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FULL PAPER

How do COVID-19 conspiracy beliefs, exposure to alternative sources and social media correlate in Germany?

Wie hängt der Glaube an COVID-19-Verschwörungstheorien mit der Nutzung von alternativen Informationsquellen und Social Media in Deutschland zusammen?

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Abstract: Throughout the COVID-19 pandemic, conspiracy beliefs about the virus spread quickly. Using an online-representative survey in Germany, this study examines the relationship between such conspiracy beliefs and media use with special regard to alternative media and influencers as well as social media. Instead of aggregating different social media platforms, this study identifies differences between them. The results show that COVID-19 conspiracy beliefs are positively associated with the use of Telegram. The use of alternative media, Facebook, and YouTube shows only very weak positive associations. On the other hand, exposure to journalistic media is negatively associated with conspiracy beliefs. Causalities and implications of these findings are discussed.

Keywords: COVID-19, conspiracy theories, Telegram, alternative sources, social media.

Zusammenfassung: Im Zuge der COVID-19-Pandemie haben sich Verschwörungstheorien über das Coronavirus schnell verbreitet. Anhand einer repräsentativen Befragung von deutschen Internetnutzenden untersucht diese Studie Zusammenhänge zwischen COVID-19-Verschwörungsglaube und Mediennutzung. Der Fokus der Untersuchung liegt auf der Rolle alternativer Medien und Influencer, sowie sozialer Medien. Dabei werden soziale Medien nicht aggregiert betrachtet, sondern die Zusammenhänge zwischen der Nutzung einzelner Plattformen und COVID-19-Verschwörungsglaube differenziert herausgearbeitet. Die Ergebnisse zeigen, dass COVID-19-Verschwörungsglaube positiv mit der Nutzung von Telegram zusammenhängt. Mit der Nutzung alternativer Medien, Facebook und YouTube hingegen zeigen sich nur sehr schwache positive Zusammenhänge. Negative Zusammenhänge finden sich mit der Nutzung journalistischer Medien. Mögliche Kausalinterpretationen und Implikationen dieser Ergebnisse werden diskutiert.

Schlagwörter: COVID-19, Verschwörungstheorien, Telegram, alternative Informationsquellen, Social Media.

1. Introduction

Conspiracy theories are narratives attributing harmful events to supposed intrigues by individuals or groups, which are typically assumed to act secretly against the interests of the general population (Mahl et al., 2022, p. 17; Swami & Furnham, 2014, p. 220). Such narratives often appear in response to important world events, providing alternative explanations that deviate from official information (Appel & Mehretab, 2020, p. 118). Hence, it is not surprising that conspiracy theories tend to rise during crises like the COVID-19 pandemic (Van Prooijen & Douglas, 2017, p. 325). The tendency to believe in such false narratives is referred to as conspiracy belief.

In December 2021 around 15 percent of Germans thought that corona is a hoax (COSMO, 2022). In Germany, conspiracy theories are particularly popular among supporters of the social movement 'Querdenken', which established itself as a form of protest against corona-related restrictions (Frei & Nachtwey, 2021, pp. 6–7). 'Querdenken' is seen as controversial, among other reasons, because many of the supporters refuse vaccination against COVID-19 (Klawier & Prochazka, 2021). The COVID-19 vaccination coverage rate in Germany is currently stagnating at about 76 percent, lagging behind in international comparison (Hörz et al., 2022) and causing controversial debates in politics and society. Several studies have found that believing in COVID-19 conspiracy theories reduces vaccination willingness (e.g., Ruiz & Bell, 2021, p. 1083). Therefore, it is important to investigate COVID-19 conspiracy beliefs and their causes in Germany since identifying factors that may be associated with susceptibility to COVID-19 conspiracy theories may suggest possible avenues of counteraction.

In the public debate, social media are often blamed for amplifying the diffusion of conspiracy theories – especially Telegram, which has emerged as an alternative to established social media in the German context (Hohlfeld et al., 2021, pp. 16–17). Moreover, alternative media and influencers voice heavy criticism of the government's handling of the pandemic and spread conspiracy theories (e.g., Boberg et al., 2020, p. 16; Flade, 2021). Despite the public debate, there is a lack of evidence on how the use of different media channels and sources is related to conspiracy beliefs in the German context. The few existing studies (e.g., Jensen et al., 2021; Schemer et al., 2021; Theocharis et al., 2021) produce different results and mostly neglect alternative influencers and Telegram. Thus, an investigation of how COVID-19 conspiracy beliefs relate to the use of relevant media channels and sources in a German sample is necessary. In this paper, we therefore investigate specific communication channels – social media and Telegram – and sources – alternative media and influencers as well as journalistic media.

2. Definition of media channels and sources

We define media *sources* as creators of news, most notably organisations like journalistic media or individuals like alternative influencers. Media *channels*, on the other hand, are technical media or platforms that can be used by media sources to disseminate their content (Schweiger et al., 2019, p. 13). Regarding chan-

nels, we concentrate on *social media* and especially *Telegram*. Generally, social media are digital platforms where users can share, create, and distribute content together (Gabriel & Röhrs, 2017, p. 12). They can serve as amplifiers for conspiracy theories as they allow the spread of information without traditional gatekeepers and quality controls (Schmid et al., 2018, p. 76). However, Facebook, YouTube, and Twitter have started deleting false posts and the accounts of prominent conspiracy theorists (Brennen et al., 2020, p. 1; Kraus, 2018). Because of such deplatforming, many of these actors have moved to social media that do not sanction disinformation (Rogers, 2020, pp. 218–219). With this regulation, YouTube, Facebook, and Twitter are stepping away from purely technical distribution channels. They control which sources distribute content on their channels and which worldviews can be shared. However, worldviews that are deleted, such as conspiracy theories, do not disappear but emerge in other channels. In Germany, especially Telegram, which is largely unregulated, has emerged as the main alternative for conspiracist online activities (Hohlfeld et al., 2021, pp. 16-17). Telegram can thus be distinguished from other social media and will be considered separately in the course of this study.

