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ABHANDLUNGEN

Populist Party Support and COVID-19 Vaccination: Explaining the AfD Vaccination Gap

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Abstract The COVID-19 vaccination program in 2021 constituted a key public health policy measure to overcome the pandemic in Germany. However, research has identified substantial variations in vaccination uptake across social groups. Over the course of the COVID-19 pandemic, research has indicated that party support influences vaccination uptake, which constitutes an underexplored dimension in Germany. Based on the health belief model, research on the populist right-wing party Alternative for Germany (*Alternative für Deutschland*; AfD) and inequality in the acceptance of public health measures during the COVID-19 pandemic, we investigated the emerging AfD vaccination gap. Based on monthly repeated cross-sectional data from the Institute for Applied Social Sciences (N persons = 7762) and logistic regression models, we found a pronounced vaccination gap of 28 percentage points between AfD supporters and nonsupporters. While this gap is not due to differences in sociodemographic characteristics and COVID-19 strain, the results from a Karlson–Holm–Breen decomposition reveal that differences in the perception

Online Appendix: https://kzfss.uni-koeln.de/sites/kzfss/pdf/Patzina-et-al.pdf

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of the pandemic as a threat to personal freedom and civil rights and feelings of missing political representation account for a large share of the AfD vaccination gap. Thus, our results indicate that the political climate prior to a pandemic influences the acceptance of public health measures and that civil movements occurring during pandemics, which address fears and worries related to civil rights and personal freedom, have the potential to substantially reduce the intended results of public health measures.

Keywords AfD support · Political climate and vaccination · COVID-19 vaccination · KHB decomposition · Logistic regression

Unterstützung populistischer Parteien und COVID-19 Impfung: Eine Erklärung für die AfD-Impflücke

Zusammenfassung Das COVID-19-Impfprogramm im Jahr 2021 war eine der wichtigsten gesundheitspolitischen Maßnahmen zur Bekämpfung der Pandemie in Deutschland. Die Forschung hat jedoch erhebliche Unterschiede in der Impfbeteiligung zwischen sozialen Gruppen festgestellt. Im Verlauf der COVID-19-Pandemie zeigte sich, dass die individuelle Parteienidentifikation Impfquoten beeinflusst – ein Aspekt, der für Deutschland noch nicht ausreichend untersucht wurde. Auf der Grundlage des health belief models und Forschungsergebnissen zur rechtspopulistischen Partei „Alternative für Deutschland“ (AfD) sowie Ungleichheit bei der Akzeptanz von Public-Health-Maßnahmen während der COVID-19-Pandemie untersuchen wir, warum sich Personen, die der AfD nahestehen, weniger häufig gegen COVID-19 impfen lassen. Basierend auf bevölkerungsrepräsentativen, monatlich wiederholten Querschnittsdaten des infas-Instituts für angewandte Sozialwissenschaften (N Personen = 7762) und logistischen Regressionsmodellen finden wir eine ausgeprägte Impflücke von 28 Prozentpunkten zwischen potenziellen AfD-Wählerinnen und -Wählern und denen demokratischer Parteien. Während diese Lücke nicht auf Korrelationen zwischen soziodemografischen Merkmalen, der subjektiven wie objektiven COVID-19-Belastung und der Impfentscheidung zurückgeht, zeigen die Ergebnisse einer Karlson-Holm-Breen-Dekomposition, dass Unterschiede in der Wahrnehmung der Pandemie als Bedrohung der persönlichen Freiheit und der Bürgerrechte sowie das Gefühl fehlender politischer Repräsentation den Großteil der Varianz im Impfverhalten zwischen potenziellen AfD-Wählerinnen und -Wählern aufdecken. Unsere Ergebnisse deuten also darauf hin, dass das politische Klima im Vorfeld einer Pandemie die Akzeptanz von Public-Health-Maßnahmen beeinflusst und dass die während einer Pandemie auftretenden Bürgerbewegungen, die sich mit Ängsten und Sorgen im Zusammenhang mit den Bürgerrechten und der persönlichen Freiheit befassen, das Potenzial haben, die beabsichtigten Ergebnisse von politischen Maßnahmen erheblich zu verringern.

Schlüsselwörter AfD-Wahl · Politisches Klima und Impfung · COVID-19-Impfung · KHB Dekomposition · Logistische Regression

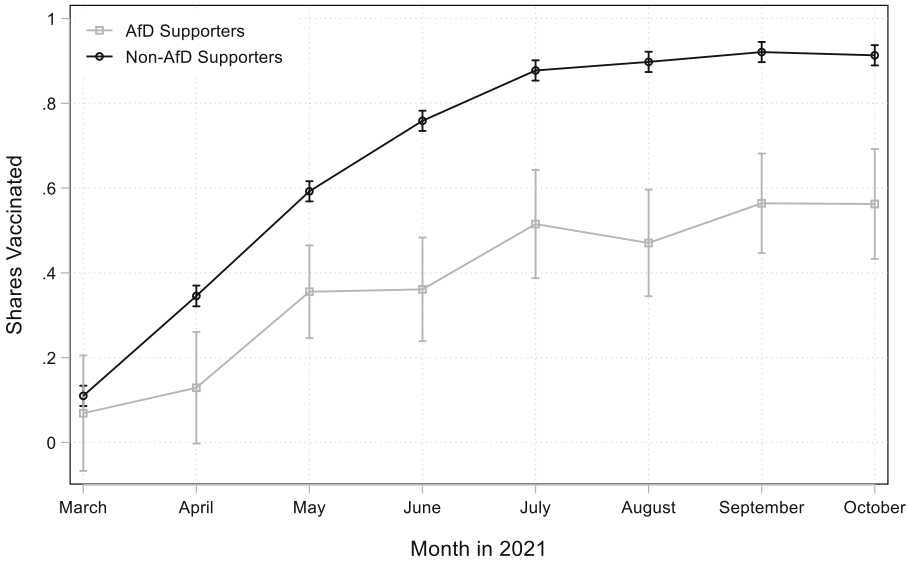

Fig. 1 Vaccination uptake by Alternative for Germany (AfD) voting preference. $N = 7780$; $N_{\text{Non–AfD-Supporters}} = 7501$; $N_{\text{AfD-Supporters}} = 279$. (Data: Institute for Applied Social Sciences multitopic survey)

1 Introduction

"[W]e have to assume that thousands of people have been injected to death with mRNA vaccines" (Plenarprotokoll Thüringer Landtag 2022, p. 20). In many speeches made by Alternative for Germany (*Alternative für Deutschland*; AfD) representatives, one can find statements such as the above from one of their most famous representatives, Björn Höcke, chairperson of the AfD in the Thuringian parliament. Although the AfD has not positioned itself against COVID-19 vaccination per se, the AfD does attack mandatory vaccination schemes (see, for example, Alternative für Deutschland 2022); furthermore, the party spreads doubts and prejudices against COVID-19 vaccination in many of its public speeches.

