Christian nationalism and COVID-19 vaccine hesitancy and uptake

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A B S T R A C T

Understanding COVID-19 vaccine hesitancy and uptake is vital for informing public health interventions. Prior U.S. research has found that religious conservatism is positively associated with anti-vaccine attitudes. One of the strongest predictors of anti-vaccine attitudes in the U.S. is Christian nationalism—a U.S. cultural ideology that wants civic life to be permeated by their particular form of nationalist Christianity. However, there are no studies examining the relationship between Christian nationalism and COVID-19 vaccine hesitancy and uptake. Using a new nationally representative sample of U.S. adults, we find that Christian nationalism is one of the strongest predictors of COVID-19 vaccine hesitancy and is negatively associated with having received or planning to receive a COVID-19 vaccine. Since Christian nationalists make up approximately 20 percent of the population, these findings could have important implications for achieving herd immunity.

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1. Introduction

It is estimated that over 3.5 million people have died from the coronavirus disease 2019 (COVID-19) worldwide [43]. The safe and effective COVID-19 vaccines are vital for curtailing the pandemic. However, this depends on a sufficient number of people being vaccinated. Vaccine hesitancy, or "delay in acceptance or refusal of vaccination despite availability of vaccination services," affects vaccination rates and the ability to generate herd immunity ([29]:4163). In the United States, the FDA granted Pfizer-BioNTech and Moderna emergency use authorization for COVID-19 vaccines in December 2020. Two months later, in February 2021, the FDA granted emergency use authorization for the Johnson and Johnson COVID-19 vaccine. By May of 2021, 62% of U.S. adults had received at least one dose of a COVID-19 vaccine, with an additional 4% planning to get vaccinated as soon as possible [21]. While people in all states aged 12 and older were eligible to receive COVID-19 vaccines by May 2021 [23], some Americans continue to choose not to be vaccinated. In a U.S. study, when asked how likely it was that they would receive a COVID-19 vaccine, 15 percent of respondents reported "not likely" and 7 percent reported they would "definitely not" [28]. Determining the factors associated with COVID-19 vaccine hesitancy and uptake are important for developing public health campaigns targeting the voluntarily unvaccinated.

In the United States, religious conservatism, including evangelical and born-again Christianity, is associated with lower levels of trust in science, rates of vaccine uptake, vaccine knowledge, and higher levels of vaccine hesitancy [5,9,20,26,46]. Olagoke et al. [36] recently found that religiosity is negatively associated with plans to receive a COVID-19 vaccine. One religious worldview especially hostile to science and vaccines is Christian nationalism [2,52].

Christian nationalism is "an ideology that idealized and advocates a fusion of American civic life with a particular type of Christian identity and culture" ([53]:ix–x). It is estimated that strong supporters of Christian nationalism make up roughly 20 percent of the U.S. adult population [53]. Historically, Christian nationalism has been conflated with evangelicalism (i.e., an umbrella term for U.S. conservative Christianity [50]), but they are distinct [53]. Whitehead and Perry [53] estimate that approximately half of U.S. evangelicals are Christian nationalists. Evangelical Christians typically "emphasize conversion, missionary activity, biblicism (seeing scripture as the sole authority for belief and action), and crucicentrism (the belief in Christ's sacrifice on the cross as atonement for human sin)" ([50,49]:384). Christian nationalism is positively associated with identifying as "Bible-Believing" and as a biblical literalist (i.e., believing that the Bible is the literal word of God), two characteristics typically associated with evangelical Christians. But Christian nationalism is also positively associated with believing that "the nation is on the brink of moral decay" and that "God requires the faithful to wage wars for good" ([53]:12). Herein lies the difference. Christian nationalists view the United States as intrinsically connected to the Christian faith.

They believe that the United States should be a Christian nation as it was founded to be, that it is special, chosen, and protected by God, and God's plan is for the United States to be successful [30,40,53]. Christian nationalism is a cultural framework that is connected to patriarchy, nativism, racial intolerance, and support for political conservatism, heterosexual marriage, and the U.S. military [53]. Thus while some Christian nationalists are evangelical, it is a separate and distinct worldview [53].