Concerning media sources, we examine *alternative media, alternative influencers,* and *journalistic media*. Alternative media like RT Deutsch, Compact, or Sputnik (see Appendix for a full list of surveyed alternative media and influencers) are news outlets that oppose mainstream media and politics by criticising them and providing alternative viewpoints (Holt et al., 2019, p. 862). Most alternative media run their own websites, sometimes also print outlets, and use social media to distribute their content. Alternative influencers like Michael Wendler, Attila Hildmann, and Eva Hermann, can be defined as individuals who have established significant followership in social media, where they disseminate alternative content opposing mainstream media and politics. They do this, for example, by expressing extreme criticism of the government's handling of the pandemic or spreading conspiracy theories (e.g., Flade, 2021). Therefore, alternative influencers are individual actors, while alternative media are organisations with editorial structures and operating under brand names. As these may be centred on individuals (Klawier et al., 2021, p. 4), however, both concepts are overlapping.

Journalistic media are sources offering more conventional information and interpretation on a broad range of topics. Ideally, they provide balanced reporting and separate fact from opinion (for further criteria separating alternative and journalistic media see Klawier et al., 2021). A variety of journalistic mechanisms and routines have developed to help ensure appropriate news quality in journalistic media (Schweiger, 2017, p. 35).

3. Causal relations of media exposure and conspiracy beliefs

Media exposure and conspiracy beliefs can theoretically be related on the individual level in three ways: (1) media exposure causes and fosters conspiracy beliefs (*direct media effects*); (2) existing conspiracy beliefs shape the selection of sources and channels (*selective exposure*, Stroud, 2008) and the processing of media content (*confirmation bias*, Nickerson, 1998), (3) both phenomena are intertwined

and reinforce each other ("*reinforcing spirals*", Slater, 2007, p. 284). In our cross-sectional survey, we cannot deliver empirical evidence which kind of effect dominates. Nonetheless, some brief considerations might contribute to a deeper theoretical understanding.

Regarding *direct media effects*, the first thing to note is that media use in general and particularly online recommender systems can induce incidental exposure to conspiracy theories (Borah et al., 2022, p. 5; Yesilada & Lewandowsky, 2022, p. 10). If this leads to regular contact with conspiracy theories over a longer period of time, it might foster cultivation (Gerbner & Gross, 1976) and thus increase the perceived credibility and adoption of conspiracy theories. Cultivation is a prominent and empirically confirmed approach which describes long-term media effects on world perception through continuously repeated exposure to similar content (e.g., Shanahan & Morgan, 1999; Williams, 2006, p. 79). Conspiracy theories might even be particularly effective in influencing attitudes due to their narrative structure (Lazić & Žeželj, 2021, p. 648; Shen et al., 2015, p. 108). They tell stories of 'good' versus 'evil', of 'ordinary people' versus 'secret forces'. Through transportation into the narrative, content may be less critically reflected upon (see Extended Elaboration Likelihood Model, Slater & Rouner, 2002). As mentioned above, the prevalence of conspiracy theories varies between different media sources and channels (see section four and five). Using sources and channels with a high prevalence of conspiracy theories might increase the individual probability of steady contact to conspiracy theories and lead to direct media effects. In addition, social cues (e.g., likes, comments) might increase the perceived credibility of content and cause direct effects (Borah & Xiao, 2018, p. 403).

The *selective exposure* paradigm assumes that the exposure to sources and channels and the perception of content is individually different and strongly determined by personal characteristics (primarily attitudes; e.g., Stroud, 2008, p. 358). This means that individuals with a high interest in conspiracy theories and corresponding attitudes would increasingly select and use consonant sources, channels, and content. Likewise, cognitive effects might occur. Information that supports one's attitudes is more likely to be processed (confirmation bias, Nickerson, 1998) and accepted (motivated reasoning, Kunda, 1990). Whether exposure to conspiracy theories actually leads to increased belief in them thus depends on the predispositions of the respective individual.

It is hence unlikely that direct media effects occur independently of the users' personal characteristics. We assume that personal predispositions and direct media effects jointly form and reinforce conspiracy beliefs. For example, individuals with pre-existing conspiracy beliefs are more likely to turn to channels and sources where they find corresponding content, which in turn reinforces their beliefs ("*reinforcing spirals*", Slater, 2007, p. 284).

Despite assumed differences at the individual level, it is important to consider associations between media use and conspiracy beliefs at the aggregate level. This way, we can identify sources and channels that potentially contribute to increased conspiracy beliefs in the population by providing supportive content and serving as an information source for conspiracy believers. Therefore, in the following, we focus on discussing the prevalence of misinforming and conspiracist content in

the respective sources and channels as well as possible links between usage and conspiracy beliefs.

4. Exposure to media channels and conspiracy beliefs

4.1 Social media

Thirty-seven percent of German internet users state that they use social media as a gateway to news, though only 14 percent trust news in social media (Newman et al., 2020, p. 70). Social media are used as distribution channels by a large variety of misinforming sources that many users may not recognise as such. Different studies found notable shares of misleading information in social media, especially in times of crisis like the Zika virus outbreak in 2015/16 (Bora et al., 2018, p. 323; Sharma et al., 2017, p. 302) or the current pandemic (Kouzy et al., 2020, p. 5; Li et al., 2020, p. 3). Accordingly, social media use is related to higher COVID-19 conspiracy beliefs (Allington et al., 2021, p. 6; Jamieson & Albarracín, 2020, p. 7; Xiao et al., 2021, p. 984). Romer and Jamieson (2021, p. 7) even found that social media use predicted an increase in COVID-19 conspiracy beliefs from March to July 2020.

