

The conspiracy hoax? Testing key hypotheses about the correlates of generic beliefs in conspiracy theories during the COVID-19 pandemic

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Short Title

Generic beliefs in conspiracy theories during a pandemic

Preprint of manuscript under review

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Author contributions according to CRediT taxonomy: Martin Bruder: conceptualization, methodology, writing, supervision; Laura Kunert: conceptualization, methodology, writing, visualization.

Abstract

Conspiracy beliefs receive unprecedented public attention during the COVID-19 pandemic. This may be because they could directly affect own and others' health and economic outcomes due to detrimental effects on preventive behaviour. We aimed to (a) test key hypotheses on the correlates of generic beliefs in conspiracy theories in this high-relevance real-life setting, (b) examine the role of trust in mediating effects on preventive behaviour, and (c) thereby inform the public health response. Using cross-sectional data ($N=1,013$) from the German COVID-19 monitoring we tested the relationships between conspiracy beliefs and (a) level of education, (b) social and economic worries, (c) trust in media, the government, public health institutions, and science, and (d) hygiene-related and contact-related preventive behaviour. Results were in line with expectations apart from null findings for the relationships with social worries and hygiene-related preventive behaviour. Trust in government mediated effects of conspiracy beliefs on contact-related preventive behaviour.

Keywords: coronavirus pandemic, conspiracy ideation, public health messaging, social distancing, government trust

Introduction

Existing research on conspiracy theories has sampled from populations (e.g., undergraduate students) that may not feel particularly threatened and therefore have lower motives to endorse conspiracy theories (Douglas et al., 2017). This creates a certain level of uncertainty about the ecological validity of previous findings. At the same time, societal crisis situations are contexts in which conspiracy theories thrive (van Prooijen & Douglas, 2017). Therefore, the current COVID-19 pandemic may be a powerful context to test some of the key hypotheses discussed in the still-emerging literature on conspiracy theories. In fact, at least in Germany, Google Trends (<https://www.google.com/trends>) analyses demonstrate that – in the week our data were collected – conspiracy theories have reached the highest level of public attention since 2004 (when data became available)¹.

The high level of public attention may partly be due to the specific nature of conspiracy beliefs in the context of a pandemic and, in particular, their possible association with preventive behaviour. Whereas in many situations believing in conspiracy theories may have little direct effect on others in society, not following recommended preventive behaviours may directly impact the further course of the pandemic – and thereby the health and economic outcomes of everyone in society.

This creates a strong incentive for the public in general and elected officials in particular to better understand the predictors and outcomes of conspiracy beliefs in the context of the pandemic. However, the existing literature only offers limited guidance. For example, the hypothesis that conspiracy beliefs arise as a compensatory control in situations with a perceived lack of control has received only very limited support in a recent meta-analysis (Stojanov & Halberstadt, 2020). It remains unclear whether indeed this link does not exist or whether interventions have been too weak to create perceptions of a lack of control.

Against this backdrop, of (a) questions about the ecological validity of existing research, (b) a pandemic situation which may provide a high-relevance context for testing existing hypotheses, (c)

unprecedented public attention to conspiracy beliefs and political need for context-specific guidance, we tested the following four key correlational hypotheses concerning possible predictors and outcomes of generic beliefs in conspiracy theories.

First, previous research observed that generic beliefs in conspiracy theories are negatively predicted by education level (Hypothesis 1; van Prooijen, 2017). Given the potential relevance of education level in the context of COVID-19 attitudes (Maher et al., 2020) and relevant behaviours (such as accepting a vaccine; Malik et al., 2020) we aimed to examine whether education level indeed predicts generic beliefs in conspiracy theories in the context of the pandemic.

Second, generic beliefs in conspiracy theories are associated with higher levels of paranoia (Imhoff & Lamberty, 2018) and are predicted by fear induced in laboratory settings (Grzesiak-Feldman, 2013). We tested both social (Hypothesis 2a) and economic (Hypothesis 2b) fears and worries as possible predictors of generic beliefs in conspiracy theories. Both types of fears and worries are arguably more severe and immediate in the context of a pandemic than in previous research, thereby also speaking to the compensatory control hypothesis.

