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ORIGINAL RESEARCH

'God will protect us': Belief in God/Higher Power's ability to intervene and COVID-19 vaccine uptake

Bernard D. DiGregorio[1] · Katie E. Corcoran[1] · Christopher P. Scheitle[1]

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Abstract

Background Vaccines represent one of the best ways to counter the COVID-19 pandemic. However, vaccine hesitancy among the population limits the effectiveness of vaccines. Recent research has explored the role of religion in vaccine hesitancy, but in doing so has encountered a "black box" problem. There is a relationship between religion and vaccine hesitancy, but the explanation for why remains unclear.

Purpose The purpose of this study is to explore the relationship between religion and vaccine hesitancy. We propose that how an individual conceptualizes God/a higher power is associated with getting vaccinated for COVID-19.

Methods We use data from a nationally representative survey of U.S. adults, collected using the Amerispeak® probability-based panel via the National Opinion Research Center (NORC) at the University of Chicago. We examine the association between individuals' views of God/a higher power as both a supervisory and an intervening figure on vaccine uptake and likelihood of getting vaccinated through logistic regressions.

Results We find that belief in God's/a higher power's supervision is not significantly associated with the odds of COVID-19 vaccine uptake or vaccination intent. However, belief in God's/a higher power's ability to intervene in the world is significantly and negatively associated with the odds of COVID-19 vaccine uptake and the odds of having received or planning to receive a COVID-19 vaccine. In addition, in models where belief in the ability of God/a higher power to intervene are included, Christian nationalism ceases to have a statistically significant association with intent to receive a COVID-19 vaccine.

Conclusions and implications: These findings suggest that how individuals conceptualize God/a higher power is associated with their willingness to get the COVID-19 vaccine. Given this, those who see God/a higher power as more involved in the world may contribute to delays in achieving herd immunity. This information benefits those working on vaccination campaigns in understanding the beliefs of some of those who are most hesitant to get vaccinated. In addition, this intervention mechanism

Extended author information available on the last page of the article

could also mediate other negative relationships between religion and other science and health-related concerns.

Keywords COVID-19 · Christian nationalism · Vaccine hesitancy · God conceptualization · God image

Introduction

As of November 17th, 2021, the World Health Organization (WHO) reported that there were over 254 million cases of COVID-19 worldwide, and over 5 million deaths resulting from COVID-19 (2021). These numbers would be higher, were it not for COVID-19 vaccines. According to the WHO, as of November 15th of 2021, there have been over 7.3 billion doses of COVID-19 vaccines administered (2021). However, despite these numbers, there are still those who are unwilling to get vaccinated. In the United States, only 58.9% of the population had been vaccinated as of November 17th, 2021 (Adams 2021). This ranged from a high of 72.19% in Vermont, to a low of 41.47%, in West Virginia.

This unwillingness to get vaccinated has led social scientists to study potential causes of vaccine hesitancy—including religion. An August Pew Research poll found that vaccination rates vary across religious groups, ranging from a high of 90% of atheists reporting that they were at least partially vaccinated, to a low of only 57% of White evangelical Protestants reporting that they were at least partially vaccinated (Funk and Gramlich 2021). Several studies have found that conservative Christians, including Christian nationalists, are less likely to support or adhere to government COVID-19 public health mandates and are less likely to have received or plan to receive a COVID-19 vaccine Adler et al. 2021; DeFranza et al. 2021; Gonzalez et al. 2021; Perry, Grubbs, and Whitehead 2020; Perry et al. 2020). Olagoke et al. (2021) found a negative association between general religiosity and intent to receive a COVID-19 vaccine. This is not surprising as numerous religious leaders have gone on the record speaking against COVID-19 vaccines (Delpilar 2021; Fearnow 2021; Fink 2021; Hurley 2021; Siemaszko 2021; Smith 2020).[1]

While these studies show a relationship between religion, anti-vaccine attitudes, and a general unwillingness to observe safety practices for COVID-19, they generally do not test the actual mechanism or mechanisms at play. Why is it that conservative Christianity, including evangelical Protestantism and Christian nationalism, is negatively associated with having received or intending to receive a COVID-19 vaccine?

One possible mechanism for explaining anti-vaccine uptake among conservative Christians is a belief in the power of God. Many religious officials argued that God would protect believers from COVID-19 (Crowley 2020; Fearnow 2021; Politi 2020; Siemaszko 2021). A poll conducted by the University of Chicago Divinity School

[1] While there have been many religious leaders speaking against the COVID-19 vaccine, this should not be taken to mean that all religious leaders take this position. There are numerous religious leaders who have spoken in favor of the vaccine as well (Breitzer 2021; Levin 2021; Mastroianni 2021; O'Loughlin 2021; Stack 2021; Vann et al. 2021).

and The Associated Press-NORC Center for Public Affairs Research found that 55% of Americans have at least some belief that God will protect them from COVID-19 (Schor and Fingerhut 2020). This is in line with previous studies, which have found that among Christian nationalists, there is the belief that Americans are God's chosen people, and that by holding to biblical principles, they will be protected (Corcoran, Scheitle, and DiGregorio 2021; Perry, Grubbs, et al. 2020; Whitehead and Perry 2020).

