

# Vaccine Hesitancy and Attitudes Toward Elite Knowledge in the United States During COVID-19

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## Abstract

To be effective, the battle against COVID-19 and other pandemics must address the social dimensions of the crisis. The objective of this study was to assess whether negative attitudes toward elite knowledge were associated with vaccine hesitancy in the United States during COVID-19. Attitudes toward elite knowledge were assessed using three measures: (a) the Epistemological Style Inventory's 'naive realism' subscale, (b) a measure about supporting education to foster understanding of politics, and (c) a populism scale. Vaccine hesitancy was measured using a 9-item adaptation of the Vaccine Hesitancy Scale used by the World Health Organization. Multiple regression results revealed that naive realism (.184,  $p < .001$ ) and populism (.356,  $p < .001$ ) were positively associated with vaccine hesitancy, while support of political education (−.296,  $p < .001$ ) was negatively associated with vaccine hesitancy. These results indicate that to fully understand vaccine hesitancy, the role of attitudes toward elite knowledge must be considered.

## Keywords

public opinion, sociology of knowledge, medicine, education, ideology, health

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## Introduction

The COVID-19 outbreak was the most significant threat the world has experienced since World War II (United Nations (UN), 2020). In August 2021, 20 months after the Centers for Disease Control and Prevention (CDC, 2022) registered its first case, COVID-19 vaccination was approved in the United States (US FDA, 2021). At the time, an estimated 93 million people in the United States eligible for vaccination chose not to (Bosman et al., 2021). By mid-March 2022, there had been 966,000 deaths due to COVID-19 in the United States, out of 79.4 million cases. Despite the vaccines being available for adults in the country for a full year, nearly 1 in 5 vaccine-eligible Americans had not received a single dose. As of October 2022, there were over 97 million COVID-19 cases and over 1 million deaths in the United States; at the same time, 266 million people in the country received at least one dose of the vaccine (CDC, 2020). With 80.1% of the population vaccinated, the weekly number of cases and deaths continues (CDC, 2020) in the United States and worldwide (WHO, 2022).

The President of the United States, Joe Biden, declared in September 2022 that ‘the pandemic is over’ (Stolberg, 2022). Presumably, the worst is over in the United States. However, the UN and the World Health Organization (WHO)<sup>1</sup> agree that the pandemic is still a reality (UN, 2022; WHO, 2022). As of November 2022, the numbers demonstrate that the crisis—although lessened—is still a threat domestically and still rages in many contexts overseas (CDC, 2020; Stolberg, 2022; WHO, 2022). Even if the coming years see a considerable drop in infection and severity of infection from COVID-19 in the United States, the issue of vaccination has garnered a considerable amount of public focus and social tension. The political divides over the issue have not been rectified, even if they are less activated and pronounced. Opposition to vaccination is not new (Marshall, 2019; Schwartz, 2012). In 2019, the WHO reported 10 threats to global health, with vaccine hesitancy being one of them (WHO, 2020). Looking forward, vaccine hesitancy—and other measures involving major health crises—is likely to continue to be a central issue of public discussion, disagreement, and even open hostility. Attitudes surrounding COVID-19 have been a heated site where a variety of political, social, and medical attitudes converge, and the issue of legitimate knowledge, and trust in elite knowledge, has been a central thread in the divided attitudes surrounding vaccination.

During the pandemic, a growing number of people became hesitant toward vaccination and other preventive measures implemented to contain the spread of the virus (Funk, 2020; Ruisch et al., 2021). Susceptibility toward conspiracy theories, false information related to the COVID-19 virus, and partisan affiliation were associated (Cárdenas et al., 2021; DiMaggio, 2022; Ruisch et al., 2021). Scholars have argued that the issue lies in people’s trust—or not—in elite knowledge (Dohle et al., 2020; Ruisch et al., 2021). Actors such as QAnon had a catalyzing influence on the susceptibility to conspiracy theory about the pandemic, and during the heights of the pandemic. It has been suggested that an assemblage of dynamically related factors—legitimation crisis, epistemic crisis, populism, anti-intellectualism, conspiracy theory—rose during this time (Morelock and Narita, 2022). It is a plausible narrative, and surely these various elements were around together and collectively played an agitating influence. But is there any empirical data to backup the notion that they played in concert, in mutually reinforcing ways?