Because many governments worldwide have implemented vaccination schemes as a key element in overcoming the COVID-19 pandemic, the described political behavior appears to be counterproductive, particularly in light of research indicating that constant criticism of vaccination policies and emphasis on individual freedom through party leaders can be associated with vaccination uptake among their supporters (Kreps and Kriner 2023). In addition to the behavior of politicians, research on COVID-19 vaccination in European countries and the United States indicates pronounced gradients in uptake according to party support and political attitudes (e.g., Bilewicz and Soral 2022; Serrano-Alarcón et al. 2023; Klymak and Vlandas 2022; Ward et al. 2020; Wollebæk et al. 2022). Moreover, research on attitudes toward vaccination (e.g., belief that vaccines weaken the immune system or cause the disease) indicates that identification with extreme political ideologies (left or right) constitutes an important driver of inequality in such attitudes regardless of

the social position of individuals (Debus and Tosun 2021). Research on Germany suggests increased levels of COVID-19 vaccination hesitancy among AfD supporters (Jäckle and Timmis 2023). However, which factors are associated with inducing AfD support–related vaccination hesitancy remains an open question.

We contribute to this research and examine differences in COVID-19 vaccination uptake between AfD supporters and nonsupporters. Investigating the AfD vaccination gap is relevant because, based on data for Germany from 2021 (Infas 2023), we find a pronounced COVID-19 vaccination gap (Fig. 1). While the average vaccination uptake of nonsupporters of the AfD older than 17 substantially increased throughout 2021, the average vaccination uptake of AfD supporters rises more slowly and almost stagnates from July onward. These trends contributed to a pronounced AfD gap in vaccination of 28 percentage points in the fall of 2021 in Germany. Interestingly, the share of unvaccinated individuals in 2021 was by far the highest among AfD supporters (Table A2 in the Online Appendix); at 61.3%, this share is twice as high as the share among supporters of The Left (*Die Linke*) party.

To identify relevant mechanisms that possibly contribute to the pronounced COVID-19 vaccination gap, this study draws on the health belief model, which is widely used to theorize health preventive behavior (Rosenstock 1974; Green et al. 2020). Essentially, this model assumes that individuals invest in health preventive behavior, such as vaccination, based on beliefs about perceived risks of a disease, benefits of a treatment, and barriers (Green et al. 2020, p. 211). Because research indicates differences between individuals favoring populism and those who do not in perceived health risks associated with COVID-19 (e.g., Kaushal et al. 2022), attitudes related to the efficiency of COVID-19 vaccinations (e.g., Kohler and Koinig 2023), and potential barriers to vaccination, such as attitudes toward COVID-19 policies (e.g., Ehrke et al. 2023) or differences in trust and social capital (e.g., Berning and Ziller 2017), the health belief model is suited to investigate differences between AfD supporters and nonsupporters in COVID-19 vaccination decisions.

Empirically, we focus on differences between AfD supporters and nonsupporters in COVID-19 strain (i.e., personal COVID-19 infection, job worries, perceived subjective overall burdens, loss of social contacts) and beliefs about COVID-19 (i.e., risk of illness, perceived severity of illness) that align with the domains of perceived risks and benefits of the health belief model. To address the domain of potential barriers, we rely on attitudes toward COVID-19 policies (i.e., regarding state debt, personal freedom, economic overburden, pensions) and perceived social capital (i.e., trust changes in government due to COVID-19 policies, political representation, and perceived societal exclusion). Furthermore, because the health belief model suggests socially stratified individual beliefs that shape health behaviors (Champion and Skinner 2008), and sociological research has identified a socially structured support for the AfD (in terms of age, migration background, education, social status, gender, labor market status), we also investigated whether the AfD gap in COVID-19 vaccination is due to confounding factors, i.e., factors that explain social differences in health beliefs and AfD support.

Based on the health belief model, it is highly likely that certain of the proposed mechanisms account for the presented vaccination gap. However, the empirical database, which consists of monthly cross-sectional data from the Institute

for Applied Social Sciences (infas) multitopic survey, does not facilitate a comprehensive test of all potential causal pathways that link AfD support to vaccination. Our main theoretical argument is that party identification influences health beliefs, which then influence vaccination uptake. Therefore, health beliefs conceptually act as mediators between AfD support and vaccination decisions. However, theoretically, it is also possible that certain health beliefs during the pandemic increased individuals' affinity for the AfD. Consequently, from a time dynamic perspective, support for the AfD could also constitute a potential mediator between health beliefs and vaccination. Finally, it is also possible that certain latent political attitudes, as common background factors, influence both AfD support and health beliefs. As our cross-sectional data allow us only to identify associations between our constructs rather than empirically test the causal structure of these theoretical considerations, we must interpret our findings with caution.

The aim of this study, however, is to decompose the variation in COVID-19 vaccination uptake associated with AfD support to provide an informative description and explanation of factors that bring about differences in vaccination uptake by potential voting behavior. Consequently, our study enhances our knowledge on why certain subgroups in the population accepted a crucial public health measure differently, and we identify factors that may induce inequality in vaccination uptake in general.

2 The AfD and COVID-19 Vaccination

At the beginning of the COVID-19 pandemic in March 2020, the AfD showed a very volatile attitude toward the thread of the pandemic itself and related policy measures. At the beginning of the political debate, law-and-order attitudes toward restrictions that could prevent negative consequences for society were in line with the generally rather authoritarian approach of this party. Later, in summer 2020, when massive protests were visible on the streets, e.g., the Querdenker movement, the AfD positioned itself largely against restricting policies, with the argument that the freedom of citizens needs to be defended against the usurpation of a totalitarian state and public (health) policy. Thus, it would probably be misleading to attribute the oppositional role of the AfD in the COVID-19 pandemic to the AfD as a purely right-wing party but rather to the AfD as a populist radical right-wing party (Arzheimer and Berning 2019).

