

## Article

# Demonic and Divine Attributions around COVID-19 Vaccines: Links with Vaccine Attitudes and Behaviors, QAnon and Conspiracy Beliefs, Anger, Spiritual Struggles, Religious and Political Variables, and Supernatural and Apocalyptic Beliefs

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**Abstract:** Given the prevalence of supernatural beliefs in the United States, some people may believe that God or the devil influenced people to create or receive COVID-19 vaccines. In an Internet sample of 3196 U.S. adults (with many preregistered hypotheses), divine vaccine attributions were more common than demonic attributions. Demonic vaccine attributions were linked with more anti-vaccination attitudes and lower odds of vaccination, whereas divine attributions showed the opposite pattern. Demonic (but not divine) attributions showed consistent positive connections with conspiracy beliefs (including QAnon), anger toward people and organizations seen as pro-vaccine, and seeing one's political opponents as enemies and as evil. Demonic attributions were also linked with more anxiety, depression, and spiritual struggle, and lower agreeableness and social desirability. Both demonic and divine attributions related positively to political conservatism, religious fundamentalism, Christian nationalism, authoritarian aggression, and traditional masculinity beliefs. Demonic (but not divine) attributions were also associated with being younger and having less education. Both demonic and divine vaccine attributions correlated positively with religiousness, belief in God and the devil, and seeing these entities as powerful, able to work through natural events, and intervening often in the world. Demonic and divine attributions also related positively to belief in heaven and hell, seeing many people as destined for hell, seeing life as a cosmic battle between good and evil, and apocalyptic or "end times" beliefs.

**Keywords:** COVID-19; vaccines; demonic; devil; conspiracy beliefs; QAnon; anger; spiritual struggles; Christian nationalism; supernatural attributions

## 1. Introduction

The COVID-19 pandemic has led to suffering and death throughout the world, including over 1 million confirmed U.S. deaths at the time of this writing (26 May 2022) (Centers for Disease Control and Prevention 2022). The COVID-19 situation also fueled widespread misinformation, confusion, and mistrust, often taking the form of conspiracy thinking (Islam et al. 2020; Su et al. 2021). Many people have seen the virus or pandemic as a hoax (Bok et al. 2021; Imhoff and Lamberty 2020) or believe that COVID-19 was intentionally created in a lab (PRRI Staff 2020). Ongoing tensions around the vaccines, as well as lockdowns and mask mandates, contributed to an atmosphere of mistrust, anger, and politically focused division (PRRI Staff 2020, 2021d; Suthaharan et al. 2021). When COVID-19 vaccines were developed and made available, many people had concerns about their safety and efficacy, leading to widespread vaccine hesitancy and refusal (Kricorian et al. 2022; PRRI Staff 2021c). Conspiracy theories such as QAnon (PRRI Staff 2021d) and concerns that the vaccines contained microchips for surveillance (Thomas and Zhang 2020) fanned the flames of confusion, fear and anger. Religious controversies arose as well: some

saw the vaccine as a way to show God’s love for one’s neighbors (PRRI Staff 2021c), while others sought religious exemptions to avoid vaccination (PRRI Staff 2021b).

Given that most people in the United States believe in God (79% in 2016; 87% in 2017) and the devil (61% in 2016) (Gallup 2022), we were interested in the following questions: Do some people believe that the devil or God influenced people to create or receive the vaccines? How do these demonic and divine attributions relate to vaccine attitudes and behaviors, conspiracy thinking, anger toward others, emotional distress and spiritual struggle? And how do these demonic and divine vaccine attributions connect with other political and religious factors, along with other beliefs related to the supernatural (e.g., ideas about how God and the devil operate; seeing many people as destined for heaven vs. hell; seeing life as a cosmic battle) and beliefs about sources of authority (e.g., fundamentalism, Christian nationalism, authoritarian aggression, masculinity)?

### 1.1. Demonic and Divine Attributions: Background

Many people see God and the devil as having the potential to work through natural events (Exline et al. 2021a). Demonic and divine attributions can have both clinical and social importance, as shown in many prior studies (for reviews, see Exline and Wilt 2022; Pargament and Exline 2022). Demonic attributions (and the closely related concept of demonic struggles) have been linked with emotional distress (Exline et al. 2014), declines in mental health (Nie and Olson 2017), higher mortality rates for medically ill older adults (Pargament et al. 2001), and poorer outcomes from divorce (Krumrei et al. 2011). Demonic attributions may be especially dangerous when focused on other people, as they are linked with anger and antagonistic behavior—patterns shown, for example, in response to the 2016 and 2020 U.S. presidential elections (Exline et al. 2021b; Wong et al. 2019). Divine attributions show more mixed correlates, depending largely on whether God’s intentions are seen as positive or negative. For example, people who see a divine hand behind positive events may feel happy and grateful (Wilt and Exline 2022). When people see God causing negative events, they might see God’s intentions as benevolent and use such beliefs to cope (Pargament et al. 2000), or they might see God’s motivations as cruel and feel anger in response (Exline et al. 2011).

We expected some people with supernatural worldviews to make divine or demonic attributions to the COVID-19 vaccines, believing that God or the devil influenced people to create or receive the vaccines. Our aim was to closely examine these divine and demonic vaccine attributions and their associations with a wide array of variables. We first focused on associations with vaccine-related attitudes and behaviors, conspiracy beliefs, anger, emotional distress, and spiritual struggle. We also examined connections with religious and political variables as well as those focused on authority and dominance: fundamentalism, Christian nationalism, authoritarian aggression, masculinity, agreeableness, and social desirability. We briefly review our predictions next, many of which were preregistered on the Open Science Framework (Exline et al. 2022; <https://osf.io/nv9q3/> (uploaded on 15 February 2022)). Because we included so many variables in this study, our hypothesis descriptions are necessarily brief.

### 1.2. Demonic and Divine Vaccine Attributions: Competing Hypotheses

We expected divine vaccine attributions to be endorsed more than demonic ones, given that people are more likely to believe in God than the devil and because vaccines are typically framed as health-promoting. When speculating about whether demonic and divine vaccine attributions would be positively or negatively related, we identified two competing hypotheses:

- **Supernatural Worldview Hypothesis.** People need to hold some belief in God and the devil—and see them as somehow active in the world—in order to make demonic and divine attributions. Using this reasoning, divine and demonic attributions should correlate positively, and they should show similar correlations with other variables,

because they both reflect a supernatural, often religious worldview in which people believe strongly in God and the devil and see them as active in the world.

- **God vs. Devil Hypothesis.** On the other hand, one could also expect demonic and divine attributions to correlate negatively. If God is seen as good and the devil as bad, then those who see the vaccines as good might see God behind them, whereas those who see the vaccines as bad would see the devil behind them. Following this logic, divine and demonic vaccine attributions should correlate negatively, and they should show opposite correlates with other variables, because they reflect the idea of God and the devil as being in opposition. In other words, the God vs. Devil hypothesis would suggest that if people see God as the cause of something, they should not see the devil as the cause, and vice versa.

### 1.3. Demonic and Divine Vaccine Attributions: Expected Links with Other Study Variables

Next, we made predictions about how demonic and divine vaccine attributions would relate to other variables. As we will show, some of our predictions reflected the God vs. Devil Hypothesis, whereas in other cases we only made predictions about demonic vaccine attributions and kept both competing hypotheses in play for divine attributions.

#### 1.3.1. Vaccine Attitudes and Behaviors

Demonic attributions are typically associated with negative events (Lupfer et al. 1994, 1996; Ray et al. 2015) and with anxiety or fear (Exline et al. 2014). In this case, we expected people who saw the vaccines in a negative light to make more demonic attributions and to show more vaccine hesitancy, anti-vaccine attitudes, and lower vaccination rates. (Note that causation could conceivably go in either direction: demonic attributions could feed negative vaccine attitudes, but negative vaccine attitudes could also increase the odds of demonic attributions.) In terms of divine attributions, we expected the God vs. Devil Hypothesis to find support here, with divine attributions linked with more pro-vaccine attitudes and higher vaccination rates.

#### 1.3.2. Conspiracy Beliefs

Because demonic attributions might both reflect and feed a sense of mistrust and fear, we expected demonic vaccine attributions to correlate positively with conspiratorial thinking, which involves the belief that sinister, secret groups of powerful actors seek to control or manipulate the world (Abrams 2020; Brotherton et al. 2013; Douglas et al. 2017, 2019; Pait 2022; van Prooijen and van Vugt 2018). Conspiracy thinking has not only been framed as quasi-religious in and of itself (Franks et al. 2013), but it has also been linked with religiousness (e.g., Frenken et al. 2022)—and, in particular, with conservative or fundamentalist religious views, in prior work (e.g., Lowicki et al. 2022; see also Oliver and Wood 2018). Religiosity has also been linked with more disbelief that COVID-19 is real (Bok et al. 2021) and with more conspiracy thinking around the pandemic (Lowicki et al. 2022). Here, we were interested in the more specific question of demonic vaccine attributions (which we expected to be greater among more religious people). We proposed that demonic attributions would show strong positive connections with QAnon beliefs (Abrams 2020; Mitchell et al. 2020; PRRI Staff 2021d, 2022; Suthaharan et al. 2021), which include a direct focus on the devil. A core QAnon belief is that a secretive cabal of leftists—who are also pedophilic, cannibalistic worshippers of Satan—conspired against Donald Trump when he was in office. We also expected demonic attributions to relate to several other beliefs suggesting conspiracy thinking: seeing COVID as a hoax and seeing the vaccine as containing a surveillance microchip or even the apocalyptic “mark of the beast” described in the Bible (PRRI Staff 2021d). We also expected demonic attributions to relate to beliefs about causes of the pandemic, with more blaming of hypothesized entities often linked with conspiracy thinking, such as the New World Order and Illuminati (CBS News 2013; Spark 2000) and the Deep State (Langer 2017), but also other governments (the United States and China) and the media. Finally, since some conspiracy beliefs also involve aliens

(Swami and Coles 2010), we speculated that demonic attributions would also be linked with seeing aliens as a cause. We did not register specific predictions about how divine vaccine attributions would relate to conspiracy beliefs, reasoning that both the Supernatural Worldview and God vs. Devil Hypotheses might both play a role.

