderson & Emmons, 2014; Utz, Otto, & Pawlowski, 2021), is that people tried to communicate support. This includes several aspects. For one thing, they expressed support for Drosten's statements. They agreed with him and further supported him by mentioning that they will share the episodes with others or on social media. They also noted that they click the like button and comment on the video to push it on YouTube. But they not only showed support for his content. Contrarily, Drosten said that he received

a lot of hate and death threats because he became a sort of enemy for deniers of the pandemic. In response to that, commenters wanted to show him their support against deniers of the pandemic. They directly addressed him to stay strong, not despair, or not get discouraged and to keep going despite this because they – the listeners – had his back:

> *I always give a thumb up [like on YouTube] unheard and unseen to counter all the conspiracy weirdos. A click for sanity. [E31]*

> *Please do not let the stupid emails demotivate you, please keep up the good work, we need your information! [E11]*

### 5.3 Drosten as a new media figure and celebrity

The last bundle of categories deals with the public figure that has been attributed to Drosten due to all the attention he received. Resulting from both the effects and the perceived skills driving them, people formed their picture of Drosten, his role in the pandemic, and for themselves. Drosten took on different roles for listeners here. He was seen as a leading figure in the pandemic but also functioned as a role model career-wise and as a person. At the same time, he was attributed a celebrity or even heroic-like status by some people.

#### *Drosten as a leading figure*

In this category, listeners seemed to like the idea of having Drosten as an official leading figure in the country. In the comments, people mentioned that they would like Drosten to get more influence on the government by e.g., hiring him as an official consultant and actively seeking advice from him or that politicians would at least have to consider the information when making important decisions. Several people went even further by taking a stand in demanding to offer Drosten a position where he himself would have actual decision-making power. Thereby the wish to have Drosten as the new Secretary of Health in Germany was expressed the most. Others added that they would vote for Drosten now or in the future if he would candidate for a political position:

> *Mr. Drosten is a perfect candidate for the Secretary of Health. [E9]*

> *Why is a professional from the field like Mr. Drosten not the Minister of Health? [E11]*

#### *Drosten as a (scientific) role model*

However, listeners not only wrote about a possible political role for Drosten but also about the role he could play for the individual listener. A couple of people reported that Drosten could be a role model career-wise for themselves or future generations. Some wrote that by listening, they developed the desire to attend university. They now want to study medicine or virology themselves, or their children are now interested in following this career path. The reasons listeners gave

were that Drosten demonstrated how important science is for society and that listening to science does not have to be boring but instead can be fun and entertaining:

> *Just as a good teacher gets students excited about his subject, Mr. Drosten gets me excited about science. It is too late for me to switch, but my son is also fascinated and for him this path is still open. [E17]*

> *I think I will study virology because I follow this podcast everyday with great interest. [E21]*

### *Between hero and celebrity*

Besides simply praising Drosten for his expertise or manners, we could also find a more exaggerated picture of him. For a small part of commenters, Drosten represented a heroic figure. They considered him as the *only salvation* in this crisis or as the reason for overcoming this pandemic. Additionally, it was mentioned that Drosten is *sacrificing* himself for society and that his service was essential for humanity. He was also called the hero of our time who deserves a place in the history books:

> *But especially to a person who sacrifices his life to protect us fellow human beings. [E8]*

> *Unbelievable that you can become a hero as a virologist. […] I value your work, besides the scientific interest, as a great humanitarian expression. [E42]*

In addition to this, some listeners demanded that Drosten should be granted several rewards for his work. People enumerated various prizes, like the Nobel prize, a second Federal Cross of Merit, or media prizes. Another suggestion was that a clinic should be named after him or that he should be paid more money. As a note, later in 2020, after the data collection period, Drosten did actually receive a second Federal Cross of Merit and a media prize:

> *Is it possible to be awarded the Federal Cross of Merit twice? I am just asking for my buddy Christian. [E40]*