However, when examining the relationship between social media use and conspiracy beliefs, possible differences between various social media are often neglected. Theocharis et al. (2021) conducted a two-wave survey in 17 countries and found that the use of Facebook and YouTube is positively associated with COVID-19 conspiracy beliefs while Twitter use holds a negative association (p. 15). The authors attribute these findings to different features of the individual platform – in particular, whether the mode of following is symmetrical or asymmetrical. On social media with a symmetrical mode of following like Facebook, users befriend each other which leads to smaller networks of reciprocal relationships with friends and acquaintances (Theocharis et al., 2021, p. 5). Since source identity is used as a heuristic to judge accuracy (Nyhan, 2020, p. 226), disinformation and conspiracist content coming from trusted peers may have a considerable impact on users.

Asymmetrical social media, such as Twitter, on the other hand, are characterised by the possibility to form unidirectional relationships. They can promote larger networks of weak connections with celebrities, politicians, or news outlets. The public character of communication on Twitter may discourage the spread of dubious information as it can be debunked quickly (Theocharis et al., 2021, pp. 5–6). In the German context, Twitter is often described as an elite network, in which journalists, politicians, and scientists are represented to an above-average extent (Emmer, 2017, p. 90; Hölig, 2018, p. 145). It can be assumed that these groups of people generally tend to be more informed and less receptive to conspiracy beliefs. Thus, the Twitter audience may be more likely to debunk conspiracy theories than users of Facebook. As connections on Facebook are rather friend-oriented, debunking of false information might interfere with social relationships (Theocharis et al., 2021, pp. 17–18).

Like Twitter, YouTube is characterised by asymmetrical relationships, however, it differs substantially from other social media. YouTube is rather used to consume

videos than to establish social connections. Consequently, recommendations are not based on friends in the network and may include rather distant sources. Thus, interactions are less visible, and users are rather anonymous, which may lead to more confidence in upvoting controversial or conspiracist videos, increasing their popularity on the platform (Theocharis et al., 2021, p. 7). Moreover, YouTube supports the formation of communities around niche celebrities (Lewis, 2018, p. 4) and thus allows conspiracy theorists to build relationships with their followers. Additionally, YouTube's focus on audio-visual formats may suit conspiracy theorists since videos allow detailed explanations of conspiracy theories, which can be complex and convoluted. Overall, it can be deduced from these findings that different social media can be differently associated with conspiracy beliefs.

In addition to differences between various social media, Theocharis and colleagues (2021) also revealed differences between countries. In Germany, conspiracy beliefs were unrelated to the use of Twitter, Facebook, and YouTube (p. 16). Other studies examining social media use and conspiracy beliefs in Germany challenge these results. Jensen and colleagues (2021, p. 4) found no correlations between Facebook and YouTube use and belief in a specific vaccine conspiracy theory as well but – in contrast to Theocharis et al. (2021) – a positive correlation with Twitter use. Other studies distinguishing between social media in general (e.g., Facebook) and video platforms (e.g., YouTube) found that exposure to social media is unrelated to conspiracy beliefs while a positive link emerged for video platforms (Schemer et al., 2021, p. 10; Schultz et al., 2017, p. 257). Germany presents an interesting case. Due to its strong public service media, low levels of polarisation, and high levels of media trust, Germany is expected to be more resilient to disinformation than for instance the US (Humprecht et al., 2020, pp. 13–14), where most research on conspiracy beliefs and social media use is conducted (e.g., Jamieson & Albarracín, 2020; Romer & Jamieson, 2021; Xiao et al., 2021). Due to the lack of further country-specific studies, the relationship between the use of social media and conspiracy beliefs in Germany should be examined further. As results from previous studies differ, we pose a research question. Since conspiracy theories focus on political issues such as government complots, we are primarily interested in the political use of media channels and sources.

> *RQ1: How is the use of different social media (Twitter, Facebook, and YouTube) for political information associated with conspiracy beliefs?*

4.2 Telegram

Telegram combines features of private messaging with public communication and can be seen as a hybrid between an instant messenger and a microblogging service. It is thus characterised by both symmetrical and asymmetrical modes of following. More importantly, however, it allows anonymous communication to large audiences (Dargahi Nobari et al., 2021, pp. 5–6). Besides a few exceptions, Telegram does not take down content and "will not block anybody who peacefully expresses alternative opinions" (Telegram, n.d.). Urman and Katz (2022, p. 915) observed a fast growth in far-right networks on Telegram in April and May 2019,

which they consider related to bans on social media. Their results indicate that deplatformed far-right actors recreated their network structures on Telegram, although they lost a big share of their audience (Rogers, 2020, p. 226). As far-right actors are known for disseminating disinformation like conspiracy theories (Freelon et al., 2020, p. 1201), their presence on Telegram could lead to an increase in such false information.

Moreover, Telegram plays an important role as a communication channel for protest movements around COVID-19 regulations that are known for spreading conspiracy theories. German Telegram channels related to these protest movements doubled their number of subscribers in July and August 2020, the main period of these protests (Jarynowski et al., 2020, p. 531).