Christian nationalists demand that their brand of Christianity be the sole source of moral authority for the United States and reject all competitors including science [2]. Net of other factors, Christian nationalists are significantly more likely to support creationism being taught in public schools, to reject evolution, to view scientists as hostile to faith, to respond incorrectly to scientific questions on topics that are religiously contentious (e.g., evolution), and to hold anti-vaccine attitudes [2,37,52]. Using pre-pandemic U.S. data from 2019, Whitehead and Perry [52] found that Christian nationalism had the second largest association with anti-vaccination attitudes after race and was the strongest predictor of believing that "vaccines cause autism", "children are given too many vaccines", and vaccines do not "help protect children."

It is not surprising then, that Christian nationalists did not respond favorably to scientific recommendations regarding how to reduce the spread of COVID-19. Even before the pandemic, Christian nationalists expressed belief that as God's chosen people, Americans will be protected and privileged if they uphold their identity as a Christian nation and biblical principles [30,53]. Of course, this does not lend itself well to COVID-19 preventative healthcare measures. As Perry et al. ([40]:407) note for Christian nationalists "the solution to the crisis is *not* to take behavioral precautions like hand-washing, mask-wearing, or social distancing, but to increase America's collective devotion, attending religious services and repenting of national sins (e.g., abortion, homosexuality, general lawlessness)." In fact, they find that Christian nationalists are less likely to take such precautionary measures and more likely to engage in incautious behaviors, such as attending gatherings with more than 10 people [40]. However, research has not explored whether Christian nationalism is associated with COVID-19 vaccine skepticism and COVID-19 vaccine uptake. To examine this, we executed a nationally representative survey of U.S. adults.

2. Methods

2.1. Study design, data collection, and instrument

We fielded a survey of U.S. adults using the AmeriSpeak® probability-based panel, which is operated and funded by NORC at the University of Chicago. The panel contains nearly 50,000 U. S. participants age 13 and over and is designed to be nationally representative of U.S. households with sample coverage of roughly 97% of U.S. households excluding some P.O. Box only addresses, some new dwellings, and some addresses not provided in the UPSPS Delivery Sequence File. U.S. households are randomly selected "with a known, non-zero probability of selection from the NORC National Sample Frame. These sampled households are then contacted by U.S. mail, telephone, and field interviewers (face to face)" [35]. The majority of AmeriSpeak households respond through web surveys, but some households without access to the internet participate by telephone. For more detailed information on the AmeriSpeak panel see NORC [35].

For the survey, NORC invited 8,238 AmeriSpeak adult panelists to participate aiming for a total of 2,000 responses. A total of 2,003 completed the survey with the majority completing the survey online (1,915) and only 88 people completing it by phone. The survey was in the field from May 17, 2021 through June 1, 2021. Around 60 percent of the U.S. population had received at least one dose of a

COVID-19 vaccine by May 2021 [21], although rates vary significantly across sub-groups and sub-regions. NORC used benchmarks from the February 2021 Census Bureau Current Population reports to compute weights based on gender, race and ethnicity, age, education, and census division. Sample-based point estimates closely parallel the U.S. adult population for these demographics when weighted. The survey included questions on socio-demographic characteristics, religiosity, COVID-19 vaccination status, likelihood of receiving a COVID-19 vaccine, and vaccine confidence. After listwise deletion of missing cases, the sample size is 1,904.

2.2. COVID-19 vaccination status

Respondents were asked "Have you received a vaccine for COVID-19?" and were provided with the response choices "yes" and "no." We refer to this as "receiving a COVID-19 vaccine" and coded it as a binary variable where 1 = yes and 0 = no. For respondents that answered no, they were then asked "How likely are you to receive a vaccine for COVID-19?" with the following response choices: "Very likely", "somewhat likely", "a little likely", and "not likely at all." We combined responses for this question with the received a vaccine for COVID-19 question to create a received/-planned to receive binary variable in which 1 = have received a COVID-19 vaccine or am very/somewhat likely to and 0 = a little likely or not likely at all to receive a COVID-19 vaccine.

2.3. COVID-19 vaccine confidence

COVID-19 vaccine confidence was measured by the following two items. Respondents were asked to "Tell us whether you agree or disagree with the following statements:" "COVID-19 vaccines are safe" and "COVID-19 vaccines are effective." Respondents were provided with the following response choices: "strongly disagree", "somewhat disagree", "neither agree nor disagree", "somewhat agree", "strongly agree". We created a scale that represents the mean response across these two items (Cronbach's alpha = 0.92).