### 1.3.3. Anger at Other People or Groups

Because demonic attributions have been linked with anger and antagonism toward others (Exline et al. 2021b; Wong et al. 2019), we expected demonic vaccine attributions to be linked with more anger toward organizations or people seen as pro-vaccine and less anger toward those seen as anti-vaccine. Once again, we expected divine attributions to show the opposite pattern (God vs. Devil Hypothesis).

### 1.3.4. Spiritual Struggles and Emotional Distress

Demonic attributions have been linked with spiritual struggle (Exline et al. 2014; Pargament and Exline 2022) and emotional distress (Nie and Olson 2017), and we expected the same patterns here. We did not offer specific predictions for divine attributions.

### 1.3.5. Religious/Supernatural Belief and Engagement

What types of religious or supernatural beliefs are linked with demonic attributions in general? Research on supernatural attributions suggests that people attribute more events to supernatural entities, including the devil, if they report strong belief in them (Wilt et al. 2022), if they have a prior history of attributing events to them, and if their beliefs about how the entities operate fits well with the event in question (Exline et al. 2021a). For example, people should be more likely to see demonic influence around the vaccine if they see the devil as very powerful—having sufficient power to work through natural events and through people, for instance—and if they believe that the devil tries to communicate with people frequently. Most proximally, we expected that seeing the devil as a cause of the pandemic would relate strongly to demonic attributions about the vaccines. Because demonic beliefs are part of many religious teachings, including Christianity, we expected people with more religious engagement to make more demonic attributions. We also expected demonic attributions to be associated with seeing life in terms of a cosmic battle between good and evil, with greater belief in hell and seeing more people as destined for hell, and with greater belief that we are living in the end times described in the Bible.

We preregistered the above hypotheses to focus on demonic vaccine attributions. Due to an oversight, we did not preregister parallel hypotheses offered for divine attributions, other than the competing ones. Yet we did expect divine vaccine attributions to relate to these religious and supernatural variables in ways that fit the Supernatural Worldview Hypothesis. For example, we expected divine attributions to relate to more religiousness and belief in God, more perceived experiences with God, and stronger “operating rules” for God (cf. Exline et al. 2021a).

### 1.3.6. Political Identities, Attitudes and Behaviors

Because vaccine hesitancy has been more pronounced among politically conservative Americans (Callaghan et al. 2021; PRRI Staff 2020; Whitehead and Perry 2020a), we expected demonic vaccine attributions to show connections with self-identified political conservatism and associated behavioral indicators, including voting for Trump in 2020, intending to do so in 2024, and endorsing the conservative FOX news network as one’s most trusted media source. Beyond these simple political affiliations, we also expected demonic vaccine attributions to be linked with attitudes toward political opponents. Specifically, we expected that demonic attributions would be linked with signs of mistrust and anger, such as believing that the 2020 election had been stolen from Donald Trump and with seeing political opponents as enemies and as evil. Beyond the competing hypotheses, we did not make predictions about divine attributions and political variables.

### 1.3.7. Authority-Related Variables

We also considered several variables related to themes of authority. For example, we expected demonic vaccine attributions to be more likely among those whose religious groups/leaders opposed the vaccine and related measures, like masks and social distancing. We also expected fundamentalism (Williamson et al. 2010) and Christian nationalism (Whitehead and Perry 2020b) to be linked with more demonic attributions around the vaccine, reflecting Biblical beliefs in the demonic as well as political and religious conservatism. Several studies have linked Christian nationalism to anti-vaccine attitudes (Corcoran et al. 2021; Whitehead and Perry 2020a). We also expected authoritarian aggression, a subset of right-wing authoritarianism (Altemeyer and Hunsberger 1992), to be linked with demonic attributions—a pattern found in response to the 2020 U.S. presidential election results (Exline et al. 2021b). Finally, traditional masculinity beliefs have often been a part of conservative religious culture, specifically including Christianity and evangelicalism (Du Mez 2020), fitting with themes of aggression, patriarchy, and militarism (including spiritual warfare) often embedded in this subculture. As such, we also expected traditional masculinity beliefs to also be linked to more demonic vaccine attributions. Other than the competing hypotheses, we did not make predictions here about divine attributions.

### 1.3.8. Agreeableness and Social Desirability

Finally, given the expected connections between demonic attributions and several variables that might be seen as disagreeable in tone (e.g., anger, aggressive attitudes, conspiracy thinking, belief that many people are going to hell), we expected demonic vaccine attributions to be linked to lower levels of agreeableness and lower scores on social desirability. These hypotheses were not preregistered.

## 2. Method

### 2.1. Participants and Procedure

The study was approved by the university's IRB. Many hypotheses and the survey were preregistered on the Open Science Framework (Exline et al. 2022; <https://osf.io/nv9q3/> (uploaded on 15 February 2022)). A 20-minute Qualtrics survey was administered online between February 28 and March 2, 2022, when Omicron was the dominant U.S. variant. U.S. adults were recruited through CloudResearch (Chandler et al. 2019), a company that contracts with other companies to recruit participants. Of the 4144 people who clicked on the survey, 369 did not consent, 477 failed two early attention checks and were exited, 50 showed rushed responding (less than 5 min), 41 typed random material in text boxes, and 11 indicated that they were under 18 years old, leaving 3196 participants for analyses.

### 2.2. Sample Demographics

The mean age was 54.5 years ( $SD = 17.2$ ). Most participants self-identified as female ( $n = 1941$ , 61%) or male ( $n = 1231$ , 38%), with approximately 1% identifying as non-cisgender (transgender, nonbinary, gender non-conforming, genderqueer, gender fluid, or agender). Sexual orientations included heterosexual (87%), homosexual (5%), bisexual (4%), asexual (1%) and pansexual (0.5%). A total of 42% were married, 27% were single, 17% were divorced or separated, 8% were widowed, and 7% were living with a partner. Most (95%) were born in the United States. Ethnic/racial categories included White/Caucasian/European American (79%), African American/Black (9%), Latino/Hispanic (3%), Asian/Pacific Islander (2%), American Indian/Native American/Alaska Native (1%), mixed (4%), and other (1%).

Approximately two-thirds (66%) of participants identified as Christian, including Catholic (18%), conservative Protestant (19%), unspecified Christian (16%), mainline or liberal Protestant (7%), unspecified Protestant (6%), and Orthodox (0.5%). Other affiliations included Jewish (3%), Muslim (1%), Hindu (0.3%), Buddhist (1%), spiritual (5%), atheist (3%), agnostic (4%), none (16%), unsure (1%), and other (1%). Political affiliations were quite evenly split between Democrat (32%) and Republican (31%), with 22% identifying



as Independent, 10% claiming no party affiliation, 1% identifying as Libertarian, and 0.4% affiliating with the Green Party.

Highest education levels completed were as follows: grammar/elementary school (1%), high school (6%), some college (24%), vocational/technical/community college (15%), four-year college (21%), Master's degree (11%), and doctoral degree (2%). Employment statuses included employed for wages (30%), self-employed (8%), unemployed (9%), home-maker (6%), retired (36%), student (1%), and unable to work (9%).

### 2.3. Measures

All participants answered items on demographics, vaccine behaviors and attitudes, anger, religion, and politics, as well as ten items from the Public Religion Research Institute (PRRI Staff 2021a, 2021d). To keep the survey at 20 min, participants were randomly assigned to two of the other six blocks: (1) COVID Causes/Struggle; (2) Authority; (3) Conspiracy; (4) God, the Devil, and the Afterlife; (5) Distress and Personality. (Block 6 items were not relevant here.).

Unless otherwise specified, measures were scored by averaging across items. To conserve space, the correlation tables provide descriptive statistics (*N*, range, *M* (*SD*),  $\alpha$ ). For full details on wording and formatting, see the survey (<https://osf.io/nv9q3/>, (uploaded on 15 February 2022)).

#### 2.3.1. Demonic and Divine Attributions for COVID-19 and Vaccines

Participants read, “Do you believe that God exists? (or that gods exist?)” and “Do you believe that the devil exists?” rated from 1 (not at all) to 5 (totally). Those who reported some belief in God or the devil were given five attribution questions for each entity. (We created these measures for this study.) The first God item read, “Do you think that God had some role in causing the COVID-19 pandemic?” and was rated from 1 (No, not at all) to 5 (Yes, definitely). This question was repeated for the devil. Using the same response scale, participants rated the extent to which they thought that God (and the devil) had led people to create the COVID-19 vaccines, had led people to receive the COVID-19 vaccines, had tried to lead them, personally, to get a COVID-19 vaccine, and had tried to lead them, personally, to NOT get a vaccine. The three divine vaccine attribution items were averaged, as were those for demonic vaccine attributions. (The items on not getting a vaccine were omitted from the indices.) Table 1 has descriptive statistics.

