



Examining American attitudes toward vaccination during the COVID-19 pandemic from the perspective of negative and positive rights

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Abstract



We examine the likely acceptance of the COVID-19 vaccine in the period prior to political polarization around vaccine mandates. Two representative cross-sectional surveys of 1,000 respondents were fielded in August and December 2020. The surveys included items about the COVID-19 vaccine and vaccine mandates. Respondents self-identifying as liberal were the least likely to believe the vaccine had undisclosed harmful effects ($p < .001$), conservatives were the most likely ($p < .001$), and moderates fell in between. Individuals with a bachelor's degree were less likely to think the vaccine had undisclosed harmful effects than individuals without a bachelor's degree ($p < .001$), and 60.5% of those individuals did not support a government vaccine mandate. Political ideology was more often strongly associated with avoiding government involvement compared to education level. In summary, both liberal political ideology and higher education were significantly associated with endorsing intended vaccine uptake. We discuss these results in terms of positive versus negative rights.

Keywords: COVID-19; vaccination; public health; political ideology; education; positive and negative rights

Introduction

Since March 2020, the American public has engaged in debates about the efficacy of masks and social distancing, the closure of businesses and schools, and the safety of vaccines in response to the COVID-19 pandemic. Such preventive measures are not inherently associated with a specific political ideology. However, ideology may inform our understanding of health behaviors and thus help explain disparate health outcomes, as well as the justification for government intervention in public health crises.

One aspect of ideology that often separates liberals and conservatives lies in the attitudes toward the public's relationship to the state, and the state's ability to infringe on individual rights or its responsibility to protect individual welfare. Philosophically, this can be examined as the difference between positive and negative rights, which has a long history in political philosophy. Negative rights usually involve freedom from interference by another person or institution (Capone, 2011). For example, laws prohibiting random searches and seizures of private property constitute a negative right. Positive rights differ in that they represent the obligation of the government to provide a service or good to individuals (Foldvary, 2011). High-quality basic health care and education constitute positive rights. Education has profound effects on health outcomes. For example, having regular mammograms has only minor

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effects on life expectancy. The benefits of controlling elevated LDL cholesterol increase life expectancy by only a few months (Kaplan, 2019). However, the difference between having less than a high school education and a graduate degree is associated with a 12-year differential in life expectancy. Some people believe that educational attainment is the single best predictor of life expectancy (Kaplan *et al.*, 2015). Similarly, there has been extensive discussion about the relationship between political ideology and vaccine acceptance. For these reasons, we felt that concentrating on these two variables was justifiable in terms of both the extant literature and public interest.

Negative and positive rights are usually important in the context of the relationship between an individual and a government. Generally, liberals tend to be more concerned with positive rights, whereas conservatives tend to demonstrate more regard for negative rights (Wildavsky & Dake, 1990). Mandating masks, social distancing, and vaccines can be interpreted as necessary actions to protect the public's health, or as unjustified infringements on constitutionally guaranteed individual liberties. Although we do not formally test for positive and negative rights in our study, this perspective can help us understand the differences we observe. While the associations we find between various aspects of vaccine mandates and positive and negative rights are speculative, our study is informed by centuries of such associations in the context of divergent responses within political philosophy. Here we provide a demonstration of variance in response to government involvement in the context of vaccine mandates.

In this article, we report results from repeated demographically representative samples of 1,000 Americans in the early phases of the COVID-19 pandemic. Specifically, this study examines the acceptance of preventive measures, such as the COVID-19 vaccine, and the association of this acceptance with political ideology and education. The study focuses on data collected in the fall of 2020, when expectations for the potential of the vaccines to end the pandemic were high and before there were significant vaccine disinformation campaigns. This allows a stronger analysis of ideological attitudes with less influence from other social and political factors. We investigate the hypothesis that even before there had been public discussions of vaccine mandates, support for mandates was associated with political ideology and educational attainment. Based on the literature and expectations noted above, we explore the following hypotheses:

H1: Political conservatives are less likely to endorse vaccine mandates than political liberals.

H2: More educated people are more likely to endorse vaccine mandates than less educated people.

Methods

Study population

Participants were members of the YouGov proprietary opt-in survey panel, which includes 1.8 million U.S. residents (YouGov, *n.d.*). Participants were recruited using online advertising campaigns targeting respondents based on the keywords they used for Google searches. The use of specific keywords prompted an invitation from YouGov to be screened for membership on a panel. All recruited members provided consent. Internal checks were used to confirm that each participant was new and that the provided address was valid. The survey was designed to take 20–25 minutes of the participant's time. To compensate them for their time, respondents were given "YouGov points" for their participation. These points could be exchanged for cash, gift cards, airline miles, and other vouchers.

In this study, we report evidence from two independent cross-sectional surveys. The first survey was completed between August 20 and August 27, 2020, and the second survey was completed between December 16 and December 22, 2020. YouGov interviewed 1,196 (August) and 1,100 (December) respondents who were then matched down to a sample of 1,000 to produce the final data set for each period. Respondents were obtained from all 50 U.S. states, the District of Columbia, and all U.S. territories. While the August and December surveys were independent cross-sectional samples, the demographic distribution between the two samples was nearly identical.

We focus on 2020 because it precedes public debate about vaccine mandates. The first survey was completed before the outcomes of vaccine clinical trials were available, while the second survey captured

the period immediately after the first Emergency Use Authorizations for vaccines. At the time, both President Donald Trump and President-Elect Joe Biden strongly promoted vaccine distribution. In December 2020, there was little discussion about vaccine hesitancy and significant competition to gain access to vaccination. At this point, there was almost no expressed concern regarding the safety of the vaccines, since the initial clinical trials indicated that the vaccines were both safe and highly effective. The debate over vaccine mandates had not yet commenced.

Weighting

The respondents were matched to a sampling frame on sex, age, race, and education. The frame was constructed by stratified sampling from the full 2018 American Community Survey one-year sample with selection within strata by weighted sampling with replacements (using the person weights on the public use file). The matched cases were weighted to the sampling frame using logistic regression-based propensity scores. Variables in the propensity score model included age, sex, race/ethnicity, years of education, and region of residence. The propensity scores were grouped into deciles in the frame and poststratified according to these deciles. The weights were then poststratified according to 2016 presidential vote choice, smoking status, general health condition (benchmarks obtained from the 2017–2018 National Health and Nutrition Examination Survey adult sample), and a four-way stratification of sex, age (four categories), race (four categories), and education (four categories) to produce the final weight (Franco et al., 2017).