2.4. Christian nationalism

To measure Christian nationalism, respondents were asked "To what extent do you agree or disagree that the federal government should declare the United States a Christian nation?" Response choices were the same as for COVID-19 vaccine confidence. This measure has been used as one item in Christian nationalism scales in numerous studies [2,1,13–14,39,51,54,55].

2.5. Control variables

We control for the following variables: gender (man, woman, or something else), age in years, marital status (married, widowed, divorced, separated, never married, and living with partner), education (less than High school, High school graduate or equivalent, vocational/tech school/some college/Associate's degree, Bachelor's degree, and post graduate study/professional degree), race and ethnicity (White, Non-Hispanic; Black, Non-Hispanic; Other, Non-Hispanic; Hispanic; two or more races identified, Non-Hispanic; Asian/Pacific Islander, Non-Hispanic), and U.S. census region (New England, Mid-Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific). Respondents were also asked "Generally speaking, do you consider yourself to be a liberal, moderate, or conservative?" proceeded by follow-up questions for those identifying as liberal or conservative that asked them if they were very or somewhat liberal or conservative depending on their previous response. These responses were combined into a political ideology variable with the following values: (1) very liberal, (2) somewhat

liberal, (3) moderate, (4) somewhat conservative, or (5) very conservative. Respondents were also asked a series of questions regarding their political party identification. First, they were asked if they considered themselves a "Democrat, a Republican, an Independent or none of these?" Then whether they considered themselves a "strong or not so strong" Republican or Democrat, depending on their previous response. Those who responded Independent or none of these were asked if they leaned more toward Democrat or Republican. The responses for these questions were combined resulting in the following 7 response choices: (1) strong Democrat, (2) not so strong Democrat, (3) lean Democrat, (4) don't lean/independent/none, (5) lean Republican, (6) not so strong Republican, and (7) strong Republican. We control for both political conservatism and political party identification in all models. We also control for income, which is an 18-category response variable from 1 = less than $5,000 to 18 = $200,000 or more. Since COVID-19 related misinformation is thought to spread through social media, we also control for whether the respondent is a Facebook user (1 = yes, 0 = no) or a Twitter user (1 = yes, 0 = no).

Finally, to distinguish Christian nationalism specifically from religiosity in general, we control for two items—religious tradition and religious service attendance. Respondents were asked for their religious tradition in a series of questions, which was coded into the following categories: (1) Protestant, (2) Catholic, (3) Other Christian, (4) Jewish, (5) Muslim, (6) Buddhist/Hindu, (7) Agnostic, (8) Atheist, (9) Nothing in particular, or (10) Something else. We combined the Buddhist and Hindu traditions due to their small sample sizes. To distinguish evangelical Protestants from non-evangelical Protestants, we used responses from a measure for view of the Bible: (1) The Bible is the actual word of God and is to be taken literally, word for word; (2) The Bible is the inspired word of God but not everything in it should be taken literally, word for word, and (3) The Bible is an ancient book of fables, legends, history, and moral codes. Protestant respondents who reported that the Bible is the actual word of God and is to be taken literally, word for word, were coded as evangelical Protestant. Protestant respondents who reported the other two responses were coded as non-evangelical Protestants. Protestant respondents who did not respond to the Bible view question, and thus could not be categorized as evangelical or non-evangelical, were included in the Other Christians category. Frequency of attending religious services has the following response choices: never, less than once a year, about once or twice a year, several times a year, about once a month, two or three times a month, nearly every week, every week, and several times a week.

2.6. Statistical analyses

All results were conducted in Stata/SE 15.1, weighted, and estimated with robust standard errors due to the weighting. For the model predicting COVID-19 vaccine confidence, we estimate Ordinary Least Squares regression models and report unstandardized and standardized coefficients and their robust standard errors. For the models predicting our binary outcomes (receiving a COVID-19 vaccine and receiving/planning to receive a COVID-19 vaccine), we estimate Logistic regression models and report Odds Ratios, 95 percent confidence intervals, fully standardized coefficients [31], and predicted probabilities.

3. Results

3.1. Descriptive statistics

Table 1 presents descriptive statistics for all variables. The mean value for the COVID-19 vaccine confidence scale is 3.82. For the

Table 1
Descriptive Statistics (N = 1,904).