Third, there is some evidence for a negative correlation between generic beliefs in conspiracy theories and trust (Hypothesis 3; Goertzel, 1994). In particular, high levels of conspiracy beliefs predicted lower levels of trust in media (Hypothesis 3a; Stempel et al., 2007). We also investigated trust in government (Hypothesis 3b; Einstein & Glick, 2015), trust in public health institutions (Hypothesis 3c), trust in the German health care system at the local level (Hypothesis 3d), and trust in science (Hypothesis 3e; Lewandowsky et al., 2015). All seem highly relevant for an adaptive response to the COVID-19 pandemic as well as of theoretical relevance – to date differences in effects of conspiracy beliefs on different types of trust are under-researched.

Fourth, generic beliefs in conspiracy theories predict lower levels of compliance with recommendations by official authorities (Marinthe et al., 2020 or, in the context of vaccination; Jolley

and Douglas, 2014). Recent research revealed that different types of specific conspiracy beliefs about COVID-19 are correlated with distinct patterns of preventive behaviour (Imhoff & Lamberty, 2020). We further explore whether different types of preventive behaviours are differentially predicted by generic beliefs in conspiracy theories. In particular, we differentiate hygiene-related behaviours (Hypothesis 4a) from contact-related behaviours (Hypothesis 4b).

In addition to testing these correlational hypotheses, we explored whether possible effects of generic beliefs in conspiracy theories on preventive behaviours could be explained by changes in trust in government. This relationship is of particularly high applied relevance in the context of the pandemic with initial evidence being consistent with an indirect effect of conspiracy beliefs on preventive behaviour through government trust (Pavela Banai et al., 2020). We expected higher levels of conspiracy beliefs to reduce trust in government and this in return to lead to a reduction in preventive behaviour (Hypothesis 5).

Method

Participants and design

We used data from the 11th wave of the German national COVID-19 Snapshot Monitoring (COSMO) survey collected between May 12 und 13, 2020 (Betsch et al., 2020). The stratified cross-sectional online sample was representative of the German population with respect to gender and age (crossed) as well as federal state (not crossed) and consisted of 1,013 participants (521 women, 492 men, $M_{\text{age}} = 46.29$, $SD_{\text{age}} = 15.56$).

Measures

Generic beliefs in conspiracy theories were measured using the five-item Conspiracy Mentality Questionnaire (Bruder et al., 2013) with item endpoints ranging from *certainly not true* (1) to *certainly true* (7). An exploratory factor analysis suggested a one-factor solution ($KMO = 0.84$, Bartlett's test:

$\chi^2(10) = 2590.560$, $p < 0.001$) explaining 67% of variance. We used the extracted factor score for all further analyses.

Level of education was assessed with three distinct response options: *0-9 years of schooling* (1), *at least 10 years of schooling without higher education entrance qualification* (2) and (3) *higher education entrance qualification*.

Social fears and worries were assessed by asking whether participants worried to lose somebody they loved during the pandemic (7-point scale ranging from *very few worries* to *a lot of worries*). Two items measured *economic fears and worries* (using the same scale): worry to lose your job and worry that an economic recession occurs.

Trust in media, different public health actors, the government, and science was measured using a 7-point scale ranging from *very little trust* to *a lot of trust*. A principal component analysis of eight items assessing trust in professionals and institutions related to health care suggested a two-factor solution after promax rotation accounting for 77% of the variance. The first factor represented trust in public health institutions (trust in the local health department, the ministry of health of the state, the Federal Ministry of Health, the Robert Koch Institute, the Federal Centre for Health Education, and the World Health Organization) whereas the second factor had high loadings of two items concerning trust in the German health care system at a local level (trust in doctors and trust in hospitals).

Participants reported on their *preventive behaviour* concerning 12 recommendations by public authorities (rated from *never* (1) to *always* (5)). Five items represented hygiene-related behaviour (avoid touching the face, use of sanitizer, cover coughing, use of face mask, hand-washing). A principal component analysis was consistent with a one-factor solution (50% of variance explained). We used extracted factor scores for all further analyses. The other seven items measured contact-related preventive behaviour (avoid handshakes, social distancing, avoid crowds, moving in public with people from one other household, only go outside when necessary, do not meet with friends and relatives,

avoid private journeys). A principal component analysis explained 51% of variance. We again used extracted factor scores for further analyses.

