

Article

**Are You Worried About Getting
Covid-19 or About Losing Your Job?**DOI: 10.47368/ejhc.2023.305
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CC BY 4.0**How Different Covid-19 Related Fears are
Indirectly Related to Vaccination Acceptance
via Media Consumption****Sonja Utz** 

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Abstract

Although research showed that media consumption during Covid-19 is related to preventive behaviours, we know less about why people turn to quality or alternative media in the first place. We focus on the role of different fears. More specifically, we assumed that fears focusing on health threats were positively associated with the consumption of quality media and negatively with the consumption of tabloids and alternative media. We expected the opposite pattern for fears focusing on economic and societal threats, and that media consumption mediated the relationship between fears and vaccination acceptance. A survey among a representative sample of Germans ($N = 1080$) showed that the fears correlated as expected positively with the consumption of the respective media type. However, the predicted negative relationships with the other media type often turned out as non-significant. The fears were differentially related to vaccination acceptance via media consumption, indicating the theoretical and practical value of differentiating between different types of fears.

Keywords

Fears, media consumption, alternative media, vaccination acceptance.

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Fighting the Covid-19 pandemic by adhering to social distancing rules, wearing masks, or getting vaccinated has been a major challenge for governments during the Covid-19 pandemic. Communication plays an important role in this process, and it has been repeatedly shown that the type of media people consume influences preventive behaviours or vaccination intentions. Watching Fox News, for example, reduced the intention to stay at home (Simonov et al., 2020), and using social media was related to lower vaccination intentions (Allington et al., 2021; Ziegele et al., 2022). Using quality media or specifically communication from virologists, in contrast, correlated positively with social distancing (Allington et al., 2021; Jiang et al., 2021; Szczuka et al., 2020; Utz et al., 2022). To contain the pandemic, it is thus crucial for governments and health communicators to motivate people to consume quality media and fight alternative media that frequently spread fake news and conspiracy theories.

In contrast to the well-demonstrated relationships between media consumption and preventive behaviours, it is, however, less clear when people are more likely to turn to quality (health) communication or alternative media. In this paper, we explore the role of emotional factors, more specifically, different fears. People who listen to podcasts from virologists reported solace after exposure (Gaiser & Utz, 2022; Utz et al., 2022), indicating that turning to Covid-19-related quality media might reduce fears. Surprisingly, there is anecdotal evidence that similar comments are found on the YouTube videos of coronavirus sceptics who spread conspiracy theories (Gaiser & Utz, 2022). This apparent contradiction could be resolved when considering that the pandemic is a multi-faceted crisis that might trigger different types of fears. In this paper, we argue that the specific fears people experience in the pandemic (focus on health threats vs. focus on economic/societal threats) are related to their media consumption and that media consumption is related to vaccination acceptance.

More specifically, we argue that fears focusing on health threats are positively related to the use of quality media and negatively to tabloids and alternative media, whereas fears focusing on economic and societal threats should show the opposite pattern. By developing a model that differentiates the two types of fears, we extend prior work on uncertainty management and conspiracy theories. We surveyed a representative sample of German adult online users to provide first evidence for our hypotheses and outline a research program in the discussion. Before turning to the development of our hypotheses and research questions, we provide some background on the German media landscape and coverage of the Covid-19 crisis.

Background Information: Coronavirus in German Media

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the pandemic were the main topics in German quality media in early 2020. A computational analysis of Facebook posts from German mainstream newspapers from January to March 2020, the first three months of the pandemic, showed that health-related topics dominated especially at the beginning (Quandt et al., 2020). The newspapers reported the number of people infected and dead and how the virus spread. Virologists and other experts also played a prominent role in newspapers, indicating that the objective of quality media was to provide evidence-based, high-quality health communication. The newspapers also reported on measures like social distancing or curfews, travel restrictions, or school closings. Although there were also some indicators of horse-racing reporting (comparing infection numbers and death across countries like in a sport competition), the overall conclusion of Quandt et al. (2020) was that the newspapers presented

a varied and balanced perspective. Quality media even reported on fake news and Covid-related conspiracy theories, but usually to contextualise and debunk them.

Virologists were not only very present in traditional media, but several of them (Christian Drosten (later with Sandra Ciesek), Alexander Kekulé, Hendrik Streeck participated in regular podcasts. Especially the podcast *Das Coronavirus-Update* [The coronavirus-update] by Christian Drosten (NDR, 2020) got very popular. The information in these podcasts focused mainly on the results of new studies on the virus, the symptoms, spread, vaccine developments, variants, and the efficiency of the various measures. Both, quality news media and the Covid-19 specific social media outlets, had a pro-vaccination attitude.

A slightly different picture was portrayed by alternative news media outlets such as *Junge Freiheit* that present themselves as corrective of mainstream media (Boberg et al., 2020). The most popular alternative media in Germany are characterised by their affinity to populism; they also tend to spread disinformation and conspiracy theories to support their right-wing agenda (for a review see Boberg et al., 2020). Although the alternative news media also reported on the number of infected people, they focused more on the failure of the government and the economic crisis stemming from wrong political actions. In general, they considered lockdowns and other restrictions as not reasonable (Boberg et al., 2020). More widespread than alternative media but also known for sharing misinformation are tabloid media. Chadwick et al. (2018) demonstrated for the UK that sharing articles from tabloids on social media is related to sharing mis- and disinformation. German tabloid media also took a government critical stance. *The Bild*, the most prominent German tabloid, for example criticised the vaccination campaign as “*Impfdesaster*” [vaccination disaster] or called the curfew and travel restrictions in April 2021 “*Einspergesetz*” [Incarceration Law].