	Mean or Percentage	S.E.	Min-Max
COVID-19 Vaccine Confidence	3.82	0.04	1–5
Received COVID-19 Vaccine	67.25%		0–1
Received/Plan to Receive COVID-19 Vaccine	74.57%		0–1
Christian nationalism	2.50	0.04	1–5
Education	3.03	0.04	1–5
Income	9.81	0.15	1–18
Age	47.97	0.61	18–94
Marital status			
Married (ref.)	50.11%		0–1
Widowed	4.09%		0–1
Divorced	9.76%		0–1
Separated	4.35%		0–1
Never Married	25.57%		
Living with partner	6.13%		0–1
Gender			
Woman	51.82%	–	0–1
Man	47.09%	–	0–1
Something else	1.11%	–	0–1
Race and ethnicity			
White, non-Hispanic	62.96%	–	0–1
Black, non-Hispanic	11.89%	–	0–1
Other, non-Hispanic	0.96%	–	0–1
Hispanic	16.9%	–	0–1
Multiracial, non-Hispanic	2.45%	–	0–1
Asian, non-Hispanic	4.85%	–	0–1
Political Conservatism	3.1	0.04	1–5
Political Party	3.69	0.06	1–7
Religious Affiliation			
Evangelical Protestant	6.51%	–	0–1
Non-evangelical Protestant	16.73%	–	0–1
Catholic	14.65%	–	0–1
Other Christian	23.97%	–	0–1
Jewish	1.49%	–	0–1
Muslim	1.01%	–	0–1
Hindu\Buddhist	1.70%	–	0–1
Agnostic	6.73%	–	0–1
Atheist	7.42%	–	0–1
Nothing in particular	14.63%	–	0–1
Something else	5.16%	–	0–1
Attendance	3.69	0.09	1–9
Facebook User	71.1%	–	0–1
Twitter User	22.34%	–	0–1
Region			
New England	4.56%	–	0–1
Mid-Atlantic	12.71%	–	0–1
East North Central	14.20%	–	0–1
West North Central	6.45%	–	0–1
South Atlantic	20.55%	–	0–1
East South Central	5.81%	–	0–1
West South Central	11.68%	–	0–1
Mountain	7.69%	–	0–1
Pacific	16.35%	–	0–1

items making up the scale a value of 3 = "neither agree nor disagree" and a value of 4 = "somewhat agree". This suggests that, on average, respondents' confidence in COVID-19 vaccines was either neutral or in somewhat agreement. Sixty-seven percent of the respondents identified having already received at least one dose of a COVID-19 vaccine and almost 75% reported having received at least one dose of a COVID-19 vaccine or that they were likely to receive one. The mean value for Christian nationalism is 2.5, which puts it in between the response choices "somewhat disagree" (2) and "neither agree nor disagree" (3).

Table 2 presents the OLS regression results for predicting COVID-19 vaccine confidence. As expected, Christian nationalism is significantly and negatively associated with COVID-19 vaccine confidence. In terms of the controls, income, education, age, political conservatism, political party, and religious service attendance are all positively and significantly associated with COVID-19 vaccine confidence. Compared to those who are married, those who are never married have significantly higher levels of COVID-19 vaccine confidence. Black, non-Hispanic respondents have significantly lower levels of COVID-19 vaccine confidence compared to White non-Hispanic respondents. In terms of religious tradition, Catholics, agnostics, and atheists have significantly higher levels of COVID-19 vaccine confidence compared to evangelical Protestants. Examining the standardized regression coefficients, Christian nationalism has one of the strongest associations with COVID-19

vaccine confidence, following age, political conservatism, political party, and the atheist and Catholic indicator variables.

Next, we look at the logistic regression models predicting having received a COVID-19 vaccine presented in Table 3. Odds ratios are presented in which values above 1 represent a positive association and values below 1 represent a negative association. A one unit increase in Christian nationalism is significantly associated with 15 percent lower odds of having received a COVID-19 vaccine. Income, age, and religious service attendance are significantly and positively associated with the odds of having received a COVID-19 vaccine, whereas political conservatism and political party identification are significantly and negatively associated with the odds of having received a COVID-19 vaccine. Those who have never been married have 78 percent higher odds of having received a COVID-19 vaccine compared to those who are married. Asian, non-Hispanic respondents have an almost 4.5 times higher odds of having received a COVID-19 vaccine compared to White, non-Hispanic respondents. Compared to evangelical Protestants, non-evangelical Protestants, Catholics, Jews, and atheists have significantly higher odds of having received a COVID-19 vaccine. Looking at the fully standardized coefficients, age and political conservatism have the strongest associations. Followed by several variables with coefficients in the 0.1 to 0.15 range: political party identification, income, the Asian, non-Hispanic indicator variable, Christian nationalism, religious service attendance, never married, and the indicator variables for non-evangelical Protestant, atheist, and Catholic