Results

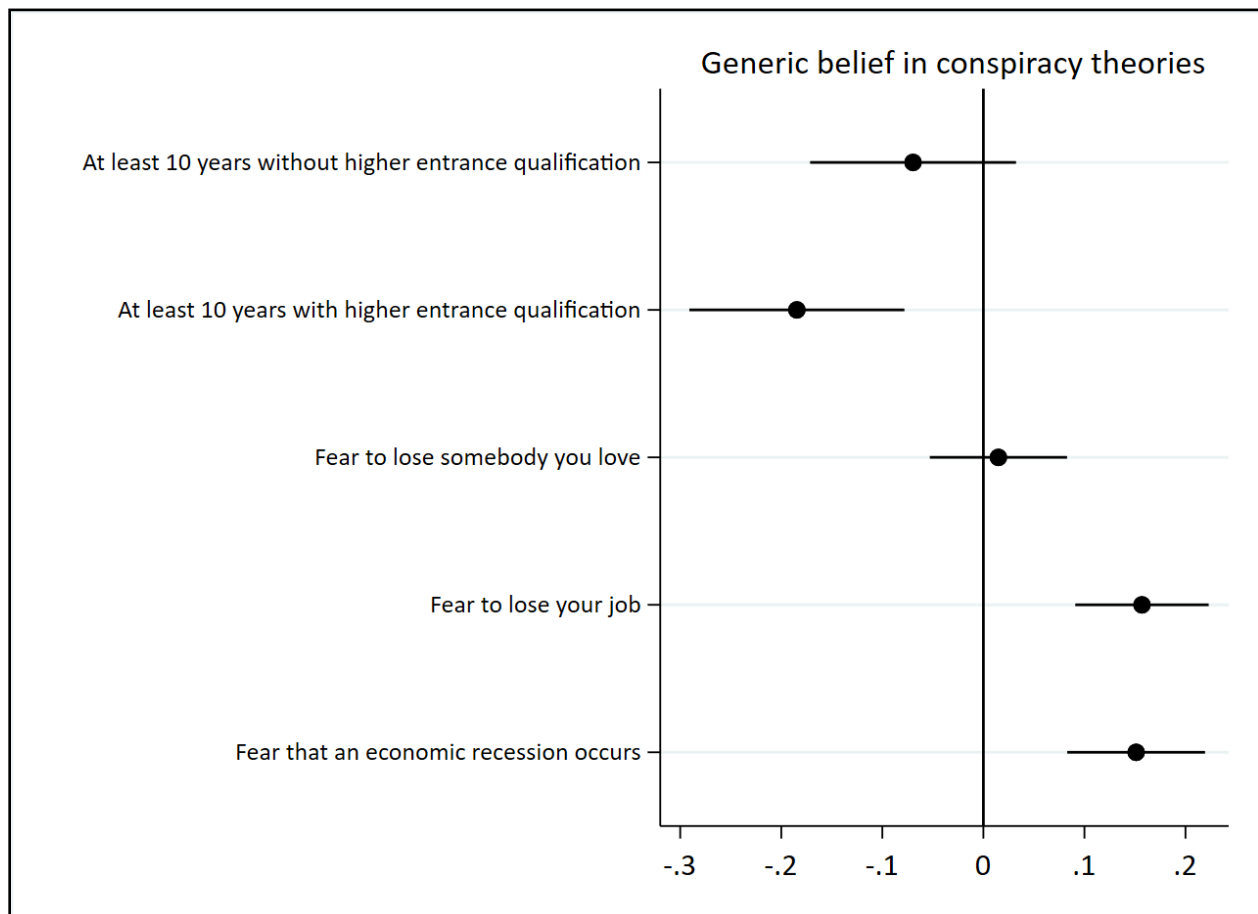
We conducted OLS regressions² with standardized beta coefficients and robust standard errors to test Hypotheses 1 to 4. Each hypothesis was tested with and without the following control variables: age, gender, community size (5 categories ranging from $\leq 5,000$ inhabitants to $>500,000$ inhabitants) and federal state fixed effects. Below, regressions including control variables are reported^{3,4}.

Education predicting generic beliefs in conspiracy theories

The regression model to test Hypothesis 1 revealed that respondents who had at least 10 years of schooling with higher entrance qualification entertain lower generic beliefs in conspiracy theories, $\beta = -0.185$, $\eta^2 = .012$, $SE = 0.054$, $p = .001$, compared to those who had 0-9 years of schooling (reference category). The effect for respondents without higher entrance qualification (as compared to the reference category) was non-significant, $\beta = -0.070$, $\eta^2 = .002$, $SE = 0.052$, $p = .181$ (see Figure 1).