**Table 1.** Variables Related to COVID-19 and Vaccines: Descriptive Statistics and Correlations with Demonic and Divine Vaccine Attributions.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
<b>Demonic and divine attribution items</b>					
Devil caused COVID-19 pandemic	1 to 5	2.6a (1.4) (–)	2634	<b>0.54 **</b>	0.40 **
God led people to receive vaccine	1 to 5	2.6a (1.4) (–)	2862	0.17 **	<b>0.92 **</b>
God tried to lead you to get vaccine	1 to 5	2.4b (1.4) (–)	2862	0.18 **	<b>0.89 **</b>
God led people to create vaccine	1 to 5	2.3b (1.4) (–)	2862	0.10 **	<b>0.81 **</b>
Devil led people to create vaccine	1 to 5	2.2c (1.3) (–)	2635	<b>0.82 **</b>	0.15 **
Devil led people to receive vaccine	1 to 5	1.8d (1.2) (–)	2635	<b>0.89 **</b>	0.14 **
God caused COVID-19 pandemic	1 to 5	1.8d (1.1) (–)	2858	<b>0.33 **</b>	0.41 **
Devil tried to lead you to NOT get vaccine	1 to 5	1.8d (1.2) (–)	2614	0.44 **	0.47 **
Devil tried to lead you to get vaccine	1 to 5	1.7e (1.0) (–)	2614	<b>0.84 **</b>	0.15 **
God tried to lead you to NOT get vaccine	1 to 5	1.7e (1.1) (–)	2862	0.67 **	0.19 **
<i>F</i> (9, 2600) = 193.66 **, Wilks' $\lambda$ = 0.60, Partial $\Omega^2$ = 00.40					

Table 1. Cont.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
<b>INDEX: Demonic and demonic vaccine attributions</b> (led people to create, led people to get, led you to get) (averaged)					
Demonic vaccine attributions	1 to 5	<b>1.9a (1.0) (0.80)</b>	2635	1.0	0.17 **
Divine vaccine attributions	1 to 5	<b>2.4b (1.2) (0.85)</b>	2862	0.17 **	1.0
<i>F</i> (1, 2613) = 389.26 **, Wilks' $\lambda$ = 0.87, Partial $\Omega^2$ = 0.13					
<b>Vaccination status</b>					
Have been vaccinated	1 to 3	2.2 (0.8) (–)	3132	–0.32 **	0.18 **
Side effects from vaccine	1 to 4	1.7 (0.8) (–)	2310	0.06 *	–0.01
Children were vaccinated (have one child)	0 to 1	0.4 (0.5) (–)	307	–0.14 *	0.16 **
Children were vaccinated (multiple children)	0 to 2	0.8 (0.9) (–)	334	–0.14 *	<b>0.33 **</b>
<b>COVID and vaccine-related attitudes</b>					
Wanted to be vaccinated	1 to 5	3.2 (1.6) (–)	3179	–0.32 **	<b>0.21 **</b>
Wanted children to be vaccinated	1 to 5	2.6 (1.6) (–)	651	–0.20 **	<b>0.33 **</b>
Morally right (vs. wrong) to get vaccine	–10 to 10	4.3 (5.6) (–)	3196	–0.35 **	<b>0.23 **</b>
Strong (vs. weak) to get vaccine	–10 to 10	4.3 (5.6) (–)	3196	–0.33 **	<b>0.24 **</b>
Vaccine is a way to show love for neighbors	1 to 4	2.6 (1.1) (–)	3194	–0.12 **	<b>0.36 **</b>
See COVID as dangerous (original, Delta, and Omicron variants; average)	1 to 5	3.5 (1.1) (0.88)	3192	–0.13 **	<b>0.17 **</b>
See vaccine as dangerous	1 to 5	2.2 (1.3) (–)	3188	<b>0.40 **</b>	–0.15 *
COVID is more dangerous than vaccine	–10 to 10	5.2 (6.0) (–)	3196	–0.35 **	–0.21 **
Felt social pressure to get vaccine	1 to 5	1.9 (1.2) (–)	3189	<b>0.21 **</b>	–0.00
Vaccine is attack on personal freedom	1 to 5	2.4 (1.6) (–)	3193	<b>0.33 **</b>	–0.20 **
Shutdowns, mandates are control attempts	1 to 4	2.2 (1.2) (–)	3195	<b>0.37 **</b>	–0.11 **
Vaccine-related worry (mean)	1 to 4	2.1 (0.9) (0.92)	1074	<b>0.44 **</b>	0.00
Long-term effects unknown	1 to 4	2.5a (1.1) (–)	1073	0.26 **	0.00
Not as effective as said to be	1 to 4	2.3b (1.0) (–)	1073	0.29 **	–0.02
Might have serious side effects	1 to 4	2.2bc (1.1) (–)	1073	0.32 **	0.00
Not as safe as said to be	1 to 4	2.2c (1.1) (–)	1074	0.35 **	–0.05
Contain dangerous chemicals/materials	1 to 4	2.0d (1.1) (–)	1072	0.43 **	0.00
Contain tissue from aborted fetuses	1 to 4	1.8e (1.1) (–)	1071	0.41 **	0.05
Contain microchip/used for surveillance	1 to 4	1.7f (1.0) (–)	1074	0.45 **	0.04
<i>F</i> (6, 1064) = 117.33 **, Wilks' $\lambda$ = 0.60, Partial $\Omega^2$ = 0.40					
<b>COVID experiences and stress</b>					
Overall stress from COVID-19 pandemic	1 to 5	2.8 (1.1) (–)	3189	0.02	0.06 **
COVID effects on self/household (PRRI)	0 to 7	1.8 (1.3) (–)	3196	0.02	0.03
Self or household member got COVID-19	0 to 1	0.4 (0.5) (–)	3196	0.05 **	0.00
COVID symptom severity	1 to 4	2.5 (0.8) (–)	921	0.06	–0.02
COVID worry	1 to 4	2.4 (0.9) (0.86)	1074	0.00	0.19 **

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . **Note.** Within each section where we did mean comparisons, means with shared subscripts (i.e., the letters after the means) do not differ at  $p < 0.05$  using the Bonferroni correction. Results in **boldface** supported preregistered hypotheses. Correlations in *italics* did not (or did not fully) support preregistered hypotheses. Correlations in regular font were not included in the preregistration.

### 2.3.2. COVID Stress and Experiences

As Table 1 shows, participants rated their overall stress around the COVID-19 pandemic from 1 (no stress) to 5 (extreme stress). Drawing established items from the PRRI Survey on Religion and COVID-19 Vaccine Trust (PRRI Staff 2021a), we asked, “Which of the following have you or someone in your household experienced as part of the COVID-19 pandemic?” (modified from “the past year” in PRRI version), followed by checkbox items: lost a job due to the COVID-19 pandemic, had hours or pay cut due to the COVID-19 pandemic, tested positive for COVID-19, gotten sick with COVID-19 symptoms, been hospitalized for COVID-19, known someone who was hospitalized for COVID-19, and known someone who died from COVID-19. Responses were summed. A few were analyzed as single items. Those who reported having COVID-19 rated the severity of their symptoms from 1 (no symptoms) to 4 (severe).

### 2.3.3. Vaccine Behaviors, Attitudes, and Anger

We developed several vaccine-related questions for this study. Participants read, “Have you received a COVID-19 vaccine?” and chose a response: 1 (No, I have not received any COVID-19 vaccines), 2 (Yes, I got the original vaccine but have not had a booster), 3 (Yes, I received the vaccine AND a booster), along with “other” and “prefer not to say” options. They read, “How much do/did you want to receive the COVID-19 vaccine?” rated from 1 (not at all) to 5 (totally). Those who reported being vaccinated rated the severity of side effects from 1 (none) to 4 (severe). Those who reported having children under age 18 were also asked if their children had received at least one vaccine dose (if one child: 0 = no, 1 = yes, 2 = don’t know; if multiple children: 0 = none; 1 = at least one but not all; 2 = all; 3 = don’t know) and how much they wanted their children to be vaccinated (from 1 = not at all to 5 = totally). (The “don’t know” responses were not included in analyses.) Participants rated how dangerous they thought the vaccines were, along with the original COVID-19 variant, the Delta variant, and the Omicron variant, from 1 = not at all to 5 = extremely. They were asked, “Which do you think is more dangerous, COVID-19 (and its variants) or the vaccines?” and responded on a slider from -10 (vaccine is more dangerous than virus) to +10 (virus is more dangerous than vaccine). Sliders were also used to answer: “Do you see it as morally right or wrong to get the COVID-19 vaccine?” (−10: morally wrong; +10: morally right) and “Do you see it as a sign of strength or weakness to get the COVID-19 vaccine?” (−10: sign of weakness; +10: sign of strength). They read, “How much social pressure have you felt to get the vaccine?” with responses from 1 (no pressure) to 5 (extreme pressure). Finally, they read, “Do you see vaccine mandates as an attack on your personal freedom?” rated from 1 (no, not at all) to 5 (extremely).