Now we examine the logistic regression results predicting received/plan to receive a COVID-19 vaccine presented in Table 3. A one unit increase in Christian nationalism, is significantly associated with 17 percent lower odds of having received or planning to receive a COVID-19 vaccine. Income, education, age, religious service attendance, and being a Twitter user are all significantly and positively associated with the odds of having received or planning to receive a COVID-19 vaccine, whereas political conservatism and political party identification are significantly and negatively associated with the odds of this outcome. Asian, non-Hispanic individuals have significantly higher odds of having received or planning to receive a COVID-19 vaccine compared to White, non-Hispanic respondents. Divorced respondents have significantly lower odds of having received or planning to receive a COVID-19 vaccine compared to married respondents. Respondents who identified their gender as something other than woman or man have significantly lower odds of having received or planning to receive a COVID-19 vaccine compared to women. There were no significant differences between the (non) religious affiliations and evangelical Protestants in their odds of having received or planning to receive a COVID-19 vaccine. Turning to the fully standardized coefficients, Christian nationalism has one of the strongest significant associations with the odds of having received or planning to receive a COVID-19 vaccine following age, political party identification, political conservatism, and the Asian, non-Hispanic indicator variable.

Table 4 presents the predicted probabilities for levels of Christian nationalism for the logistic regression models presented in Table 3 holding all other variables at their means. The predicted probability of having received a COVID-19 vaccine is 79 percent when Christian nationalism is at its lowest value and 66 percent when it is at its highest value. The predicted probability of having received or planning to receive a COVID-19 vaccine is 87 percent for the lowest value of Christian nationalism and 76 percent for the highest value.

Table 2
OLS Regression Models.

	COVID-19 Vaccine Confidence		
	b (Robust SE)	β	P-value
Christian nationalism	−0.08 (0.03)	−0.1	0.008
Income	0.02 (0.01)	0.09	0.006
Education	0.09 (0.03)	0.09	0.004
Age	0.02 (0.00)	0.29	<0.001
Marital status			
Married (ref.)	—		
Widowed	0.09 (0.15)	0.02	0.53
Divorced	−0.09 (0.11)	−0.02	0.403
Separated	0.06 (0.15)	0.01	0.686
Never married	0.24 (0.09)	0.09	0.01
Living with partner	0.22 (0.13)	0.05	0.093
Race and ethnicity			
White, non-Hispanic (ref.)	—		
Black, non-Hispanic	−0.32 (0.1)	−0.09	0.002
Other, non-Hispanic	−0.11 (0.15)	−0.01	0.464
Hispanic	−0.14 (0.11)	−0.04	0.195
Multiracial, non-Hispanic	−0.1 (0.2)	−0.01	0.617
Asian, non-Hispanic	0.22 (0.19)	0.04	0.23
Gender			
Woman (ref.)	—		
Man	0.03 (0.07)	0.01	0.647
Something else	0.18 (0.15)	0.02	0.247
Political conservatism	−0.12 (0.04)	−0.11	0.004
Political party	−0.12 (0.02)	−0.21	<0.001
Facebook user	−0.02 (0.07)	−0.01	0.768
Twitter user	0.14 (0.08)	0.05	0.064
Region			
New England (ref.)	—		
Mid-Atlantic	0.15 (0.2)	0.04	0.447
East-North Central	0.32 (0.2)	0.10	0.109
West North Central	0.26 (0.22)	0.05	0.238
South Atlantic	0.26 (0.19)	0.09	0.178
East South Central	0.34 (0.21)	0.07	0.116
West South Central	0.05 (0.21)	0.01	0.817
Mountain	0.21 (0.21)	0.05	0.331
Pacific	0.25 (0.2)	0.08	0.214
Attendance	0.03 (0.01)	0.08	0.018
Religious affiliation			
Evangelical Protestant (ref.)	—		
Non-evangelical Protestant	0.28 (0.17)	0.09	0.101
Catholic	0.42 (0.18)	0.13	0.024
Other Christian	0.25 (0.17)	0.09	0.141
Jewish	0.35 (0.25)	0.04	0.166
Muslim	−0.46 (0.5)	−0.04	0.358
Hindu/Buddhist	0.53 (0.31)	0.06	0.09
Agnostic	0.48 (0.21)	0.10	0.025
Atheist	0.66 (0.2)	0.15	0.001
Nothing in particular	0.32 (0.2)	0.10	0.102
Something else	0.25 (0.22)	0.05	0.26
Constant	2.67 (0.03)		<0.001
N	1,904		
R²	0.284		

Note: All models are weighted. Two-tailed tests of significance are reported.