Fears and worries predicting generic beliefs in conspiracy theories

Inconsistent with Hypothesis 2a, social fears and worries were not significantly linked to generic beliefs in conspiracy theories, $\beta = 0.015$, $\eta^2 < .001$, $SE = 0.034$, $p = .667$. However, both items on economic fears and worries predicted generic beliefs in conspiracy theories (Hypothesis 2b): worry to lose your job, $\beta = 0.157$, $\eta^2 = .023$, $SE = 0.034$, $p < .001$, and worry that an economic recession occurs, $\beta = 0.151$, $\eta^2 = .023$, $SE = 0.035$, $p < .001$ (see Figure 1).

Figure 1*Plotted regression results for Hypotheses 1, 2a, and 2b*

Note. The reference category for the regressions of both education categories is *0-9 years of schooling*.

Generic beliefs in conspiracy theories predicting trust

Results showed that trust in media (Hypothesis 3a) is negatively predicted by generic beliefs in conspiracy theories, $\beta=-0.372$, $\eta^2=.137$, $SE=0.031$, $p<.001$. Further, generic beliefs in conspiracy theories are negatively associated with trust in government, $\beta=-0.479$, $\eta^2=.231$, $SE=0.028$, $p<.001$ (Hypothesis 3b). Among all hypotheses related to trust, generic beliefs in conspiracy theories has the strongest association with trust in public health institutions, $\beta=-0.510$, $\eta^2=.257$, $SE=0.033$, $p<.001$ (Hypothesis 3c). A smaller but still significant negative association exists between generic beliefs in conspiracy theories

and trust in the German health care system, $\beta=-0.270$, $\eta^2=.074$, $SE=0.037$, $p<.001$ (Hypothesis 3d).

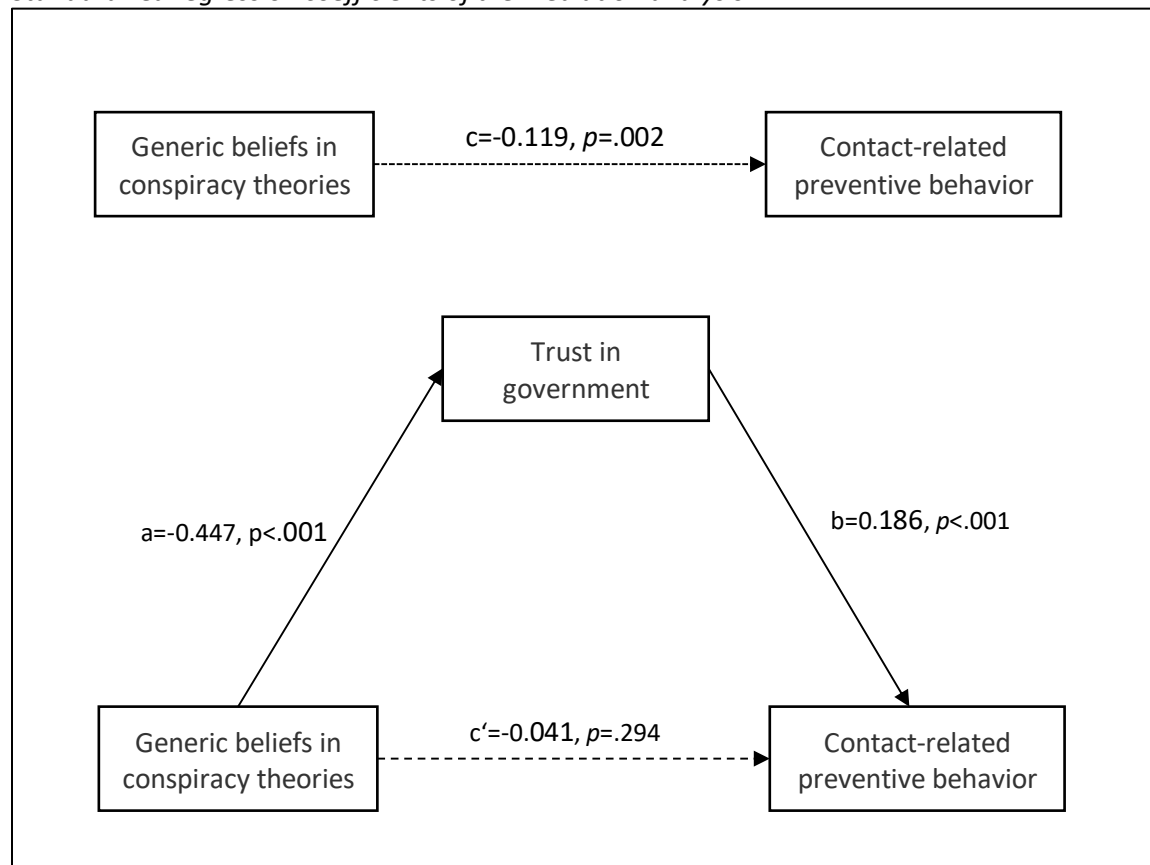
Finally, results revealed a negative relationship between generic beliefs in conspiracy theories and trust in science, $\beta=-0.415$, $\eta^2=.173$, $SE=0.032$, $p<.001$ (Hypothesis 3e).