### 2.3.4. COVID-19 and Vaccine Worry

Participants in the Distress/Personality block read items on COVID-related worry adapted from a (PRRI Staff 2021d) survey. They read, “How worried are you that . . . ” followed by 10 items rated from 1 (not at all worried) to 4 (very worried). Three items focused on COVID-19 (you will get COVID-19; your family, romantic partner, or close friends will get COVID-19; you might spread COVID-19 to someone else). Seven focused on vaccine worry: four from the PRRI survey (you might experience serious side effects from the COVID-19 vaccine; the COVID-19 vaccines are not as effective as they are said to be; the COVID-19 vaccines are not as safe as they are said to be; the long-term effects of the COVID-19 vaccines are unknown) and three created for this study (the COVID-19 vaccines contain tissue from aborted fetuses; the COVID-19 vaccines include a microchip or something else being used for surveillance; the COVID-19 vaccines contain dangerous chemicals or materials). See Table 1.

### 2.3.5. PRRI Items, Including Three QAnon Beliefs

Participants completed 10 items from a Public Religion Research Institute (PRRI) survey (PRRI Staff 2021a), rated from 1 (completely disagree) to 5 (completely agree).



Because these 10 items were all administered as part of the initial PRRI survey, we used the entire set here. The first three items focused on QAnon beliefs: (1) The government, media and financial worlds in the U.S are controlled by a group of Satan-worshipping pedophiles who run a global child sex trafficking operation. (2) There is a storm coming soon that will sweep away the elites in power and restore the rightful leaders. (3) Because things have gotten so far off track, true American patriots may have to resort to violence in order to save our country. The remaining items were: (4) The 2020 election was stolen from Donald Trump; (5) The chaos in America today is evidence that we are living in what the Bible calls “the end times”; (6) God always rewards those who have faith with good health and will protect them from COVID-19; (7) Because getting vaccinated against COVID-19 helps protect everyone, it is a way to live out the religious principle of loving my neighbors; (8) The coronavirus that causes COVID-19 was developed intentionally by scientists in a lab; (9) Shutdowns, mask mandates, and other steps taken by state and local governments since the coronavirus pandemic began are unreasonable attempts to control people; (10) The COVID-19 vaccine contains a surveillance microchip that is the sign of the beast in biblical prophecy. (Please note that these items are presented in several different tables in the text, as they are grouped together as part of different sets of analyses.).

### 2.3.6. Conspiracy Beliefs and Pew QAnon Items

All participants read, “Do you think that COVID-19 is real or a hoax?” and rated responses from -10 (definitely real) to +10 (definitely a hoax). See Table 2. Those in the Conspiracy block completed these measures: (1) Three established items from a [Pew Research Center \(2020\)](#) survey on QAnon beliefs: “How much, if anything, have you heard or read about QAnon?” (adapted as 1 = nothing at all, 2 = a little, 3 = a lot). Those who said “a little” or “a lot” were asked to rate whether they thought QAnon was a good vs. bad thing for the country, from 1 (very bad) to 4 (very good), and “How much do you believe that QAnon ideas are true?” from 1 (not at all) to 5 (totally); (2) The widely-used 15-item Generic Conspiracist Beliefs Scale ([Brotherton et al. 2013](#)), with items (e.g., “The government is involved in the murder of innocent citizens and/or well known public figures, and keeps this a secret”) rated from 1 (definitely not true) to 5 (definitely true). See Table 2.

**Table 2.** QAnon and Conspiracy Beliefs: Descriptive Statistics and Correlations with Demonic and Divine Attributions about Vaccines.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
General conspiracy beliefs	1 to 5	2.7 (1.0) (0.96)		<b>0.38 **</b>	0.00
<b>PRRI QAnon Items</b>					
Index (the three below, averaged)	1 to 4	1.9 (0.8) (0.78)	3195	<b>0.50 **</b>	0.09 **
Cabal	1 to 4	1.7 (0.9) (–)	3195	<b>0.46 **</b>	0.02
Storm is coming	1 to 4	2.0 (1.0) (–)	3194	<b>0.39 **</b>	0.14 **
Patriots may need to resort to violence	1 to 4	1.9 (1.0) (–)	3193	<b>0.38 **</b>	0.06 **
<b>Pew QAnon Items</b>					
Have heard of QAnon	1 to 3	1.6 (0.7) (–)	1069	–0.06	–0.03
Believe in QAnon	1 to 5	1.6 (1.1) (–)	460	<b>0.53 **</b>	0.03
QAnon is a good thing for the country	1 to 4	1.6 (0.8) (–)	547	<b>0.37 **</b>	–0.07
<b>Covid-19 causes</b>					
See COVID as a hoax (vs. real)	–10 to 10	–6.2 (5.7) (–)	3196	<b>0.35 **</b>	–0.08 **
COVID intentionally started by scientists in a lab	1 to 4	2.6 (1.1) (–)	3195	<b>0.30 **</b>	–0.03
<b>Checkbox items (0 = no, 1 = yes)</b>					
God	0 to 1	0.03 (0.2) (–)	1050	0.07	0.12 **

Table 2. Cont.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
Devil	0 to 1	0.1 (0.3) (–)	1050	0.36 **	0.14 **
Fate/destiny	0 to 1	0.1 (0.3) (–)	1050	0.04	0.09 **
Karma	0 to 1	0.04 (0.2) (–)	1050	0.08 *	0.02
Luck	0 to 1	0.04 (0.2) (–)	1050	–0.03	0.00
Natural factors	0 to 1	0.3 (0.5) (–)	1050	–0.16 **	0.05
Random factors	0 to 1	0.3 (0.4) (–)	1050	–0.10 **	0.03
Illuminati	0 to 1	0.05 (0.2) (–)	1050	<b>0.21 **</b>	–0.07 *
New World Order	0 to 1	0.1 (0.3) (–)	1050	<b>0.29 **</b>	–0.08 **
Deep State	0 to 1	0.1 (0.3) (–)	1050	<b>0.22 **</b>	–0.10 **
Aliens	0 to 1	0.02 (0.1) (–)	1050	0.05	0.00
Liberals	0 to 1	0.1 (0.3) (–)	1050	<b>0.20 **</b>	–0.02
Scientists in lab	0 to 1	0.5 (0.5) (–)	1050	0.07 *	–0.08 *
The media	0 to 1	0.1 (0.4) (–)	1050	0.09 **	–0.06
U.S. government	0 to 1	0.2 (0.4) (–)	1050	<b>0.16 **</b>	–0.10 **
Chinese government	0 to 1	0.5 (0.5) (–)	1050	<b>0.14 **</b>	0.02

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . **Note.** Correlations in **boldface** supported preregistered hypotheses. Correlations in *italics* did not (or did not fully) support preregistered hypotheses. Correlations in regular font were not included in the preregistration.

### 2.3.7. Causes of Pandemic

We developed several items about the causes of the pandemic. Those in the COVID Causes/Struggle block read, “Which factors do you think may have played a role in causing the COVID-19 pandemic?” followed by checkbox items in random order (e.g., the Illuminati; the devil; the media). See Table 2 for the full list of items.

### 2.3.8. Anger at Other People in Response to the Pandemic

Here we adapted items from an earlier study focused on the 2016 U.S. presidential election (Exline et al. 2021b). All participants read, “When you think about the COVID-19 pandemic, how angry do you feel toward:” followed by 13 items (e.g., liberals, people who did not get the vaccine) in random order, rated from 1 (not at all angry) to 6 (totally furious). Table 3 presents all 13 items.

**Table 3.** Anger toward Others in Response to the Pandemic: Descriptive Statistics and Correlations with Demonic and Divine Vaccine Attributions.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
<b>Anger toward ... (see list below)</b>					
the Chinese government	1 to 5	3.1a (1.5) (–)	3192	<b>0.15 **</b>	0.02
Donald Trump	1 to 5	2.9b (1.7) (–)	3189	–0.17 **	0.09 **
organizations that OPPOSE vaccines, masks, distancing	1 to 5s	2.8bc (1.6) (–)	3190	– <b>0.20 **</b>	0.19 **
religious leaders who OPPOSE vaccines, masks, distancing	1 to 5	2.8bcd (1.6) (–)	3189	– <b>0.21 **</b>	0.17 **
the media	1 to 5	2.7bd (1.4) (–)	3192	<b>0.18 **</b>	–0.09 **
the U.S. government	1 to 5	2.7de (1.4) (–)	3192	<b>0.23 **</b>	–0.11 **
Joseph Biden	1 to 5	2.6e (1.7) (–)	3192	<b>0.26 **</b>	–0.10 **
people who DID NOT get the vaccine	1 to 5	2.5f (1.5) (–)	3191	– <b>0.18 **</b>	0.21 **

Table 3. Cont.

	Range	M (SD) ( $\alpha$ )	n	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
Liberals	1 to 5	2.4fg (1.4) (–)	3189	<b>0.23 **</b>	–0.03
Conservatives	1 to 5	2.4g (1.4) (–)	3187	–0.02	0.06 **
organizations that MANDATE vaccines, masks, distancing	1 to 5	2.2h (1.5) (–)	3192	<b>0.32 **</b>	–0.17 **
religious leaders who MANDATE vaccines, masks, distancing	1 to 5	2.0i (1.4) (–)	3192	<b>0.30 **</b>	–0.17 **
people who GOT the vaccine	1 to 5	1.4j (0.9) (–)	3188	<b>0.32 **</b>	0.03

$F(12, 3142) = 563.22$  \*\*, Wilks'  $\lambda = 0.32$ , Partial  $\Omega^2 = 0.68$

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . **Note.** Means with shared subscripts do not differ at  $p < 0.05$  using the Bonferroni correction. Correlations in **boldface** supported preregistered hypotheses. Correlations in regular font were not included in the preregistration.