Walther and McCoy (2021, p. 113) found conspiracy theories and anti-vaccination propaganda in US-based Telegram channels. Similarly, in an explorative screening of 913 German channels and groups, Jünger and Gärtner (2020, p. 18) identified conspiracy theories in 23 percent of these channels and groups, reaching 2,407 users on average. The communication was emotional, harsh, and disproportionately criticised journalistic media as well as pandemic response measures (Jünger & Gärtner, 2020, pp. 28–30). It should be noted, however, that these studies focused on hate-based and problematic channels and thus their results cannot be seen as representative for Telegram in general. Nevertheless, the findings underline the need for closer investigations of the relationship between Telegram use and conspiracy beliefs:

> *H1: Telegram use for political information is positively associated with COVID-19 conspiracy beliefs.*

5. Exposure to information sources and conspiracy beliefs

5.1 Alternative influencers and media

Although alternative influencers and media do not necessarily engage in disseminating conspiracy theories, they are particularly prone to such narratives discrediting the government and established journalistic media. Especially during the COVID-19 pandemic, a range of alternative media and influencers attracted public attention by voicing heavy criticism of the government and spreading conspiracy theories (Boberg et al., 2020, p. 16; Flade, 2021; Rooke, 2021, p. 9). Frischlich et al. (2020, p. 2) found that alternative media users are more likely to report being exposed to disinformation and conspiracy theories than non-users of alternative media, although the difference between users and non-users was small. Furthermore, studies found a positive relationship between exposure to alternative media and conspiracy beliefs (Frischlich et al., 2022, p. 11; Schemer et al., 2021, p. 10; Schultz et al., 2017, p. 257;) Thus, we assume:

> *H2: The use of (a) alternative influencers and (b) alternative media for political information is positively associated with COVID-19 conspiracy beliefs.*

5.2 Journalistic media

As journalistic media ideally adhere to quality standards like truthful reporting, recipients relying on them may be rather well informed and equipped to recognise conspiracy theories as such. This is also indicated by a study from Humprecht et al. (2020, p. 15) which found that countries with strong public service media are rather resilient to disinformation. Regarding COVID-19, these assumptions are supported by studies finding negative associations between COVID-19 conspiracy beliefs and reliance on journalistic channels (Allington et al., 2021, p. 4; Schemer et al., 2021, p. 917) and specific journalistic media outlets (Jamieson & Albarracín, 2020, p. 6). Romer and Jamieson (2021, p. 7) even found that the use of print media predicted a decline in conspiracy beliefs from March to July 2020. Based on these findings the following hypothesis is derived:

> *H3: Journalistic media use for political information is negatively associated with COVID-19 conspiracy beliefs.*

6. Other correlates to conspiracy beliefs

Besides media use, several other variables are correlated with conspiracy beliefs. Therefore, in our empirical analyses we control for a range of political, socio-psychological and psychological variables (see Table 1).

Table 1. Constructs correlating with conspiracy beliefs

Construct	Source	Characterisation
Political variables		
Institutional trust	Bruder & Kunert, 2021	Politicians, journalists, and scientists are often accused in conspiracy theories (Pummerer, 2021, p. 44). Hence, an association between trust in representatives of social institutions and conspiracy beliefs was found in several studies.
System justification	Jolley et al., 2018	As conspiracy theories attribute problems to groups and individuals they might relieve the social and political system from blame and thus heighten the motivation to justify the societal status quo.
Political efficacy	Ardèvol-Abreu et al., 2020	By attacking politicians and political institutions, conspiracy theories may affect individual feelings of capability to impact the political process.
AfD voting intention	Schuler et al., 2020	Conspiracy theories and populism share a dualistic worldview (contrast of 'good' and 'bad', Hameleers et al., 2017, p. 871). Thus, voting for populist parties like the German AfD was found to correlate with conspiracy beliefs.

Socio-psychological variables		
Interpersonal trust	Brotherton et al., 2013	Distrust in others can be associated with believing in distrusting conspiracy theories.
Moral foundations	Leone et al., 2019	Moral foundations theory includes the basic values of harm/care and fairness/reciprocity, which place the locus of moral value on the individual (individualising moral foundations) as well as ingroup/loyalty, authority/respect, and purity/sanctity, which place the locus of moral value on the group (binding moral foundation, Graham et al., 2011, pp. 5–6). As conspiracy theories involve ingroup vs. outgroup perspectives they may be more appealing to individuals emphasising binding over individualising moral foundations.
Anomia	Baier & Manzoni, 2020	Anomia describes an individual's feeling of disorientation (Legge et al., 2008, p. 249). Conspiracy theories may provide some sense of orientation for individuals by establishing clear attributions of guilt.
Paranormal beliefs	Lobato et al., 2014	An association between paranormal beliefs and conspiracy beliefs has been demonstrated in various studies.
Psychological variables		
Need for uniqueness	Imhoff & Lamberty, 2017	Unconventional messages in conspiracy theories can be attractive to individuals with a desire to be unique.
Sensation seeking	Van Prooijen et al., 2022	High sensation seekers prefer stimulating, novel, and unconventional messages (Donohew et al., 1998, p. 459) – a need conspiracy theories may satisfy.
Need for cognitive closure	Marchlewska et al., 2018	Individuals high in need for cognitive closure want fast and firm answers (Kruglanski & Webster, 1996, p. 264). Conspiracy theories may be appealing to them by providing clear attributions of guilt.

7. Method

To address the hypotheses and research question, an online survey was conducted in January and February 2021. Participants were recruited by the online panel provider *Respondi* according to combined quotas of age, gender, and education to draw a sample representative of the German online population.

7.1 Sample

The data collection resulted in a sample of 2,159 participants. To ensure high data quality, subjects who had completed the questionnaire particularly fast or who had confessed to have completed questions dishonestly were excluded from the sample. Additionally, cases with missing values for crucial variables (e.g., conspiracy beliefs) or with the same answers throughout the whole disinformation[1] and conspi-

1 The item battery also contained other disinformation items. Since this study focuses on conspiracy beliefs, these items are excluded.

racy belief scale (which included reversely coded items) were excluded. This resulted in a net sample of n = 2,007. The sample consists of 50 percent women and the average age is 45.4 years (SD = 15.0). Around 27 percent of the sample had a low, 35 percent a middle education and 39 percent were highly educated.