Validity of sampling

YouGov polling methods have been quite accurate when compared with publicly verifiable events, such as elections (Twyman, 2008). For example, self-reported votes in both the 2016 and 2020 presidential elections closely corresponded to the actual popular vote (Lauderdale et al., 2020). Table S1 in the Supplementary Material shows the weighted demographic distributions for the August and December study samples in comparison to the expected distribution in the U.S. population. The dependent variables were the likelihood of getting vaccinated (Figures 1, 3), support for a vaccine mandate (Figures 2, 4), and belief in the vaccine's harmful effects (Figure 5). The questions are shown in the Supplementary Material (Tables S2 and S3 and Appendix S5). "Agree" responses were coded as 1 and "disagree" responses as 2. For the regression analyses, these variables were dummy coded 1 for agree and 0 for disagree.

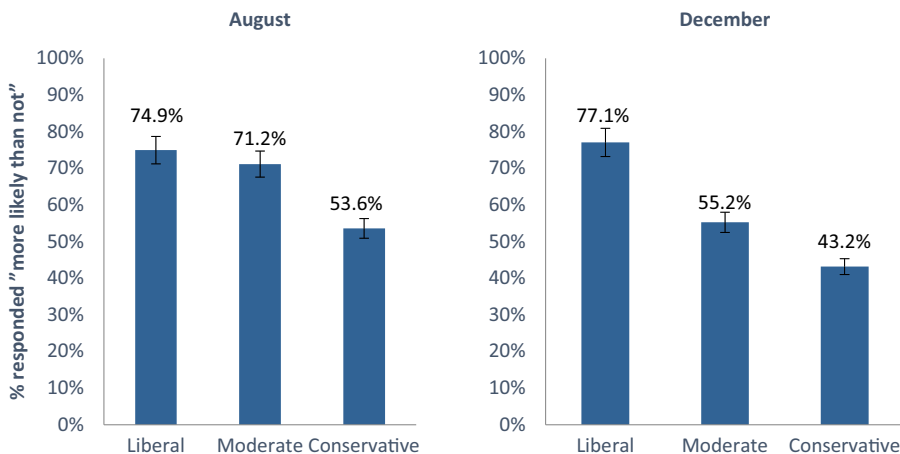


Figure 1. Stated likelihood of getting vaccinated, by ideology.

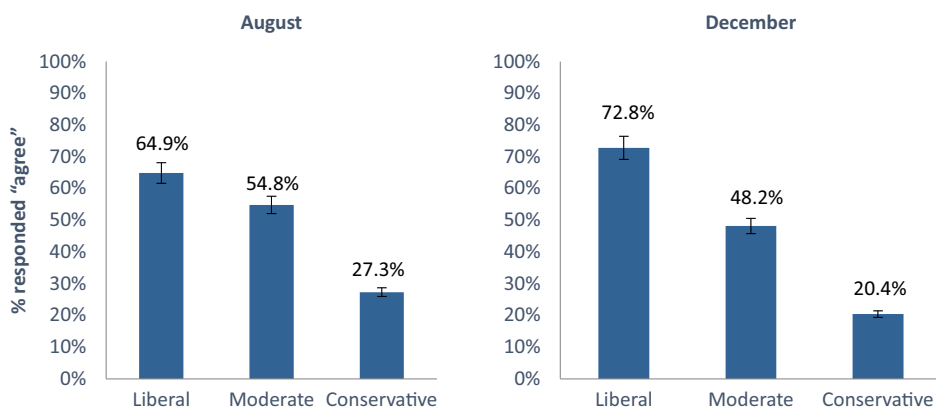


Figure 2. Support for a vaccine mandate, by liberal, moderate, or conservative ideology.

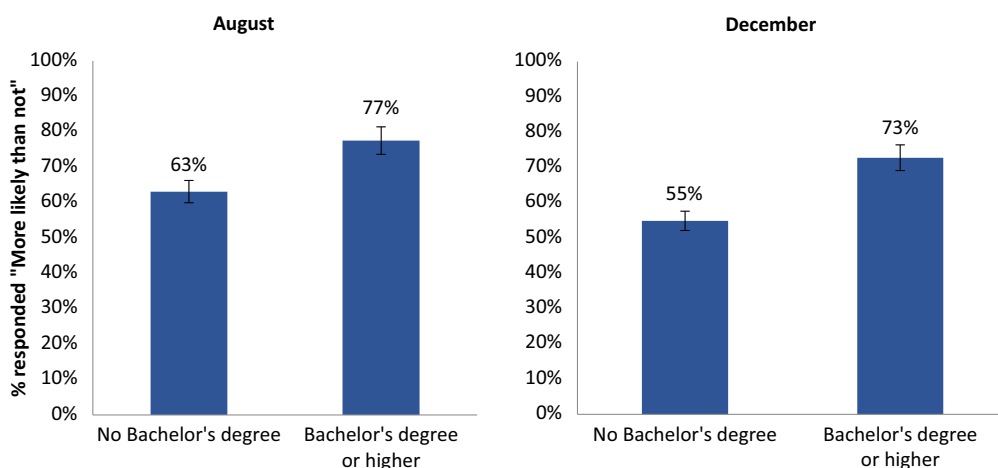


Figure 3. Likelihood of getting vaccinated, by completion of bachelor's degree.

The survey included a wide range of topics that related to the pandemic in some manner. The questions included in this analysis centered on the participant's political ideology, education level, and feelings toward vaccines, vaccine mandates, and the safety of the vaccines. The survey included demographic variables, such as sex, race, marital status, region of residence, and education. Using a question from the Pew Research Center, respondents were asked, "Would you describe yourself as a 'born-again' or evangelical Christian, or not? (yes or no)." Relevant questions from the survey are included in the [Supplementary Material](#).

The original survey asked individuals to self-identify as "very liberal," "liberal," "moderate," "conservative," or "very conservative." For some analyses, the categories "very liberal" and "liberal" were combined, as were the categories "very conservative" and "conservative." Similarly, the original survey asked individuals to identify the highest level of education they received as "no high school," "high school graduate," "some college," "2-year college," "4-year college," or "post-graduate education." For clarity, the categories "no high school," "high school graduate," "some college," and "2-year college" were combined into a new category, "no bachelor's degree." The categories "4-year college" and "post-graduate education" were combined into the category "bachelor's degree."