With regard to COVID-19 vaccines, which became available in early 2021, the AfD remained skeptical against vaccination and other science-based public (health) policy measures used to contain the spread of the virus. In this study, we cannot offer a systematic review or analysis of policy documents showing what AfD representatives have said about COVID-19 vaccination. Instead, we show typical arguments and lines of argumentation that suffice to plausibly assume that either the AfD contributed to lower vaccination rates among their followers or that people who refuse the COVID-19 vaccination are more likely to have a preference for the AfD.

In the official manifesto of the AfD used in the federal election on 26 September 2021 (AfD Manifesto 2021), 12 of the 200 pages are devoted to health policy, with two pages being devoted to COVID-19 policies in particular. Only one sentence

discusses vaccination. However, this sentence does not speak against vaccination; rather, it claims only that vaccination should stay voluntary. More substantial statements on vaccination can be found in an AfD leaflet, which serves as a guideline for employees in hospitals and nursing homes who were affected by the compulsory vaccination implemented on 15 March 2022 (Alternative für Deutschland 2022):

> "Vaccination cannot end the pandemic. With the omicron variant of the coronavirus, the infection figures are rising again—especially and particularly among those who have already been vaccinated. Yet the government remains stubbornly committed to its plan for universal mandatory vaccination, despite the fact that it will not sufficiently prevent infection or disease."

This quote shows one general feature of the COVID-19 communication of the AfD, namely, they use formulations that are not wrong in a strict sense but are formulated vaguely and thus cannot be proven wrong. Björn Höcke has claimed that COVID-19 vaccination could make the next generation sterile and has called the vaccination gene therapy (Süddeutsche Zeitung 2022). His statement that "we have vaccinations that do not protect" (Plenarprotokoll Thüringer Landtag 2022, p. 20) is another example of an ambiguous formulation because vaccinations protect, but not to 100% (e.g., Tregoning et al. 2021). It is likely that this is a deliberate communication strategy of the AfD to support vaccination refusal, to reflect anger in the population, and to create solidarity between the AfD and segments of the population who disagree with COVID-19 policies. This strategy also puts the AfD in the position to criticize the official COVID-19 strategy from two angles and thus attract two different groups of people to vote for the AfD; the first claims that the vaccination is dangerous and ineffective (without scientific support for this position), and the second criticizes any plan for a compulsory vaccination from a liberal point of view, claiming that compulsory vaccination would restrict freedom, self-determination, and physical integrity.

3 Why Should We Find an AfD Supporter Gap in COVID-19 Vaccination Uptake?

We rely on the health belief model (i.e., a model of behavior change) to conceptualize why and how AfD support affects COVID-19 vaccination uptake. The main premise of this model is that individual beliefs influence health (preventive) behavior. Crucial beliefs that shape health-related behavior are subjective perceptions regarding the risk of contracting a disease (susceptibility) and the seriousness of the disease (severity) as well as potentially positive outcomes (benefits) and material and immaterial costs (barriers) of an action that reduce the threat of a disease (Rosenstock 1974; Green et al. 2020). Research on COVID-19 vaccination intentions and uptake applying the health belief model shows that perceived individual benefits and barriers affect vaccination intention (e.g., Chen 2023, Harutyunyan et al. 2023, Huang and Gerend 2024). Moreover, perceived susceptibility to the disease relates to vaccination intention (e.g., Harutyunyan et al. 2023).

In this study, we argue that AfD support influences health beliefs. The main rationale behind this argument is that the constant criticism of vaccination policies and the emphasis placed on individual freedom by party leaders can reduce vaccination uptake among party supporters, as for example indicated in one study on Italy (Kreps and Kriner 2023). Additionally, research on political identification and vaccination attitudes suggests that individuals at the ideological extremes are more skeptical toward vaccination (e.g., Debus and Tosun 2021). Consequently, the vaccination gap found in Germany may be mainly a result of political ideologies that drive AfD support and vaccination-related health beliefs associated with AfD support.

In this study, we identify four potential domains that may explain lower levels of vaccination uptake among AfD supporters and that are conceptually related to the health belief model. These domains are (i) perceived COVID-19 strain (e.g., distress resulting from policy measures), (ii) personal beliefs and populist attitudes (e.g., fear of infections or worries about the future), (iii) feelings of social exclusion and political representation, and (iv) sociodemographics. The first domain relates to susceptibility to and severity of the illness, and the second domain relates to benefits associated with becoming vaccinated. The third domain relates to perceived barriers. The fourth domain is important because the health belief model suggests socially stratified beliefs.

3.1 COVID-19 Strain

A domain that may explain the AfD gap in vaccination stems from differences in perceived COVID-19 strain. To this end, we tested both an objective and a subjective dimension. The objective dimension refers to personal COVID-19 infection, while the subjective dimension refers to burdens related to the COVID-19 pandemic.

First, differences in COVID-19 infection rates may explain parts of the AfD vaccination gap because for infected individuals, the incentive to get the vaccine may decrease. This might be the case because a personal COVID-19 infection increases one's belief that a vaccination (or a further dose) is no longer necessary (e.g., Hall et al. 2021). Additionally, research on infections and district voting behavior suggests a positive correlation between the AfD voter share and COVID-19 incidence rates (Reuband 2021). Longitudinal evidence from the United States supports this finding by showing that counties with a high share of Trump voters had higher COVID-19 infection rates throughout the first wave of the pandemic. Thus, research suggests that partisanship is associated with the prevalence of COVID-19 infection, which may translate into different vaccination behaviors according to party support.

Second, we assume that differences between potential AfD voters and nonvoters in perceived burdens induced by the COVID-19 pandemic (e.g., fear of job loss, too little contact, or perceived burdens induced by governmental restrictions) relate to differences in vaccination uptake. Such differences in perceived burden are likely to occur when party supporters adhere differently to public health policies. Research indicates that supporters of right-wing and populist parties are more likely than supporters of democratic parties to not comply with public health measures (e.g., Magnus 2022; 2024). Thus, AfD sympathizers may perceive fewer burdens associated with the COVID-19 pandemic in Germany because they demonstrate

a lower level of compliance. Simultaneously, some dimensions of such burdens, such as a loss of social capital, which is a result of distancing policies, are associated with vaccination uptake (e.g., Jaspal and Breakwell 2022; Shea et al. 2022). Note, however, that research on perceived burdens due to COVID-19, partisanship and vaccination is scarce. Thus, it remains mainly an empirically open question whether COVID-19–related burdens are associated with party support and, if so, whether these differences translate into vaccination uptake.

3.2 Personal Beliefs and Populist Attitudes

As already mentioned in Sect. 2 regarding AfD and vaccination, over the course of the pandemic, the AfD has fueled the public discourse with ambiguous statements about vaccination that have been populistic and partly derived from conspiracy theories. In this subsection, we discuss the role of health threat perceptions from COVID-19 infection and populist attitudes in differences in vaccination uptake.