7.2 Measures

COVID-19 conspiracy beliefs were assessed with six items which either explicitly address a plot of individuals or groups or imply common conspiracy theories. Based on researching previous studies on COVID-19 conspiracy theories (Eberl et al., 2021; Imhoff & Lamberty, 2020), fact-checking websites, and news media coverage we chose conspiracy theories about COVID-19 that were popular at the time of our survey. Participants indicated their belief in the different statements on a five-point scale ranging from (1) 'certainly not true' to (5) 'certainly true'. Approval of the single items is shown in Table 2. A mean index was calculated from the six items (M = 2.0, SD = 0.9, α = .82).

Table 2. Approval of conspiracy items

Conspiracy items	*M*	*SD*
The government wants to introduce compulsory vaccination for corona.	2.6	1.4
The coronavirus was created in a laboratory.	2.6	1.4
The corona measures only serve to extend the power of the government.	2.1	1.3
The coronavirus is used as a pretext by influential people to distract from the real events in the world.	2.1	1.3
The corona vaccination is designed to implant microchips in people.	1.4	0.9
5G cell towers spread the coronavirus.	1.3	0.7

Note. Responses were collected on a five-point scale from 1 = 'certainly not true' to 5 = 'certainly true', n = 2,007.

To measure *the use of social media, Telegram, and journalistic media for political information,* participants were asked how often they use Facebook, Twitter, YouTube, and Telegram, and the journalistic news types 'newspapers and magazines', 'TV and radio', and 'news websites or apps' to get political information (five-point scales from 1 = 'never' to 5 = 'daily'). Mean values, standard deviations, and exposure frequencies can be found in Table 3.

To assess *the use of alternative media and influencers for political information,* we created lists of 16 German influencers and 14 alternative media through researching fact-checking websites and news media coverage for actors voicing fundamental criticism of the German authorities' handling of the pandemic (see Ap-

pendix for complete lists). The selection was discussed by the authors who know the central actors of alternative media and influencers in Germany, as well as closely observe their presence in academic research and journalistic reporting. Only sources clearly opposing the political and media mainstream are included in the questionnaire. To keep the questionnaire simple for respondents, we employed a binary measure of exposure. Participants were first asked to select all influencers and outlets from our lists they know, and then to select those among them that they follow on social media or whose websites they visit regularly. Since all the surveyed influencers and media deal with socially relevant topics, there was no need to ask specifically about the political use of these sources. The data were merged into two dummy variables indicating whether participants had contact with at least one alternative influencer (1 = contact, 23%) or alternative media outlet (1 = contact, 14%). Usage numbers for the individual alternative sources can be found in the Appendix.

Table 3. Frequencies of media use

Source or channel	*M*	*SD*	Exposure frequency in %				
			Never	Less than once a week	Once a week	Several times a week	Daily
YouTube	2.2	1.4	45%	21%	12%	13%	9%
Facebook	2.4	1.6	48%	12%	9%	12%	20%
Twitter	1.5	1.1	81%	7%	4%	4%	4%
Telegram	1.3	0.9	87%	5%	3%	3%	3%
Newspapers & magazines	2.9	1.5	25%	21%	17%	19%	19%
News websites & apps	3.2	1.5	23%	13%	14%	25%	26%
Television & radio	4.1	1.2	6%	7%	9%	26%	53%

Note. n = 2,007.

To measure the *control variables* listed in Table 1, items from existing scales were applied and translated where necessary. Except for voting intention, all items were measured on five-point scales. For variables that were measured with several (partially shortened) scales, mean indices were calculated (Table 4).

Table 4. Measurement of control variables

Construct	Source	#Items	*M*	*SD*	Cronbach's α
System justification	Kay & Jost, 2003	7	2.7	0.8	.83
Internal political efficacy	Gastil & Xenos, 2010	3	2.9	0.9	.74
External political efficacy	Gastil & Xenos, 2010	3	2.4	0.9	.77
Individualising moral foundations[2]	Graham et al., 2011	4	4.2	0.6	.65
Binding moral foundations[2]	Graham et al., 2011	6	3.1	0.6	.57
Anomia	Gümüs et al., 2004	4	2.8	1.0	.90
Paranormal beliefs	GESIS Leibniz-Institut für Sozialwissenschaften, 2018	5	2.2	0.9	.86
Need for uniqueness	Lynn & Harris, 1997	2	2.9	1.1	.83
Sensation seeking[2]	Gniech et al., 1993	5	2.2	0.8	.67
Need for cognitive closure	Schlink & Walther, 2007	4	3.4	0.7	.71

Note. All constructs were measured on a five-point scale from (1) 'do not agree at all' to (5) 'agree fully'. *N* = 2,007.

AfD voting intention was measured using a list of different political parties. Subsequently, a dummy variable was created for voting intention regarding the party 'AfD' (1 = voting intention, 11%). Moreover, trust in scientists (*M* = 3.6, *SD* = 1.0), politicians (*M* = 2.4, *SD* = 1.1), and journalists (*M* = 2.6, *SD* = 1.0) was measured with one item each on a five-point scale from (1) 'no trust at all' to (5) 'full trust'. Interpersonal trust (European Social Survey, 2016, *M* = 2.6, *SD* = 1.1) was measured with one item on a five-point scale ranging from (1) 'one cannot be too careful' to (5) 'most people can be trusted'.