In this study, we explore the beliefs that people hold about God's/a higher power's power and whether those beliefs are associated with COVID-19 vaccination status and intent to receive a vaccine. We use a nationally representative sample of US adults fielded in May-June of 2021 to test our hypotheses and find partial support for them.

Conceptualizations of God:

Prior research on images of God has shown that such images shape attitudes and behavior. Gorsuch (1968) was one of the earliest to look at the concept of images of God, noting that people have different conceptualizations of God. In his work, he called for more research exploring different God-concepts. In 1983, the General Social Survey (GSS) for the first time included questions that specifically explored twelve different images of God that individuals might hold. Roof and Roof (1984) wrote a research note discussing the results of the GSS, noting that overall the most popular image of God was as creator, followed by healer, friend, and redeemer.

Greeley (1991) proposed that how one conceptualizes God (or a higher power) is indicative of how the individual perceives the world around them. Within this focus on the image of God, Greeley specifically explored the perception of a caring God, more maternal and caring, a friend rather than a judge or a benign deity. He called this perception a "gracious worldview" (Greeley 1993:23). Those who view God in this way are more likely to oppose the death penalty and tougher policies on crime (Greeley 1989; Unnever, Cullen, and Applegate 2005; Unnever, Cullen, and Bartkowski 2006) and are more likely to support environmental protections (Greeley 1993), safe-sex education in schools (Greeley 1991), and liberal politics (Greeley 1988). On the other hand, those who conceptualize God as punitive and judgmental support harsher punishments toward criminals and offenders (Evans and Adams 2003; Unnever et al. 2005).

Bader and Froese (2005) continued this work and focused on two different dimensions of God-images: (1) to what extent individuals believe that God is active and engaged with the world, and (2) to what extent individuals see God as an authoritative and judgmental figure (Bader and Froese 2005; Froese and Bader 2007, 2008). Their findings indicate that conceptualizations of God strongly predict stances on moral subjects such as abortion and sexual morality, belief in biblical literalism, church attendance rates, and political party affiliation (Bader and Froese 2005). They also argue that there is a positive relationship between American religious conservatism, and conceptualizing God as being both highly active and engaged in the world, as well as being extremely authoritative and judgemental (Froese and Bader 2007). Specifically, they argue that those who view God to be more involved in the world

and more authoritarian in nature are "moral absolutists," at least on sex and abortion issues (Froese and Bader 2008:710).

Belief that God is involved in the world may impact decisions regarding COVID-19 vaccine uptake. If people believe that God will protect them from COVID-19, then what need is there for a vaccine? Beyerlein, Nirenberg, and Zubrzycki (2021) note that the belief that "Jesus is my vaccine"—which was "seen and heard at several anti-lockdown protests in the United States" and "echoed in a number of conservative congregations"—is a form of religious coping in which one either actively surrenders or passively defers their problems or concerns with COVID-19 to God. They found that 54% of their sample identified belief that God would protect them from being infected with COVID-19. Similarly, Schnabel and Schieman (2021) found that nearly 60% of Americans prayed for COVID-19 to end and that attempting to pray away COVID-19 was associated with experiencing less distress during the pandemic. This variable explained the residual differences between atheists and evangelicals in their levels of distress during the pandemic.

This belief in God's intervention, protection, and power was also one theorized mechanism explaining the relationship between Christian nationalism's negative association with COVID-19 mitigation behaviors including vaccines (Corcoran et al. 2021; Perry, Grubbs, et al. 2020). As Corcoran, Scheitle, and DiGregorio (2021) state "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 […] does not lend itself well to COVID-19 preventative healthcare measures." In the minds of 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)" (Perry, Grubbs, et al. 2020:407).

The closest direct test of these ideas is found in Upeniek, Ford-Robertson, and Robertson's (2021) recent article. They examined the effect of belief in an engaged God on mistrust of the COVID-19 vaccine and the effect of beliefs in divine control on COVID-19 vaccine uptake. However, as they note, their study was not able to directly test whether belief in an engaged God is associated with COVID-19 vaccine uptake; instead, they were only able to examine the association between divine control and COVID-19 vaccine uptake.

The study presented here builds upon their work on COVID-19 vaccine uptake but utilizes more explicit measures of individual's beliefs about God's ability to intervene in the world. These measures were also asked of those who do not believe in God but do believe in a higher power, which further advances past research that nearly exclusively focused on images of God. Moreover, this study also controls for Christian nationalism and political identification factors that have been found to be strongly associated with COVID-19 vaccine uptake and intent to receive a COVID-19 vaccine (Corcoran et al. 2021; Latkin et al. 2021; Reiter et al. 2020; Viswanath et al. 2021). In addition, Upeniek et al. (2021) collected their primary data on trust in the COVID-19 vaccine between January 27th -March 21st of 2021. Our data collection started May 17th of 2021, a couple of months later. This difference of time, though small, is relevant. Between the end of their data collection and the start of ours, every U.S. adult was made eligible for the COVID-19 vaccine (Hubbard 2021). While we

acknowledge that this didn't necessarily guarantee access to the vaccine for every single American, for many it changed the discussion of getting the COVID-19 vaccine from something theoretical to a more concrete decision.