Generic beliefs in conspiracy theories predicting preventive behaviour

There was no significant link between generic beliefs in conspiracy theories and hygiene-related preventive behaviour, $\beta=-0.054$, $\eta^2=.003$, $SE=0.034$, $p=.112$ (Hypothesis 4a). However, in line with Hypothesis 4b, generic beliefs in conspiracy theories negatively predicted contact-related preventive behaviour, $\beta=-0.119$, $\eta^2=.015$, $SE=0.038$, $p=.002$.

Mediating role of trust in government

Given the results of Hypotheses 4a and 4b, the mediating role of trust in government was examined for the relationship between generic beliefs in conspiracy theories and contact-related preventive behaviour only. As Figure 2 illustrates, the direct effect between generic beliefs in conspiracy theories and contact-related preventive behaviour is reduced to non-significance when controlling for trust, $\beta=-0.041$, $SE=0.039$, $p=.294$. Instead, the SEM model showed that generic beliefs in conspiracy theories were indirectly linked to contact-related preventive behaviour via trust in government as a mediator, $\beta=-0.083$, $SE=0.020$, $p<.001$ (Hypothesis 5). The pattern of results is consistent with full mediation according to Baron and Kenny (1986).

Figure 2*Standardized regression coefficients of the mediation analysis*

Note. Dashed lines indicate non-significant relationships; solid lines indicate significant relationships at $\alpha = .05$.

Discussion

We tested four key correlational hypotheses concerning predictors and outcomes of generic beliefs in conspiracy theories in the context of the ongoing pandemic. We also aimed to inform public health interventions.

Results revealed a small but reliable positive association between education level and generic beliefs in conspiracy theories driven by differences of those in the highest and lowest education category. Given the sometimes complex and uncertain nature of COVID-19-related public health information, public health messaging should be mindful of the additional challenge posed by possible conspiracy beliefs when communicating with those with lower levels of education.

Interestingly, the personal fear of losing a loved person did not predict higher levels of conspiracy beliefs – but both personal and more general economic worries did thereby adding to the complex picture concerning the compensatory control hypothesis. Decisive political action to minimize the economic impact of the pandemic on individuals may be one important type of intervention to reduce the prevalence of conspiracy beliefs in the further course of the pandemic.

Generic beliefs in conspiracy theories predicted trust with medium (media, health care at the local level) to large (government, public health institutions, science) negative effect sizes. The somewhat lower effect size for trust in media is surprising given the public hostility of conspiracy believers against mainstream media in particular. Further, cross-national research as well as more differentiated assessment of different media outlets can help to identify whether effect sizes are smaller in Germany compared to other countries or whether trust in specific media is more strongly associated with conspiracy beliefs. The strong correlation between conspiracy beliefs and trust in government, public health institutions, and science may provide hints that a focus on debunking conspiracy theories with facts may be a crucial component in gaining trust among some parts of the population.

Finally, preventive behaviour is not negatively associated with generic beliefs in conspiracy theories across the board. In particular, we did not observe an association between conspiracy beliefs and relatively low-level hygiene-related preventive behaviours such as hand-washing or covering one's mouth when coughing. In the German context this also includes mask wearing which has not been as politicized in the broader public (the ferocious opposition of smaller groups notwithstanding) as it may have been in the US or Brazil). In contrast, there was a small but significant effect of generic beliefs in conspiracy theories on contact-related such as social distancing. Given the very substantial effects of non-compliance of even a relatively small group on the health and economic outcomes of everyone, this effect warranted further examination.