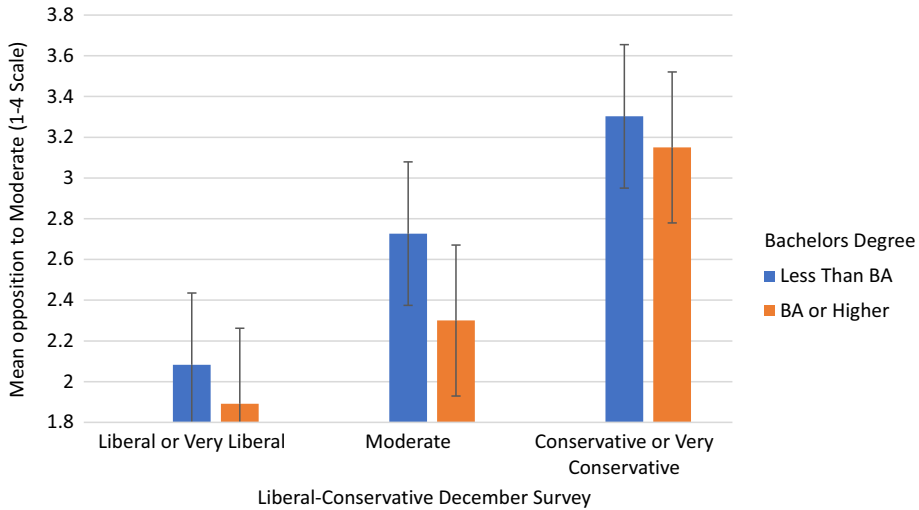
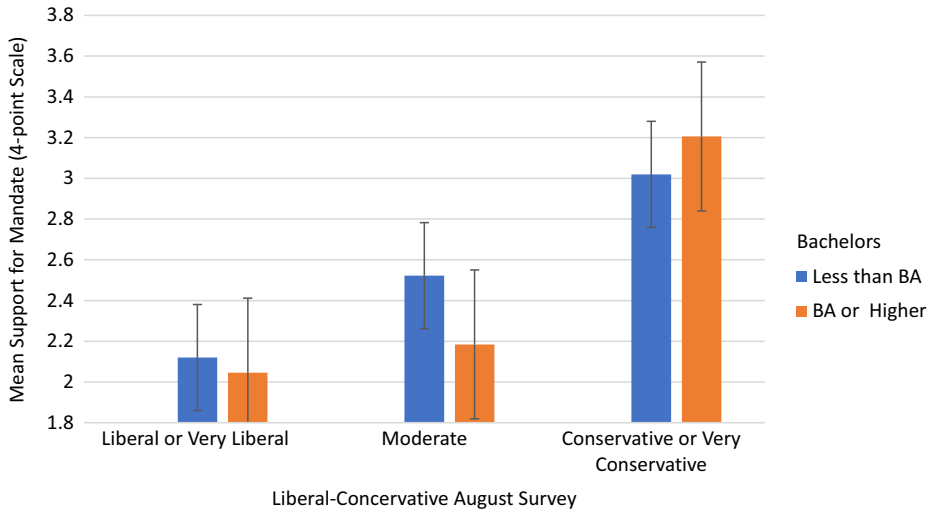


Figure 4. Opposition to vaccine mandate, by political ideology and education in August (top panel) and December (bottom panel). Response scale is 1 = strongly support, 2 = support, 3 = oppose, 4 = strongly oppose. Error bars are standard deviations.

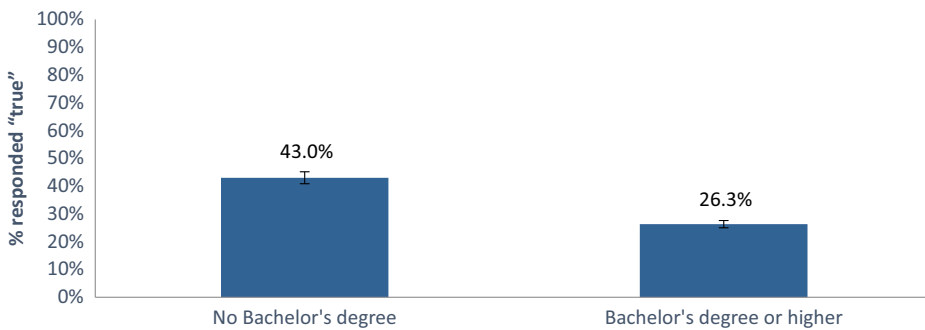


Figure 5. Percentage of individuals who responded “true” to the question “Do you think the following statement is true, or false? ‘Vaccines have harmful effects which are not being disclosed to the public,’ by completion of bachelor’s degree.

Analysis

The data were weighted, as described earlier, before they were analyzed using Crunch.io, a survey research analysis program that is constructed as a front end for the R analysis system. Univariate analyses were conducted for each survey question. Comparisons for scaled outcomes were made using univariate analysis of variance. The Tukey HSD method was used to compare individual means in post hoc analysis. For the supplementary tables, the comparison of frequency distributions used chi-square methods. Significance levels were set to $< .05$. To identify the influence of confounding variables, we used general linear model multiple regression to estimate the effects of ideology (for the five levels, there were four dummy variables, with “very conservative” used as the reference case).

The dependent variable was the stated likelihood of accepting the vaccine (4-point scale ranging from “very unlikely” to “very likely”), with statistical controls for sex (coded 1 = female, male/other = 0), marital status (married = 1, other = 0), race (White = 1, other = 0), self-identification as “born-again” (yes = 1, other = 0), region of residence (Northeast = 1, other = 0), and education (bachelor’s degree or higher = 1, less than bachelor’s degree = 0). The rationale for dichotomizing education is based on extensive analysis by Case and Deaton (2020), indicating that having less than a bachelor’s degree is the most important threshold for fewer economic opportunities and poorer health outcomes. These analyses were completed using the general linear models function in SPSS 28 for Mac.

Consent and IRB review

Each participant provided consent on three occasions. In addition to the two YouGov consents, participants were presented with a Stanford University consent form, and all provided electronic consent. The protocol was reviewed by the Stanford University School of Medicine Committee on the Protection of Human Subjects (IRB Protocol 56833); with the addition of a consent form, the committee approved the study for exempt status.