Methods

Study design, data collection, and instrument

Data was collected through the use of a survey, focused on U.S. adults. The survey was done through the National Opinion Research Center (NORC) at the University of Chicago, using their AmeriSpeak® probability-based panel. The panel is nationally representative of U.S. households, and contains nearly 50,000 U.S. participants, aged 13 or older. Random selection is used to select households from the NORC National Sample Frame, which are then contacted using U.S. Mail, telephone calls, and face to face via field interviewers (NORC 2021). The most common response used by AmeriSpeak households is the web survey. Those households without internet access participate in surveys via telephone. More detailed information for the AmeriSpeak panel is available via NORC (2021).

NORC aimed to get 2,000 responses to the survey in total, which led to 8,238 AmeriSpeak adult panelists being invited to participate. The majority (1,915) completed the survey online, and an additional 88 people completed it by phone, for a total of 2,003 responses. The survey was fielded for a period of about two weeks, from May 17, 2021, through June 1, 2021. While rates vary significantly across subgroups and sub-regions by this time period (May), about 60% of the U.S. population had received at least a single dose of a COVID-19 vaccine. NORC computed weights based on race and ethnicity, age, gender, census division, and education, using benchmarks from the February 2021 Census Bureau Current Population reports. Sample-based point estimates closely parallel the U.S. adult population for these demographics when weighted. The survey includes questions on COVID-19 vaccination status, likelihood of receiving a COVID-19 vaccine, religiosity, and sociodemographic characteristics. After listwise deletion of missing cases, the sample size is 1,623.

COVID-19 vaccination status

COVID-19 vaccination status was measured using two variables. The first looked at current vaccination status among respondents, while the second looked at vaccination intent. For vaccination status, respondents were asked, "Have you received a vaccine for COVID-19?" Respondents were given two choices, no (0) and yes (1), coded as a binary variable.

We are interested in whether conceptualizations of God/higher power affect whether someone was vaccinated for COVID-19. However, since it is possible that some people may not have had access to vaccines even though they were eligible to be vaccinated, we also examine intent to vaccinate. As the factors that affect whether someone is not vaccinated may be different from the factors that affect how

likely someone is to get vaccinated contingent on not being vaccinated already, we combined the vaccination and intent to vaccinate questions. This also maintains the same sample size and allows for comparisons across models. For vaccination intent, respondents who said that they had not been vaccinated were asked a second question, "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". The response to this question was combined with the responses to the question about being vaccinated, to create a binary vaccination intent variable. A value of 1 indicated that respondents had either already received a vaccine for COVID-19 or that they were very or somewhat likely to get a COVID-19 vaccine. A value of 0 indicted that respondents were either not likely at all, or a little likely, to receive a COVID-19 vaccine.

God/Higher power conceptualizations

Respondents were asked, "Do you believe in God, or not?" Response options were "Yes" or "No". Those who answered no were then asked, "Which of these statements comes closer to your views, even if neither is exactly right?" Possible responses were "I do not believe in God, but I do believe there is some other higher power or spiritual force in the universe" or "I do not believe there is any higher power or spiritual force in the universe." Those who reported believing in God and those who reported "I do not believe in God, but I do believe there is some other higher power or spiritual force in the universe" were asked a series of seven different questions regarding how they conceptualize God/a higher power.

Respondents were asked, "Which of the following, if any, do you believe about [insert God or the higher power or spiritual force in the universe depending on their answer to the previous question]?": "Knows everything that goes on in the world", "Is concerned about every human being personally", "Watches over me", "Has the power to direct or change everything that goes on in the world", "Is directly involved in worldly affairs", "Performs miracles that defy the laws of nature", and "Grants health and relief from sickness to believers who have enough faith". Factor analysis with varimax rotation indicates that the first three items loaded together with factor loadings above 0.70 and the last four items loaded together with factor loadings of 0.45 and higher. The first three items were used to create a scale reflecting the mean response across these three items, which measures the concept of supervision by God/a higher power (Cronbach's alpha = 0.85). The latter four items were used to create a scale representing the mean response across these items, which measures the concept of intervention in the world by God/a higher power (Cronbach's alpha = 0.78). There was a strong positive correlation between supervision and intervention, r = .6819 ($p < .001$). It is important to note, that those who indicated that they do not believe in God or a higher power were not included in the models, as they have nothing to assess for these questions since they were not asked them.