### 2.3.9. Emotional Distress

Participants in the Distress/Personality block completed the widely used PHQ-4 (Kroenke et al. 2009), with two items each on anxiety (e.g., “feeling nervous, anxious, or on edge”) and depression (e.g., “feeling down, depressed, or hopeless”) focused on the last two weeks, rated from 0 (not at all) to 3 (nearly every day). Sums were used for scoring. See Table 4.

**Table 4.** Emotional Distress and Spiritual Struggles: Descriptive Statistics and Correlations with Demonic and Divine Attributions about Vaccines.

	Range	M (SD) ( $\alpha$ )	n	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
Anxiety (PHQ-4)	0 to 6	1.6 (2.0) (0.92)	1068	<b>0.13 **</b>	0.04
Depression (PHQ-4)	0 to 6	1.5 (1.9) (0.89)	1068	<b>0.14 **</b>	0.09 **
Anger/hostility	0 to 6	1.3 (1.7) (0.84)	1068	<b>0.17 **</b>	0.06 *
Spiritual struggles around COVID-19 (single item)	1 to 5	1.8 (1.1) (–)	3190	<b>0.29 **</b>	0.20 **
Spiritual struggles around COVID-19 (six-item screener)	1 to 5	1.6 (0.9) (0.92)	1048	<b>0.28 **</b>	0.18 **
Moral struggles	1 to 5	1.7a (1.0) (–)	1048	0.20 **	0.16 **
Ultimate meaning struggles	1 to 5	1.7ab (1.1) (–)	1047	0.22 **	0.11 **
Demonic struggles	1 to 5	1.6bc (1.0) (–)	1048	<b>0.37 **</b>	0.22 **
Interpersonal struggles	1 to 5	1.6c (1.0) (–)	1048	0.22 **	0.14 **
Doubt struggles	1 to 5	1.6c (1.0) (–)	1046	0.20 **	0.12 **
Divine struggles	1 to 5	1.5d (0.9) (–)	1048	0.23 **	0.13 **

$F(5, 1041) = 14.23$ , Wilks'  $\lambda = 0.94$ , Partial  $\Omega^2 = 0.06$

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . **Note.** Means with shared subscripts do not differ at  $p < 0.05$  using the Bonferroni correction. Correlations in **boldface** supported preregistered hypotheses. Correlations in regular font were not included in the preregistration.

### 2.3.10. Spiritual Struggles

All participants read, “To what extent have you experienced religious or spiritual struggles around the COVID-19 pandemic?” rated from 1 (not at all/does not apply) to 5 (a great deal). Those in the COVID Causes/Struggle block read, “In response to the COVID-19 pandemic, to what extent have you had each of the experiences listed below?” followed

by a six-item screener based on the Religious and Spiritual Struggles (RSS) Scale (Exline et al. 2014), with one compound item each for six types of r/s struggle (divine, demonic, interpersonal, moral, ultimate meaning, doubt). A sample item is “Struggles related to God (e.g., anger or disappointment with God; feeling punished or abandoned by God).” See Table 4.

### 2.3.11. Religious/Spiritual Variables

Participants listed their religious affiliation (if any) and completed a four-item measure of religious belief salience adapted from Blaine and Crocker (1995), with items rated from 1 (strongly disagree) to 5 (strongly agree). Items include: I allow my religious/spiritual beliefs to influence other areas of my life; My religious/spiritual beliefs provide meaning and purpose to life; My religious/spiritual beliefs lie behind my whole approach to life; Being a religious/spiritual person is important to me. For religious participation, they read, “On a typical week, how often do you” followed by four items rated from 1 (not at all) to 5 (more than once a day): pray or meditate; attend religious/spiritual services or meetings (or watch online); read religious/spiritual materials (the Bible, books, magazines); think about religious/spiritual issues. The religious belief salience and participation measures were standardized and averaged to assess religiousness (cf. Exline et al. 2014). Participants who reported being part of a religious group/community read, “Which of the statements is most true for your religious group/community?” followed by: (1) Leaders of my religious group have mostly OPPOSED the COVID-19 vaccine, masks, and social distancing; (2) Leaders of my religious group have been MIXED in their reactions to the COVID-19 vaccine, masks, and social distancing; (3) Leaders of my religious group have mostly SUPPORTED the COVID-19 vaccine, masks, and social distancing. (There were also “don’t know” and does not apply” options for this question about religious communities, which we developed for this study.) See Table 5.

**Table 5.** Religiousness and Beliefs about God, the Devil, and the Afterlife: Descriptive Statistics and Correlations with Demonic and Divine Vaccine Attributions.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
<b>Religiousness (index: belief, participation)</b>	−1.7 to 1.8	0.0 (0.9) (0.83)	3196	<b>0.20 **</b>	0.33 **
Participation	1 to 5	2.5 (1.1) (0.86)	3194	<b>0.22 **</b>	0.33 **
Belief salience	1 to 5	3.4 (1.2) (0.94)	3196	<b>0.14 **</b>	0.28 **
One’s religious group (if any) has supported vaccine, masks, social distancing	−1 to 1	0.6 (0.7) (−)	937	<b>−0.27 **</b>	0.10 **
<b>God beliefs</b>					
Belief that God exists	1 to 5	3.9 (1.4) (−)	3196	<b>0.11 **</b>	0.29 **
Perceived experiences with God	0 to 4	2.1 (1.5) (−)	974	<b>0.13 **</b>	0.27 **
God has power over life	1 to 5	3.7 (1.3) (−)	973	<b>0.13 **</b>	0.33 **
God communicates often	1 to 6	3.9 (1.6) (−)	974	<b>0.14 **</b>	0.35 **
God can operate even if natural explanation	1 to 5	3.7 (1.2) (−)	974	<b>0.13 **</b>	0.31 **
God can work through people	1 to 5	4.1 (1.1) (−)	973	<b>0.07 *</b>	0.30 **
God will protect faithful from COVID-19	1 to 4	2.2 (1.1) (−)	3195	<b>0.36 **</b>	0.31 **
<b>Devil beliefs</b>					
Belief that devil exists	1 to 5	3.5 (1.5) (−)	3196	<b>0.16 **</b>	0.26 **
Perceived experiences with devil	0 to 4	1.6 (1.4) (−)	892	<b>0.27 **</b>	0.22 **
Devil has power over life	1 to 5	2.7 (1.2) (−)	892	<b>0.21 **</b>	0.28 **
Devil communicates often	1 to 6	3.5 (1.6) (−)	892	<b>0.23 **</b>	0.24 **

Table 5. Cont.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
Devil can operate even if natural explanation	1 to 5	3.1 (1.2) (–)	891	<b>0.30 **</b>	0.32 **
Devil can work through people	1 to 5	3.6 (1.3) (–)	889	<b>0.21 **</b>	0.26 **
<b>Hell/end times/apocalyptic beliefs</b>					
Life is cosmic battle between good and evil	1 to 5	3.5 (1.4) (–)	891	<b>0.25 **</b>	0.24 **
Afterlife exists	1 to 5	3.6 (1.4) (–)	1073	0.05	0.22 **
Heaven exists	1 to 5	3.8 (1.5) (–)	1073	0.12 **	0.32 **
Hell exists	1 to 5	3.3 (1.6) (–)	1073	<b>0.19 **</b>	0.30 **
Qty. of people going to heaven	1 to 7	3.5 (1.4) (–)	919	<b>–0.14 **</b>	0.02
Qty. of people going to hell	1 to 7	3.5 (1.4) (–)	834	<b>0.28 **</b>	0.11 **
End times beliefs (PRRI)	1 to 4	2.3 (1.1) (–)	3194	<b>0.36 **</b>	0.23 **
Vaccine has microchip: mark of beast (PRRI)	1 to 4	1.5 (0.9) (–)	3194	<b>0.49 **</b>	0.02

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . Correlations in **boldface** supported preregistered hypotheses. Correlations in regular font were not included in the preregistration.

### 2.3.12. Specific Beliefs about God, the Devil, and the Afterlife

Participants in the God, Devil, and Afterlife block, and who endorsed some belief in God, completed these items adapted from Exline et al. (2021b): “Have you ever had an experience in which you thought God was (or might have been) involved?” rated from 0 (no, never) to 4 (yes, many times); “In your opinion, how much power does God have in terms of being able to affect people’s lives?” rated from 1 (no power at all) to 5 (total power); “In your opinion, how often does God try to communicate with people?” rated from 1 (never) to 6 (all of the time); “If a certain event can be explained using natural laws, could God still play some role in causing or influencing the event?” and “Do you think that God sometimes works through people?”, rated from 1 (no, definitely not) to 5 (yes, definitely). Those with some belief in the devil then completed the same items with “the devil” in place of “God”. Participants also rated, “Do you see life in terms of a cosmic battle between good and evil (or God and the devil?)” from 1 (no, not at all) to 5 (yes, definitely). Participants rated their level of belief in an afterlife, heaven, and hell (all three rated from 1 = not at all to 5 = totally). Those with some belief in heaven read, “How many people do you think will go to heaven?” rated from 1 (none) to 7 (everyone), with a parallel item for hell. See Table 5.