First, research indicates that the perception of a COVID-19 infection as a health threat or a threat to one's own perceived security constitutes a driver of vaccination (e.g., Terry et al. 2022; Ward et al. 2022). This is important for our study because findings from the United States indicate a negative correlation between the identification of a person as a Republican and the risk perception associated with a COVID-19 infection (Kiviniemi et al. 2022). The lowest levels of worry about experiencing COVID-19 were found among Trump supporters, which decreased even further over the course of 2020 by almost 50% (Kaushal et al. 2022, p. 74). Given the findings on partisanship and infections (as mentioned in the previous subsection) and perceived health threats, it appears plausible that these factors also explain parts of the AfD COVID-19 vaccination gap in Germany.

Second, research has indicated that populist attitudes relate negatively to compliance with public health measures (Ehrke et al. 2023). Moreover, COVID-19 pandemic and COVID-19 vaccine-related conspiracy beliefs decrease the likelihood of COVID-19 vaccination (e.g., Kowalska-Duplaga and Duplaga 2023). Research on AfD supporters (i.e., on the propensity for right-wing populism) indicates that they show above-average levels of feeling a loss of control (Hilmer et al. 2017). According to Hilmer et al. (2017), populist attitudes and orientations in Germany stem from worries about the future on a personal level (e.g., having enough money during retirement) and at the state level (e.g., in terms of migration policies). Consequently, it is plausible that COVID-19–related attitudes that refer to future or personal freedom are correlated with vaccination uptake among AfD supporters.

3.3 Social Exclusion and Political Representation

Research indicates that feelings of a lack of social integration and political representation are important drivers of AfD voting behavior. For instance, a study by Sachweh (2020) shows that voting intentions for AfD increase with increasing levels of social exclusion. Additionally, research emphasizes that dissatisfaction with democracy appears to be important for AfD support (e.g., Hansen and Olsen 2019; Klein et al. 2018). Moreover, dissatisfaction with democratic representation and

a low level of trust in democratic institutions are drivers of voting AfD (e.g., Hilmer et al. 2017).

Simultaneously, research on COVID-19 vaccination uptake indicates that trust in the government and feelings related to both social integration and political representation are important predictors of COVID-19 vaccination uptake (e.g., Bajos and Bajos 2022; Carrieri et al. 2023; Paul et al. 2021). Thus, differences in feelings related to societal integration, trust, and political representation may explain parts of the AfD COVID-19 vaccination gap.

3.4 Sociodemographics

Over the last decade, a fruitful discussion on the reasons why individuals vote for the AfD has emerged (e.g., Hartmann et al. 2022; Klein et al. 2018; Lengfeld 2017, 2018; Lengfeld and Dilger 2018; Lux 2018, 2022; Rippl and Seipel 2018, Tutić and von Hermanni 2018; Tutić and Grehl 2021). Despite the discussion on the importance of competing hypotheses (i.e., "cultural backlash" vs. "losers of modernization") that explain AfD support (e.g., Lengfeld 2017, 2018; Lengfeld and Dilger 2018), this research stream indicates that socioeconomic position has a predictive role. With an increasing education level, the amount of support and sympathy given to and identification with the AfD decrease (Klein et al. 2018; Lux 2018; Tutić and von Hermanni 2018). Additionally, labor market status, such as unemployment, type of employment, employment contracts (Lux 2018; Tutić and von Hermanni 2018), and household income (Hartmann et al. 2022; Tutić and von Hermanni 2018), relate to AfD support. Moreover, individuals from lower social layers (e.g., from the *Unterschicht*) are more likely to support the AfD (Lux 2022). Finally, research indicates that sex, migration background, and age are associated with AfD support (e.g., Lengfeld 2017; Lux 2018; Tutić and von Hermanni 2018).

Findings from extensive literature reviews on COVID-19 vaccination suggest that sociodemographic characteristics that influence AfD support (e.g., sex, age, working status, education, household income, and migration background) also influence COVID-19 vaccination uptake (e.g., Mendolia and Walker 2023; Troiano and Nardi 2021). Given the research on AfD and COVID-19 vaccination, it appears plausible that factors that influence both AfD support and vaccination uptake may explain the AfD vaccination gap.

4 Empirical Setup

4.1 Data Set

We rely on monthly, repeated, cross-sectional data drawn from a probabilistic sample of the German population from the Institute for Applied Social Sciences (Infas 2023). The infas panel surveys approximately 1000 respondents aged 18 and over in Germany every month using a multitopic telephone survey. The respondents are recruited offline by random sampling. The sampling follows the well-established Häder/Gabler method, the standard method of the ADM institutes (Arbeitskreis

Deutscher Markt- und Sozialforschungsinstitute e. V.). In this procedure, all telephone numbers used in the field are generated synthetically. The set of all generated telephone number blocks forms the basis for selection, from which individual numbers are then randomly drawn. Due to the arrangement of the selection population, each number contained in a block has the same chance of being selected, regardless of its length. Within the households, the person who last had a birthday and is of legal age is then interviewed. Of the approximately 1000 respondents per month, approximately 500 are drawn from the existing infas panel, while some 500 respondents are additionally recruited by random sampling. In addition to questions on sociodemographics and political and social topics, questions from customers are posed in a changing constellation. These are exclusively from the areas of social and political issues (no market research). This is one reason why the infas panel regularly achieves high response rates of up to 60%.

These data provide information from 11,163 individuals who were surveyed between January 2021 and November 2021 and include information on the vaccination status of individuals as well as detailed information on their social backgrounds, voting intentions, and political and social attitudes. We restricted our data set to the months between March and October, which reduces the number of cases to 8114. The two main reasons for this data restriction are as follows: (1) We excluded January and February because only high-risk groups could be vaccinated at this time, and (2) from November onward, some items on attitudes related to the COVID-19 pandemic were no longer included in the multitopic data set. Due to missing data, we excluded 334 further cases. Thus, the final data set uses information from 7780 individuals representing March to October 2021.

4.2 Measures

The outcome under study is vaccination uptake. To this end, we created a binary indicator stemming from the following survey question: "Have you been vaccinated against the coronavirus?" The AfD support variable stems from the classic poll question (in Germany, it is called the "Sunday question"): "Which party would you vote for if federal elections were held next Sunday?"