Results

Attitudes toward both vaccines and vaccine mandates depend on a variety of external factors. Figure 1 summarizes the expressed likelihood of getting the COVID-19 vaccine, as stratified by political ideology. The questions regarding vaccines were asked before the COVID-19 vaccine was made available to the general public. Between August and December 2020, the trend between political ideologies remained consistent. Liberals stated that they were more likely than moderates, who stated that they were more likely than conservatives to take the vaccine. Differences in attitude as stratified by political ideology were more prominent in December than in August. As shown in Figure 1, liberals’ general vaccine acceptance increased marginally (74.9% to 77.1%, $p > .05$), but both moderates’ and conservatives’ general vaccine acceptance decreased. The largest change in vaccine acceptance between August and December was among the moderates, whose acceptance of the vaccine declined from 71.2% to 55.2% ($p < .05$), despite stronger evidence for the safety and efficacy of the vaccine and the Emergency Use Authorization by the U.S. Food and Drug Administration. It is of note that between the August and December surveys, the 2020 presidential election took place, in which the United States transitioned from a Republican to a Democratic administration.

Table 1 further examines the relationship between political ideology and support for a government vaccine mandate when responses are stratified by belief in the vaccine’s safety. We posit that concerns about the vaccine’s safety serve as a proxy for discomfort with the level of government intrusion into individual lives. This was especially salient because the vaccines were developed under government mandate using taxpayer funds and offered and distributed free of charge to all citizens as a result of the “Warp Speed” initiative. Of individuals who believed the vaccine had undisclosed harmful effects (indicated by those who responded “true” to the prompt “Vaccines have harmful effects that are not being disclosed to the public”; see Table 1A), an interesting pattern emerged. The absolute number of

Table 1. Responses to the question: “To what extent do you agree with the following statement: I would support a government mandate requiring that everyone be vaccinated in order to achieve population immunity.” Tables 1A and 1B were stratified based on responses to the question: “Vaccines have harmful effects which are not being disclosed to the public.” Responses “definitely true” and “probably true” were combined into “true.” (1A) Results from August are displayed on the left, results from December are displayed on the right. *P* values are denoted as follows: ♦ *p* < .001; † *p* < .01; * *p* < .05; + *p* < .1

1A. Attitudes toward vaccine mandates among individuals who responded “true” to the statement: “Vaccines have harmful effects which are not being disclosed to the public.”					
August					
	Liberal	Moderate	Conservative	Not sure	All
Agree	37%	♦ 52%	♦ 21%	22%	34%
Disagree	63%	♦ 48%	♦ 79%	78%	66%
Unweighted <i>N</i>	64	107	133	40	344
December					
December	Liberal	Moderate	Conservative	Not sure	All
Agree	♦ 63%	+ 33%	♦ 12%	* 14%	26%
Disagree	♦ 37%	+ 67%	♦ 88%	* 86%	74%
Unweighted <i>N</i>	60	107	140	53	360
1B. Attitudes toward vaccine mandates among individuals who responded “false” to the statement: “Vaccines have harmful effects which are not being disclosed to the public.”					
August					
	Liberal	Moderate	Conservative	Not sure	All
Agree	♦ 75%	59%	♦ 36%	57%	60%
Disagree	♦ 25%	41%	♦ 64%	43%	40%
Unweighted <i>N</i>	233	191	107	21	552
December					
	Liberal	Moderate	Conservative	Not sure	All
Agree	♦ 79%	63%	♦ 37%	50%	64%
Disagree	♦ 21%	37%	♦ 63%	50%	36%
Unweighted <i>N</i>	243	143	97	21	504

individuals who believed vaccines had harmful, undisclosed effects remained similar from August (344) to December (360). However, of the individuals who doubted the vaccine’s safety, there was a significant decrease in support of a government vaccine mandate between August (34%) and December (26%) (Table 1A). Liberals were the only subgroup who did not follow this trend, as support for a government vaccine mandate increased from 37% to 63%. Conversely, among individuals who did not believe vaccines had harmful, undisclosed effects, the percentage supporting a government vaccine mandate remained relatively consistent from August (60%) to December (64%) (Table 1B). Black race was also significantly associated with opposition to a mandate in August ($t = 2.12, df = 905, p = .028$), but not in December. Being married was associated with the likelihood of taking the vaccine in August ($t = 2.65, df = 905, p < .01$) but not in December.

To further examine this relationship, Table S2 reports the chi-square value (with Yates correction) of the direct association between the perception of the potential undisclosed effects of the COVID-19 vaccine and attitudes toward a vaccine mandate, as stratified by political ideology. The association between a belief that the vaccine had undisclosed harmful effects and opposition to a government vaccine mandate was observed within individuals of all political ideologies. Thus, it is especially notable that ideology drove opinions about government mandates more than beliefs about any potential harmful effects.

Figure 2 examines individual vaccine acceptance stratified by education. Individuals without a bachelor's degree were less likely to accept the vaccine than individuals with a bachelor's degree. This trend remained consistent between August and December. However, there was an overall decrease in vaccine acceptance among both categories between August and December.

Figure 3 displays opposition to a government vaccine mandate, as stratified by education and political ideology. Respondents who received a bachelor's degree or higher were more likely to support a government vaccine mandate than those who did not; this trend appeared in both August and December, with a stronger association in December ($\eta^2 = .02$ December versus $.007$ in August; see also Appendix 4). However, there were complex interactions. In the August survey, liberal and moderate respondents were more likely to support a mandate if they held a bachelor's degree. But among conservatives, those with more education were most opposed to mandates (interaction $F_{4/906} = 2.44, p < .05$). Yet this pattern was not replicated in the December survey, in which conservatives with a bachelor's degree were less opposed to the mandate than conservatives who had completed their degree (interaction $F_{1/886} = 1.42, p = .24$). Similar patterns were observed for the expressed likelihood of taking the vaccine. In August, those self-identifying as very liberal or liberal were more likely to report they would take the vaccine, followed by moderates and conservative or very conservative self-identifiers ($F_{2/770} = 20.41, p < .001$). In addition, those with a bachelor's degree or higher were significantly more likely to say they would take the vaccine than those without a four-year degree ($F_{1/770} = 8.51, p < .01$). The interaction between ideology and having a bachelor's degree was nonsignificant. The effects were replicated in the December survey.

Figure 4 describes beliefs about the COVID-19 vaccine's undisclosed harmful effects, as stratified by education. Respondents who had not received a bachelor's degree were significantly more likely to believe the vaccine had undisclosed harmful effects ($p < .001$).