Regarding *socio-demographics*, participants indicated their gender, age in years, and highest school degree. Education was recoded to a dummy variable with high (college entry degree, 39%) and low education (no college entry degree, 61%) for further use in regression analyses.

8. Results

The belief in COVID-19 conspiracy theories is low with an average of 2.0 on a five-point scale (*SD* = 0.9), indicating that most respondents do not believe in conspiracy theories. Nonetheless, the conspiracist statement 'The corona measures only serve to extend the government's power', for example, is supported by 17 percent of respondents (full or limited agreement). This shows that despite a gene-

2 Cronbach's alpha is not sufficiently high. However, deleting items did not improve the value, so that it must be tolerated for further evaluations.

ral tendency to reject conspiracy theories, a substantial number of respondents agree with at least some of them.

To investigate the hypotheses and research question, we calculated hierarchical multiple regressions (Table 5). Variables were introduced into the regression in two steps, starting with control variables. Media use variables follow in the second step since they are less stable traits and more susceptible to environmental influences. Multicollinearity between variables was tested (see Appendix for correlation table of central variables). The control variables explain 45 percent of the variance in COVID-19 conspiracy beliefs. The inclusion of media use variables increases the explained variance slightly but significantly to 49 percent. Media use thus plays a small but nevertheless important role for explaining conspiracy beliefs. Regarding our interpretation, it is important to point out that the associations with alternative media and influencer use (binary measurement of regular contact) cannot be directly compared with the associations of social media and journalistic media use (measured as frequency of use) since they capture different aspects of use.

Table 5. Hierarchical regressions for COVID-19 conspiracy beliefs

	Model 1 beta	Model 2 beta
Control variables		
Age	-0.09***	-0.03
Gender (1=female)	0.01	0.02
Education (1=high)	-0.08***	-0.06***
Trust in politics	-0.12***	-0.10***
Trust in media	-0.06**	-0.05*
Trust in science	-0.16***	-0.13***
System justification	-0.13***	-0.12***
External political efficacy	-0.00	-0.01
Internal political efficacy	0.00	0.01
AfD voting intention (1=yes)	0.14***	0.13***
Interpersonal trust	-0.03	-0.04
Binding moral foundations	0.18***	0.15***
Individualising moral foundations	-0.05**	-0.04*
Anomia	0.09***	0.10***
Paranormal beliefs	0.23***	0.18***
Sensation seeking	0.11***	0.09***
Need for uniqueness	0.01	0.01
Need for cognitive closure	-0.01	0.00

Media use		
Facebook		0.05**
Twitter		-0.02
YouTube		0.05*
Telegram		0.12***
Alternative influencers (1=regular exposure)		0.03
Alternative media (1=regular exposure)		0.05**
Newspapers & magazines		-0.02
News websites & apps		-0.07***
Television & radio		-0.12***
adj. r^2	0.45	0.49***

Note. *n* = 2,007; ***p < .001; **p < .01; *p < .05.

8.1 Use of different social media platforms and COVID-19 conspiracy beliefs

To answer *RQ1*, the links between the use of Twitter, Facebook, and YouTube for political information and COVID-19 conspiracy beliefs (see Table 5) are discussed. Twitter use is not significantly associated with conspiracy beliefs. This supports previous studies finding no connection between Twitter use and conspiracy beliefs in Germany (Theocharis et al., 2021, p. 16) but contradicts studies finding positive associations (Jensen et al., 2021, p. 4). In other countries, even negative associations were found (Theocharis et al., 2021, p. 15). The unrelatedness of the constructs underscores that Twitter can be considered insignificant in the context of conspiracy beliefs in Germany. As communication on Twitter is rather public, conspiracy theories may be quickly debunked by highly educated and politically engaged users (Holig, 2018, p. 145; Theocharis et al., 2021, pp. 17–18).

There is a weak link between the use of Facebook and YouTube for political information and COVID-19 conspiracy beliefs. This adds to an ambivalent body of research in the German context with some studies finding positive associations between conspiracy beliefs and exposure to video platforms (e.g., Schemer et al., 2021, p. 11) while others find no links with the use of Facebook and YouTube (Theocharis et al., 2021, p. 16). However, against the background of the model's high statistical power, this finding should be interpreted cautiously. Despite the statistical significance, the weakness of the associations indicates that Facebook and YouTube should not be at the centre of concern about the spread of conspiracy beliefs in Germany.

8.2 Telegram use and COVID-19 conspiracy beliefs

Conspiracy beliefs show a significant and positive relationship with Telegram use for political information. H1 is therefore supported. Even after taking into account several control variables, Telegram holds the strongest positive association with conspiracy beliefs compared to the other media use variables. This result underscores that Telegram's no-delete policy makes it particularly well-suited for

spreading conspiracy theories (Jünger & Gärtner, 2020, p. 18) and that it is popular with conspiracists (Hohlfeld et al., 2021, pp. 16–17).

8.3 Use of alternative influencer content and COVID-19 conspiracy beliefs

The familiarity with alternative influencers among respondents is high, as 70 percent know at least one alternative influencer. However, the high familiarity does not translate into equally high usage. Only 23 percent are regularly exposed to at least one alternative influencer. Some influencers reach quite a large audience (Michael Wendler; 11%), while others can be considered as a niche phenomenon with only five users in the sample (Dennis Arnold; 0.2%). Regular exposure to at least one alternative influencer for political information is not significantly linked to conspiracy beliefs. Therefore, H2a is not supported. This finding is rather surprising, as a range of alternative influencers voiced heavy criticism of the government and spread conspiracy theories in the wake of the COVID-19 pandemic (Flade, 2021; Rooke, 2021, p. 9).