### 2.3.13. Political Variables

Participants were asked to choose their political party affiliation (if any) from a list and then rated their political views on a slider from –10 (left: liberal/progressive) to +10 (right: conservative/traditional). They were asked who won the 2020 election, who they voted for in 2020 (if anyone), and who they planned to vote for in 2024. They also completed two new items developed for this study: “Think about people whose political views are VERY different from your views. Do you tend to see these people as ENEMIES?” and rated responses from 1 (NO, not at all) to 5 (YES, strongly). The next item was the same except that EVIL was replaced by ENEMIES. See Table 6.



**Table 6.** Political Variables: Descriptive Statistics and Correlations with Demonic and Divine Vaccine Attributions.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
<b>Political attitudes and voting</b>					
Political conservatism (vs. liberalism)	−10 to 10	1.3 (6.1) (−)	3185	<b>0.21 **</b>	0.01
Republican affiliation (vs. another party)	0 to 1	0.4 (0.5) (−)	2751	0.13 **	−0.04
Fox News trusted most (vs. other sources)	0 to 1	0.2 (0.4) (−)	2407	0.11 **	−0.05 *
Voted for Trump in 2020	0 to 1	0.4 (0.5) (−)	3196	<b>0.11 **</b>	−0.06 **
Intend to vote for Trump in 2024	0 to 1	0.3 (0.5) (−)	3195	<b>0.14 **</b>	−0.07 **
Think Trump won 2020 election	0 to 2	0.7 (0.9) (−)	3118	<b>0.27 **</b>	−0.10 **
2020 election stolen from Trump (PRRI)	1 to 4	2.1 (1.2) (−)	3195	<b>0.31 **</b>	−0.07 **
Those who disagree are enemies	1 to 5	1.6 (1.0) (−)	3187	<b>0.22 **</b>	0.08 **
Those who disagree are evil	1 to 5	1.6 (1.0) (−)	3195	<b>0.26 **</b>	0.09 **

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . Correlations in **boldface** supported preregistered hypotheses. Correlations in regular font were not included in the preregistration.

#### 2.3.14. Authority-Related Measures

Participants in the Authority block completed four measures in random order, all of which were chosen because they related to ideas about sources of authority: (1) a six-item measure of Christian Nationalism (Perry et al. 2019; Whitehead and Perry 2020b), with items (e.g., “The federal government should declare the United States a Christian nation”) rated from 1 (strongly disagree) to 5 (strongly agree); (2) the five-item Intratextual Fundamentalism Scale (Williamson et al. 2010), with items adapted with permission to focus on the Bible (e.g., “Everything in the Bible is absolutely true without question”) and rated from 1 (strongly disagree) to 6 (strongly agree); (3) five authoritarian aggression items from Altemeyer and Hunsberger (1992) measure of Right-Wing Authoritarianism (as adapted in Exline et al. 2021b); (4) the five-item Male Role Norms inventory (McDermott et al. 2019) to assess traditional masculinity beliefs, with items (e.g., “A man should always be the boss”) rated from 1 (strongly disagree) to 7 (strongly agree). See Table 7.

**Table 7.** Individual-Difference and Authority-Related Variables: Descriptive Statistics and Correlations with Demonic and Divine Vaccine Attributions.

	Range	<i>M</i> ( <i>SD</i> ) ( $\alpha$ )	<i>n</i>	Demonic Vaccine Attributions <i>r</i>	Divine Vaccine Attributions <i>r</i>
Christian fundamentalism	1 to 6	3.6 (1.6) (0.91)	1062	<b>0.23 **</b>	0.29 **
Christian nationalism	1 to 5	3.1 (1.0) (0.86)	1061	<b>0.25 **</b>	0.22 **
Authoritarian aggression (five-item subset of right-wing authoritarianism)	1 to 5	3.1 (0.9) (0.84)	1062	<b>0.16 **</b>	0.16 **
Traditional masculinity beliefs	1 to 7	3.3 (1.4) (0.83)	1062	<b>0.30 **</b>	0.13 **
Agreeableness	1 to 5	3.8 (0.7) (0.74)	1074	−0.22 **	0.04
Social desirability	0 to 5	3.5 (1.4) (0.61)	1073	−0.12 **	−0.05

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . Correlations in **boldface** supported preregistered hypotheses. Correlations in regular font were not included in the preregistration.

### 2.3.15. Agreeableness and Social Desirability

Although personality was a secondary focus here, we included two brief measures, which we expected to correlate negatively with demonic attributions. Participants in the Distress/Personality block completed the six-item Agreeableness subscale of the BFI-2-S (Soto and John 2017), with items (e.g., “Is compassionate, has a soft heart”) rated from 1 (disagree strongly) to 5 (agree strongly) and a five-item measure of social desirability (e.g., “I am always courteous, even to people who are disagreeable”) (Hays et al. 1989), with items scored as 0 (false) or 1 (true). Items were summed for the social desirability measure.

## 3. Results

### 3.1. Overall Layout of Results

Because we examined correlations between many variables, we organized them within a series of tables. Each table includes descriptive statistics ( $M$ ,  $SD$ ,  $\alpha$ ,  $N$ , range) for each variable as well as correlations with demonic and divine vaccine attributions. Across all tables, results in boldface represent preregistered hypotheses that were supported, whereas those in italics represent preregistered hypotheses that were not supported (or only partly supported, e.g., by being smaller than expected). Results in regular font are ones for which we did not have preregistered hypotheses. Given the large sample size, many correlations were highly significant (i.e., had very low  $p$  values). For brevity, we only discuss correlations of magnitude 0.10 or above. To interpret the effect sizes of correlations, we use recent guidelines suggested by Gignac and Szodorai (2016) and Funder and Ozer (2019), in which 0.10 is interpreted as small, 0.20 as moderate, 0.30 as large, and 0.40 as very large.

### 3.2. COVID and Vaccine-Related Variables, Including Divine and Demonic Attributions

Table 1 focuses on COVID-19 and vaccine-related attitudes, experiences and behaviors. Most participants had been vaccinated (50% with booster, 22% with no booster) and reported pro-vaccination attitudes. They reported moderate stress around COVID-19 and saw COVID-19 as more dangerous than the vaccines. Over a third (36%) reported that they or a household member had tested positive or been sick with COVID-19. Among those who got COVID-19 themselves, moderate symptoms were reported on average.

As Table 1 shows, all means for divine and demonic vaccine attributions were below the scale midpoint of 3, suggesting that most people did not see God or the devil as influencing COVID or vaccine behaviors. People were much more likely to see the devil (vs. God) as causing the pandemic, and they were more likely to see God (vs. the devil) as influencing people to create or get the vaccines. In terms of specific vaccine items, respondents were more likely to see the devil as having led people to *create* the vaccine than leading people to *receive* the vaccine, which in turn was endorsed more than belief that the devil had led oneself, personally, to receive (or not receive) the vaccine. In terms of divine attributions, people were most likely to believe that God led people to get the vaccine, followed by leading oneself, personally, to get the vaccine, with lower endorsement for the idea that God led people to create the vaccines.

Table 1 shows that demonic and divine attributions were positively correlated, supporting the Supernatural Worldview Hypothesis. However, a supplemental analysis provided some support for the God vs. Devil Hypothesis as well. When we controlled for beliefs that God and the devil had caused the pandemic itself, the correlation between divine and demonic vaccine attributions flipped to become negative:  $pr(2605) = -0.11$ ,  $p < 0.01$ .

As predicted (see Table 1), demonic vaccine attributions were consistently linked with lower vaccination rates for oneself and one's children, more vaccine hesitancy (less desire for vaccinations for self or children; more vaccine worry) and more anti-vaccination attitudes (getting vaccine is morally wrong and a sign of weakness, vaccine is more dangerous than COVID-19, vaccines are an attack on personal freedom and unreasonable attempts to control people). In terms of specific vaccine worries, health and safety concerns (long-term effects unknown, side effects, not safe or effective) predominated over

fears that the vaccines contained dangerous materials or chemicals, tissue from aborted fetuses, or microchips or other surveillance tools. All vaccine worry items had moderate to strong positive correlations with demonic vaccine attributions, but the strongest correlations were with the items on dangerous materials or chemicals, aborted fetal tissue, and microchips/surveillance tools.

As predicted, divine vaccine attributions generally showed the opposite pattern from demonic attributions, correlating with higher vaccination rates for oneself and one's children, more pro-vaccine attitudes, and seeing COVID-19 as more of a threat. Divine attributions were also linked with seeing vaccination as a way to show love for one's neighbors. Contrary to predictions, divine vaccine attributions were not related to vaccine-related worry or feelings of social pressure to get the vaccine. (We had expected negative associations.) Broadly speaking, though, the correlations between divine attributions and these vaccine-related variables fit with the God vs. Devil Hypothesis, as predicted.

Divine and demonic vaccine attributions were not closely tied with COVID-19 stress or experiences (and we had not offered predictions about these variables). The main exception was a positive link between COVID-related worry and divine vaccine attributions.