This issue of trust in elite knowledge was especially agitated in the United States during the heights of the COVID-19 pandemic, but it is an issue with an extensive history that is not going away. As such, the issue of vaccine hesitancy during the COVID-19 pandemic is an ideal place to investigate heated attitudes toward elite knowledge, which is likely to continue to be a line of heated division in the coming years. The present study explores the social dimensions of vaccine hesitancy by using three different measurements pertaining to attitudes regarding elite knowledge: naïve

realism, support for education about politics, and populism. The results support the claim that a political legitimization crisis and an epistemic crisis converged in the issue of vaccine hesitancy during the COVID-19 pandemic in the United States.

## Background

During the COVID-19 pandemic, governments and health agencies stressed the magnitude of the crisis. Yet, stressing the magnitude was clearly not enough to convince everyone to vaccinate, wear masks, and so on. Trust in government officials, nongovernmental agencies, political actors, and science experts plays a crucial role in moments of crisis (Dohle et al., 2020; Jetten et al., 2020; Oksanen et al., 2020). During COVID-19, trust in science was only higher among those with higher science knowledge (Funk et al., 2019). For Republicans, there was a sharp decline in trust in medical science during this period (Kennedy et al., 2022). American views about the role of journalists and elected officials—described here as elite knowledge—are low (Funk, Kennedy and Johnson, 2020). Fasenfest (2021) suggests that the decline in educational standards has led to a drop in understanding of general issues and, consequently, the rise in uncritically accepting unsupported claims from unreliable sources.

Vaccine hesitancy, described by the American Psychological Association (2022) as an attitude of ambivalence regarding vaccines, garnered notable academic focus before COVID-19 (Dubé et al., 2013; Jacobson et al., 2015; Kennedy, 2019; MacDonald, 2015; Salmon et al., 2015). Nevertheless, a very large body of work emerged as a result of the COVID-19 pandemic, in great part aiming to understand the different factors associated with people's behaviors and trust amidst the COVID-19 pandemic (Dohle et al., 2020). The reasons for vaccine hesitancy can be varied and complex. Populist politics and distrust—in science, scientists, media, experts, and so on—have been extensively studied and shown to be strongly associated with vaccine hesitancy and the underestimation of COVID-19 threats (Calvillo et al., 2020; Funk et al., 2019; Funk, Kennedy and Johnson, 2020; Ruisch et al., 2021; Vignoles et al., 2021).

In a recent study on public perceptions of the credibility of elite knowledge on foreign policy, legitimization of such knowledge was investigated in terms of four different categories of elites: elected officials, career professionals, academics, and media members (Lupton and Webb, 2022). Although these categories are different in kind, persons in such positions share a common context: receiving higher education, garnering privileged access to knowledge, and donning the status of authority concerning the knowledge under one's domain. It is in the sense of this common context of education, knowledge, and status/authority that the term 'elite knowledge' is used in the present study. As opposed to knowledge that is readily available to the general population without requiring any formal education or access, elite knowledge is typically possessed and/or filtered and disseminated by persons of elite status.

The notion of 'elite knowledge' is broad and can be conceptualized in multiple ways. In *Manufacturing Consent*, Herman and Chomsky (2002) seminally describe the 'elite' as 'experts' who produce principles, ideologies, and manufactured consent to fit market agendas. For DiMaggio (2022), who builds on their analysis adding in the Gramscian notion of hegemony, elite thinking—as promulgated through Republican partisanship, right-wing media consumption and social media—becomes an important factor in the prediction of conspiracy theories, including those related to COVID-19, such as the claims of how 5G technology was behind the pandemic and how the virus was a Chinese-manufactured biological weapon. The COVID-19 crisis struck in a period when strong populist ideas had risen to the top of much of mainstream right-wing discourse. In light of this, we suggest that a full consideration of right-wing media should consider the populist<sup>2</sup> rejection of elite knowledge on the grounds of its elite status. This suggests more than a catering to

moneyed interests, but rather a somewhat self-contradictory double responsiveness—to a capitalist elite and to a populist rejection of elites. Here we focus on the latter element.