Regarding Covid-19 specific misinformation, a study by CORRECT!V, a German fact-checking agency, found that most coronavirus-related fake news stemmed from YouTube (Echtermann, 2020). Some conspiracy theorists became famous on social media channels as well. Most popular was the physician Bodo Schiffmann, the head of the *Querdenker*-movement (a popular movement of coronavirus-deniers in Germany), who started his own YouTube channel. Several of the videos were deleted by YouTube because they contained misinformation (Bell, 2021). Another famous conspiracy theorist, Attila Hildmann, spread content on his Telegram channel. This channel was blocked in June 2021 (Mansholt, 2021). In general, alternative media channels were against vaccination, spread misinformation about side-effects of the vaccinations, or claimed that there would be a global plan to enforce mandatory vaccination (Jensen et al., 2021).

Fears and Media Consumption

Pandemics like Covid-19 are periods of high uncertainty. The coronavirus was novel, so not much was known about how infectious it is, how exactly it spreads, how it can be treated, or when vaccines will be available. Later, the lockdowns threatened the economy, both on a societal and individual level. Uncertainty can create anxiety and trigger specific fears (Brashers, 2001). Kruglanski et al. (2021) reason that, in the context of Covid-19, two classes of threats prevail: threats to health and well-being and threats to economic security. These threats and the related fears trigger different processes.

We argue that media selection might be one of these processes. Information search or avoidance are known to be uncertainty management strategies in which people engage, for

example when threatened by an illness (Brashers et al., 2000). Media played an important role for information search during the pandemic. People got much scientific information on the pandemic and preventive behaviours, but also misinformation and conspiracy theories from mass and social media (Echtermann, 2020). We differentiate between the two types of media described above: quality media like newspapers or journalistic content vs. tabloid and right-leaning alternative media. Because media use is often habitual (Westlund & Ghersetti, 2015), we examine media consumption patterns not only on a general (e.g., newspapers) level, but also at a Covid-19 specific level (e.g., podcasts or YouTube channels that were established during the pandemic). In the section below, we outline the expected relationships between the two types of fears and media consumption.

We assume that there is a positive relationship between fears focusing on the health threat and turning to quality media: newspaper and (online) journalistic formats. In times of crisis, people turn to news media (Westlund & Ghersetti, 2015). It is also well-known that people search for health information when they feel threatened (Brodie et al., 2000). During novel health threats, quality media and channels of physiologists might be the channels that people seek out (Kittler et al., 2004). In line with this assumption, the viewing figures for quality media such as mainstream TV stations from many countries went up at the beginning of the pandemic when health fears prevailed because lockdowns were not in place yet (e.g., for the US, Cable News Fact Sheet (2021); for Germany, Statista (2020)). The various coronavirus-podcasts in Germany also were launched during this phase and gained quickly in popularity. Survey data as well as an analysis of the comments given to the most popular podcast Das Coronavirus-Update showed that listeners reported that the podcasts took away some of their fears (Gaiser & Utz, 2022; Utz et al., 2022). Turning to quality media – the ones habitually used but especially new formats that promise to fulfil information needs, might thus have been triggered by health fears. Because uncertainty management in health issues also comprises information avoidance (Brashers et al., 2021), we expect that people who turn to quality media at the same time avoid turning to tabloids and alternative media. This argumentation fits to the finding that fears focusing on health are negatively related to pseudoscientific beliefs about Covid-19 often spread by these media (Čavojová et al., 2022). Our first hypothesis is therefore:

H1: Fears that focus on health threats (self/close others) correlate positively with consumption of quality media and negatively with consumption of tabloid and alternative media.

Economic threats, in contrast, trigger agency, rivalry, and competition; others are perceived as opponents (Kruglanski et al., 2021). People who are mainly afraid of the economic and societal consequences of lockdowns and other restrictions might thus turn away from established legacy media and instead turn to alternative media on which they encounter conspiracy theories. According to the existential threat model (Van Prooijen, 2019), uncertainty and fears are a precondition for susceptibility to conspiracy theories. In line with this argumentation, several studies found positive relationships between economic threats and belief in pseudoscientific information or conspiracy theories (Čavojová et al., 2022; Ziegele et al., 2022), information usually spread on alternative media (Boberg et al., 2020). A recent study found that the relationship between perceived or actual poor economic country and the development of conspiracy theories about elites ruling their nation is found across 36 countries (Hornsey et al., 2023). This cross-sectional research cannot answer the question of causality, but there is evidence that fears come first from a related domain. Berning and Schlueter (2016)

explored whether economic threats cause right-wing party preferences or vice versa. Their longitudinal analyses in a Dutch and a German sample demonstrated that perceived economic threats precipitate preferences for right-wing populist parties. Populist parties as well as conspiracy theories receive more attention in tabloid and alternative media than in legacy media. We argue that fears focusing on economic/societal threats first influence which media people consume and thereby increase exposure to right-wing and conspiracy content. At the same time, fears focusing on the economic threats should be related to a lower tendency to turn to quality media because legacy media and the mainstream parties might be perceived as opponents. This leads to our second hypothesis:

H2: Fears focused on economic and social threats correlate negatively with consumption of quality media and positively with consumption of tabloid and alternative media.