Regarding sociodemographic characteristics, we included a metric age variable, a dummy variable indicating male sex, a dummy variable indicating whether a person was unemployed, and a further dummy indicating whether a person was a "worker." Moreover, we included three categorical variables. First, we included a variable indicating whether a person had no migration background or was a first- or second-generation migrant. Second, we included an education variable, which categorizes individuals into five groups: (i) no formal school degree, (ii) a degree from the vocational training system, (iii) a tertiary degree below the university level, (iv) a university degree, or (v) still in education. Third, we relied on a net household income variable with seven categories (less than 1000, 1000–1999, 2000–2999, 3000–3999, 4000–4999, 5000–5999, and 6000 or more).

For COVID-19 strain, we relied on four measures. To approximate a more objective domain of strain, we used a dummy variable indicating whether respondents reported having had a COVID-19 infection. To approximate a more subjective do-

main of strain, we used answers to the following questions: "People deal with the coronavirus crisis differently. What is it like for you personally? I will now read out some statements to you. Please tell me to what extent they apply to you. (i) I am afraid for my job or training position; (ii) The restrictions in daily life burden me; (iii) I have too little contact with other people and often feel lonely." Answers were given on a five-point Likert scale ranging from "fully agree" to "fully disagree."

For personal beliefs, we relied on two answers to the following questions: "People deal with the coronavirus crisis differently. What is it like for you personally? I will now read out some statements to you. Please tell me to what extent they apply to you. (i) I am afraid of catching the coronavirus; (ii) I fear for my personal safety because of the coronavirus crisis." Again, the respondents answered on a five-point Likert scale.

For COVID-19-related attitudes, we relied on four answers to the following questions: "For each of the following statements, please say to what extent you agree or disagree with them. As a result of the coronavirus crisis: (i) ... the state is getting itself into far too much debt; (ii) ... freedom and civil rights are at risk; (iii) ... the economy is overburdened; (iv) ... our pensions are no longer safe." Again, respondents were asked to answer on a five-point Likert scale ranging from "fully agree" to "fully disagree."

To measure trust, we used answers to the following question: "As a result of the coronavirus crisis, my trust in the government's actions has increased." Answers ranged from "fully agree" to "fully disagree." For political representation, we used answers to the question "As a citizen, you can feel differently represented by politics. How do you feel personally?" Answers ranged from 1, "I do not feel represented at all," to 10, "I feel very well represented." To measure social integration, we relied on the following survey question, which measures social participation: "One can have the feeling of taking part in society and belonging to it, or one can feel more excluded. Which is true for you? To what extent do you feel more integrated in or more excluded from society?" Answers ranged from 1, "I feel integrated," to 10, "I feel excluded."

4.3 Methods

Because we used a binary outcome variable, we employed logistic regression models. We tested each potential domain that may bring about the AfD vaccination gap separately before estimating the full model, in which we included all factors under study.[1] Based on the full model, we employed the well-established Karlson-Holm-Breen (KHB) decomposition model (Karlson et al. 2012). In all tables, we present the average marginal effects (Mood 2010). Moreover, every model accounts for the month of the interview and the federal state that respondents lived in.

Because our AfD support indicator variable takes on a value of 1 if individuals state they would vote for the AfD in the next election and 0 otherwise, we ran some robustness checks, which removed some groups from the 0 category. First,

[1] Note that the employed constructs only marginally or moderately correlate with each other. Table A4 in the Online Appendix provides an overview.

Table 1 Differences in sociodemographics and COVID-19 strain by Alternative for Germany (AfD) support

	Nonsupporters $N=$ 7501	AfD supporters $N=279$		Nonsupporters $N=$ 7501	AfD supporters $N=279$
Sample share	96.4	3.6			
Sociodemographics			*COVID-19 strain*		
Mean age	58.2	56.6	Personal COVID-19 infection	3.3	5.0
Male*	51.9	73.7	Fear of job loss*		
First-generation migrant	7.4	9.0	1: Fully agree	1.6	4.3
Second-generation migrant	8.1	8.3	2	1.8	2.2
Worker*	6.0	13.7	3	1.9	3.6
Not employed	43.2	45.7	4	12.1	12.7
Education*			5: Fully disagree	80.7	76.3
No degree	3.9	5.4	Missing information	1.9	1.1
Vocational education	34.4	52.5	Perceived burden by restrictions*		
Tertiary education below university	22.3	20.5	1: Fully agree	11.8	31.7
University	34.9	19.1	2	16.8	18.4
In school	2.2	1.1	3	23.0	16.9
Missing information	2.3	1.4	4	25.0	15.5
Net household income*			5: Fully disagree	23.3	17.6
Up to 999 euros	2.5	7.9	Missing information	0.1	0.0
1000–1999 euros	10.3	13.3	Too few contacts		
2000–2999 euros	16.2	13.3	1: Fully agree	10.8	14.4
3000–3999 euros	15.3	16.2	2	16.7	14.4
4000–4999 euros	12.8	10.4	3	18.6	17.3
5000–5999 euros	10.2	8.6	4	25.5	21.2
6000 euros or more	14.5	11.5	5: Fully disagree	28.3	32.7
Missing information	18.2	18.7	Missing information	0.1	0.0

$N=7780$. Data are from the Institute for Applied Social Sciences multitopic survey, including waves from March to October 2021
*Indicates statistically significant differences according to chi^2 tests

we excluded left-wing voters. Second, we excluded individuals from the 0 category who did not give a valid response to the Sunday question. Third, we removed all undecided individuals and nonvoters from the 0 category. Fourth, we applied all three steps simultaneously. The results remain mainly unaffected. Additionally, we reproduced our analysis with the actual voting behavior from the last federal election, and the results again remain mainly unaffected. Finally, we changed the dependent variable to vaccination hesitancy, which takes on a value of 1 if respondents state that they will not get vaccinated, are still indecisive, or will wait a little longer. (Table A3 in the Online Appendix summarizes the findings from the abovementioned robustness checks.)