Control variables

We control for the following variables: 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), gender (male, female, or something else), marital status (married, widowed, divorced, separated, never married, and living with partner), age in years, 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)[2]. We account for region because research has shown that vaccine hesitancy is more prevalent certain states and regions (Beleche et al. 2021). We also control for income, which is an 18-category response variable from 1 = less than $5,000 to 18 = $200,000 or more.

In addition, we also control for political party identification. Respondents were asked if they considered themselves a "Democrat, a Republican, an Independent or none of these?" Following this, they were asked whether they considered themselves a "strong or not so strong" Republican or Democrat, depending on their previous response. Respondents who indicated themselves to be Independent or none of these were asked if they leaned more toward Democrat or Republican. The responses for these questions were combined to create seven possible 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. In all models, we control for both political conservatism and political party identification. We also control for whether the respondent is a Facebook user (1 = yes, 0 = no) or a Twitter user (1 = yes, 0 = no), because COVID-19 related misinformation is thought to spread through social media.

We also control for several measures of religiosity. Respondents were asked for their religious tradition in a series of questions, which were coded into the following categories: (1) Evangelical Protestant, (2) Other Protestant, (3) Catholic, (4) Non-Christian, (5) Agnostic, (6) Atheist, (7) Nothing in particular, or (8) Something else. We created the evangelical Protestant category by coding those who reported that they were Protestant or "just Christian" and, on a separate question, indicated that the term "evangelical" describes them "somewhat" or "very well." The Other Protestant category is for those who reported that they were Protestant or "just Christian" but did not report that the term "evangelical" described them somewhat/very well. Due to small sample sizes, non-Christian respondents were combined into one category. We control for respondent's beliefs regarding 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. We also include a measure of religious service attendance frequency (never, less than once a year,

[2] U.S. Census regions were coded according to the nine divisions used by the U.S. Census Bureau. For a full list of the classification of U.S. states into these divisions, please see (https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf).

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).

Christian nationalism was measured using a single question, asking respondents, "To what extent do you agree or disagree that the federal government should declare the United States a Christian nation?" Respondents were provided with the following response choices: "Strongly disagree," "Somewhat disagree," "Neither agree nor disagree," "Somewhat agree," "Strongly agree." Christian nationalism scales in numerous studies have included this item (Baker et al. 2020; Baker and Smith 2009; Davis 2018, 2019; Perry et al. 2019; Whitehead and Perry 2015; Whitehead, Perry, and Baker 2018; Whitehead et al. 2018).

Statistical analyses

All results were conducted in Stata/IC 15.1, weighted, and estimated with linearized standard errors using the survey command. We estimate Logistic regression models and report odds ratios and predicted probabilities.

Results

Table 1 presents descriptive statistics for all variables. 66% of respondents indicated that they had received at least one dose of a COVID-19 vaccine, and 73% of respondents indicated that they had either received at least a single dose of a COVID-19 vaccine or that they were likely to receive one. With regards to the God/higher power supervision scale, the mean value was 0.79. This means the average person responded yes to between 2 and 3 (all) of the items in the scale. Approximately 70% of respondents answered yes to all of the items on the scale. The mean value for the God/higher power intervention scale was lower, at 0.61. This equates to the average respondents reporting yes to between 2 and 3 of the four items in the scale. Approximately 35% of respondents answered yes to all of the items on this scale. These values may seem high, but it is important to remember that the sample represents people with some belief in God/a higher power.

Table 2 presents the logistic regression results in odds ratios predicting the association between beliefs in both a supervising and an intervening God/higher power on COVID-19 vaccination status. Model 1 includes the non-religious control variables. Income, age, education, and being a Twitter user are all significantly and positively associated with the odds of being vaccinated. Asian, non-Hispanic individuals have significantly higher odds of being vaccinated compared to White, non-Hispanic individuals. Those who identified as "Other, non-Hispanic" are significantly less likely to be vaccinated, compared to White, non-Hispanic individuals. Those who have never been married have significantly higher odds of being vaccinated compared to respondents who are married. Political affiliation is significantly and negatively associated with the odds of being vaccinated. Individuals in the West South Central region (Arkansas, Louisiana, Oklahoma, and Texas) have significantly lower odds of being vaccinated compared to individuals in the South Atlantic region (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina,