Table S3 reports the association between the perception of the potential undisclosed effects of the COVID-19 vaccine and attitudes toward vaccine mandate, as stratified by education. There was a significant association between the perception of vaccines and attitudes toward vaccine mandates for both those with and without a bachelor's degree ($p < .00001$ and $p < .0009$, respectively). Individuals with and without a bachelor's degree who believed the vaccine had undisclosed harmful effects were significantly more likely to oppose a government vaccine mandate. Questions about vaccine safety were only in the December survey. At the time of the August survey, vaccines were still a distant reality. There was no data on vaccine efficacy, much less safety. Most of the concerns in August related to the prospects for an effective vaccine, and questions surrounding safety had not yet emerged. Therefore, we did not ask about safety concerns until the December survey when data on the vaccines first became available.

Multivariate analysis

To evaluate the effects of confounding variables, we conducted a multivariate analysis using multiple regression. In stepwise analysis, ideology was entered into the equation after the effects of sex, marital status, race, self-identification as "born-again," region of residence, and education had been statistically controlled (see the Analysis section for coding). For these analyses, the five categories of ideology were represented as four dummy variables, with "very conservative" used as the reference case. For the other nonscaled variables, we controlled for variance attributable to differences across all categories. Participants who responded "not sure" to the political ideology item ($N = 108$) were excluded from the analysis.

The results of the analysis for the stated likelihood of taking the vaccine are summarized in Table 2. The regression coefficients (B) indicate that the difference along the 5-point scale for the likelihood of taking the vaccine is associated with a one-unit change in the predictor variable. In both August and December, there were significant effects for sex, born-again religious beliefs, and education. Females and those with higher education were more likely to say they would take the vaccine. For example, in December, females differed from males by 0.269 on a scale from 1 to 5, suggesting they were less likely to take the vaccine. Similarly, in both August and December, the effects of the region of residence were nonsignificant. The effect of race was nonsignificant in August, but it became statistically significant in December. Black respondents were least likely to report they would take the vaccine, while Asian respondents were most likely. Post hoc analysis using the Tukey HSD method revealed that Asian, White, and Hispanic respondents formed a homogeneous cluster with less vaccine hesitancy than Black and mixed-race groups. Native American and Middle Eastern respondents were not included because of insufficient sample sizes. Overall, because of the small sample size, we urge caution in interpreting differences for groups other than White, Black, and Hispanic respondents.

In the December survey, those reporting they were born-again were significantly less likely to say they would take the vaccine ($M = 2.55$ versus $M = 1.98$, $t = 7.11$, $df = 998$, $p < .001$), but this finding was not replicated in December. Being married was associated with the likelihood of taking the vaccine in August ($t = 2.65$, $df = 905$, $p < .01$) but not in December. In both August and December, the effect of ideology on the likelihood of taking the vaccine was highly significant after controlling for all other variables (August $F = 10.54$, $p < .001$; December $F = 21.62$, $p < .001$).

Table 2 also shows the effect sizes, as measured by eta-squared for the likelihood of taking the vaccine. Variance explained was the same in each survey ($R^2 = .14$ in both surveys). In both surveys, variables explaining the most variance were education, very liberal ideology, and liberal ideology.

Table S4 summarizes the multiple regression for the effects of ideology on support for a mandate with control for covariates. The results were similar to those for the likelihood of taking the vaccine. With control for covariates, those who identified as very liberal, liberal, or conservative were more likely to endorse a mandate that those identifying as conservative or very conservative (p values all $< .001$). Among the covariates, females, those of White race, and those with a bachelor's degree were more likely to support the mandate.

Discussion

Two cross-sectional surveys of nationally representative samples during the first year of the COVID-19 pandemic showed that both political ideology and education were correlated with attitudes toward government mandates around vaccination. We find support for our hypotheses that attitudes toward COVID-19 vaccines and vaccine mandates relate to both political ideology as well as education level. In addition, our findings confirm greater vaccine acceptance among women in comparison to men (Lazarus et al., 2021), although, on a global basis, women are less likely than men to report an intention to be vaccinated (Zintel et al., 2022).

The association between these factors and the outcomes that we examined is not as straightforward as a simple correlation between political parties and attitudes toward government-mandated public health measures might indicate. Rather, although we did not test for these factors explicitly, we suggest that various attitudes are best and most comprehensively understood as reflecting differences in the weighting of positive and negative rights between political liberals and political conservatives. Indeed, political ideology was more strongly correlated with perceptions of vaccines, vaccine mandates, and vaccine safety than was education level. However, political ideology and education are often correlated, with more liberal viewpoints linked to higher levels of education (Hibbing et al., 2014). Furthermore, we found that in August, among individuals who identified as conservative, those with higher education were more likely to oppose vaccine mandates and question vaccine safety than individuals with a bachelor's degree. However, this trend was no longer apparent in December. This tendency for more highly educated

Table 2. Multiple regression results: Vaccine acceptance

Analysis of effect of ideology on vaccine acceptance with adjustment for confounders from August and December YouGov Surveys							
2A. August multivariate analysis: Dependent variable: “How likely would you be to take the vaccine?”							
August 2020							
Dependent variable: “How likely would you be to take the vaccine?” (5-point scale, 1 = very likely, 5 = very unlikely) with control for covariates.							
Parameter	B	SE	t	Sig.	95% confidence interval		Partial eta-squared
					Lower bound	Upper bound	
Intercept	2.732	.247	11.069	< .001	2.248	3.217	.119
Female	.406	.071	5.686	< .001	.266	.546	.034
Married	.052	.020	2.654	.008	.013	.090	.008
White race	-.026	.026	-.998	.319	-.078	.025	.001
Born-again	-.280	.092	-3.059	.002	-.460	-.100	.010
Northeast region	-.017	.034	-.507	.612	-.084	.049	.000
Bachelor’s degree	-.103	.024	-4.259	< .001	-.150	-.055	.020
Very liberal	-.866	.159	-5.450	< .001	-1.177	-.554	.032
Liberal	-.662	.152	-4.364	< .001	-.960	-.364	.021
Moderate	-.522	.142	-3.671	< .001	-.801	-.243	.015
Conservative	-.136	.155	-.878	.380	-.440	.168	.001
Very conservative	0 ^a
2B. December multivariate analysis: Dependent variable: “How likely would you be to take the vaccine?” (5-point scale) with control for covariates (December 2020).							
December 2020							
Dependent variable: How likely would you be to take the vaccine (5-point scale, 1 = very likely, 5 = very unlikely)							
Parameter	B	SE	t	Sig.	95% confidence interval		Partial eta-squared
					Lower bound	Upper bound	
Intercept	2.491	.239	10.405	<.001	2.021	2.960	.109
Female	.269	.074	3.661	<.001	.125	.414	.015
Married	.032	.020	1.597	.111	-.007	.071	.003
White race	.079	.026	3.057	.002	.028	.129	.010
Born-again	-.111	.089	-1.246	.213	-.287	.064	.002
East region	.049	.036	1.368	.172	-.021	.119	.002
Bachelor’s degree	-.106	.025	-4.245	< .001	-.155	-.057	.020
Very liberal = 1	-.970	.155	-6.238	< .001	-1.275	-.665	.042
Liberal = 2	-.756	.144	-5.242	< .001	-1.039	-.473	.030
Moderate = 3	-.387	.131	-2.950	.003	-.644	-.129	.010
Conservative = 4	-.015	.136	-1.107	.915	-.282	.253	.000
Very conservative (reference case)							