4. Discussion

Prior research found that Christian nationalism is strongly associated with anti-vaccine attitudes [52]. However, the study did not

Table 3
Logistic Regression Models.

	Received COVID-19 Vaccine			Received/Plan to Receive COVID-19 Vaccine		
	aOR [95% CI]	β	P-value	aOR [95% CI]	β	P-value
Christian nationalism	0.85 [0.75, 0.96]	−0.10	0.009	0.83 [0.72, 0.95]	−0.11	0.005
Income	1.07 [1.02, 1.11]	0.12	0.002	1.05 [1.01, 1.1]	0.09	0.029
Education	1.15 [0.96, 1.37]	0.07	0.123	1.23 [1.02, 1.48]	0.10	0.03
Age	1.06 [1.04, 1.07]	0.41	<0.001	1.05 [1.04, 1.07]	0.36	<0.001
Marital status						
Married (ref.)	—			—		
Widowed	1.64 [0.63, 4.25]	0.04	0.311	1.4 [0.53, 3.72]	0.03	0.495
Divorced	0.72 [0.47, 1.11]	−0.04	0.138	0.63 [0.4, 0.99]	−0.06	0.046
Separated	1.12 [0.47, 2.71]	0.01	0.796	1.14 [0.47, 2.76]	0.01	0.778
Never married	1.78 [1.11, 2.85]	0.11	0.017	1.68 [1, 2.81]	0.09	0.05
Living with partner	0.99 [0.54, 1.82]	0.00	0.974	1.08 [0.5, 2.34]	0.01	0.848
Race and ethnicity						
White, non-Hispanic (ref.)	—			—		
Black, non-Hispanic	0.62 [0.3, 1.3]	−0.06	0.209	0.72 [0.32, 1.64]	−0.04	0.437
Other, non-Hispanic	0.63 [0.21, 1.9]	−0.02	0.414	0.38 [0.13, 1.13]	−0.04	0.081
Hispanic	0.82 [0.52, 1.28]	−0.03	0.379	0.76 [0.48, 1.22]	−0.04	0.262
Multiracial, non-Hispanic	0.88 [0.39, 2.02]	−0.01	0.77	0.94 [0.38, 2.32]	0.00	0.886
Asian, non-Hispanic	4.47 [1.39, 14.43]	0.14	0.012	8.19 [1.72, 38.85]	0.18	0.008
Gender						
Woman (ref.)	—			—		
Man	1.1 [0.79, 1.54]	0.02	0.577	1.2 [0.85, 1.71]	0.04	0.307
Something else	0.61 [0.26, 1.43]	−0.02	0.254	0.34 [0.14, 0.84]	−0.05	0.018
Political conservatism	0.62 [0.51, 0.74]	−0.23	<0.001	0.63 [0.52, 0.75]	−0.21	<0.001
Political party	0.85 [0.76, 0.94]	−0.15	0.002	0.77 [0.69, 0.86]	−0.22	<0.001
Facebook user	1.02 [0.71, 1.45]	0.00	0.916	1.26 [0.86, 1.83]	0.04	0.231
Twitter user	1.42 [0.95, 2.12]	0.06	0.088	1.56 [1.01, 2.41]	0.08	0.043
Region						
New England (ref.)	—			—		
Mid-Atlantic	0.58 [0.24, 1.37]	−0.08	0.214	0.77 [0.3, 2]	−0.04	0.593
East-North Central	0.88 [0.38, 2.03]	−0.02	0.772	1.46 [0.58, 3.67]	0.05	0.426
West North Central	0.85 [0.36, 2.06]	−0.02	0.726	1.15 [0.45, 2.99]	0.01	0.768
South Atlantic	0.85 [0.36, 1.98]	−0.03	0.704	1.09 [0.43, 2.77]	0.02	0.848
East South Central	0.62 [0.23, 1.7]	−0.05	0.351	0.94 [0.34, 2.57]	−0.01	0.907
West South Central	0.44 [0.18, 1.05]	−0.11	0.063	0.82 [0.32, 2.1]	−0.03	0.675
Mountain	0.89 [0.37, 2.15]	−0.01	0.804	1.1 [0.43, 2.85]	0.01	0.842
Pacific	0.79 [0.34, 1.87]	−0.04	0.599	0.96 [0.38, 2.4]	−0.01	0.926
Attendance	1.11 [1.04, 1.19]	0.12	0.002	1.08 [1.01, 1.16]	0.08	0.033
Religious affiliation						
Evangelical Protestant (ref.)	—			—		
Non-evangelical Protestant	2.45 [1.19, 5.03]	0.14	0.015	1.52 [0.73, 3.16]	0.06	0.261
Catholic	2.02 [1.02, 4.01]	0.10	0.044	1.42 [0.7, 2.88]	0.05	0.329
Other Christian	1.5 [0.8, 2.82]	0.07	0.206	1.11 [0.59, 2.08]	0.02	0.756
Jewish	3.8 [1.02, 14.15]	0.07	0.046	3.52 [0.72, 17.23]	0.06	0.12
Muslim	1.02 [0.18, 5.71]	0.00	0.985	0.64 [0.11, 3.66]	−0.02	0.613
Hindu/Buddhist	3.79 [0.53, 27.16]	0.07	0.185	4.62 [0.44, 48.71]	0.08	0.203
Agnostic	2.26 [0.89, 5.72]	0.09	0.086	1.91 [0.73, 5.02]	0.07	0.19
Atheist	3.11 [1.08, 9]	0.12	0.036	3.03 [0.96, 9.61]	0.12	0.059
Nothing in particular	1.54 [0.73, 3.24]	0.06	0.259	1.04 [0.47, 2.29]	0.01	0.924
Something else	1.33 [0.55, 3.2]	0.03	0.530	1 [0.39, 2.53]	0.00	0.996
N	1,904			1,904		
R²	.244[a]			.256[a]		