Not being confined to a specific class populism can encompass all population strata, eventually targeting knowledge and education (Stavrakakis et al., 2018). In Shils' (1996) words, 'when populism goes on the warpath, among those they wish to strike are the "overeducated," those who are "too clever," [ . . . ] whose education has led them away from the simple wisdom and virtue of the people' (p. 99). Therefore, it is unsurprising that authoritarian populist leaders like Donald Trump reject science (Langman and Lundskow, 2022). Pratt and Lutyens (2022) argue that populism has created a decivilizing process in society—especially during the COVID-19 pandemic. For them, the response of populist leaders to the pandemic crisis undermines the civilizing process by attacking, distrusting, and undermining the elites.

Sæther (2021) suggests that mistrust in scientific knowledge can create a 'sort of "skeptical populism"' (p. 22). In other words, 'skepticism doubts the possibility for objective knowledge at all'. Morelock and Narita (2022) refer to the contemporary 'epistemic crisis' as compounding difficulties of getting people to follow scientific best practices since there is no consensus as to what is true, what is a sound method for gaining truth, and who is a trusted authority or expert for imparting knowledge of the truth. They suggest that this context may enhance the ability for anti-science and conspiracy theories, such as those touted by QAnon about COVID-19, to gain traction. This traction may be further motivated by the populist rejection of scientists based on their status as knowledge elites. In this situation of entangled epistemic crisis and legitimation crisis, respect for higher education declines as anti-intellectualism ascends. Anti-intellectualism and conspiracy theory are nothing new in the United States, in fact they are staples of the social and political landscape, as famously described by Hofstadter (1963, 2012). Yet they are not always of the same general intensity or popularity, and in the contemporary period they have been on the rise. During the COVID-19 pandemic, anti-intellectualism has demonstrated its intersection with populism through Donald Trump's rejection of scientific knowledge by fixating on the solution to the pandemic by suggesting unscientific and lethal methods of cure. The fallibility of science, by contrast, was attacked by Donald Trump (Hastings and Sæther, 2021).

While much of the debate on vaccine hesitancy in the United States is centered on domestic populist discourse, resistance to vaccination is not new, nor is it constrained to the United States border. Resistance to vaccination can be traced back to the first smallpox vaccine developed by Edward Jenner in 1796 when medical mistrust played a role in containing the dissemination of the disease (Marshall, 2019). Today, factors and reasons for vaccine hesitancy are diverse. For instance, Umakanthan et al. (2021) have demonstrated that in India, religious and populist views can affect people's reluctance toward vaccination. Similarly, in parts of Africa, misinformation about the vaccination and people's political and religious views have also contributed to COVID-19 vaccine hesitancy (Dzinamarira et al., 2021). In Japan, for example, age and gender play a role in people's acceptance or hesitancy toward vaccination (Okubo et al., 2021; Yoda and Katsuyama, 2021). In Brazil, not only did lack of knowledge about the COVID-19 vaccination play a role in hesitancy, but also people rejected vaccines because of the vaccine's country of origin (Moore et al., 2021).

## Political Education

After populism, another aspect of attitudes toward elite knowledge that we explore in this study is the belief that education should be used to help people understand politics. In short, we refer to this as support for political education. 'Political education' is undoubtedly an ambiguous term, as education on its own can be political (Frazer, 1999). Nevertheless, political education can be associated with political knowledge. The level of political education directly impacts democratic

principles, knowledge, and attitudes about specific issues, and how people participate in politics (Galston, 2001). In this sense, higher education has been directly linked to specific political outcomes (Emler and Frazer, 1999). Political education plays a role in addressing democratic threats (Sant, 2019).

The issue of attitudes toward political education brings together two important strands. First, there is the question of what the proper purpose of education should be. For instance, other than support for education as developing the intellect for its own sake, people may view the purpose of education as preparing for high-paying careers or training for the ability to work hard. The neglect to associate a positive value with education for developing the understanding bleeds into the issue of anti-intellectualism. Knowledge and intelligence are not valued as goods in themselves, as much as more ‘practical’ goals such as wealth, status, and discipline.

Second, we suspect that people who chafe at the notion of elite knowledge are less likely to be comfortable with entrusting knowledge elites such as teachers and professors with educating people about politics. Despite the importance of political education in providing people with the basic level of knowledge that allows them to make certain civic judgments (Galston, 2001), educational institutions have long been under attack. The skepticism toward education is seen specifically among Republicans who are dissatisfied with political bias (Green, 2021; Parker, 2019). In a 2006 survey, 48.5% of the Republicans listed political bias as a problem in higher education (Gross and Simmons, 2006). In 2019, 4 in 10 Americans believed higher education negatively impacts the country and 8-in-10 Republicans saw political bias as a major reason the American higher education system heads in the wrong direction (Parker, 2019).