R² = 0.14.

^aThis parameter is set to zero because it is redundant.

Republicans to be more skeptical is consistent with many other areas where Gallup polls show that the more educated Democrats and Republicans are, the more their beliefs separate. This is evident, for example, in beliefs on climate change where more educated Democrats are more likely to believe in climate change, while more educated Republicans are less likely to believe in climate change (Gallup, 2015; Quealy, 2017).

With the introduction of vaccination, the U.S. government offered the public a positive right: the right to free and effective protection from COVID-19 through vaccination. However, in contrast with most European countries, American government and culture are typically framed within the context of negative rights (i.e., protection against governmental overreach, such as Fourth Amendment rights preventing unreasonable search and seizure). There is an inherent skepticism of positive rights in the broader American culture, particularly among conservative-leaning and less educated citizens. There are many reasons for this perspective, including skepticism toward government intervention in individual lives and an inherent privileging of personal freedom over governmental intrusion. However, another reason for opposition to positive rights includes the financial cost which is born equally across all taxpayers, regardless of whether or not they individually choose to avail themselves of a given benefit; many conservatives object to this socialization of costs in the face of privatized benefits (Gordon et al., 2017).

Among individuals who believed that vaccines did not have harmful, undisclosed effects, the majority of conservatives still did not support a government vaccine mandate. This indicates that particularly among conservatives, hesitance toward a vaccine mandate was only partially due to mistrust of the vaccine itself. However, among individuals who believed that vaccines had harmful, undisclosed effects, there was a decrease in support for a vaccine mandate between August and December among moderates and conservatives. This trend was reversed among liberals, where there was an increase in support. While the absolute number of liberals who believed that vaccines had harmful, undisclosed effects did not significantly change, the proportion of individuals who supported a government mandate significantly increased. While many factors could precipitate this change, one potential influence is the presidential election in November 2020, which fell in between the two surveys, changing the government from a Republican to a Democratic administration. Other external factors, like the historical distrust between medical and marginalized communities or the consumption of misinformation, likely played a smaller role in this specific trend. The change in leadership from the Republicans to the Democrats under Joe Biden provided a more dramatic shift that could have changed attitudes from August to December. Liberals would be more likely to trust a government structure imposed by their own political party (Rudolph & Evans, 2005). Moreover, misinformation and mistrust did not start with the COVID-19 pandemic. Misinformation about vaccines and outbreaks has been recognized for decades, and fears about a link to autism led to hostile confrontations long before SARS-CoV2. But the COVID-19 pandemic may have amplified this trend.

Given the timing of our surveys, we posit that the growth of misinformation may have played a small role in this study. When the data were collected in the fall of 2020, the vaccines were not yet authorized. Nearly all the information about the vaccines was very positive. Although there were vaccine skeptics, they were rare. In the early phases of distribution, there was much more demand for vaccines than readily available supplies. Indeed, when the vaccines were released in early 2021, the biggest concern was that people would attempt to get vaccinated before they were officially eligible based on age or occupation.

When stratified by education level, a discrepancy emerged when examining attitudes toward vaccine mandates and perception of the vaccine itself. This mirrored the patterns found when answers were stratified by political ideology. Furthermore, when perceptions of the vaccine were compared directly to attitudes toward a vaccine mandate, a significant relationship between the two variables was found in both individuals with and without a bachelor's degree. This indicates that while a discrepancy exists, individuals with and without a bachelor's degree who believed the vaccine did not have undisclosed effects were significantly more likely to support a vaccine mandate than oppose it.

Our results are consistent with other national public opinion polls. For example, the Pew Research Center has shown that confidence in medical scientists among Republicans or those who lean toward

Republicans systematically declined during the course of the COVID-19 pandemic (Kennedy *et al.*, 2022). Pew surveys have also consistently shown that partisan beliefs are strongly associated with vaccine acceptance (Nadeem, 2022). The Pew survey reported in February 2022 also reports differences in vaccination rates by age, party affiliation, and education. It is of interest that our data show that vaccine hesitancy was already becoming established in August 2020 even before any vaccine had been authorized or approved, or indeed before data regarding vaccine efficacy had even been released. This allows our study to examine ideologic attitudes without as much influence from other political and social factors. Furthermore, while our data represented attitudes in August and December of 2020, similar trends of vaccine hesitancy have persisted as evidenced by data collected by the Centers for Disease Control and Prevention (CDC) (n.d.) in May through June 2021. This finding is particularly interesting given that vaccine counternarratives were much more prominent in the spring of 2021 than in August and December 2020.

Although our study was conducted during the COVID-19 pandemic, the results may have implications for hesitancy to use other vaccines. Baumgaertner and colleagues (2018) studied the effects of political ideology and trust on parental decisions to vaccinate their children. Their study was completed in 2017, well before the COVID-19 outbreak. Yet it also identified political conservatism and distrust of medical experts as key determinants of vaccine acceptance decisions. Baumgaertner *et al.* posit that ideology determines who is trusted, thereby creating an indirect pathway to vaccine acceptance. In a related study, Justwan and colleagues (2019) demonstrated that distrust in the government interacts with disease threats in the community. Overall, they found that parental attitudes toward vaccinating children against measles were unrelated to living near measles outbreaks. However, those who strongly distrust the government—in this case, the CDC—may look more favorably on vaccines if an outbreak emerged closer to their own community. Future outbreaks may inform the psychological processes underlying the relationship between education, political ideology, and preferences for government intervention in the case of public health crises. For example, strong uptake of the Mpox vaccine in the gay male community, which was most affected by the recent outbreak, contrasts strongly with very weak vaccination rates among the Hasidic Jewish communities in Rockland County, New York, which has witnessed an emergence of the community spread of polio, with at least one paralytic case, for the first time since 1979 (Feemster & Szipszky, 2020; Owens & Hubach, 2023).