Fears and Vaccination Acceptance

We further hypothesise that the different fears correlate differently with vaccination acceptance. People who fear that they or close others will get sick should be more inclined to protect themselves and close others by getting vaccinated or encouraging others to do so. People who mainly fear (in their eyes unwarranted) economic and societal restrictions might be less positive towards vaccinations. From a scientific perspective, this is irrational because high vaccination rates would help to condemn the virus and allow to lose restrictions more quickly. However, these people often believe in Covid-19 related conspiracy theories that tell them that vaccinations have serious side effects, genetically manipulate people, or contain micro-chips that are used for tracking and manipulating people (Gagliardone et al., 2021; Leuker et al., 2022). Several findings support the hypothesis of differential effects of fears: Positive correlations between health-related fears and preventive behaviours and negative relationships between economic fears and preventive behaviours were found in Slovak, German, and Polish samples (Čavojová et al., 2022; Rosman et al., 2021; Sobkow et al., 2020). Bendau et al. (2021) report a positive correlation between health-related fears and vaccination intention, but a negative correlation with the item focusing on economic threats. Ziegele et al. (2022) found in their German sample also a negative relationship between economic deprivation and vaccination intentions. We therefore predict:

H3: Fears focused on health threats correlate positively with vaccination acceptance.

H4: Fears focused on economic and societal threats correlate negatively with vaccination acceptance.

Finally, we hypothesise that the effects of fears on vaccination acceptance are mediated by media consumption, thereby providing a potential explanation for the differential relationships between the two types of fears and vaccination acceptance. In H3 and H4, we predicted a relationship between the fears and vaccination acceptance. In H1 and H2, we assumed differential relationships between the two fears and media consumption, the potential mediator. The last part necessary for a mediation is the relationship between media consumption and vaccination acceptance. The positive relationships between consuming quality media and adherence to various preventive behaviours and vaccination acceptance as well as the negative relationships between consumption of tabloids and alternative media and preventive measures have been demonstrated repeatedly (Allington et al., 2021; Chadwick et

al., 2021; Leuker et al., 2021; Pummerer et al., 2021; Roozenbeek et al., 2020; Ziegele et al., 2022). Combining these findings with the hypotheses above, we thus predict:

H5: The effect of fears focused on health threats on vaccination acceptance is mediated by consumption of quality media.

H6: The effect of fears to focus on economic and societal threats on vaccination acceptance is mediated by consumption of tabloid and alternative media.

The hypotheses and additional research questions which are not in the focus of the current paper, materials, analysis strategy and planned sample size was preregistered at <https://aspredicted.org/3yt4u.pdf>.

Method

Participants and Covid-19 Situation During Data Collection

An online survey was held among a representative sample of German adults in terms of gender and age distribution ($N = 1080$, 521 women, 546 men, rest not specified; age 18-74, $M = 45.99$) recruited by the panel provider Respondi. Data were collected during June 4 – 7, 2021. At this time, incidences were rather low and falling (from 30 to 24 cases per 100,000 inhabitants). On June 1, 44% of the population had received a first vaccination dose (33.1% of our sample), but only priority groups were admitted, and it was hard to get an appointment even for members of the priority groups.

Procedure

This study has been part of a larger study (see preregistration at <https://aspredicted.org/3yt4u.pdf> and second preregistration at https://aspredicted.org/ZRH_PGM). After the study information and informed consent, people received first a block with questions on media use and trust in media, then a block with questions on worries, fears, and impairments, next a block on Covid-19 knowledge, metacognitive sensitivity, and efficiency, followed by the questions on vaccination acceptance. Finally, after some questions on conspiracy mentality, demographics and political orientation were assessed. In the following sections, we describe the measures relevant to this preregistered study; the complete German questionnaire and an English translation of the items can be found together with the data set relevant to this paper, the analysis scripts, results from the preregistered analyses, and the output from the PROCESS models on https://osf.io/h9ufj/?view_only=22a8b68b870c434199ebcd2358d47996.

Measures

Media Consumption. We assessed media consumption both generally and coronavirus-specifically. For the general consumption of quality media, participants indicated how often they inform themselves about political events via daily newspapers (incl. online) and journalistic (online) content (e.g., spiegel.de, tagesschau.de, heute.de) on a scale from 1 = *never* to 5 = *always*. One item was on tabloids (incl. online, e.g., Bildzeitung) and one on

alternative media (Tichys Einblick, Junge Freiheit, Breitbart). These items were surrounded by the filler items social media, radio, and TV that were too general to be classified as quality or alternative media. In the preregistration, we had stated that we would combine the items on tabloid and alternative media if they are correlated .65 or higher. As can be seen in Table 1, the two items correlated at $r(1080) = .40, p < .001$; the same was surprisingly the case for the two items for quality media. We therefore decided to analyse the four items separately.

For coronavirus-specific media use, the podcast Das Coronavirus-Update (Drosten/Ciesek) and the YouTube channel maiLab served as indicators for quality media ($\alpha = .62$), and the Telegram channel of Attila Hildmann and the YouTube channel of Dr. Bodo Schiffmann served as indicators for alternative media ($\alpha = .83$). The latter two have repeatedly been identified as sources of misinformation and fake news (Echtermann, 2020) and the channel of Attila Hildmann was even blocked by Telegram because of this on the last day of data collection.

Fears were assessed with items from the Covid-19 Snapshot Monitoring (COSMO). Participants indicated on a scale from 1 = *very few worries* to 7 = *a lot of worries* how many worries they had about health (two items, e.g., "you yourself will fall ill"; $\alpha = .78$) or economic and societal consequences (three items, e.g., "the societal life will be restricted for a long term," $\alpha = .70$).