Furthermore, people assigned Drosten some celebrity status, which resembled typical fandom similar to musician or actors. People called themselves fans, mentioned that they started to become fans, or even wished for a fan meeting. He was also called a new or *unintended (rock-)star* of this generation. Some commenters even wished for merchandise products like t-shirts or live events. Additionally, his name was used to create new words to describe the fan community, like *drostenultras*, *teamdrosten,* or *drostians:*

> *Mr. Drosten, you are becoming a celebrity in Germany because of the new coronavirus. I am definitely a fan. [E8]*

> *I am a self-confessed Drostian! [E17]*

### 5.4 Criticism

Despite all the positive feedback, there were also critical voices. Many who criticized Drosten mentioned his involvement during the spread of the swine flu in 2010 where he advised people to get vaccinated and warned about a possible huge wave of infections. Commenters argued that his predictions did not come true back then, and as a result, people should not listen to him now. Others said that he presented himself as all-knowing and superior to other virologists. It is important to note that the main number of critical comments were found in the last five coded podcasts that were published when infection rates went down and Drosten was still warning about the threats of a second wave of infections, while other virologists expressed different opinions:

> *[…] Drosten was also completely wrong about swine flu in 2009 'A luminary in the eyes of the federal government' ... That cracks me up! [E40]*

> *How simple-minded and addicted to reputation must a scientist be to allow himself to be used naively by unscrupulous politics? [E39]*

It is also noteworthy to mention that criticism was often paired with arguments in line with conspiracy theories. Critics implied that the government instrumentalized Drosten by spreading propaganda, working with Bill Gates, or being sponsored by pharmaceutical companies. Moreover, some demanded that Drosten should either react to the questions of scientists who were popular in conspiracy groups or even invite them to the podcast. It is plausible that some of these conspiracy supporters were not actually listening to the podcast but came to the comment section to incite against Drosten:

> *It is an outrageous act, like no other, to screw your colleagues in such a way. But whose institute is supported by Bill Gates? Mr. Drosten's. [E31]*

## 6. Discussion

The objective of this study was to provide initial insight about a specific form of science communication during the first phase of the COVID-19 pandemic in Germany. We investigated what characteristics and perceived skills can be seen as relevant or crucial for the podcast's success with the virologist Christian Drosten. Additionally, we examined what effects the podcast seemed to have on listeners, whether they could benefit from it, and whether PSP played a role in that.

The first research question focused on what characteristics and perceived skills listeners wrote about that likely helped the podcast to become successful. People praised the podcast and Drosten for multiple characteristics, which can be seen as drivers for further engaging in the podcast. One factor people appreciated was Drosten's expertise, especially his experience with this kind of virus. This appears to have made the podcast relevant for people in the first place, which again reflects the importance of source expertise for science communication (Yuan et al., 2019). From the beginning, Drosten had the benefit of the doubt from many people. Additionally, people claimed that the podcast had the right amount of information in

a non-sensation-seeking manner, which positively stood out in the media landscape during the pandemic. This underlines that in a crisis, where people are daily overwhelmed by information, they prefer to focus on a single source but still get all relevant information (Westlund & Ghersetti, 2015). The fact that the podcast started at an early stage of the pandemic in Germany and that the NDR were the first to cooperate with Drosten as an expert has provided the base for this development.

However, this study also showed that perceived professional expertise is not the only relevant factor for the success of science communication (Martinez-Conde et al., 2016). Consistent with the work from Mercer-Mapstone and Kuchel (2017), communicative skills were found to be an important skill. Many listeners wrote about the perceived talent of Drosten to explain scientific topics in a comprehensible way. People appreciated his communicative style, like using vivid language (Yuan et al., 2019).

The last characteristic included personality traits of Drosten, like being sympathetic, honest, humble, and empathetic, which can be associated with the importance of warm communication (Arnold & Boggs, 2020). Listeners were impressed that he acknowledged when something was not his area of expertise.