Overall, the results of these surveys showcase the difference in liberal and conservative response to COVID-19 preventive measures, as well as the difference in response for individuals with and without a bachelor's degree. These attitudes translated to observable behavior and mixed messaging regarding the effectiveness of the preventive measures that further politicized these protections. These responses likely contributed to the higher U.S. COVID-19-related mortality rates that have emerged and disproportionately increased in conservative political districts (Bilinski & Emanuel, 2020). Furthermore, these findings are highly consistent with other investigations that applied different methods (Baumgaertner *et al.*, 2018; Rabin & Dutra, 2022; Rabinowitz *et al.*, 2016).

Our results align with the literature, which indicates a strong association between political ideology and preferences across this spectrum: liberals tend to support positive rights that endorse government intervention for the public good, while conservatives tend to endorse negative ones which oppose the use of government funds for the public good, and force individual behavior, more strongly.

Limitations and conclusions

With the relatively small sample size ($n = 1,000$) for each survey, we were unable to offer reliable regional or state-level estimates. Furthermore, this small sample size limited how many meaningful educational subgroups could be created. Further, we urge caution in interpreting effects of race for groups other than White, Black, and Hispanic. Sample sizes for other groups were less than 40. Although the YouGov methods accurately forecast verifiable events, such as public elections, the methods depend on the opt-in selection and are not truly random samples from the general population (Twyman, 2008). Additionally,

the individual respondents differed between surveys. While the demographic makeup of each survey remained the same, the results could partially be attributed to differences in the respondent population. Furthermore, the surveys depend on unvalidated self-reports, leaving room for inaccuracies. As in most survey research, inferences are based on responses to single-item questions rather than validated multi-item scales. Additionally, questions regarding theoretical vaccine uptake were posed before the vaccine was available to the general public. This is important to consider as intentions can differ from actions. Our results also depend on the wording of the questions, and we do not have evidence on how complex items were understood or interpreted by respondents. Because there are no standardized measures of positive and negative rights, we inferred these dispositions from responses to items about acceptance of mandates, and agreement that the government was promoting a vaccine that may have had side effects that were not disclosed to the public. Our results are limited by our inability to assess people's endorsement of items directly related to positive and negative rights.

We recognize that it was difficult to fully pinpoint reasons for attitudes toward specific beliefs. For example, discrepancies in attitudes toward government vaccine mandates may be partially explained by other factors not measured in this analysis.

Several important influences may not be well reflected in our data. There is a long and dark history of racial exploitation of the African American community by American researchers (Warren et al., 2020; Washington, 2006). Distrust of the medical system among members of some racial or ethnic minority groups is likely to have influenced decisions to receive the COVID-19 vaccine (Willis et al., 2021). Unfortunately, we were unable to adequately capture this dynamic within our surveys, and thus could not measure the role this mistrust had within the perception of vaccine safety. Additionally, widespread misinformation about the COVID-19 vaccine contributed to the perception of the vaccine's safety (Garett & Young, 2021; Kricorian et al., 2022). Unfortunately, our surveys did not include questions to assess this effect.

In summary, we found systematic relationships between political ideology and support for government-sponsored vaccine programs. Support of vaccine programs and mandates was also related to educational attainment. We interpret these findings in terms of preference for the negative right to resist government interference compared to the positive right to receive a health-protective service as a means of explaining some part of vaccine hesitancy. Compared to education, conservative ideology is more strongly associated with resistance to perceived infringements on negative rights as manifested in opposition to vaccine mandates. However, both liberal political ideology and education are strongly associated with the endorsement of the positive rights associated with free public vaccination mandates. Current approaches to increasing vaccination rates are dominated by appealing to the perceived benefits of the vaccine. While this approach has its merits, there is a limit to its effectiveness, as shown by larger factors (Burke et al., 2021). Future vaccine campaigns should consider such implications and adapt their strategy to populations based on their political ideology and or education levels.

Data availability statement. This article earned the Open Data and Open Materials badges for open science. All data and replication code for this study is available at the Harvard Dataverse <https://doi.org/10.7910/DVN/NMDJ36>. This study was not preregistered.

Supplementary material. The supplementary material for this article can be found at <http://doi.org/10.1017/pls.2023.17>.

References

- Baumgaertner, B., Carlisle, J. E., & Justwan, F. (2018). The influence of political ideology and trust on willingness to vaccinate. *PLOS ONE*, 13(1), e0191728. <https://doi.org/10.1371/journal.pone.0191728>
- Bilinski, A., & Emanuel, E. J. (2020). COVID-19 and excess all-cause mortality in the US and 18 comparison countries. *JAMA*, 324(20), 2100–2102. <https://doi.org/10.1001/jama.2020.20717>
- Burke, P. F., Masters, D., & Massey, G. (2021). Enablers and barriers to COVID-19 vaccine uptake: An international study of perceptions and intentions. *Vaccine*, 39(36), 5116–5128. <https://doi.org/10.1016/j.vaccine.2021.07.056>