Vaccination Acceptance was assessed with three items partly adapted from Roozenbeek et al. (2020). Participants indicated their agreement with items such as "If I had the opportunity now, I would advise my family and friends to get vaccinated" on a scale of 1 = *strongly disagree* to 7 = *strongly agree*. One item assessed vaccination intention; this item had an additional "I have already been vaccinated" answer option that was scored as 7 as well because vaccination prioritisation in Germany was lifted only at the last day of data collection. Considering that many people who wanted to get vaccinated simply were not admitted yet or had not yet got hold of a vaccination appointment, it seemed unfair to give people who were already vaccinated a higher score than the ones who definitely intended to do so. Together, these items formed a reliable scale, $\alpha = .88$.

Additional Variables. We also assessed education level (no degree, vocational training, Abitur/high school diploma, bachelor, master/doctorate, other) and political orientation (7-point scale from 1 = *left* to 7 = *right*). We also included measures on deliberate ignorance of certain channels and preregistered corresponding analysis. Because the majority of participants did not deliberately ignore channels and the additional analyses somewhat distract from the main focus of this paper, we do not report on them here. Interested readers can find the syntax in the OSF-folder.

Descriptive statistics and correlations are presented in Table 1.

Data Analysis

We had preregistered to look first at the correlations (H1-H4) and mediation models with the PROCESS macro (Model 4), one model per each type of fear for H5 and H6. The model for fears focusing on health threats should contain the quality media as potential mediators. In contrast, the model for fears focusing on economic/societal aspects should contain the alternative media as potential mediators. These preregistered analyses can be found on OSF.

Table 1. Descriptive Statistics and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. General: newspapers	3.11	1.35	-							
2. General: journalistic content	2.87	1.32	.40***	-						
3. General: tabloid	1.85	1.09	.26***	.25***	-					
4. General: alternative media	1.47	0.95	.09**	.19***	.40***	-				
5. COVID: quality channels	1.51	0.90	.16***	.33***	.25***	.29***	-			
6. COVID: alternative channels	1.25	0.72	.03	.12***	.34***	.51***	.59**	-		
7. Fears health	3.69	1.76	.11***	.05	.10**	-.04	.17**	.13***	-	
8. Fears economic/societal	3.18	1.50	-.001	.07*	.18***	.24***	.15**	.24***	.45***	-
9. Vaccination acceptance	5.75	1.83	.24***	.15***	-.08**	-.35***	.03	-.20***	.18***	-.17**

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Because they yielded some inconsistent findings pointing to the importance of also controlling for the other type of fear and the other media, we decided to focus on the more appropriate but not preregistered mediation models that also include controls in the paper.

Results

A look at the correlations in Table 1 shows that the differential relationships between the two types of fears were not as clear-cut as predicted. The two fears correlated positively with the respective media (except for other journalistic content). However, instead of the expected negative correlations with the other type of media, often weaker correlations emerged. The fears were, however, correlated with vaccination acceptance as predicted. The preregistered mediation models (see OSF) revealed next to the expected effects two unexpected findings: In the health fears model, surprisingly, the indirect effect of fear on vaccination acceptance via Covid-19 specific quality channels was negative, albeit very small, $b = -0.01$, $SE = 0.01$, 95% CI [-0.02, -0.001]. Similarly, the economic/societal fears model revealed an unexpected positive indirect effect of the consumption of tabloids on vaccination acceptance, $b = .02$, $SE = 0.01$, 95% CI [0.003, 0.02].

Because Table 1 also shows an unexpected positive correlation between using alternative and quality Covid-19 specific channels, we speculated that there might be people who consume whatever they encounter on their social media channels (so-called omnivores, Chadwick et al., 2021), traditional and alternative sources. In line with this assumption, exploratory correlation analyses with the filler item social media use showed that social media use was positively correlated to use of alternative media in general, $r(1080) = .37$, $p < .001$, use of Covid-specific alternative channels, $r(1080) = .32$, $p < .001$, but also use of Covid-specific quality channels, $r(1080) = .29$, $p < .001$.

An explanation for the unexpected effects in the mediation models could thus be that listening to quality Covid-channels can also be a proxy for listening to alternative channels and vice versa. To control for the intercorrelations between the media items as well as for the positive correlations between the two types of fears, we ran additionally mediation models in which we included all media use indicators simultaneously as potential mediators. We use one type of fear as predictor and included the respective other fear type as covariate. Because prior research has shown that demographics such as education level or political orientation also play a role, we also included gender, age, education level, and political orientation as covariates. This analysis is a robustness check. One might, for example, argue that people with lower education levels should have higher fears of losing their job. If we still find effects of fears focusing on economic threats when controlling for the demographics, this points to the importance of fears.

Since these models controlling also for the opposite type of fear, the other media use variables, and the demographics are stricter tests of our hypotheses, we decided to report only these analyses in the paper.¹

Mediation Analyses on the Impact of Fears on Vaccination Acceptance via Media Consumption

The first part of the two exploratory models, predicting the use of different media by fears and controls, is identical for both models. As can be seen in Table 2, media use is affected by the demographics. Women used all media less to inform themselves about news or Covid-specific news. Older people were more likely to use newspapers and less likely to use all other media. The higher educated people were, the more likely they were to use newspapers and other journalistic content. The more people leaned to the right, the less likely they were to use other journalistic content and the more likely they were to consume tabloids and general or Covid-specific alternative media.

Theoretically more interesting is that fears focusing on health threats still positively predicted the consumption of newspapers and Covid-19 specific quality channels when controlling for demographics and fears focusing on economic/societal threats. Fears focusing on health threats were in this model negatively associated with the use of general alternative media, providing some support for the second part of H1. Fears focusing on the economic threats were still positively associated with the consumption of tabloids, general and Covid-specific alternative media, demonstrating the robustness of this finding (H2).