To explore whether there are differences between single alternative influencers, users and non-users were compared regarding their conspiracy beliefs (Table 6). Since the group sizes differ greatly and the variances between users and non-users are not always equally distributed, Mann-Whitney tests are used for comparison instead of t-tests (Bortz & Schuster, 2010, p. 122). The Mann-Whitney test is a non-parametric test, which ranks data (for more information see Field et al., 2012, p. 654). To ensure sufficient group size, only influencers that were used by at least 30 subjects were included in the analysis.

Table 6. Conspiracy beliefs of users and non-users of alternative influencers

Alternative influencer	Non-users			Users			Effect size	*W*
	M	*SD*	*N*	*M*	*SD*	*N*		
Sucharit Bhakdi	2.0	0.9	1955	3.1	0.7	52	0.19	16094***
Wolfgang Wodarg	2.0	0.9	1976	3.4	0.8	31	0.16	7292***
Bodo Schiffmann	2.0	0.9	1976	3.1	1.0	31	0.12	12978***
Ken Jebsen	2.0	0.9	1976	3.0	1.1	31	0.11	15251***
Eva Hermann	2.0	0.9	1961	2.7	1.1	46	0.11	26451***
Xavier Naidoo	2.0	0.9	1833	2.3	1.0	174	0.09	129572***
Atilla Hildmann	2.0	0.9	1926	2.4	1.0	81	0.08	58637***
Michael Wendler	2.0	0.9	1785	2.1	0.9	222	0.06	176846**

Note. n = 2,007; ***$p < .001$; **$p < .01$.

Throughout all influencers, users display significantly higher conspiracy beliefs than non-users. However, the significances must be critically evaluated due to the large sample size. As indicated by the effect sizes and the means of the respective groups, the differences between users' and non-users' conspiracy beliefs are extremely small in the case of influencers who originally gained fame not by spreading conspiracy theories, but through their careers, as is the case with the singers Xavier Naidoo and Michael Wendler and the TV chef Attila Hildmann. Therefore, many of their followers may not be genuinely interested in conspiracist content, but rather follow them for entertainment purposes. The familiarity of these influencers' names may also have led subjects to report their usage, even if they do not use their content regularly. Since followers of these celebrity influencers make up a large portion of the followers of alternative influencers in our sample, this may explain why the aggregated usage variable does not show a strong effect. Influencers whose users display particularly high conspiracy beliefs are less popular.

8.4 Use of alternative media and COVID-19 conspiracy beliefs

Participants are less familiar with alternative media than alternative influencers. Only 24 percent know one or more alternative media brands and only 14 percent use at least one of them regularly. This corresponds with other surveys in Germany (Frischlich et al., 2020, p. 1). The numbers for the individual titles illustrate that alternative media rather serve a niche audience. The range goes from 0.5 percent regular users (NuoViso.TV) to four percent for RT DE, the alternative medium with the highest reach in our survey, being financed by the Russian state and classified as a propaganda channel by German authorities (Schneider, 2021). The Russian state-backed media Sputnik and RT DE are now banned by the European Union (Deutsch, 2022), but this was not yet the case at the time of our survey.

Using at least one of these alternative media regularly to obtain political information is very weakly positively associated with conspiracy beliefs, showing only weak support for H2b. This is partly in line with previous research finding a link between alternative media use and conspiracy beliefs (e.g., Schultz et al., 2017, p. 257), though this result indicates that conspiracy theories may be less widespread on alternative media than feared. Initial quantitative studies show that conspiracy theories account for only a small amount of alternative media content (Boberg et al., 2020, p. 16). The reasons for visiting alternative media are manifold, e.g., political interest or distrust of mainstream media (Klawier et al., 2021, p. 12) and therefore cannot be attributed mainly to conspiracy beliefs.

We conducted Mann-Whitney tests to explore differences in conspiracy beliefs between users and non-users of specific alternative media titles. Again, only alternative media with at least 30 users are considered (Table 7). For all alternative media, users' average conspiracy beliefs are significantly higher than non-users. However, the effect sizes for Compact, Sputnik, and NachDenkSeiten are extremely small. For RT Deutsch, on the other hand, a small to medium effect emerges.

Table 7. Conspiracy beliefs of users and non-users of alternative media

Alternative media	Non-users			Users			Effect size	*W*
	M	*SD*	*N*	*M*	*SD*	*N*		
RT DE	2.0	0.8	1927	2.9	1.0	80	0.18	36011***
Tichys Einblick	2.0	0.9	1965	2.7	1.0	42	0.10	24574***
Compact	2.0	0.9	1949	2.5	1.1	58	0.09	39574***
Sputnik	2.0	0.9	1955	2.4	1.0	52	0.07	38492**
NachDenkSeiten	2.0	0.9	1977	2.4	0.9	30	0.05	22197*

Note. n = 2,007; ***$p < .001$; **$p < .01$; *$p < .05$.

8.5 Use of journalistic media and COVID-19 conspiracy beliefs

The use of newspapers and magazines for political information is not significantly related to conspiracy beliefs. The use of news websites and apps for political information, on the other hand, is slightly negatively associated with conspiracy beliefs. Political television and radio use hold the strongest negative association with conspiracy beliefs. This is in line with previous research (e.g., Allington et al., 2021, p. 4) and supports H3 partly – mainly for television and radio and to a smaller extent for news websites and apps. These associations allow different interpretations. They might be attributed to factually correct information in journalistic media content, which can help recipients to recognise conspiracy theories as such. Moreover, it is plausible to assume that conspiracy believers tend to avoid journalistic media because they distrust journalistic reporting (Bruder & Kunert, 2021, p. 3), which often contradicts conspiracist world views. Similar to findings by Allington and colleagues (2021, p. 4), the use of television and radio emerged as the strongest predictor negatively associated with conspiracy beliefs while newspaper and magazine use seems unrelated to conspiracy beliefs. As television and radio in Germany are strongly characterised by public service broadcasting, they might attract users with stronger ties to the political and social system.