A mediation analysis revealed that the correlational pattern of the association between generic beliefs in conspiracy theories and contact-related preventive behaviour was consistent with a mediation of this association by trust in government. Focusing on retaining or regaining the trust of all parts of the population should therefore be a major focus of government action – not only to avoid a dysfunctional level of polarization of the public discourse, but also to keep the population safe and healthy during public health emergencies.

Of course, this research – as a lot of other research on conspiracy beliefs – is limited with respect to any possible causal claims by the cross-sectional nature of the data. Future research will have to ascertain our proposed causal pathways. However, avoiding false generalizations in the current high-relevance context as well as using this context to generate rapid analyses on the possible role of conspiracy beliefs in such contexts warrant, we believe, these initial analyses.

¹ See supplementary material for details.

² The Bonferroni-adjusted alpha level is .017 (.05/3) for Hypotheses 2a and 2b (two tests for 2b), .01 (.05/5) for Hypotheses 3a-3e, and .025 (.05/2) for Hypotheses 4a and 4b.

³ Some of the measures contain missing values, which reduced sample sizes. Please see the regression tables in the supplementary material for details.

⁴ Hypotheses 2a-4b were also tested with participants' level of education as additional control variable. This did not affect the results in any substantial way (i.e., significance levels were identical, effect sizes were of the same order of magnitude).

Ethical Compliance Section

Funding: The authors have no funding to disclose.

Compliance with Ethical Standards: We exclusively used secondary data from the COSMO project (<http://dx.doi.org/10.23668/psycharchives.2776>). All procedures performed in the COSMO studies involving human participants were in accordance with the ethical standards of the University of Erfurt institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Conflict of Interest: The authors declare they have no conflict of interest.

Informed consent: Informed consent was obtained from all individual participants included in the study.

Only adults were eligible as participants.

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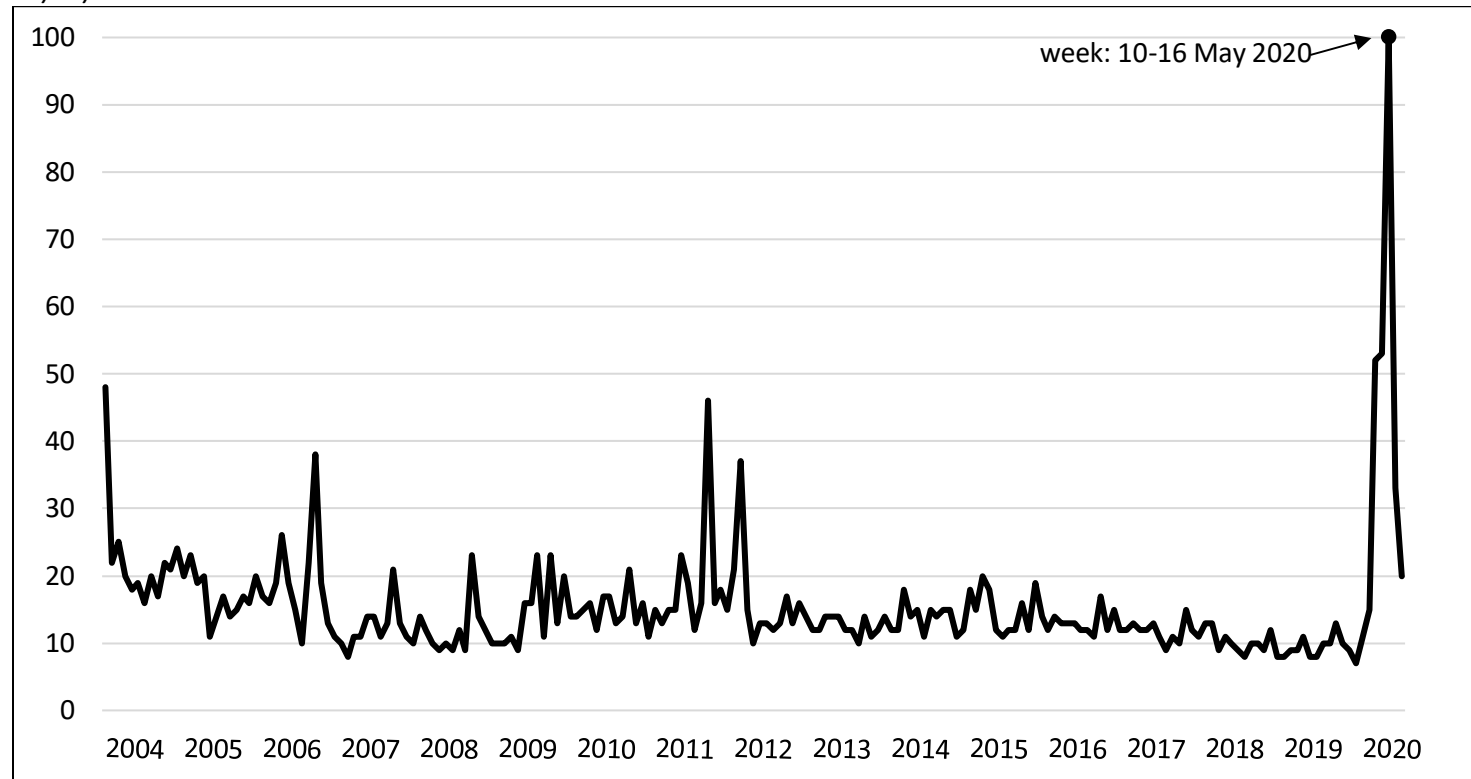
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Supplementary Material**Figure 1**