Literature has indicated that to those on the right-wing side of the political spectrum, educational institutions—among other knowledge institutions—are a center of left-leaning ideology (Burmila, 2021; Gross and Simmons, 2006). Among the reasons is the potential misunderstanding between what science is—specifically political science—and what political indoctrination is. In this respect, the line between politics and political education seems to be blurred outside academia. One contributing factor is that most faculty members tend to identify themselves as liberals rather than conservatives; nevertheless, there is no evidence that their political values and beliefs influence students (Burmila, 2021; Linnell, 2011; Zipp and Fenwick, 2006). Eventually, the problematique of left-wing bias in higher education lies in the general trust of Americans in higher education (Zipp and Fenwick, 2006) and elite knowledge more broadly.

## **Naïve Realism**

In philosophy, naïve realism is located under theories of perception (Genone, 2016), and debates on the matter explore visual senses and the consciousness of seeing (Fish, 2009; Zięba, 2019). Broadly, naïve realists frame reality as singular and objective (Pronin, 2007), and argue that experienced objects are located in a mind-independent world (Brewer, 2007; Genone, 2016; Zięba, 2019). Social psychologists describe naïve realism as ‘the tendency to assume that one’s perspective of events is a natural, unbiased reflection of objective reality and to infer bias on the part of anyone who disagrees with one’s views’ (American Psychological Association, 2022). In this sense, naïve realism is the personal belief that one’s own perspective, unhampered by the flaws, nuances, or complexities of life, is the most accurate and undistorted representation of reality. As Roberts-Miller (2009) states, to be a naïve realist is to ‘trust one’s perception without second guessing’. The naïve realist can overestimate bias in others’ judgment and be convinced that their own perception of the world reflects reality precisely (Pronin, 2007). In political discourse, for example, a naïve realist tendency is to reject opposing views (and the people who hold them), rather than agreeing to disagree.

When it comes to vaccine hesitancy and the COVID-19 crisis, naïve realism is an underexplored element. During the COVID-19 pandemic, while elite knowledge professionals educate people about risks and preventive measures, naïve realism plays a role in cognitive bias in a way that people receive—or fail to receive—this education, and in how they may select, accept, and diffuse false information (Cahapay, 2022). Epistemic crisis or widespread skepticism might seem to counteract naïve realism in society, but this is not necessarily the case. Skepticism can go hand-in-hand with naïve realism by suggesting that people’s views of the world are objective and those with different or opposing views are wrong, irrational, or biased (Weisz, 2022). In this way, a ‘post-truth’ society may be prone to dogmatism without recourse to objectivity, rather than toward inclusive relativism.

According to Çalişir (2021), naïve realist narratives are one-dimensional and associated with illusion—individuals move away from reality to see what they want to see, and this is intertwined explicitly with various forms and methods of false information. Amidst a global pandemic, such bias is directly related to how individuals interpret and act—or fail to act—upon information and knowledge (Cahapay, 2022; O’Donohue et al., 2022). Dombrowski (2020) describes one example of naïve realism concerning how people incorrectly linked vaccination with autism:

The autism–vaccination link where a child at the age of 18 months starts to regress in behavior following administration of the MMR vaccine which typically occurs around that time period in the USA. Some may intuitively conclude that the vaccine is responsible; however, the behavioral regression is likely related to the progression of autism spectrum rather than the vaccine. Thus, a parent might understandably, yet mistakenly, conclude that the vaccine was the ‘cause’ of their child’s autism. This conclusion would be erroneous and an example of naïve realism (as well as illusory correlation). (p. 15)

Eventually, as Dombrowski suggests, the erroneous conclusion directly impacted parents’ decision-making. Therefore, naïve realism eventually may explain the problem of political discourse, and consequently, the COVID-19 health measures that were politicized, which includes vaccine hesitancy. Instead of focusing on dealing with a world crisis in a collective manner, people rigidly disagree and whatever goes against one’s worldview is treated as unacceptable (Cahapay, 2022). That is what naïve realism produces. Eventually, when dealing with the unprecedented COVID-19 pandemic crisis, a cohesive society that considers a sense of unity and the relevance of the collective is necessary (Muldoon et al., 2021).