Vaccination acceptance was influenced by gender and education level. Males and higher educated people showed higher levels of vaccination acceptance. When entered simultaneously, both fears still predicted vaccination acceptance in the predicted differential way (H3, H4). Consumption of quality media was positively related to vaccination acceptance, whereas consumption of alternative media was negatively related to vaccination acceptance. Only the consumption of tabloid media showed no significant relationship with vaccination acceptance in these models.

When it comes to the indirect effects, the analyses showed that there were indirect positive effects of fears focusing on health threats on vaccination acceptance via newspapers, $b = 0.03$, $BootSE = 0.01$, 95% CI [0.01, 0.04], and Covid-specific quality channels, $b = 0.02$, $BootSE = 0.01$, 95% CI [0.01, 0.03], see also Figure 1.

Table 2. Results of the Exploratory Mediation Analyses, Including All Media Types and Controlling for Demographics and Other Fear

Predictors	Outcomes: Media Consumption Quality Media					
	Newspaper		Other Journalistic Content		COVID-19 Quality Media	
	<i>b</i> (SE)	95% CI	<i>b</i> (SE)	95% CI	<i>b</i> (SE)	95% CI
Fear health	0.11 (0.03)**	[0.06, 0.17]	0.02 (0.03)	[-0.03, 0.07]	0.08 (.02)**	[0.04, 0.11]
Fear economic/societal	-0.02 (0.03)	[-0.08, 0.05]	0.06 (0.03)	[-0.01, 0.12]	0.04 (.02)	[-0.01, 0.08]
Gender ^a	-0.38 (0.09)**	[-0.56, -0.20]	-0.29 (0.09)**	[-0.47, -0.11]	-0.23 (.06)**	[-0.36, -0.11]
Age	0.01 (0.003)**	[0.01, 0.02]	-0.01 (0.003)**	[-0.01, 0.02]	-0.01 (0.002)**	[-0.01, -0.007]
Education level ^b	0.11 (0.03)**	[0.06, 0.17]	0.12 (0.03)**	[0.07, 0.18]	0.03 (0.02)	[-0.05, 0.04]
Political orientation ^c	0.004 (0.04)	[-0.06, 0.07]	-0.07 (0.03)*	[-0.14, -0.001]	-0.006 (0.02)	[-0.05, 0.04]

Predictors	Outcomes: Media Consumption Tabloid and Alternative Media					
	Tabloid		Alternative, General		COVID-19 Alternative	
	<i>b</i> (SE)	95% CI	<i>b</i> (SE)	95% CI	<i>b</i> (SE)	95% CI
Fear health	0.01 (0.02)	[-0.03, 0.05]	-0.09 (0.02)**	[-0.13, -0.06]	0.02 (0.01)	[-0.01, 0.04]
Fear economic/societal	0.11 (0.03)**	[0.06, 0.17]	0.20 (0.02)**	[0.15, 0.24]	0.09 (0.02)**	[0.06, 0.12]
Gender ^a	-0.26 (0.08)**	[-0.41, -0.11]	-0.27 (0.06)**	[-0.39, -0.15]	-0.13 (0.05)**	[-0.22, -0.04]
Age	-0.01 (0.003)*	[-0.01, -0.001]	-0.01 (0.002)**	[-0.01, -0.002]	-0.01 (0.002)**	[-0.01, -0.004]
Education level ^b	-0.01 (0.02)	[-0.06, 0.04]	0.02 (0.02)	[-0.02, 0.06]	-0.01 (0.01)	[-0.04, 0.02]
Political orientation ^c	0.13 (0.03)**	[0.07, 0.18]	0.12 (0.02)**	[0.08, 0.17]	0.08 (0.02)**	[0.05, 0.12]

Notes. **p* < .05, ***p* < .01; ^a1 = male, 2 = female; ^b1 = no degree, 5 = master, PhD; ^c1 = left, 7 = right.

Table 2 (continued). Results of the Exploratory Mediation Analyses, Including All Media Types and Controlling for Demographics and Other Fear

Predictors	Outcome: Vaccination Acceptance	
	<i>b</i> (<i>SE</i>)	95% CI
Fear health	0.22 (0.03)**	[0.17, 0.28]
Fear economic/societal	-0.15 (0.04)**	[-0.23, -0.07]
Gender ^a	-0.27 (0.08)*	[-0.49, -0.06]
Age	0.01 (0.004)	[-0.001, 0.01]
Education level ^b	0.08 (0.03)*	[0.01, 0.15]
Political orientation ^c	-0.07 (0.04)	[-0.15, 0.01]
Newspapers	0.24 (0.04)**	[0.15, 0.32]
Journalistic content	0.12 (0.04)*	[0.03, 0.21]
COVID-19 quality	0.19 (0.07)*	[0.06, 0.33]
Tabloid	-0.01 (0.05)	[-0.11, 0.10]
Alternative, general	-0.59 (0.07)**	[-0.72, -0.46]
COVID-19 alternative	-0.35 (0.10)**	[-0.54, -0.15]

	Indirect effects			
	Fear Health > Vaccination Acceptance		Fear Economic > Vaccination Acceptance	
	Effect (bootSE)	95% CI	Effect (bootSE)	95% CI
Newspapers	0.03 (0.01)	[0.01, 0.04]	-0.004 (0.01)	[-0.02, 0.01]
Journalistic content	0.003 (0.003)	[-0.003, 0.01]	0.01 (0.004)	[-0.001, 0.02]
COVID-19 quality	0.02 (0.01)	[0.01, 0.03]	0.01 (0.01)	[-0.001, 0.02]
Tabloid	<0.001 (0.001)	[-0.003, 0.003]	-0.001 (0.01)	[-0.01, 0.01]
Alternative, general	0.06 (0.02)	[0.03, 0.09]	-0.12 (0.02)	[-0.17, -0.07]
COVID-19 alternative	-0.01 (0.005)	[-0.02, 0.004]	-0.03 (0.01)	[-0.05, -0.01]
Total indirect effect	0.09 (0.02)	[0.06, 0.14]	-0.14 (0.02)	[-0.19, -0.09]

Note. **p* < .05, ***p* < .01; ^a1 = male, 2 = female; ^b1 = no degree, 5 = master, PhD; ^c1 = left, 7 = right.