Table 1 Descriptive statistics

	Mean or Percentage	Standard Deviation	Min-Max
Vaccinated for COVID-19	66.17%	--	--
Vaccinated or likely to get vaccinated for COVID-19	73.07%	--	--
God/Higher power supervision	0.79	0.35	0–1
God/Higher power intervention	0.61	0.37	0–1
Religious Affiliation			
Evangelical Protestant	21.50%	--	--
Other Protestant	31.30%	--	--
Catholic	17.25%	--	--
Non-Christian	3.64%	--	--
Agnostic	6.35%	--	--
Atheist	1.42%	--	--
Nothing in Particular	12.26%	--	--
Something else	6.28%	--	--
Religious Service Attendance	3.98	2.73	1–9
Bible Beliefs			
Bible as actual word of God	24.77%	--	--
Bible as inspired by God	53.42%	--	--
Bible as book of fables	21.81%	--	--
Christian Nationalism	2.65	1.44	1–5
God Beliefs			
Belief in a Higher Power	9.43%	--	--
Belief in God	90.57%	--	--
Income	9.52	4.14	1–18
Age	50.61	17.27	19–94
Political Affiliation	3.85	2.14	1–7
Education	3.12	0.99	1–5
Marital Status			
Married	52.80%	--	--
Widowed	4.62%	--	--
Divorced	11.52%	--	--
Separated	4.62%	--	--
Never Married	19.96%	--	--
Living with Partner	6.47%	--	--
Gender			
Female	55.88%	--	--
Male	43.50%	--	--
Other	0.62%	--	--
Race-Ethnicity			
White, non-Hispanic	64.51%	--	--
Black, non-Hispanic	11.77%	--	--
Other, non-Hispanic	1.48%	--	--
Hispanic	17.56%	--	--
2 or more races, non-Hispanic	2.77%	--	--
Asian, non-Hispanic	1.91%	--	--
Facebook User	72.95%	--	--

Table 1 (continued)

	Mean or Percentage	Standard Deviation	Min-Max
Twitter User	19.90%	--	--
Region			
New England	4.56%	--	--
Mid-Atlantic	9.37%	--	--
East North Central	17.19%	--	--
West North Central	9.86%	--	--
South Atlantic	20.58%	--	--
East South Central	5.85%	--	--
West South Central	9.00%	--	--
Mountain	9.18%	--	--
Pacific	14.42%	--	--

Note: $N = 1{,}623$

Virginia, and West Virginia). This is consistent with research finding that this region has some of the highest rates of vaccine hesitancy(Beleche et al. 2021).

Model 2 incorporates the religious controls. Christian nationalism is significantly and negatively associated with the odds of being vaccinated, while Catholics have significantly higher odds of being vaccinated compared to evangelical Protestants. Model 3 incorporates belief in a supervising God/higher power. The belief in a supervising God/higher power is not statistically significant, nor does it change the significance of any of the other variables. Model 4 adds belief in an intervening God/higher power to the baseline model (Model 2). Belief in a God or a higher power that intervenes in the world is statistically and negatively associated with the odds of being vaccinated. A one unit increase in belief in the intervention power of God or a higher power is associated with an individual having 47% lower odds of having received a COVID-19 vaccine. The difference between Catholics and evangelical Protestants loses its significance in this model, and religious service attendance becomes statistically significant, predicting higher odds of being vaccinated. Model 5 incorporates the belief in a supervising God/higher power with belief in an intervening God/higher power. Belief in a supervising God/higher power remains not statistically significant, whereas belief in the intervention power of God or a higher power remains statistically significant.

Table 3 presents the logistic regression results predicting intent to receive a COVID-19 vaccine or having already received one (i.e., received/planning to receive a COVID-19 vaccine). As before, Model 1 includes the non-religious control variables. Income, age, education, and being a Twitter user are all significantly and positively associated with the odds of having received or planning to receive a COVID-19 vaccination. Asian, non-Hispanic individuals have significantly higher odds of being vaccinated or planning to get vaccinated, compared to White, non-Hispanic individuals. Those who have never been married have significantly higher odds of being vaccinated or planning to get vaccinated compared to respondents who are married. Political affiliation is significantly and negatively associated with the odds of being vaccinated or planning to get vaccinated, as is identifying as "Other, non-Hispanic", compared to White, non-Hispanic individuals. Religious controls are incorporated

into Model 2. Christian nationalism is significantly and negatively associated with the odds of having received or planning to receive a COVID-19 vaccine, with a one unit increase in Christian nationalism corresponding to a 15% decrease in the odds of having received or planning to receive a COVID-19 vaccine.

Model 3 incorporates belief in a supervising God/higher power. As with vaccination status, the belief in a supervising God/higher power is not statistically significant having received or planning to receive a COVID-19 vaccine, nor does it change the significance of any of the other variables. Model 4 adds belief in an intervening God/higher power to Model 2. Belief in God or a higher power that intervenes in the world is statistically and negatively associated with the odds of having received or planning to receive a COVID-19 vaccine. A one unit increase in belief in the intervention power of God or a higher power is associated with 62% lower odds of having received or planning to receive a COVID-19 vaccine. It is also worth noting that belief in an intervening God or higher power attenuates the association between Christian nationalism and the odds of having received or planning to receive a COVID-19 vaccine. Model 5 includes both belief in a supervising God/higher power and belief in an intervening God/higher power. As before, belief in a supervising God/higher power does not have a statistically significant association with the outcome. Belief in an intervening God or higher power continues to be statistically and negatively associated with the outcome, with a one unit increase in belief associated with 64% lower odds of having received or planning to receive a COVID-19 vaccine.