[a] Mcfadden's pseudo-R²

Table 4
Christian Nationalism Predicted Probabilities for Logistic Models.

	Received COVID-19 Vaccine		**Received/Plan to Receive COVID-19 Vaccine**	
	Predicted Probability	95% CI	Predicted Probability	95% CI
Christian nationalism				
1	0.79	[0.75, 0.83]	0.87	[0.84, 0.9]
2	0.76	[0.73, 0.79]	0.85	[0.82, 0.87]
3	0.73	[0.7, 0.76]	0.82	[0.79, 0.85]
4	0.70	[0.65, 0.75]	0.79	[0.75, 0.84]
5	0.66	[0.58, 0.74]	0.76	[0.69, 0.83]

have measures of COVID-19 vaccine hesitancy or uptake. White-head and Perry ([52]:9) implored "researchers currently collecting data to account for Americans' attitudes toward a possible COVID-19 vaccine as well as their views toward Christian nationalism.

Given these findings, it is clear that future researchers will need to account for Christian nationalism to explicate Americans' responses to a COVID-19 vaccine." The current study took up that call. We find that Christian nationalists are less likely to view

COVID-19 vaccines as safe and effective and less likely to have received or plan to receive a COVID-19 vaccine. It was one of a handful of variables to have a consistent negative association with all the outcomes.

The focus of much of the prior literature on vaccine hesitancy generally has focused on race and ethnicity and political conservatism [4,7,8,17,28,27,34]. In the United States, prior research has typically found that Black people have lower rates of vaccine uptake[7,8,9,19,28,27,34,48], in part due to a distrust of the medical establishment as a result of prior (e.g., the Tuskegee Syphilis Study) and current abusive practices [10,47]. Though more recent explanations draw attention to the role of systemic racism and a lack of outreach to the Black community [10,16]. While we found that Black/African American, non-Hispanic respondents had significantly lower levels of COVID-19 vaccine confidence compared to White, non-Hispanic respondents net of the other variables, we did not find significant differences for the COVID-19 vaccine uptake variables. Moreover, in bivariate analyses, Black/African American respondents do not significantly differ from White respondents on all three outcomes (see Supplemental Table 1). This suggests that the U.S. Black community may think differently about COVID-19 vaccine uptake compared to prior vaccines possibly due to the higher rates of COVID-19 mortality and severe disease in the Black population [48]. Asian respondents were the only racial group that significantly differed from White people on the COVID-19 vaccine uptake variables. We can only speculate but this may be due to the increased violence and discrimination toward the Asian American community during the pandemic or due to higher proportions of Asian Americans working in labor sectors that make them more vulnerable to COVID-19 [56].