### 3.3. Conspiracy Beliefs

As predicted, demonic vaccine attributions showed strong, consistent, positive associations with variables assessing conspiracy beliefs (see Table 2). Demonic vaccine attributions showed robust positive links with general conspiracy thinking and with QAnon beliefs, including all three PRRI items (cabal, storm is coming, patriots may have to resort to violence) as well as the Pew items on believing in QAnon and seeing it as a good thing for the country. Demonic vaccine attributions were also linked with vaccine-specific conspiracy beliefs: seeing COVID-19 as a hoax, believing that it was intentionally started by scientists in a lab (which was especially clear on the Likert PRRI item), and seeing forces such as the New World Order, the Illuminati, the Deep State, liberals, and the U.S. and Chinese governments as causes of COVID-19. Divine vaccine attributions, in contrast, showed very weak, inconsistent links with conspiracy beliefs.

### 3.4. Anger toward Other People and Groups

Table 3 focuses on pandemic-focused anger at other people. Bonferroni-corrected comparisons show that participants felt most angry at the Chinese government, followed by Donald Trump and organizations and religious leaders that opposed vaccines, masks, and social distancing. Next were the media and the U.S. government, along with Joseph Biden. In general, participants reported more anger at entities and leaders than at other individuals (e.g., liberals, conservatives, or people who did or did not get the vaccine). Reflecting the fact that about  $\frac{3}{4}$  of participants had been vaccinated, participants reported more anger at unvaccinated people than at those who were vaccinated, and more anger at organizations that opposed vaccines, masks, and distancing than those who supported them.

As predicted, demonic vaccine attributions correlated positively and consistently with anger toward organizations and individuals seen as pro-vaccine or liberal, and they were linked with less anger toward those seen as anti-vaccine. Divine attributions around the vaccine showed the opposite pattern: they were linked with more anger toward people or groups seen as anti-vaccine and less anger toward those seen as pro-vaccine. These findings fit with the God vs. Devil Hypothesis, as we had predicted.

### 3.5. Emotional Distress and Spiritual Struggles

Table 4 shows that participants, on average, reported low levels of emotional distress in the past two weeks. Demonic vaccine attributions were linked with greater distress, as predicted.

On average, participants reported low levels of pandemic-related spiritual struggles. Moral and ultimate meaning struggles were endorsed most and divine struggles the least, with demonic, interpersonal, and doubt struggles (which did not differ from each other) in

between. Spiritual struggles (one-item and six-item measures) correlated positively with demonic vaccine attributions, as predicted. Spiritual struggles also correlated positively with divine vaccine attributions. Although we had not made a prediction here, this finding fit with the Supernatural Worldview Hypothesis. A supplemental analysis clarified the picture: When we controlled for belief that God and the devil had caused the pandemic itself, demonic vaccine attributions were still moderately related to more spiritual struggle (on the six-item measure),  $pr(870) = 0.21$ ,  $p < 0.01$ , whereas the link between divine vaccine attributions and struggle dropped to nonsignificance,  $pr(870) = 0.06$ ,  $p = 0.06$ .

### 3.6. Religious Engagement and Specific Beliefs about God, the Devil, and the Afterlife

Table 5 shows that, as predicted, demonic and divine vaccine attributions correlated positively with religiousness (belief salience and participation). As expected, demonic attributions were linked negatively with perceptions that one's religious group had supported vaccines, masks, and distancing, whereas the opposite was true for divine attributions. Demonic attributions were linked with more belief in God and the devil, more prior experiences attributed to the devil and to God, and seeing both as having strong "operating rules" (cf. Exline et al. 2021a) (powerful, communicating often, able to operate indirectly through people and natural events), along with belief that God would protect the faithful from COVID-19. Divine vaccine attributions also showed positive correlations with beliefs, experiences, and strong operating rules for both God and the devil, in line with the Supernatural Worldview Hypothesis.

As predicted, people were also more likely to endorse demonic vaccine beliefs if they saw life as a cosmic battle between good and evil, believed in heaven and hell, saw more people as destined for hell (and fewer destined for heaven), and believed that we are living in the end times described in the Bible. These same beliefs also correlated positively with divine attributions, again supporting the Supernatural Worldview Hypothesis. Yet there was a notable exception to this pattern: demonic attributions—but not divine attributions—showed strong positive correlations with the apocalyptic belief that the vaccine contains a microchip that is the "sign of the beast" in Biblical prophecy. This item goes beyond basic religious teaching and might be seen as a conspiracy belief, in line with the findings presented earlier (Table 2).

### 3.7. Political Variables

Table 6 shows that, as expected, demonic vaccine attributions were linked with self-identified political conservatism and related variables: Republican party affiliation, turning to FOX News as a trusted information source, voting for Donald Trump in 2020, and intending to vote for him in 2024. These associations were modest in size. However, demonic attributions showed stronger associations with believing that Trump won the 2020 election and that the election was stolen from him—two beliefs that go beyond basic conservative identification or behavior to suggest more potential conspiracy thinking. Also, as predicted, those who made more demonic attributions were more likely to see people with different political views as enemies and as evil. Divine vaccine attributions showed weak connections with these general political variables.

### 3.8. Authority-Related Variables and Individual Differences

As expected, demonic vaccine attributions were correlated with more religious fundamentalism, Christian nationalism, authoritarian aggression, and traditional masculinity beliefs. Divine vaccine attributions also correlated positively with these variables, supporting the Supernatural Worldview Hypothesis. Demonic (but not divine) attributions were also linked with lower levels of agreeableness and social desirability.

### 3.9. Demographic Differences

Demographic differences were of secondary interest in this article, as we did not recruit a representative sample of the U.S. population. As such, most of these analyses were

exploratory, although we did expect political conservatives and Christians to report more demonic attributions than other groups. We ran these analyses of categorical demographic variables as separate, Bonferroni-corrected ANOVAs, and we also examined correlations with age and education level.

Those identifying as conservative Protestants or (unspecified) Christians reported the highest levels of demonic vaccine attributions ( $M = 2.1$ ,  $SD = 1.0$ ) when combining these groups;  $ps < 0.01$  in Bonferroni-corrected comparisons against the other well-represented groups—Catholics ( $M = 1.7$ ,  $SD = 0.9$ ), liberal and mainline Protestants ( $M = 1.6$ ,  $SD = 0.8$ ), those identifying as spiritual ( $M = 1.6$ ,  $SD = 0.9$ ) or as atheist, agnostic or nonreligious ( $M = 1.8$ ,  $SD = 1.0$ ), and Jewish individuals ( $M = 1.4$ ,  $SD = 0.8$ ). For divine attributions, the main difference centered on being Christian vs. not: the three Christian groups (Catholics:  $M = 2.5$ ,  $SD = 1.2$ ; liberal and mainline Protestants:  $M = 2.5$ ,  $SD = 1.2$ ; conservative Protestants and unspecified Christians:  $M = 2.6$ ,  $SD = 1.1$ ) reported more divine attributions than those who were spiritual but not religious ( $M = 2.0$ ,  $SD = 1.0$ ), atheist, agnostic or nonreligious ( $M = 1.9$ ,  $SD = 1.0$ ), or Jewish ( $M = 1.8$ ,  $SD = 1.1$ ) (all Bonferroni-corrected  $ps < 0.01$ ). It might be surprising to see any divine or demonic attributions from nonreligious individuals. However, only those endorsing some belief in God (or the devil) received the items on divine (or demonic) vaccine attributions; so those included in this analysis had reported some belief in God and/or the devil.

When comparing the well-represented political groups (Democrats, Republicans, Independents, unaffiliated), Republicans reported more demonic vaccine attributions ( $M = 2.0$ ,  $SD = 1.0$ ) than Independents ( $M = 1.9$ ,  $SD = 1.0$ ) and the unaffiliated ( $M = 1.9$ ,  $SD = 1.0$ ), who in turn reported more than Democrats ( $M = 1.6$ ,  $SD = 0.9$ ) (Bonferroni-corrected  $ps < 0.01$ ). Democrats reported the most divine attributions ( $M = 2.6$ ,  $SD = 1.3$ ), followed by Republicans ( $M = 2.4$ ,  $SD = 1.2$ ), who did not differ from Independents ( $M = 2.3$ ,  $SD = 1.1$ ). The unaffiliated reported the least divine attributions ( $M = 2.1$ ,  $SD = 1.1$ ) (Bonferroni-corrected  $ps < 0.01$ ). Given that Republicans made the most demonic vaccine attributions, it is worth highlighting that they still reported more divine than demonic attributions ( $p < 0.01$ ).

When comparing demonic attributions across race/ethnicity, using groups comprising over 1% of the sample, the only significant finding was that those who identified as African American or Black reported more demonic attributions ( $M = 2.2$ ,  $SD = 1.1$ ) than those identifying as White, Caucasian, European American ( $M = 1.8$ ,  $SD = 1.0$ ,  $p < 0.01$  using Bonferroni correction). However, African American/Black participants also reported more divine attributions ( $M = 2.8$ ,  $SD = 1.2$ ) than those identifying as White, Caucasian, European American ( $M = 2.3$ ,  $SD = 1.2$ ), Latino or Hispanic ( $M = 2.4$ ,  $SD = 2.4$ ,  $SD = 1.1$ ), or multi-racial or multi-ethnic ( $M = 2.4$ ,  $SD = 1.2$ ) (Bonferroni-corrected  $ps < 0.01$ ).