Table 4 presents the predicted probabilities for levels of belief in an intervening God/higher power for the logistic regression models presented in Tables 2 and 3, holding all other variables at their means. The predicted probability of having received a COVID-19 vaccine is 79% when belief in an intervening God/higher power is at its lowest value and 65% when it is at its highest value. The predicted probability of having received or planning to receive a COVID-19 vaccine is 88% for the lowest value of belief in an intervening God/higher power and 73% for the highest value.

Discussion

Prior research has consistently found that religiosity, typically religious conservatism, is negatively associated with trust or confidence in science, vaccine uptake, and vaccine confidence (Brewer et al. 2011; Cawkwell and Oshinsky 2015; Constantine and Jerman 2007; Gerend and Shepherd 2011; Hussain et al. 2018; Johnson, Scheitle, and Ecklund 2015; Katz et al. 2009; Krok-Schoen et al. 2018; McPhetres and Zuckerman 2018; Turner 2017; Whitehead and Perry 2020; Wombwell et al. 2015). Recent work has replicated these findings in the context of uptake or intent to receive a COVID-19 vaccine (Corcoran et al. 2021; Olagoke, Olagoke, and Hughes 2021; Scott et al. 2021). Yet these associations, for the most part, remain a black box. Numerous mechanisms have been theorized, but generally have not been tested.

The current study contributes to this literature by theorizing and testing one possible mechanism—God's or a higher power's ability to supervise or be actively involved in human affairs. While past research examined the relationship between images of God and a variety of attitudes and behaviors (Bader et al. 2017; Bader and

Table 2 Logistic Regression Models Predicting COVID-19 Vaccination Status, Odds Ratios Displayed

	Model 1	Model 2	Model 3	Model 4	Model 5
God/Higher Power Supervision	--	--	0.84	--	1.21
God/Higher Power Intervention	--	--	--	0.53*	0.49*
Religious Affiliation					
Evangelical Protestant (ref.)	--	--	--	--	--
Other Protestant	--	1.60	1.59	1.51	1.50
Catholic	.--	1.80*	1.78*	1.67	1.66
Non-Christian	--	1.99	1.92	1.82	1.87
Agnostic	--	2.35	2.24	1.98	2.04
Atheist	--	2.92	2.92	2.58	2.53
Nothing in Particular	--	1.29	1.27	1.16	1.17
Something Else	--	1.05	1.04	1.01	1.01
Religious Service Attendance	--	1.07	1.08	1.08*	1.08*
Bible Beliefs					
Bible as actual word of God (ref.)	--	--	--	--	--
Bible as inspired by God	--	1.18	1.17	1.09	1.09
Bible as book of fables	--	0.78	0.74	0.64	0.66
Christian Nationalism	--	0.81**	0.81**	0.82**	0.82**
God Beliefs					
Belief in a Higher Power (ref.)	--	--	--	--	--
Belief in God	--	1.05	1.10	1.16	1.12
Income	1.09**	1.07**	1.07**	1.07**	1.07**
Age	1.05**	1.06**	1.06**	1.06**	1.06**
Political Affiliation	0.77**	0.80**	0.80**	0.80**	0.80**
Education	1.29**	1.21*	1.21*	1.21*	1.21*
Marital Status					
Married (ref.)	--	--	--	--	--
Widowed	1.36	1.28	1.27	1.21	1.22
Divorced	0.73	0.75	0.74	0.73	0.74
Separated	1.28	1.26	1.25	1.27	1.29
Never Married	2.48**	2.31**	2.30**	2.34**	2.35**
Living with Partner	1.04	1.03	1.01	1.03	1.06
Gender					
Female (ref.)	--	--	--	--	--
Male	1.10	1.05	1.04	1.01	1.01
Other	0.78	0.82	0.80	0.80	0.82
Race-Ethnicity					
White, non-Hispanic (ref.)	--	--	--	--	--
Black, non-Hispanic	0.85	0.97	0.98	1.00	1.00
Asian, non-Hispanic	4.52**	4.61*	4.69*	4.88*	4.83*
Other, non-Hispanic	0.28*	0.31*	0.31*	0.31*	0.30*
Hispanic	1.01	1.01	1.00	1.04	1.05
Two or more Races, non-Hispanic	1.17	1.06	1.06	1.05	1.05
Facebook User	1.04	1.10	1.10	1.08	1.08
Twitter User	1.75*	1.74*	1.75*	1.77*	1.77*
Region					
South Atlantic (ref.)	--	--	--	--	--
New England	0.82	0.86	0.86	0.78	0.77

Table 2 (continued)

	Model 1	Model 2	Model 3	Model 4	Model 5
Mid-Atlantic	0.64	0.68	0.68	0.68	0.68
East North Central	0.89	0.90	0.90	0.88	0.89
West North Central	1.06	1.17	1.15	1.15	1.17
East South Central	0.70	0.75	0.76	0.76	0.75
West South Central	0.40**	0.41**	0.40**	0.41**	0.41**
Mountain	1.01	0.96	0.96	0.97	0.97
Pacific	0.82	0.86	0.86	0.82	0.82
Constant	0.07**	0.06**	0.07**	0.08**	0.07**