Table 2 Differences in populist attitudes, personal beliefs, and feelings of social exclusion and political representation by Alternative for Germany (AfD) support

	Nonsupporters $N=7501$	AfD supporters $N=279$		Nonsupporters $N=7501$	AfD supporters $N=279$
Populist attitudes			*Personal beliefs*		
Pandemic is a threat to personal freedom and civil rights*			Fear of COVID-19 infection*		
1: Fully agree	14.6	60.8	1: Fully agree	11.3	9.0
2	15.9	15.8	2	13.7	5.4
3	16.2	7.2	3	15.3	8.6
4	31.5	10.1	4	29.2	25.5
5: Fully disagree	21.5	5.4	5: Fully disagree	30.5	51.4
Missing information	0.4	0.7	Missing information	0.1	0.0
Pandemic overburdens economy*			Fear for personal safety due to pandemic*		
1: Fully agree	17.1	45.3	1: Fully agree	2.5	10.1
2	24.6	19.1	2	4.9	7.9
3	27.0	18.4	3	7.5	5.8
4	23.0	11.9	4	28.4	25.9
5: Fully disagree	7.5	3.6	5: Fully disagree	56.6	50.4
Missing information	0.9	1.8	Missing information	0.3	0.0
Too much state debt during the pandemic*			*Social exclusion and political representation*		
1: Fully agree	30.9	71.9	Feelings of social exclusion*	3.7	4.9
2	26.5	15.8	Feeling politically represented*	5.1	2.8
3	17.9	5.8	COVID-19 pandemic increases trust in government*		
4	17.9	4.0	1: Fully agree	2.7	4.0
5: Fully disagree	5.4	1.1	2	9.0	1.8
Missing information	1.4	1.4	3	23.4	5.8
Due to the pandemic, pensions not being saved anymore*			4	38.7	25.2
1: Fully agree	11.2	40.7	5: Fully disagree	25.6	62.6
2	17.5	25.2	Missing information	0.6	0.7
3	18.5	12.6			
4	34.4	14.4			
5: Fully disagree	14.7	5.4			
Missing information	3.8	1.8			

$N=7780$. Data are from the Institute for Applied Social Sciences multitopic survey, including waves from March to October 2021

*Indicates statistically significant differences according to chi^2 tests

5 Results

5.1 Differences Between AfD Supporters and Nonsupporters

Before turning to our multivariate results, we describe the bivariate differences between AfD supporters and nonsupporters in the four domains outlined in Sect. 3. Table 1 indicates that differences in sociodemographic characteristics exist. Although Table 1 displays no statistically significant differences according to age, employment status, or migration background, compared to females, males appear more likely to support the AfD (share of male nonsupporters: 73.7% vs. 51.9% among AfD supporters, respectively). Additionally, the share of workers is more than twice as high among AfD supporters (13.7%) compared to nonsupporters (6.0%). Moreover, our data indicate pronounced differences by education level and some differences by income groups. University-educated individuals are less likely to support the AfD, while individuals with no education or a vocational education are more likely to support the AfD. Table 1 also indicates that lower-income groups tend to support AfD more often than higher-income groups. Note, however, that the differences between supporters and nonsupporters are rather small.

The right-hand side of Table 1 displays differences by COVID-19 strain. While no statistically significant differences between supporters and nonsupporters exist with regard to personal infection or feelings of isolation, differences in fear of job loss and perceived burdens induced by COVID-19 policies do exist. To this end, Table 1 indicates that the differences in fear of job loss are rather small. The most pronounced differences in COVID-19 strain stem from perceived burdens. Almost one-third of AfD supporters stated that COVID-19–related policy measures placed a great burden on their daily lives, whereas only one-tenth of nonsupporters perceived high levels of burdens related to COVID-19 policies.

Table 2 reports differences in personal beliefs, populist attitudes, feelings of social exclusion, and political representation between AfD supporters and nonsupporters. The left-hand side of Table 2 indicates pronounced differences in populist attitudes related to COVID-19. Almost two-thirds of AfD supporters held the opinion that the pandemic was a threat to personal freedom and civil rights. However, only 14.6% of nonsupporters held this opinion; in contrast, more than 50% of nonsupporters did not think that the pandemic was a threat to personal freedom or civil rights. Moreover, compared to nonsupporters, AfD supporters were far more likely to believe that the COVID-19 pandemic might have negative consequences at the state level. To this end, Table 2 indicates that AfD supporters were far more likely than nonsupporters to state that the pandemic overburdened the economy (45.3% vs. 17.1%, respectively), induced too much state debt (71.9% vs. 30.9%, respectively), and was a threat to future pensions (40.7% vs. 11.2%, respectively).

The right-hand side of Table 2 also indicates pronounced differences in personal beliefs. Fears of personal COVID-19 infection appeared less often among AfD supporters, and AfD supporters stated more often that they feared for their personal safety during the pandemic. Additionally, Table 2 indicates that AfD supporters had higher levels of feeling socially excluded (4.9 vs. 3.7, respectively) and lower levels of feeling politically represented (2.8 vs. 5.1, respectively). Additionally,

Table 3 Explaining the Alternative for Germany (AfD) vaccination gap: null model, sociodemographics, and COVID-19 strain

	(1) AME (se)	(2) AME (se)	(3) AME (se)
AfD support (0 = no/1 = yes)	–0.28*** (0.03)	–0.24*** (0.02)	–0.23*** (0.03)
Sociodemographics			
Age		0.01*** (0.00)	
Male (0 = no/1=yes)		–0.02+ (0.01)	
Migration background (reference: none)			
First-generation migrant		–0.07*** (0.02)	
Second-generation migrant		–0.04** (0.02)	
Worker (0 = no/1=yes)		–0.04* (0.02)	
Unemployed (0 = no/1=yes)		0.03** (0.01)	
Education (reference: no degree)			
Vocational education		–0.01 (0.02)	
Tertiary education below university		0.01 (0.02)	
University		0.04* (0.02)	
In school		0.12*** (0.03)	
Net household income (reference: < 1000 euros)			
1000–1999 euros		0.05 (0.03)	
2000–2999 euros		0.09** (0.03)	
3000–3999 euros		0.09*** (0.03)	
4000–4999 euros		0.11*** (0.03)	
5000–5999 euros		0.13*** (0.03)	
≥6000 euros		0.12*** (0.03)	
COVID-19 strain			
COVID-19 infection (0 = no/1=yes)			–0.15*** (0.03)
Fear of job loss (reference: fully agree)			
Agree			0.10+ (0.05)
Partly agree			0.10+ (0.05)
Partly disagree			0.20*** (0.04)
Fully disagree			0.29*** (0.04)
Perceived burden by restrictions (reference: fully agree)			
Agree			0.09*** (0.02)
Partly agree			0.11*** (0.02)
Partly disagree			0.16*** (0.02)
Fully disagree			0.17*** (0.02)
Too few contacts (reference: fully agree)			
Agree			–0.04* (0.02)
Partly agree			0.01 (0.02)
Partly disagree			–0.03+ (0.02)
Fully disagree			–0.05*** (0.02)

Table 3 (Continued)

	(1) AME (se)	(2) AME (se)	(3) AME (se)
N observations	7780	7780	7780
Pseudo-R^2	0.31	0.38	0.35
Chi^2	3016.08	3733.16	3431.39

Significance levels: + 0.10; *0.05; **0.01; ***0.001. AME = Average Marginal Effects.
Dependent variable: binary indicator of vaccination status (1 = yes/0 = no). The table displays average marginal effects. Constant not shown. Control variables: state and interview fixed effects (not displayed; included in all models). Values of missing categories of items are not displayed. Data are from the Institute for Applied Social Sciences multitopic survey, including waves from March to October 2021

Table 2 clearly indicates lower levels of trust in the government. Two-thirds of AfD supporters fully disagreed with the claim that the COVID-19 pandemic increased one's trust in the government, while only one-fourth of nonsupporters fully disagreed with this claim.