This fits the ideas of Yuan et al. (2019) and Goldsmith and MacGeorge (2000) that different skills in science communication are important for building more closeness and a stronger relationship with the audience. This seemed to work successfully here due to a mixture of perceived source expertise, adequate information, communicative skills, and additional likeable characteristics of the scientist. These insights could be beneficial when planning future science communication formats to increase the chances of success. Still, the pandemic situation was a rather exceptional situation and according to Wormer (2020), it is not yet conceivable if the effects this brought on media and communication are transferable to the times after the pandemic (p. 468), which must be kept in mind regarding generalizability.

In the second research question, we asked about the possible effects and benefits of listening to the podcast during the pandemic. The analysis showed that the podcast seemed to have different effects on its listeners. We were able to identify various affective reactions in the comments.

Instead of provoking fear regarding the situation, as is usually a focus in science communication research (Maier et al., 2014), in this case, many listeners apparently experienced the opposite. They expressed that the podcast and Drosten calmed them down, made them feel more relaxed, and, therefore, reduced fear to a tolerable amount. Some even mentioned that the podcast was an emotional support which illustrates positive effects on listeners' social well-being. Listeners who struggled with the situation felt comforted by the podcast, which fits the results of Utz et al. (2022) regarding the importance of solace. In contrast to less imminent threats like smoking or climate change, where fear is induced to produce a behavioral change (Maier et al., 2014), the perceived threat during the pandemic was already so high that people also needed reassurance in addition.

In addition to comfort and reducing fears, people also reported that they experienced positive emotions in terms of enjoying the podcast and having something to look forward to in a time when many activities, especially activities people

used to cope with stress, were not possible. This feeling of anticipation and the knowledge that a new episode would come out also helped people to structure their day, as for some it became a habit (Zuraikat, 2020) that made people feel better and more in control of the situation. Other affective effects found were the feeling of gratitude and the emergence of trust. For some people listening to the podcast apparently resulted in special trust attributions; they conveyed that the podcast and Drosten gave them the feeling that they have somebody to rely on during this time. This shows that listening to the podcast could potentially strengthen the trust in the scientist even when there is much uncertainty, like during the pandemic (Maier et al., 2014).

We also found some attitudinal effects concerning science and virology in general. Some commenters changed their attitude towards science because Drosten showed them that scientific topics can be interesting and exciting. This is in line with the ideas of Maier et al. (2014) that science communication can influence general beliefs about science. Some even wanted to implement this insight into their career paths, meaning it could lead to possible behavioral effects in the future. Interestingly, we identified more affective reactions than cognitive or behavioral aspects, such as comments about people improving their knowledge or taking regulations more seriously. This does not imply that these effects are not there, only that those are not the factors people chose to express, indicating that those were not the most relevant for them. This prevalence of affective versus cognitive or behavioral comments underlies the role of emotion-focused coping (Folkman & Moskowitz, 2004).

In this context, we saw that a sort of relationship with Drosten potentially played a role in generating those positive effects, which was relevant for the third research question. Commenters often directly addressed Drosten, suggesting that people intended to engage in an actual conversation or at least wanted him to receive the message. Interestingly, the comments of the listeners about Drosten and the positive affective effects were quite similar to the ones of people describing their favorite TV show or true crime podcasts, e.g., that it makes them feel better or happy (Cole & Leets, 1999; Pavelko & Myrick, 2020). Such reactions are not typically expected for science communication but rather in entertainment contexts; still, it fits with research on meteorologists and PSRs (Klotz, 2011; Sherman-Morris, 2005). Additionally, the auditory modality seemed to contribute to this, as listeners specifically referred to the sound of Drosten's voice as being pleasant or relaxing, which might be a unique experience that happens only with podcasts (Hilmes & Lindgren, 2016).

People also anticipated new episodes and integrated the podcast into their daily structure, showing that at least some indeed formed enduring PSRs, demonstrating that podcasts encourage their formation (Zuraikat, 2020).