- Capone, S. F. (2011). Negative rights. In D. K. Chatterjee (Ed.), *Encyclopedia of global justice* (pp. 749–750). Springer Netherlands. https://doi.org/10.1007/978-1-4020-9160-5_338
- Case, A., & Deaton, A. (2020). *Deaths of despair and the future of capitalism*. Princeton University Press.
- Centers for Disease Control and Prevention. (n.d.). *Vaccine hesitancy for COVID-19*. Retrieved February 23, 2023, from <https://data.cdc.gov/stories/s/Vaccine-Hesitancy-for-COVID-19/cnd2-a6zw/>
- Feemster, K. A., & Szipszky, C. (2020). Resurgence of measles in the United States: How did we get here? *Current Opinion in Pediatrics*, 32(1), 139. <https://doi.org/10.1097/MOP.0000000000000845>
- Foldvary, F. E. (2011). Positive rights. In D. K. Chatterjee (Ed.), *Encyclopedia of global justice* (pp. 882–883). Springer Netherlands. https://doi.org/10.1007/978-1-4020-9160-5_359
- Franco, A., Malhotra, N., Simonovits, G., & Zigerell, L. J. (2017). Developing standards for post-hoc weighting in population-based survey experiments. *Journal of Experimental Political Science*, 4(2), 161–172. <https://doi.org/10.1017/XPS.2017.2>
- Gallup. (2015, March 26). *College-educated republicans most skeptical of global warming*. <https://news.gallup.com/poll/182159/college-educated-republicans-skeptical-global-warming.aspx>
- Garett, R., & Young, S. D. (2021). Online misinformation and vaccine hesitancy. *Translational Behavioral Medicine*, 11(12), 2194–2199. <https://doi.org/10.1093/tbm/ibab128>
- Gordon, P. R., Gray, L., Hollingsworth, A., Shapiro, E. C., & Dalen, J. E. (2017). Opposition to Obamacare: A closer look. *Academic Medicine*, 92(9), 1241–1247. <https://doi.org/10.1097/ACM.0000000000001725>
- Hibbing, J. R., Smith, K. B., & Alford, J. R. (2014). Differences in negativity bias underlie variations in political ideology. *Behavioral and Brain Sciences*, 37, 297–307. <https://doi.org/10.1017/S0140525X13001192>
- Justwan, F., Baumgaertner, B., Carlisle, J. E., Carson, E., & Kizer, J. (2019). The effect of trust and proximity on vaccine propensity. *PLOS ONE*, 14(8), e0220658. <https://doi.org/10.1371/journal.pone.0220658>
- Kaplan, R. M. (2019). *More than medicine: The broken promise of American health*. Harvard University Press.
- Kaplan, R. M., Howard, V. J., Safford, M. M., and Howard, G. (2015). Educational attainment and longevity: Results from the REGARDS U.S. national cohort study of Blacks and Whites. *Annals of Epidemiology*, 25(5), 323–328. <https://doi.org/10.1016/j.annepidem.2015.01.017>
- Kennedy, B., Tyson, A., & Funk, C. (2022, February 15). *Americans' trust in scientists, other groups declines*. Pew Research Center. <https://www.pewresearch.org/science/2022/02/15/americans-trust-in-scientists-other-groups-declines/>
- Kricorian, K., Civen, R., & Equils, O. (2022). COVID-19 vaccine hesitancy: Misinformation and perceptions of vaccine safety. *Human Vaccines & Immunotherapeutics*, 18(1), 1950504. <https://doi.org/10.1080/21645515.2021.1950504>
- Lauderdale, B. E., Bailey, D., Blumenau, J., & Rivers, D. (2020). Model-based pre-election polling for national and sub-national outcomes in the US and UK. *International Journal of Forecasting*, 36(2), 399–413. <https://doi.org/10.1016/j.ijforecast.2019.05.012>
- Lazarus, J. V., Ratzan, S. C., Palayew, A., Gostin, L. O., Larson, H. J., Rabin, K., Kimball, S., & El-Mohandes, A. (2021). A global survey of potential acceptance of a COVID-19 vaccine. *Nature Medicine*, 27(2), 225–228. <https://doi.org/10.1038/s41591-020-1124-9>
- Nadeem, R. (2022, March 3). *The changing political geography of COVID-19 over the last two years*. Pew Research Center. <https://www.pewresearch.org/politics/2022/03/03/the-changing-political-geography-of-covid-19-over-the-last-two-years/>
- Owens, C., & Hubach, R. D. (2023). Rural-urban differences in monkeypox behaviors and attitudes among men who have sex with men in the United States. *The Journal of Rural Health*, 39(2), 508–515. <https://doi.org/10.1111/jrh.12726>
- Quealy, K. (2017, November 14). The more education Republicans have, the less they tend to believe in climate change. *The New York Times*. <https://www.nytimes.com/interactive/2017/11/14/upshot/climate-change-by-education.html>, <https://www.nytimes.com/interactive/2017/11/14/upshot/climate-change-by-education.html>
- Rabin, C., & Dutra, S. (2022). Predicting engagement in behaviors to reduce the spread of COVID-19: The roles of the health belief model and political party affiliation. *Psychology, Health & Medicine*, 27(2), 379–388. <https://doi.org/10.1080/13548506.2021.1921229>
- Rabinowitz, M., Latella, L., Stern, C., & Jost, J. T. (2016). Beliefs about childhood vaccination in the United States: Political ideology, false consensus, and the illusion of uniqueness. *PLOS ONE*, 11(7), e0158382. <https://doi.org/10.1371/journal.pone.0158382>
- Rudolph, T. J., & Evans, J. (2005). Political trust, ideology, and public support for government spending. *American Journal of Political Science*, 49(3), 660–671. <https://doi.org/10.2307/3647738>
- Twyman, J. (2008). Getting it right: YouGov and online survey research in Britain. *Journal of Elections, Public Opinion and Parties*, 18(4), 343–354. <https://doi.org/10.1080/17457280802305169>
- Warren, R. C., Forrow, L., Hodge, D. A., & Truog, R. D. (2020). Trustworthiness before trust—Covid-19 vaccine trials and the Black community. *New England Journal of Medicine*, 383(22), e121. <https://doi.org/10.1056/NEJMp2030033>
- Washington, H. A. (2006). *Medical apartheid: The dark history of medical experimentation on Black Americans from colonial times to the present*. Doubleday.

- Wildavsky, A., & Dake, K.** (1990). Theories of risk perception: Who fears what and why? *Daedalus*, **119**(4), 41–60.
- Willis, D. E., Andersen, J. A., Bryant-Moore, K., Selig, J. P., Long, C. R., Felix, H. C., Curran, G. M., & McElfish, P. A.** (2021). COVID-19 vaccine hesitancy: Race/ethnicity, trust, and fear. *Clinical and Translational Science*, **14**(6), 2200–2207. <https://doi.org/10.1111/cts.13077>
- YouGov.** (n.d.). *What the world thinks*. Retrieved November 27, 2021, from <https://today.yougov.com/>
- Zintel, S., Flock, C., Arbogast, A. L., Forster, A., von Wagner, C., & Sieverding, M.** (2022). Gender differences in the intention to get vaccinated against COVID-19: A systematic review and meta-analysis. *Journal of Public Health*, **31**, 1303–1327. <https://doi.org/10.1007/s10389-021-01677-w>

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