In sum, this subsection provides empirical insights into the differences between AfD supporters and nonsupporters in 2021. According to our data, differences in sociodemographics and COVID-19 strain appear moderate, while differences in beliefs, attitudes, and feelings of social exclusion and political representation appear pronounced. In the next subsection, we will elaborate on whether the presented differences can account for differences in vaccination uptake.

5.2 Main Results

Tables 3 and 4 display findings from partial logistic regression models. The first model presented in Table 3 indicates the already mentioned vaccination gap of 28 percentage points. The second model introduces sociodemographic characteristics, which reduce the marginal effect of the AfD-support dummy slightly to 23.5 percentage points. The marginal effects of the sociodemographic characteristics corroborate the findings of the COVID-19 vaccination literature, which indicates that age, sex, migration background, employment, education, and incomes are related to vaccination uptake. Model 3 introduces variables approximating COVID-19 strain. Again, the marginal effect of the AfD-support dummy decreases to 23 percentage points. Interestingly, individuals with forgone COVID-19 infection were more likely not to be vaccinated. While feeling socially isolated is correlated only weakly with vaccination uptake, individuals who did not fear job loss and who did not perceive high burdens related to COVID-19 policies were more likely to be vaccinated.

Model 4 in Table 4 indicates that the marginal effect of the AfD-support dummy decreases greatly to 13.5 percentage points when we add items related to personal beliefs and attitudes. The main effects of the items indicate that being very afraid of a COVID-19 infection only moderately relates to vaccination uptake. Additionally, individuals who did not perceive the pandemic as a threat to their personal safety show higher vaccination levels. The state debt and overburden items appear not to have much predictive power. In contrast, individuals who strongly agreed with the thought that the COVID-19 pandemic was a threat to their personal freedom and

Table 4 Explaining the Alternative for Germany (AfD) vaccination gap: personal beliefs, populist attitudes, social exclusion, political representation, and full model[a]

	(4) AME (se)	(5) AME (se)	(6) AME (se)
AfD support (0 = no/1=yes)	–0.14*** (0.02)	–0.16*** (0.03)	–0.09*** (0.02)
Sociodemographics			✓
COVID-19 strain			✓
Personal beliefs and populist attitudes			✓
Fear of COVID-19 infection (reference: fully agree)			
Agree	–0.04* (0.02)		
Partly agree	–0.04** (0.02)		
Partly disagree	–0.03+ (0.02)		
Fully disagree	–0.02+ (0.01)		
Fear for personal safety due to pandemic (reference: fully agree)			
–	0.02 (0.03)		
Partly agree	0.05 (0.03)		
Partly disagree	0.07** (0.03)		
Fully disagree	0.08** (0.03)		
Too much state debt during the pandemic (reference: fully agree)			
Agree	–0.01 (0.01)		
Partly agree	–0.03* (0.01)		
Partly disagree	–0.03* (0.01)		
Fully disagree	–0.03 (0.02)		
Pandemic is a threat to personal freedom and civil rights (reference: fully agree)			
Agree	0.14*** (0.02)		
Partly agree	0.20*** (0.02)		
Partly disagree	0.23*** (0.02)		
Fully disagree	0.24*** (0.02)		
Pandemic overburdens economy (reference: fully agree)			
Agree	–0.01 (0.01)		
Partly agree	0.02 (0.01)		
Partly disagree	0.05*** (0.02)		
Fully disagree	0.03 (0.02)		
Due to the pandemic, pensions not being saved anymore (reference: fully agree)			
Agree	0.02 (0.02)		
Partly agree	0.03+ (0.02)		
Partly disagree	0.07*** (0.02)		
Fully disagree	0.08*** (0.02)		
Social exclusion and political representation			✓
Feeling politically represented		0.02*** (0.00)	
Feeling socially excluded		–0.01*** (0.00)	
Pandemic increases trust in government (reference: fully agree)			
Agree		0.01 (0.03)	
Partly agree		0.02 (0.03)	
Partly disagree		–0.00 (0.03)	
Fully disagree		–0.07* (0.03)	

Table 4 (Continued)

	(4) AME (se)	(5) AME (se)	(6) AME (se)
N observations	7780	7780	7780
Pseudo-R^2	0.36	0.35	0.44
Chi^2	3593.12	3415.08	4349.45

Significance levels: + 0.10; *0.05; **0.01; ***0.001. *AME* Average Marginal Effects.
[a]Table A1 in the Online Appendix displays the full model
Dependent variable: binary indicator of vaccination status (1 = yes/0 = no). The table displays average marginal effects. Constant not shown. Control variables: state and interview fixed effects (not displayed; included in all models). Values of missing categories of items not displayed. Data are from the Institute for Applied Social Sciences multitopic survey, including waves from March to October 2021

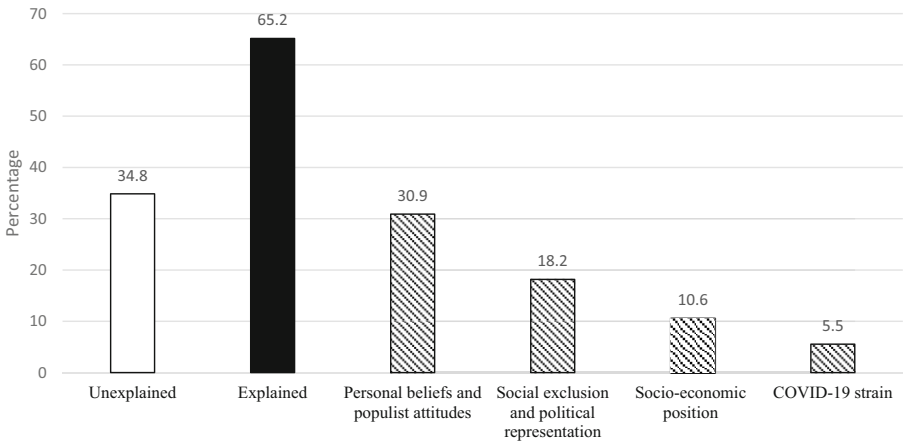

Fig. 2 Unexplained and explained share of the Alternative for Germany (AfD) vaccination gap by explanatory factor. $N = 7780$; $N_{Non-AfD-Supporters} = 7501$; $N_{AfD-Supporters} = 279$. (Data: Institute for Applied Social Sciences multitopic survey, including waves from March to October 2021)

civil rights show the lowest levels of vaccination uptake. This strong correlation hints toward a reluctance toward mandatory vaccination and public health measures in general during the pandemic. Furthermore, this attitude may explain greater parts of the AfD vaccination gap within the decomposition model.