There were no gender differences in divine or demonic vaccine attributions. Demonic attributions showed modest negative associations with age ( $R = -0.19$ ,  $p < 0.01$ ) and education level ( $R = -0.13$ ,  $p < 0.01$ ), whereas divine attributions were not linked with age ( $R = 0.00$ ) or education level ( $R = 0.01$ ). Consistent with the age effect, retired people were less likely to make demonic vaccine attributions ( $M = 1.7$ ,  $SD = 0.8$ ) than employed people ( $M = 2.0$ ,  $SD = 1.1$ ), self-employed people ( $M = 1.9$ ,  $SD = 1.1$ ), unemployed people ( $M = 2.1$ ,  $SD = 1.0$ ), homemakers ( $M = 2.0$ ,  $SD = 1.0$ ), and those unable to work ( $M = 1.9$ ,  $SD = 1.0$ ) (all  $ps < 0.05$  with Bonferroni correction). Divine vaccine attributions did not differ by occupation.

#### 4. Discussion

Many people see God and the devil as having the potential to intervene in human events. This study focused on demonic and divine attributions around the COVID-19 vaccine in an online sample of U.S. adults (about 3/4 of whom had received a vaccine). We preregistered many correlational predictions. Divine vaccine attributions were more common than demonic attributions, although the average participant did not strongly endorse these supernatural explanations. Respondents were more likely to believe that the



devil led people to create the vaccines than to believe that the devil had led people to get the vaccines, whereas the opposite was true for divine attributions.

We offered competing predictions about the relationship between divine and demonic vaccine attributions and found some support for both. Supporting the Supernatural Worldview Hypothesis, divine and demonic attributions correlated positively with each other, likely reflecting a broader worldview in which both God and the devil are believed to intervene in human affairs. However, when we controlled for belief that God and the devil had caused the pandemic itself, the association between divine and demonic attributions flipped to be negative, supporting the God vs. Devil Hypothesis. As we review below, both of these hypotheses can help to interpret key correlational results from this study.

#### 4.1. Vaccine Attitudes and Behaviors

The God vs. Devil Hypothesis was strongly supported in terms of vaccine-related attitudes and behaviors, as expected. Divine attributions were linked with pro-vaccine attitudes and behaviors. In contrast, demonic attributions showed robust associations with greater vaccine hesitancy (e.g., less desire for vaccination; more vaccine worry), lower odds of vaccination for oneself and one's children, and more anti-vaccination attitudes overall. Demonic attributions were related to viewing vaccination as morally wrong and a sign of weakness, seeing the vaccines as more dangerous than COVID-19, and viewing vaccine mandates as attacks on personal freedom and as unreasonable attempts to control people. In terms of specific vaccine worries, demonic attributions correlated positively with health and safety concerns; however, the strongest links were with concerns that the vaccines contained dangerous materials or chemicals, aborted fetal tissue, and microchips or other surveillance tools—which fit with other findings on conspiracy beliefs.

#### 4.2. Conspiracy Beliefs

Some of the strongest and most consistent associations were between demonic vaccine attributions and conspiracy thinking. In contrast to divine attributions, which showed only weak, scattered associations with conspiracy beliefs, demonic attributions showed moderate to strong links with all of the conspiracy belief measures in the survey, as predicted. Demonic vaccine attributions were linked with stronger tendencies toward generic conspiracy beliefs and COVID-specific conspiracy beliefs: seeing COVID-19 as a hoax and belief that the pandemic was intentionally started by scientists in a lab (though this was clearer on the PRRI item than the checkbox item). On the checkbox items, demonic attributions were connected with blaming COVID-19 on entities such as the Chinese government, the U.S. government, liberals, and the media, along with sources more typically and directly linked with conspiracy beliefs: the Deep State, the Illuminati, and the New World Order. Demonic attributions were linked with believing that the vaccines contain a surveillance microchip that contains the mark of the beast, and they also showed strong, consistent connections with QAnon beliefs, as measured both through the three PRRI items (cabal; storm is coming; violence by patriots may be necessary) and the two Pew items (belief in QAnon; see QAnon as a good thing for the country). These results provide strong support for the proposed links between demonic vaccine attributions and conspiracy beliefs.

#### 4.3. Pandemic-Related Anger at Other People and Groups

Participants reported the most pandemic-focused anger toward the Chinese government, followed by Donald Trump. Overall, respondents in this majority-vaccinated sample reported more anger toward those seen as anti-vaccination vs. pro-vaccination. As predicted, however, demonic attributions were linked with more anger toward those seen as pro-vaccination, including individuals who were vaccinated and organizations and religious leaders who mandated vaccines, masks, and social distancing. Demonic attributions were also related to more anger toward liberals, Joseph Biden, the U.S. government, the media, and the Chinese government. Correlations between anger and divine vaccine

attributions were small and mainly focused on anger at organizations and religious leaders who opposed vaccination.

#### 4.4. *Spiritual Struggle and Emotional Distress*

Demonic vaccine attributions showed positive connections with depression, anxiety, and anger along with pandemic-related spiritual struggles, as predicted. Divine vaccine attributions also showed a modest but significant link with greater spiritual struggles, following the Supernatural Worldview Hypothesis. When controlling for belief that God or the devil caused the pandemic, however, the link between divine vaccine attributions and spiritual struggle was no longer significant, whereas demonic vaccine attributions were still correlated with more spiritual struggle.

#### 4.5. *Religiousness and Supernatural Beliefs*

Consistent with the Supernatural Worldview Hypothesis, participants made more divine and demonic vaccine attributions if they reported more religious engagement, stronger belief in God and the devil, and more prior experiences with both. They also made more demonic and divine attributions if they saw the devil or God as having strong “operating rules” (cf. [Exline et al. 2021a](#))—that is, having considerable power over people’s lives, communicating often, being able to work through people, and being able to operate even if a natural explanation exists.

We also found the expected links between demonic attributions and apocalyptic and afterlife beliefs: more belief in hell, seeing more people as destined for hell (vs. heaven), seeing life as a cosmic battle between good and evil, and belief that we are living in the Biblical end times. The strong correlation with the PRRI microchip item, which refers to the mark of the beast, fits with these apocalyptic findings as well. In general, demonic attributions were associated with seeing the world as a frightening battleground, one where eternal consequences are at stake. Divine attributions were also positively connected with these afterlife and apocalyptic beliefs, except for the microchip item—an item that goes beyond apocalyptic beliefs to suggest greater conspiracy belief.

#### 4.6. *Political Variables, Including Seeing Political Opponents as Enemies and as Evil*

Divine vaccine attributions did not show strong connections with political variables. As expected, however, demonic vaccine attributions were linked with indicators of political conservatism, including self-identified conservatism, Republican affiliation, favoring FOX news, voting for Donald Trump in 2020, and intending to vote for Trump in 2024. Again, though, the strongest connections with demonic attributions were not with basic conservatism indicators but with items that veered more toward conspiracy thinking: believing that Trump had won the 2020 election and that the election had been stolen from him. Building on the anger and conspiracy findings reported earlier, there was also a moderate positive association between demonic attributions and seeing one’s political opponents not only as enemies, but as evil—beliefs that could conceivably justify not only anger but also aggression toward them.

#### 4.7. *Authority-Related Variables and Individual Differences*

As expected, people made more demonic attributions if their religious communities opposed the vaccines, whereas they made more divine attributions (weakly) if their religious communities supported vaccines. Also reflecting this idea of religious authority, demonic attributions were also linked with more fundamentalist belief and with Christian nationalism, with its blending of political and Biblical worldviews. Demonic attributions also correlated positively with authoritarian aggression and traditional masculinity beliefs, as expected, suggesting more connections with themes of authority and dominance. For all of these variables, divine vaccine attributions showed similar correlations to demonic attributions, in line with the Supernatural Worldview Hypothesis. Finally, echoing the

connections between demonic attributions and aggressive attitudes, demonic (but not divine) attributions were linked with lower agreeableness and social desirability.

#### 4.8. Demographic Differences

Although demographic differences were not a key focus of this article due to our nonrepresentative sample, a few findings warrant mention: Demonic vaccine attributions were more common among people who were younger, with lower levels of education, and among Republicans and conservative Christians (along with those who simply identified as “Christian” without a denomination). Divine attributions were similar across the Christian groups and were endorsed more by Christians than by other religious (or nonreligious) groups. Divine vaccine attributions were endorsed most by Democrats, but Republicans and Independents were a close second. Even among Republicans, divine vaccine attributions clearly predominated over demonic attributions. Those identifying as African American or Black also reported more demonic (but also more divine) vaccine attributions than those identifying as White, Caucasian, or European American.

#### 4.9. Limitations and Future Directions

These results are based on a convenience sample of English-speaking U.S. adults. Because the data are cross-sectional, causal relationships cannot be inferred. Survey data are subject to a variety of self-report biases, and internet-based surveys are only available to people who have internet access. Also, because we included so many variables, space constraints dictated that we limit ourselves to very simple analyses: mean differences and correlations. In future articles, more in-depth analyses, such as regression, path analysis, or structural equation modeling could help to consolidate these data and highlight key relationships.

### 5. Conclusions

This study focused on demonic and divine attributions focused on a major social and public health issue: vaccination in response to the COVID-19 pandemic. Key findings include robust links between demonic vaccine attributions and anti-vaccination attitudes and behaviors, along with conspiracy beliefs, spiritual struggles, and pandemic-related anger focused on pro-vaccine individuals and organizations. Religious fundamentalism, apocalyptic and hell-related beliefs, Christian nationalism, authoritarian aggression, and traditional masculinity beliefs also showed consistent positive links with demonic vaccine attributions—but also with divine attributions, a reminder that demonic and divine attributions often overlap as part of a supernatural worldview.

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