Google Trends data showing search activity for the term “Verschwörungstheorie” (conspiracy theory) in Germany from 01/01/2004 to 23/07/2020.



Note. Source: Google Trends (<https://trends.google.com/trends/>). Retrieved on July 23, 2020. Data are normalized with total number of search queries and scaled on an interest scale ranging from 0 to 100. For details see <https://medium.com/google-news-lab/what-is-google-trends-data-and-what-does-it-mean-b48f07342ee8>

Table 1*Test of Hypothesis 1: OLS regression analysis on education (and controls) predicting generic beliefs in conspiracy theories*

Variables	Generic beliefs in conspiracy theories					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Education = 2, at least 10 years without higher entrance qualification	-0.054	.291	[-0.156, 0.047]	-0.070	.181	[-0.172, 0.032]
Education = 3, at least 10 years with higher entrance qualification	-0.152	.004	[-0.254, -0.050]	-0.185	.001	[-0.291, -0.078]
Age				-0.096	.003	[-0.160, -0.033]
Gender				0.036	.245	[-0.025, 0.098]
Community size				-0.033	.373	[-0.106, 0.040]
State FE	No			Yes		
R ²	.013			.040		

Note. N=1,013. FE=Fixed Effects.**Table 2***Test of Hypothesis 2a: OLS regression analysis on social fears and worries (and controls) predicting generic beliefs in conspiracy theories*

Variables	Generic beliefs in conspiracy theories					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Fear to lose somebody you love	0.020	.559	[-0.047, 0.087]	0.015	.667	[-0.053, 0.083]
Age				-0.053	.086	[-0.114, 0.008]
Gender				0.040	.209	[-0.023, 0.103]
Community size				-0.049	.177	[-0.121, 0.022]
State FE	No			Yes		
R ²	0.000			0.025		

Note. N=1,013. FE=Fixed Effects.

Table 3

Test of Hypothesis 2b: OLS regression analysis on job-related economic fears and worries (and controls) predicting generic beliefs in conspiracy theories

Variables	Generic beliefs in conspiracy theories					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Fear to lose your job	0.157	.000	[0.093, 0.220]	0.157	.000	[0.091, 0.223]
Age				-0.024	.463	[-0.088, 0.040]
Gender				0.040	.204	[-0.022, 0.103]
Community size				-0.062	.090	[-0.134, 0.010]
State FE	No			Yes		
R ²	.024			.049		

Note. N=983. FE=Fixed Effects.

Table 4

Test of Hypothesis 2b: OLS regression analysis on recession-related economic fears and worries (and controls) predicting generic beliefs in conspiracy theories

Variables	Generic beliefs in conspiracy theories					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Fear that an economic recession occurs	0.150	.000	[0.083, 0.218]	0.151	.000	[0.083, 0.219]
Age				-0.066	.032	[-0.127, -0.006]
Gender				0.035	.266	[-0.026, 0.096]
Community size				-0.047	.196	[-0.118, 0.024]
State FE	No			Yes		
R ²	.023			.047		

Note. N=1,013. FE=Fixed Effects.