The results of model 5 shown in Table 4 also indicate a pronounced decrease of the AfD-support dummy to 15.7 percentage points due to the addition of variables related to social exclusion and political representation. The main effects of the added variables indicate that with a 1-point increase in political representation, the vaccination probability statistically significantly increases by 2.4 percentage points. With increasing feelings of social exclusion, the vaccination probability decreases by 1.3 percentage points. Moreover, individuals who fully disagreed with the statement that the pandemic increased one's level of trust in government were less likely to be vaccinated.

Figure 2 shows the findings from a KHB decomposition and indicates that our full model (model 6; coefficients displayed in Table A1 in the Online Appendix) explains

approximately 65% of the AfD vaccination gap. The largest parts of the variation decrease can be attributed to personal beliefs and populist attitudes, which reduce the overall vaccination gap by approximately 31 percentage points. Our analysis indicates that the perception of the pandemic as a threat to personal freedom and civil rights appears to be the most important attitude. Moreover, feelings of social exclusion and political representation account for approximately 18 percentage points of the AfD-related variation in COVID-19 vaccination. Our analysis indicates that feelings of political exclusion are especially important. The role of sociodemographics and COVID-19 strain is less important.

6 Discussion and Conclusion

Based on repeated cross-sectional data from a probabilistic sample of the German population (Infas 2023) for 2021, this study investigated the vaccination gap between AfD supporters and nonsupporters. Expectations regarding why a vaccination gradient may emerge were derived from the health belief model (e.g., Rosenstock 1974; Green et al. 2020), research on the AfD, and acceptance of public health measures during the COVID-19 pandemic. Our central results are as follows.

First, we found a pronounced gap in vaccination uptake of 28 percentage points. Second, this gap was found to be mainly related to differences in political attitudes toward the COVID-19 pandemic and feelings of missing political representation between AfD supporters and nonsupporters. Differences in sociodemographic characteristics and COVID-19 strain (i.e., personal infection, social isolation, perceived burden due to restrictions, and fear of job loss) could not account for much variation in vaccination uptake.

Our finding that missing political representation is strongly associated with both AfD support and the vaccination gap indicates that the political climate prior to a pandemic influences the acceptance rate of public health measures. This finding suggests that the more a political climate shifts toward antigovernment attitudes, the higher the level of reluctance toward public health measures will be, which may affect other non–COVID-19–related preventive public health policies, such as those aimed at preventing illness from heat.

Moreover, given the strong association between political representation and vaccination uptake, government-induced policies that solely focus on freedom of choice will not motivate certain parts of society to follow the intended policy (in our case, COVID-19 vaccination). That would imply that governments may find themselves in a dilemma between introducing mandatory public health measures (because voluntary measures do not reach certain reluctant groups) and opposition against precisely these mandatory measures from groups concerned about freedom and civil rights. Additionally, the result regarding this particular attitude may indicate that civil movements, which focus on fears and worries related to civil rights and personal freedom during a pandemic, have the potential to limit the intended result of public health measures.

Furthermore, the results of this study indicate that high levels of perceived burdens related to restrictions that are partly the result of a low vaccination rate do not

translate into vaccination uptake. This finding appears counterintuitive and emphasizes that factors such as attitudes toward the state outweigh the potential individual gains of ending a pandemic sooner by adhering to a public health measure. Interestingly, our research also corroborates COVID-19 vaccination studies that have indicated only a small influence of fear of infection on vaccination uptake (e.g., Karlsson et al. 2021). Moreover, our results suggest lower vaccination uptake rates among infected individuals. Thus, in future pandemics or epidemics, vaccination policies should emphasize the important role of booster shots.

Of course, our study has some limitations. First, because the share of potential AfD voters in our sample is smaller than results from polls in 2021 on voting intentions suggest (Wahlrecht 2025), the AfD indicator used may suffer from social desirability bias, which should reduce population representativeness in this regard. Social desirability bias may lead to an underestimation of the vaccination gap and the importance of the investigated domains under study. Social desirability bias may be an important source of bias in our study if certain groups are less likely to report AfD support. This may be the case, for instance, for some sociodemographic groups (e.g., highly educated and high-income groups). Unfortunately, the data at hand neither allow a nondirective identification of an individual's AfD propensity (e.g., via certain questions that measure one's general political attitudes) nor entail a metric AfD vote probability, which could reduce the social desirability bias in the outcome. Moreover, research comparing responses to COVID-19 vaccination questions in anonymous settings with interviewer-present scenarios indicates that such questions suffer from social desirability bias (Wolter et al. 2022). In our study, it is hard to judge which of these two biases is more problematic, especially when we assume that certain social groups, such as the highly educated, react differently when asked about AfD support and vaccination (e.g., the highly educated might be more inclined to be dishonest when stating AfD support but more trustworthy when reporting vaccination status). Future research should seek to account for both forms of social desirability bias to validate the findings of this study.

Additionally, due to the cross-sectional nature of our data, our results may suffer from reversed causality (e.g., the relationship between perceived safety during the pandemic and vaccination uptake is unclear). Last, while the data comprise many important factors that relate to vaccination uptake, some factors, such as perceived vaccine safety (e.g., Mouter et al. 2022) or generalized trust (e.g., Eisnecker et al. 2022), are missing, which may further reduce the unexplained part of the AfD gap in COVID-19 vaccination uptake.

Nevertheless, our study offers important insights into inequality in COVID-19 vaccination uptake, which may be important for policymakers in future epidemics or pandemics. Simultaneously, our results emphasize that political attitudes, as well as feelings of political participation, should be incorporated in future work on other important vaccination schemes, such as those related to influenza.

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