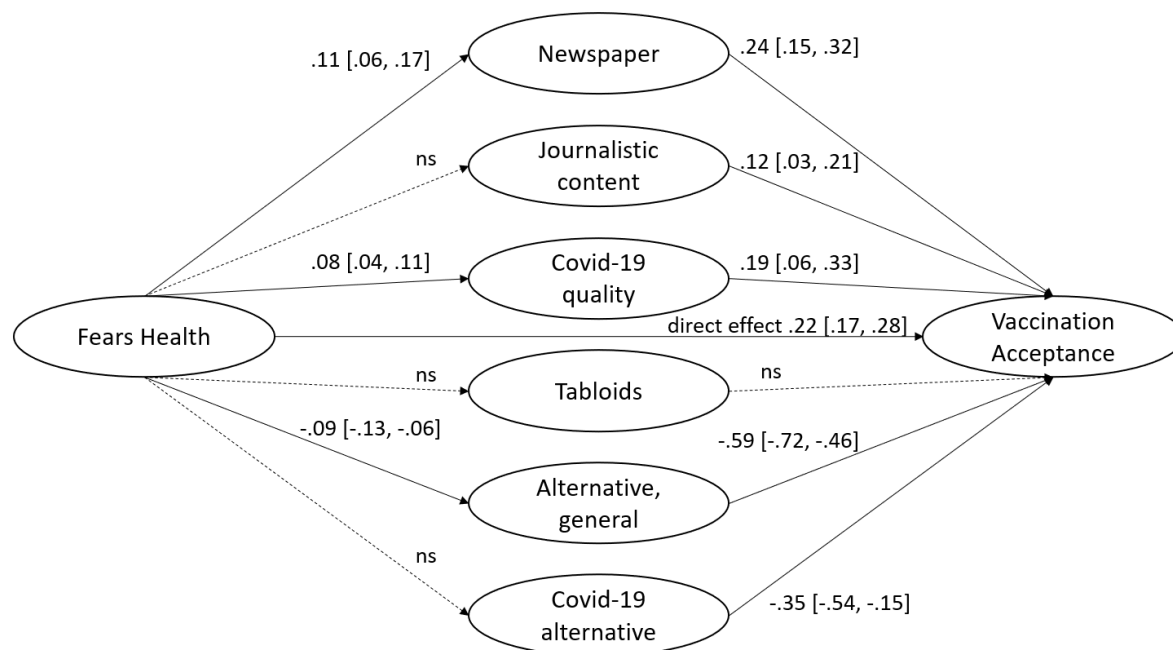


Figure 1. Exploratory Mediation Model of Fears Focusing on Health Threats Predicting Vaccination Acceptance

Note. Included controls: Fears focusing on economic/societal threats, gender, age, education, political orientation

These effects are in line with H5; only the effect for the third indicator, other journalistic content, did not become significant. There was also a positive indirect effect via general alternative channels, $b = 0.06$, $BootSE = 0.02$, 95% CI [0.03, 0.09], indicating that the higher health-related fears, the less alternative media people consumed. Since consumption of alternative media is negatively related to vaccination acceptance, these two negative relationships result in a positive indirect effect.

As can be seen in Figure 2, when fears focusing on economic and societal threats were used as predictor, indirect negative effects via the consumption of general alternative media, $b = -0.12$, $BootSE = 0.02$, 95% CI [-0.17, -0.07], and Covid-19 specific alternative media emerged, $b = -0.03$, $BootSE = 0.01$, 95% CI [-0.05, -0.01]. Thus, H6 is supported regarding alternative media. In contrast to the expectations, there was, however, no indirect effect via tabloid media.

Taken together, the exploratory analyses largely replicate the findings of the preregistered analysis and provide a robustness check because we now control also for demographics and the intercorrelations between the fears and media consumption variables. The inconsistent effects disappeared. However, the fears focusing on health (economic) threats are still only positively correlated with the consumption of quality (alternative) media but not negatively correlated with the consumption of the other media type.

Discussion

The aim of this study was to examine the differential relationships of fears focusing on health vs. economic threats on media consumption and vaccination acceptance. Prior work has found differential relationships between the two types of fears and vaccination acceptance or