Note: $N = 1{,}623$; * $p < .05$ ** $p < .01$

Froese 2005; Evans and Adams 2003; Froese and Bader 2007, 2008; Greeley 1988, 1989, 1991, 1993; Henderson, Fitz, and Mencken 2017; Jang et al. 2018; Maynard et al. 2001; Unnever et al. 2005, 2006), it failed to examine the potential influence of particular images of God on vaccine attitudes or science more broadly (see Upenieks et al. (2021) for an exception). We find that God or a higher power's ability to intervene in the world is significantly and negatively associated with the odds of COVID-19 vaccine uptake and having received or planning to receive a COVID-19 vaccine. On the other hand, belief in God or a higher power's supervision is not significantly associated with the outcomes. This is likely due to the intervention scale focusing more on God/higher power's ability to protect, heal, and/or grant health, which may be perceived as more directly relating to whether someone needs to receive a vaccine.

While past research on images of God have focused specifically on God, this study advances the literature by also examining how perceptions of a higher power as intervening shape vaccine uptake. The findings for the intervention scale remain net of whether someone believes in a God or higher power (i.e., adjusting for whether the intervention scale is referring to one's belief in God's or a higher power's intervention powers), which suggests that it is the belief in the intervention abilities themselves and not whether they are held by a God or higher power that matters. Future research should further investigate how images of a higher power may relate to other forms of science or health-related attitudes and behaviors.

We found that Christian nationalism is negatively associated with having received a COVID-19 vaccine even net of belief in God's/higher power's intervention or supervision powers. Thus, while prior research suggested that this might be a possible mechanism explaining Christian nationalists' lower vaccine rates (Corcoran et al. 2021; Whitehead and Perry 2020), we do not find that that is the case. However, in the models predicting whether one has received or plans to receive a COVID-19, the negative association between Christian nationalism and the outcome becomes non-significant. This suggests that the relationship between Christian nationalism and intent to receive a COVID-19 vaccine is explained by being more likely to believe in God or a higher powers ability to intervene, while whether a Christian nationalist has already received a vaccine is due to other factors.

In terms of the other control variables, we found that the West South Central region has lower odds of being vaccinated than the South Atlantic region. This is consistent with research finding that this region has some of the highest rates of vaccine hesitancy (Beleche et al. 2021). This difference was not attenuated net of reli-

gion, political affiliation, and socio-demographic variables. Future research would benefit from exploring what factors account for that difference. Additionally, net of belief in God's/higher power's intervention, the difference in odds of being vaccinated between Catholics and evangelical Protestants became non-significant suggesting that belief in intervention powers accounts for that difference. While our aim in this study was to examine how a person's conceptualization of God affects their vaccine uptake, it is also possible that such conceptualizations may moderate other associations. Thus, believing in a God/higher power that intervenes may reduce the positive association between attendance and vaccination and may amplify the negative association between Christian nationalism and vaccination. Exploring how conceptualizations of God may moderate other relationships is an important avenue for future research.

There are, of course, some limitations to this study. First, the cross-sectional nature of the data means we cannot interpret the results as causal. Having received or planning to receive a COVID-19 vaccine could potentially affect belief in the abilities of God or a higher power though we think that is less likely than the theorized causal direction. Second, while past research has examined a variety of different images of God and their associations with various attitudes and behaviors, the survey data only allows us to examine belief in God's/higher power's intervention and supervision. Examining the associations between vaccine uptake and other images of God would be an interesting avenue for future research. Third, although all U.S. adults were eligible for a COVID-19 vaccine during the fielding of the survey, respondents were not asked if the COVID-19 vaccine was accessible to them. COVID-19 vaccines may still have been difficult to access in certain areas and for marginalized populations during this time period. Predicting having received or planning to receive a COVID-19 vaccine helps address this as does controlling for region and socio-demographic variables.

Conclusion and implications

This study is one of the first to crack open the black box related to religiosity and vaccine uptake using the case of COVID-19 vaccines. We find that belief in God or a higher power's ability to intervene in the world is consistently negatively related to COVID-19 vaccine uptake and intent to receive a COVID-19 vaccine. Given that 19.48% and 35.86% of our sample reported believing in 3 and 4 items of the intervention scale respectively, people who believe in God or a higher power's intervention abilities may contribute to delays in achieving herd immunity due to their lower COVID-19 vaccine uptake rates. This may be especially the case if people who believe this tend to cluster and attend the same congregations. Current and future public health interventions would benefit from considering how to best create vaccination campaigns that speak to people who believe that God or a higher power will protect and heal them. Moreover, while this study focused on how particular images of God may inform research on the negative associations between religious conservatism and vaccine uptake, belief in God or a higher power's intervention abilities may also serve as a mechanism mediating the negative associations between religious conservatism and other science and health-related attitudes and behaviors. Future