9. Discussion

The overall objective of this study was to investigate how the use of different media channels and sources, especially alternative information sources, correlates with individual COVID-19 conspiracy beliefs. The hypotheses were tested with a representative survey of German Internet users. To obtain accurate estimates, a large number of control variables were taken into account.

The regular use of at least one alternative medium is slightly positively associated with conspiracy beliefs, whereas following at least one alternative influencer

is not related to conspiracy beliefs. Nevertheless, followers of alternative influencers show significantly higher conspiracy beliefs than non-followers. However, there are differences between the user groups of various influencers. Especially among the users of the most popular influencers, conspiracy beliefs are only minimally higher. Future research should therefore investigate the motives for using various alternative sources more closely. In research to date, alternative media and especially influencers have received too little attention.

Across all media sources and channels, the use of Telegram for political information emerged as the strongest predictor of conspiracy beliefs, which underscores growing concerns about the platform. While most social media take measures against disinformation (Kraus, 2018), Telegram refers to its no-delete policy (Telegram, n.d.) and thus provides an apt framework for the spread of conspiracy theories. The link between the use of Facebook and YouTube and conspiracy beliefs is very weak. For Twitter, no connection was found. This raises the question whether the spread of conspiracy theories is shifting from widespread social media to Telegram. The high popularity of Telegram among conspiracy theorists (Hohlfeld et al., 2021, pp. 16–17) suggests that an alternative information network may develop in Telegram. Presumably, social groups such as 'Querdenken', whose telegram channel has experienced strong growth during the COVID-19-related protests (Jarynowski et al., 2020, p. 531), play a relevant role within that network. Future research should examine the information behaviour of social groups such as 'Querdenken'. An interesting starting point could be, for example, how they use Telegram – rather passively to consume content or actively by liking, sharing, and creating content – and how that relates to conspiracy beliefs.

The use of journalistic media can be seen as a counterweight to alternative sources. Except for newspapers and magazines, exposure to journalistic media in Germany negatively relates to conspiracy beliefs. This is in line with previous research (Allington et al., 2021, p. 4). It indicates, on the one hand, that factually correct information delivered through professional journalism may help prevent conspiracy beliefs. On the other hand, conspiracy believers might tend to avoid journalistic media as they often distrust them (Bruder & Kunert, 2021, p. 3) and might not find their worldviews and values reflected.

Overall, we found weak links between conspiracy beliefs and the use of different media sources and channels, which can be attributed to a couple of reasons. First, the high amount of control variables contributed to the weak associations, which is indicated by stronger bivariate correlations (see Appendix). By controlling for other possible influences, the associations become smaller while representing reality more accurately. Second, the German population is rather resilient against disinformation due to its low levels of polarisation, high levels of shared news consumption, and strong public service broadcasting. The US population, on the other hand, where most studies on conspiracy beliefs and information behaviour are conducted, is particularly vulnerable to disinformation due to weak public service broadcasting, high levels of polarisation, and its large advertising market (Humprecht et al., 2020, pp. 12–14). Therefore, results from previous research on media use and conspiracy beliefs (e.g., Jamieson & Albarracín, 2020; Romer & Jamieson, 2021; Xiao et al., 2021) cannot be transferred to Germany.

This study adds to German research on this topic by showing that there are significant, albeit weak associations between media use and conspiracy beliefs.

It is important to mention that this study cannot make any claims concerning causality since it is based on a cross-sectional design. As discussed in section three, we consider an interplay of personal predispositions and direct media effects to be plausible (e.g., "reinforcing spirals", Slater, 2007, p. 284).

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1. Appendix

Appendix 1. Surveyed alternative influencers and media with usage numbers

Alternative influencers	Users	Alternative media	Users
Michael Wendler	222	RT Deutsch	80
Xavier Naidoo	174	Compact	58
Attila Hildmann	81	Sputnik	52
Sucharit Bhakdi	52	Tichys Einblick	42
Eva Hermann	46	NachDenkSeiten	30
Ken Jebsen	31	Wissensmanufaktur	29
Bodo Schiffmann	31	KenFM	28
Wolfgang Wodarg	31	Junge Freiheit	27
Oliver Janich	18	Epoch Times	26
Heiko Schrang	15	Demokratischer Widerstand	25

Michael Ballweg	14	kla.tv	20
Samuel Eckert	13	Journalistenwatch	18
Daniele Ganser	13	Rubikon	16
Naomi Seibt	8	NuoViso.TV	10
Anselm Lenz	7		
Dennis Arnold	5		

Appendix 2. Correlation table for central variables

Variable	1	2	3	4	5	6	7	8	9
1. Conspiracy beliefs	-								
2. Twitter	0.03	-							
3. Facebook	0.18***	0.19***	-						
4. YouTube	0.17***	0.34***	0.38***	-					
5. Telegram	0.27***	0.32***	0.23***	0.32***	-				
6. Alternative media	0.23***	0.23***	0.18***	0.30***	0.37***	-			
7. Alternative influencer	0.24***	0.13***	0.20***	0.19***	0.25***	0.31***	-		
8. Newspaper and magazines	-0.17***	0.10***	0.06	0.07*	0.05	0.08**	0.02	-	
9. News websites and apps	-0.15***	0.21***	0.14***	0.29***	0.10***	0.15***	0.05	0.28***	-
10. TV and radio	-0.24***	-0.03	0.14***	0.04	-0.05	-0.04	0.01	0.35***	0.21***

Note. n = 2,007, ***p < .001; **p < .01; *p < .05