Table 5*Test of Hypothesis 3a: OLS regression analysis on generic beliefs in conspiracy theories (and controls) predicting trust in media*

Variables	Trust in media					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Generic beliefs in conspiracy theories	-0.376	.000	[-0.436, -0.316]	-0.372	.000	[-0.433, -0.311]
Age				0.076	.012	[0.016, 0.135]
Gender				0.055	.065	[-0.003, 0.144]
Community size				0.047	.185	[-0.022, 0.115]
State FE	No			Yes		
R ²	.141			.157		

Note. N=985. FE=Fixed Effects.**Table 6***Test of Hypothesis 3b: OLS regression analysis on generic beliefs in conspiracy theories (and controls) predicting trust in government*

Variables	Trust in government					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Generic beliefs in conspiracy theories	-0.477	.000	[-0.532, -0.422]	-0.479	.000	[-0.534, -0.424]
Age				0.025	.384	[-0.032, 0.082]
Gender				0.058	.041	[0.002, 0.113]
Community size				0.060	.070	[-0.005, 0.125]
State FE	No			Yes		
R ²	.229			.249		

Note. N=986. FE=Fixed Effects.

Table 7*Test of Hypothesis 3c: OLS regression analysis on generic beliefs in conspiracy theories (and controls) predicting trust in (public) health institutions*

Variables	Trust in (public) health institutions					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Generic beliefs in conspiracy theories	-0.502	.000	[-0.566, -0.439]	-0.510	.000	[-0.574, -0.445]
Age				-0.023	.463	[-0.086, 0.039]
Gender				0.075	.016	[0.014, 0.136]
Community size				0.058	.106	[-0.012, 0.127]
State FE	No			Yes		
R ²	.253			.273		

Note. N=795. FE=Fixed Effects.**Table 8***Test of Hypothesis 3d: OLS regression analysis on generic beliefs in conspiracy theories (and controls) predicting trust in the German health care system at the local level*

Variables	Trust in the German health care system at the local level					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Generic beliefs in conspiracy theories	-0.279	.000	[-0.350, -0.209]	-0.270	.000	[-0.342, -0.198]
Age				0.154	.000	[0.087, 0.221]
Gender				-0.012	.723	[-0.079, 0.055]
Community size				0.073	.058	[-0.002, 0.149]
State FE	No			Yes		
R ²	.078			.119		

Note. N=795. FE=Fixed Effects.

Table 9*Test of Hypothesis 3e: OLS regression analysis on generic beliefs in conspiracy theories (and controls) predicting trust in science*

Variables	Trust in science					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Generic beliefs in conspiracy theories	-0.410	.000	[-0.472, -0.347]	-0.415	.000	[-0.478, -0.352]
Age				-0.029	.337	[-0.088, 0.030]
Gender				0.004	.885	[-0.053, 0.062]
Community size				0.061	.060	[-0.003, 0.125]
State FE	No			Yes		
R ²	.170			.191		

Note. N=973. FE=Fixed Effects.**Table 10***Test of Hypothesis 4a: OLS regression analysis on generic beliefs in conspiracy theories (and controls) predicting hygiene-related preventive behaviour*

Variables	Hygiene-related preventive behaviour					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Generic beliefs in conspiracy theories	-0.050	.137	[-0.115, 0.016]	-0.054	.112	[-0.120, 0.013]
Age				0.174	.000	[0.111, 0.236]
Gender				0.236	.000	[0.170, 0.301]
Community size				0.054	.160	[-0.021, 0.129]
State FE	No			Yes		
R ²	.002			.097		

Note. N=873. FE=Fixed Effects.

Table 11

Test of Hypothesis 4b: OLS regression analysis on generic beliefs in conspiracy theories (and controls) predicting contact-related preventive behaviour

Variables	Contact-related preventive behaviour					
	Model 1			Model 2		
	β	p	95% CI	β	p	95% CI
Generic belief in conspiracy theories	-0.117	.002	[-0.191, -0.043]	-0.119	.002	[-0.194, -0.044]
Age				0.232	.000	[0.165, 0.300]
Gender				0.200	.000	[0.132, 0.267]
Community size				0.022	.580	[-0.055, 0.098]
State FE	No			Yes		
R ²	.013			.128		

Note. N=753. FE=Fixed Effects.