Listeners became nervous when the new episode was late, or they did not want the podcast to ever end. Some even joked around that they were addicted. Moreover, people felt the need to defend Drosten from haters in the comment section and emphasize that they back him up like people would do for their friends. Similar behavior has been reported for fans who develop PSRs with athletes (Sanderson & Emmons, 2014). The uncertainty and huge information flow dur-

ing the pandemic that people wrote about possibly enhanced the likelihood to engage in some sort of relationship with Drosten. This caused people to focus on him as a guide who was informative, trustworthy, and could counteract anxiety related to the pandemic (Cole & Leets, 1999; Jarzyna, 2020). One could conclude that people use the podcast and the relationship to Drosten as a coping mechanism that combines problem-focused coping and emotion-focused coping. They do this by getting relevant and important information about the pandemic they feel the need to stay informed about and at the same time getting help with dealing with the situation in an enjoyable, mood-enhancing, and soothing way, similar to the results of Eden et al. (2020).

This combination of likable skills and characteristics and the beneficial effects people can experience by listening to the podcast helped to create a cult around Drosten. This resulted in a wide range of images of Drosten. For some people, he takes on collective functions of the virologist as a leading figure for society, where people want him in a decision-making position or as the hero who leads them out of this situation. For others, he takes a more individual function as either a role model concerning their future career path or as a celebrity, where they can engage in fandom. At the same time, he is an enemy for people with a different opinion who found a target for their blame and anger. Through these different frames, Drosten is promoted from a scientist that is an expert in his field to a *celebrity scientist* that is either perceived as benign and much-loved or controversial.

## 7. Limitations and future research

This study has several limitations. First, by using the comment section of YouTube videos we were not able to collect any demographic information about the commenters. Furthermore, the sample is not representative of all listeners and probably consists of people that are already engaged to a higher extent, as they were those who made the effort to comment on an episode. Results could be different for the complete audience of the podcast or when collecting comments on a different platform. Simultaneously, we cannot be sure that people who commented actually listened to the podcast. However, the likelihood that people listened to the podcast is higher for YouTube comments on specific episodes than for episode-independent comments on Twitter or Facebook. Additionally, we cannot make assumptions about the listening situation of the commenters. We are aware that YouTube is probably not the main platform to choose when listening to the podcast on the phone or on the go. Due to YouTube's limitations, it might be more difficult to include the podcast into a daily schedule, which could be relevant for the development of PSP. Nevertheless, since YouTube was one of the few platforms where people could leave comments, it is rather possible that people who listened on a different platform still came to YouTube to express their opinions. Further, during the phase of the pandemic in this study, restrictions often forced people in Germany to stay home, where it is more plausible to listen to the podcast via YouTube. Additionally, the pandemic is still an exceptional situation, and focusing on one scientist might limit the generalizability of the results. Future research should therefore look at the potential of affective effects for science com-

munication in a non-pandemic-related scenario to see if this sort of personality cult might be specific to the pandemic (Wormer, 2020).

Because we observed conspiracy theorists who argued in favor of alleged scientists in the comments, we decided to briefly look at the comment sections of videos from well-known conspiracy theorists in Germany. Here anecdotal evidence shows similar patterns in the comments, such as praising these theorists in the same way as people did Drosten. We saw in this study that expertise is only one characteristic of several important traits, and this could be a first indication that similar (parasocial) processes could also be observed for central figures in the conspiracy scene, which would be interesting to look at in the future.

## 8. Conclusion

In this study, we conducted a qualitative content analysis of comments on YouTube to explore relevant characteristics and perceived skills for the success of the podcast *Coronavirus-Update* with virologist Christian Drosten and effects on listeners during the early phase of the pandemic in Germany. Additionally, we also assessed the potential role of PSP as an underlying process. We found that in addition to professional expertise, the scientist's communicative talent and personality traits were also relevant drivers of effective communicative science. Moreover, we found that listeners can benefit from listening to the podcast due to positive affective effects like calming, reducing fears, anticipation, gratitude, and trust. We also showed that PSP with the scientist can be beneficial for improving well-being and reducing anxiety and can therefore play an important role regarding these effects. People used listening to the podcast and their PSP to Drosten as coping mechanisms to deal with the current crisis. Together, these findings open new perspectives for future designs of science communication formats and for future research on science communication to focus more on affective effects, scientists as possible partners for PSP, and its role for coping.

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