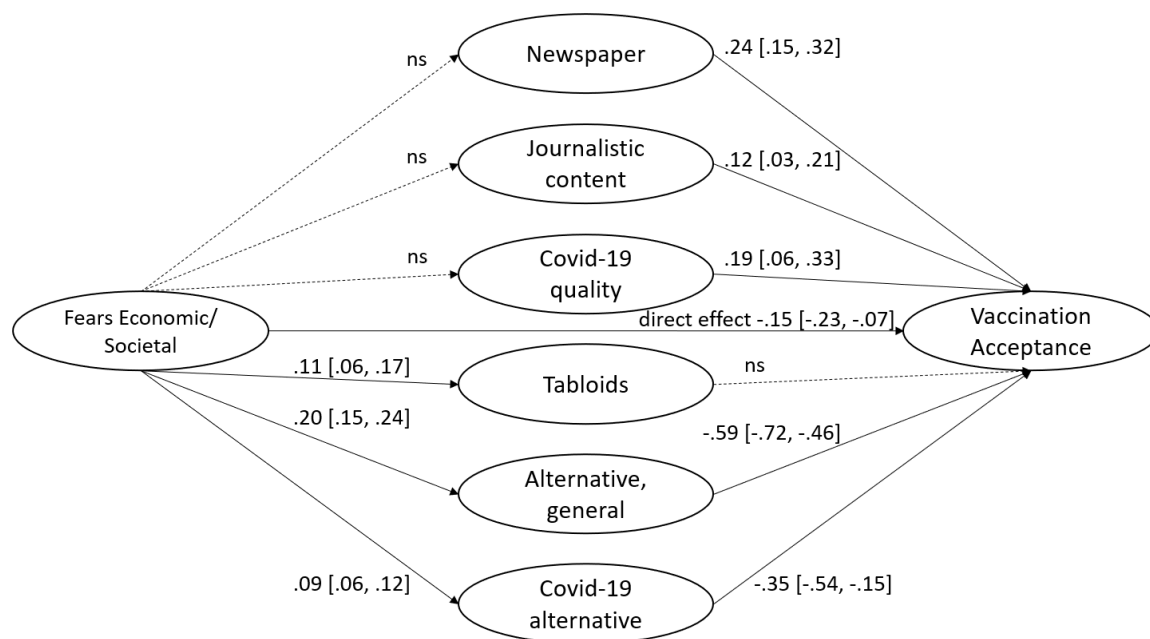


Figure 2. Exploratory Mediation Model of Fears Focusing on Economic/Societal Threats Predicting Vaccination Acceptance

Note. Included controls: Fears focusing on health threats, gender, age, education, political orientation.

adherence to other preventive measures, but these differential effects were often not predicted or even opposite to the predictions (Bendau et al., 2021; Bruder & Kundert, 2022; Sobkov et al., 2020). By building on Kruglanski et al. (2021) and uncertainty management (Brashers (2001), we developed a model that proposes that fears are related to media consumption and avoidance. We provide first empirical evidence that fears focusing on health threats were positively related to vaccination acceptance via the consumption of newspapers and Covid-19 quality media and a reduced consumption of alternative media, whereas fears focusing on economic and societal threats were negatively related to vaccination acceptance via the consumption of general and Covid-19 specific alternative media.

Theoretical Contributions to Health Communication

These results have important theoretical and practical implications. First, they show that it makes sense to differentiate between different types of fears when studying media consumption, but also related phenomena such as belief in conspiracy theories and adherence to preventive measures during the pandemic. One should note, however, that the relationships with media consumption were not as clear-cut and simple as predicted; a specific fear was usually positively associated with the predicted media type, but there was less evidence for media avoidance. A reason could be the positive correlation between the fears as well as the correlations between the different media use variables. It seems that social media users consume whatever appears in their news feed (see work on super seekers and omnivores by Chadwick et al., 2021). Fears seem to predict rather which media are sought out more than which media are avoided.

Cross-sectional analyses can only determine relationships, but not cause and consequence. There are, however, several reasons to believe that fears indeed trigger media use. First, health fears were more likely dominant in the first weeks of the pandemic before lockdowns, and thus,

economic and societal threats were imposed in Europe. In these early days of the pandemic, many people turned to quality media; in Germany, for example, the national news show Die Tagesschau had the highest number of viewers ever (Tagesschau - 2020 höchste Quote seit Beginn der Messung, 2021). There is also evidence that listening to the podcast Das Coronavirus-Update took away (vs. increased) fears (Gaiser & Utz, 2022; Utz et al., 2022). This pattern supports the idea of fears focusing on health threats triggering consumption of quality media. There is evidence for the causal relationship between economic threats and the preference for right-wing parties (Berning & Schlueter, 2016). It is thus likely that fears focusing on economic threats also trigger the consumption of right-wing alternative media.

We do not exclude the possibility that media consumption might further increase fears; this would be in line with the observation that there are reinforcing spirals between conspiracy theories – which are frequently shared on alternative media – and existential threats (Van Prooijen, 2019). Searching for information on Covid-19 also can further increase health-related fears (Mertens et al., 2020).

Next Steps. We presented first promising results demonstrating that different fears are differentially related to media choice and, in turn, vaccination acceptance. To demonstrate the value of this theoretical framework, further research is needed. First, the results were more convincing for media selection than for media avoidance. Further correlational studies could test whether this pattern replicates. Experimental work could test then whether fears mainly affect media selection or avoidance more explicitly. For example, fears related to health or economic threats could be activated experimentally, and in the next step, participants could be asked to choose from various high quality or right-wing alternative media. To also tackle the question of avoidance, certain articles (quality media or alternative media) could be pre-selected in additional conditions. This would allow to see whether people actively de-select (= avoid) a specific channel or whether they just don't approach it deliberately. Such experiments could prove the causal effects of fears on media selection.

To answer the question whether there are also effects of media use on fears, experiments could be conducted as well. Additionally, longitudinal studies with several waves on the onset of another health crisis could establish whether fears focusing on health threats or media selection precede each other, similar as the work on economic threat and right-wing populist party preference by Berning and Schlueter (2016). It is also unclear whether fears focusing on health threats are only correlated with the use of quality media in countries with independent trustworthy media and/or a good healthcare system. Cross-cultural research systematically comparing countries with different media and healthcare systems is needed to see whether these variables play a moderating role in the model.