Prior research has found that political conservatives and Republicans are more likely to hold anti-vaccine attitudes [3,4,6,17,22,24,25,32,33,42]. Recent research has also found that they are less likely to state that they plan to receive a COVID-19 vaccine [11,18]. Our findings are consistent with this prior research. Political conservatism and identifying as a Republican are negatively associated with COVID-19 confidence, uptake, and received or plan to receive a COVID-19 vaccine net of the other variables.

Few studies have examined the relationship between religion and COVID-19 vaccine hesitancy [36,44]. Olagoke et al. [36] found that a religiosity scale was negatively associated with intent to receive a COVID-19 vaccination. Net of the other variables, we find that religious service attendance is, in fact, positively associated with COVID-19 vaccine confidence and uptake. In terms of affiliation, we find some differences between evangelical Protestants and certain other (non) religious affiliations but none that are consistent across all three outcomes. The strong negative associations between Christian nationalism and all three outcomes provides strong evidence for the importance of including such a measure in future studies of COVID-19 vaccine hesitancy and uptake. Whitehead and Perry [52] theorized that Christian nationalists have higher rates of general anti-vaccine attitudes due to their distrust in science, hostility toward state intervention, an emphasis on individualism and one's rights above protecting public health, and an attachment to Donald Trump who is connected to anti-vaccine statements. These mechanisms are likely also implicated in Christian nationalists' lower levels of COVID-19 vaccine confidence and uptake. Future research would benefit from explicitly measuring and testing these mechanisms. Moreover, research should also examine whether Christian nationalism is associated with rejecting other forms of preventative health care in order to determine if their distrust in science and belief that God will protect them is specific to vaccines and COVID-19 or if it extends to other health-related outcomes.

However, there are some limitations of our study. First, the data are cross-sectional; we cannot say that holding Christian national-ist attitudes caused lower rates of COVID-19 vaccine confidence and uptake, though the reverse causal direction seems less plausible. Second, the survey only included one item on Christian nationalism. While additional measures would have been preferable, this measure has been used in prior Christian nationalism scales [2,1,13–14,39,51,54,55] and several studies have used one item to operationalize Christian nationalism [12,15,38,45]. Additionally, our measure shows that 14 percent of respondents "strongly agreed" and 9 percent "somewhat agreed" with the statement "To what extent do you agree or disagree that the federal government should declare the United States a Christian nation." This is consistent with Whitehead and Perry's [53] finding that strong supporters of Christian nationalism make up approximately 20 percent of the U.S. adult population. Third, the survey did not ask respondents whether the COVID-19 vaccine was accessible to them. At the time the survey was administered, all U.S. adults were eligible to receive the vaccine; however, it is possible that in certain U.S. locations or for marginalized populations a COVID-19 vaccine may still have been inaccessible. Controlling for U.S. census region and socio-demographic variables helps address this issue. Moreover, the fact that Christian nationalism continues to have a negative association even when the outcome variable is received or plan to receive a COVID-19 vaccine suggests that accessibility does not account for the negative association. Fourth, it is possible that because Christian nationalists are more likely to be anti-science [2] that they may be less likely to respond to academic surveys. While we can only speculate, if this were the case, it would likely make our results more conservative as one might expect that Christian nationalists who are the most anti-science would also be the most anti-vaccine. Fifth, to identify evangelical Protestants we combined our affiliation measure with a biblical literalist response to a question on one's view of the Bible. While an evangelical Protestant measure drawn exclusively from responses to religious affiliation would have been preferable, biblical literalism is a key defining belief of evangelical Protestants [50].

5. Conclusion

Christian nationalism's anti-science, anti-vaccine, anti-government intervention, pro-Trump ideology with a focus on protecting one's own freedoms at the expense of protecting medically vulnerable people makes it the perfect storm for COVID-19 vaccine hesitancy [2,40,41,53,52,54]. As strong adherents to Christian nationalist ideology make up a sizable minority of the U.S. adult population (20 percent) [53], they are likely contributing to lower rates of COVID-19 vaccine uptake and delays in herd immunity. Understanding Christian nationalism and incorporating measures of it into future COVID-19 related studies is vital for informing future public health interventions.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.vaccine.2021.09.074.

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