Table 3 Logistic Regression Models Predicting Having Received or Planning to Receive a COVID-19 Vaccine, Odds Ratios Displayed

	Model 1	Model 2	Model 3	Model 4	Model 5
God/Higher Power Supervision	--	--	0.65	--	1.10
God/Higher Power Intervention	--	--	--	0.38*	0.36**
Religious Affiliation					
Evangelical Protestant (ref.)	--	--	--	--	--
Other Protestant	--	1.12	1.10	1.02	1.02
Catholic	.--	1.29	1.26	1.15	1.15
Non-Christian	--	3.32	2.95	2.83	2.88
Agnostic	--	1.87	1.66	1.43	1.46
Atheist	--	2.03	2.03	1.65	1.63
Nothing in Particular	--	0.91	0.87	0.78	0.79
Something Else	--	0.91	0.89	0.86	0.86
Religious Service Attendance	--	1.04	1.05	1.06	1.05
Bible Beliefs					
Bible as actual word of God (ref.)	--	--	--	--	--
Bible as inspired by God	--	1.49	1.46	1.34	1.34
Bible as book of fables	--	0.92	0.80	0.68	0.69
Christian Nationalism	--	0.85*	0.85*	0.88	0.88
God Beliefs					
Belief in a Higher Power (ref.)	--	--	--	--	--
Belief in God	--	0.95	1.04	1.09	1.08
Income	1.07**	1.06*	1.06*	1.06*	1.06*
Age	1.05**	1.05**	1.05**	1.05**	1.05**
Political Affiliation	0.68**	0.70**	0.70**	0.70**	0.70**
Education	1.32**	1.25*	1.25*	1.24*	1.24*
Marital Status					
Married (ref.)	--	--	--	--	--
Widowed	1.27	1.25	1.23	1.17	1.17
Divorced	0.67	0.69	0.67	0.66	0.67
Separated	1.58	1.58	1.51	1.59	1.61
Never Married	2.08**	1.96*	1.96*	2.00*	2.01*
Living with Partner	1.08	1.11	1.05	1.10	1.11
Gender					
Female (ref.)	--	--	--	--	--
Male	1.27	1.19	1.17	1.14	1.14
Other	0.62	0.65	0.63	0.63	0.63
Race-Ethnicity					
White, non-Hispanic (ref.)	--	--	--	--	--
Black, non-Hispanic	0.82	0.99	0.99	1.02	1.02
Asian, non-Hispanic	9.02**	8.51**	8.96**	9.75**	9.71**
Other, non-Hispanic	0.18**	0.21**	0.21**	0.20**	0.20**
Hispanic	0.93	0.92	0.91	0.96	0.97
Two or more Races, non-Hispanic	0.94	0.88	0.88	0.86	0.86
Facebook User	1.20	1.26	1.26	1.23	1.23
Twitter User	1.74*	1.69*	1.70*	1.74*	1.75*
Region					
South Atlantic (ref.)	--	--	--	--	--

Table 3 (continued)

	Model 1	Model 2	Model 3	Model 4	Model 5
New England	1.04	0.99	0.99	0.86	0.86
Mid-Atlantic	0.61	0.63	0.63	0.64	0.64
East North Central	1.06	1.07	1.06	1.04	1.04
West North Central	1.06	1.10	1.06	1.08	1.09
East South Central	0.83	0.92	0.94	0.95	0.94
West South Central	0.58	0.61	0.61	0.63	0.63
Mountain	0.94	0.90	0.90	0.92	0.92
Pacific	0.79	0.80	0.79	0.73	0.73
Constant	0.30	0.27	0.39	0.47	0.45

Note: $N = 1{,}623$; * $p < .05$ ** $p < .01$

Table 4 God/Higher Power's Intervention Predicted Probabilities for Logistic Models

	Received a COVID-19 Vaccine		Received/Plan to Receive a COVID-19 Vaccine	
	Predicted Probability	95% CI	Predicted Probability	95% CI
God/Higher Power Intervention				
0	0.79	[0.72, 0.86]	0.88	[0.83, 0.93]
0.25	0.76	[0.71, 0.81]	0.85	[0.81, 0.89]
0.50	0.73	[0.69, 0.76]	0.82	[0.79, 0.85]
0.75	0.69	[0.65, 0.73]	0.78	[0.74, 0.81]
1	0.65	[0.58, 0.71]	0.73	[0.67, 0.79]

research should explore these and other outcomes as well as additional images of God and their relationships to them.

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Authors and Affiliations

Bernard D. DiGregorio[1] · Katie E. Corcoran[1] · Christopher P. Scheitle[1]

✉ Bernard D. DiGregorio
bdigrego@mix.wvu.edu

✉ Katie E. Corcoran
kecorcoran@mail.wvu.edu

✉ Christopher P. Scheitle

cpscheitle@mail.wvu.edu

[1] Department of Sociology & Anthropology, West Virginia University, PO Box 6326, 26506-6326 Morgantown, WV, United States