Theoretical Contributions beyond Health Communication

Our findings have implications beyond health communication. Future work could explore how different fears relate to media consumption in different crises such as the war in Ukraine. In this context, economic and societal fears should be less strongly correlated because the war had economic consequences for many countries (e.g., rising gas prices), but did not necessarily come with societal restrictions. Our findings could also inspire future work on conspiracy theories. Van Prooijen (2019) argued that uncertainty and fears are positively related to a higher susceptibility to conspiracy theories. However, prior work did not conceptually differentiate between different types of fears and instead expected similar effects for different fears (Bruder

& Kunert, 2022). That economic threats are positively related to belief in various conspiracy theories has been shown across 36 countries (Hornsey et al., 2023); it might thus make sense to focus the theorising of the existential threat model on economic threats (and maybe to reconsider “existential”). Van Prooijen (2019) assumed that sense-making processes explain the relationship between existential threats and conspiracy theories. The present research points to the importance of media consumption in this process. People do not only process the same information in a different way in the sense-making process, but they expose themselves to different media channels in the first place. Experimental research could distinguish between media selection and processing of media content.

We showed that the relationships between fears and vaccination acceptance are partly mediated by media consumption. Paradoxically, following media that spread conspiracy theories and, in turn, refusing to get vaccinated prolongs the status quo and is an ineffective way of reducing fears and coping with a pandemic. Our findings are thus in line with earlier work arguing that fears drive susceptibility to conspiracy theories without reducing the fears (Douglas et al., 2017; Van Prooijen, 2019). Interestingly, a longitudinal study published after our data collection showed that higher beliefs in conspiracy beliefs at the onset of the Covid-19 pandemic resulted in less adherence to preventive behaviours, a higher likelihood of getting infected, and a higher likelihood of job loss (Van Prooijen et al., 2021), demonstrating that turning to conspiracy theories is not functional.

Methodological and Practical Implications

Our work has also methodological implications. The preregistered analyses yielded some unexpected effects, such as a negative relationship of Covid-19 specific quality channels and vaccination acceptance. A closer look showed that social media users seem to consume a broad range of different channels. Chadwick et al., (2021) have identified a similar type of media users and called them omnivores. The fears also correlated positively with each other. It is therefore important to control for these shared variances. Results from papers assessing only one form of media use should thus be interpreted with caution, especially when they focus on social media. Our results show that social media use, but even the consumption of Covid-19 specific quality channels, can be a proxy for the consumption of alternative media (and vice versa).

A practical implication of our findings is that it is important to also address fears focusing on economic and societal threats when trying to increase vaccination rates. More specifically, health communication should not only focus on classical topics of health communication. It is also important to emphasise the faster opening of economy and society enabled by a low incidence to reach also people scoring high on economic fears. Fears focusing on economic threats were not related to a lower use of quality media; especially (online) newspapers can play an important role in stressing the benefits of vaccination for the quick recovery of the economy or the shortening of lockdowns.

Limitations and Strengths

Our study is not without limitations. The most serious limitation is that it was cross-sectional, making it difficult to determine causality. However, there is evidence for the causal effect of media consumption on social distancing behaviour from a quasi-experiment by Simonov et al. (2020), and there is work showing that perceived economic threats are rather the cause than the

consequence of turning to right-wing populist parties (Berning & Schlueter, 2016). Suggesting that media consumption and thereby exposure to scientific information vs. misinformation and conspiracy theories plays a mediating role is a plausible explanation for the differential relationships of fears focusing on health vs. economic threats and various preventive behaviours that turned out in several studies (Bendau et al., 2021; Čavojová et al., 2022; Rosman et al., 2021; Sobkow et al., 2020). Longitudinal and experimental studies are, however, needed to disentangle selection and media effects and establish causality.

Another limitation is that we used only two channels for assessing consumption of Covid-19 specific quality and alternative channels. We also assessed only self-reports on frequency of media consumption but did not measure exposure to specific pieces of (mis)information. However, relying on analysis of the content of quality media (Quandt et al., 2020) and fact-checking organisations (Echtermann, 2020), we can safely assume that people who turn to alternative media are more likely to be exposed to misinformation and conspiracy theories.

A strength of our study is the representative sample; this allows us to generalise our findings for Germany, but it is unclear whether the results also generalise to other countries with a more polarised media system, or different health and economic security systems. This should, however, mainly affect the level of health- and economic-related fears and less the general pattern of fears and media use. Another strength is that the relationships between fears and media use were significant when including demographics. This strengthens the point that fears are not just a proxy for education or political orientation but that emotional processes play an essential role in media consumption.

Conclusion

Taken together, our work shows that it is important to look at different types of fears to predict whether people turn to high-quality or alternative media and that media consumption plays an important role in explaining the relationship between fears and vaccination acceptance. Vaccination campaigns should also target people scoring high on economic and societal fears and stress the benefits of vaccination for the economy and the re-opening of society. Beyond this pandemic-specific recommendation, our proposed model has broader implications for health communication. Work on health communication tends to focus on health-related fears or has even triggered them (see work on fear appeals; cf. Witte & Allen, 2000). Many health problems reduce the capacity to work and come with economic threats in the long term. A systematic test of our differential fear-effects model could be an important step towards the consideration of economic fears and their implications for the processing of health communication messages.

Notes

1. We thank an anonymous reviewer for the suggestion to report only the more valid exploratory analysis in the paper.

Ethical Approval

The study was approved by the local Ethics committee (LEK 2020/015).

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Conflict of Interest

The authors have no conflict of interest.

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