## **Materials and Methods**

### *Sampling and Participants*

To investigate the association between attitudes toward elite knowledge and vaccine hesitancy, data from an online survey were used. Participants were eligible to participate in the web-based study if they were at 18 years of age or older, and if they lived in the United States at the time of the survey. Participants were recruited via a paid social-media campaign, namely Facebook over the course of September, 2021. The advertisement featured a picture of a syringe, with an invitation to participate in the survey to help social scientists learn more about vaccination decisions, with an option to register for a raffle for a US\$50 gift card. Interested participants were asked to click on a link that took them to a consent page, which was the first page of the survey, housed securely in REDCap. The consent page explained the purpose of the survey further, discussed confidentiality, the minimal benefits and risks of participation in the study, and provided contact information for the institutional review board (IRB) that approved the study. Finally, participants were asked to



confirm they understood the information provided, were eligible according to the stated criteria regarding age and location, and consented to being in the study.

### *Key Measures*

**Vaccine Hesitancy.** The dependent variable in this study was an adapted version of the Vaccine Hesitancy Scale used by the WHO. This 10-item scale was originally created to assess parents' hesitancy around vaccinating their children, but was altered for adults by Akel et al. (2021) to create the 'aVHS', to report on adults' hesitancy surrounding their own vaccination. Akel et al. determined the scale was internally consistent, valid, and reliable. The scale was also used by Lu et al. (2021). Keeping the measure focused on attitudes rather than behaviors, in this study one item was dropped from the aVHS, about behaviors concerning patient compliance, rather than vaccine-specific attitudes ('Generally I don't do what my doctor recommends about vaccines').

**Populism.** In this study, populism was measured using the populism measure, comprising three subscales, developed by Silva et al. (2018); specifically, the three subscales measuring 'anti-elitism', 'people-centrism', and 'Manichean outlook'. Each subscale contained five items. They were tested against six other populism scales in another study by Silva et al. (2020). In the comparison, this populism measure was all around one of the two best performing scales in the study for validity and reliability. The choice to use this particular scale for the present study was due to the fact that this one also held cross-national validity. In the event of possibly repeating the study with international scope, this measure would clearly be used, so it was used here in order to have better commensurability with possible future cross-national work. While the scale consisted of three separate components when originated, the present study did not seek to distinguish between the different facets of populism delineated by the three subscales. Combining all three subscales in a single measure rendered a Cronbach's alpha of .608. In light of its salience, this study used the one composite populism scale for the measure.

**Naïve Realism.** The scale for naïve realism used in the present study is a subscale of the epistemological style inventory (EPI) developed by Wilkinson and Migotsky (1994) and more recently used by Henry et al. (2019). The original EPI consists of three subscales, each one containing five items. Each item is rated on a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). The subscales are for 'naïve realism', 'skeptical subjectivism', and 'logical reasoning'. From the data for this study, the measure for naïve realism had salient Cronbach's alpha (.661). The statements rated under 'naïve realism' are the following: (a) I prefer that teachers should simply tell me the facts; (b) good teachers never let you leave the classroom with doubts about subject matter; (c) there is nothing more annoying than a question that has more than one answer; (d) most social problems are solved by a very few qualified individuals; and (e) I would learn more in the humanities if teachers would stick to the facts.

**Political Education.** The measure regarding education for understanding politics was a subscale about 'understanding politics' from a larger measure consisting of 48 items, designed to assess beliefs concerning the purposes of school among adolescents (Nicholls, 1989; Nicholls et al., 1985). When used in this study, the subscale is to be referred to as a 'political education' scale. The political education scale consists of four items, each referring to the beginning prompt, 'A very important thing school should do is. . .' Participants were instructed to rate each item on a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). The four items were (a) help us think clearly about what politicians say, (b) help us understand how what our country does affects the

world, (c) help us understand enough to vote wisely in elections, and (d) help us understand the issues facing our state and country (foreign relations, environment, etc.). When used in the present study, the political education scale registered a Cronbach's alpha of .847.

**Covariates.** The choice of covariates was based on prior research that tested various demographics and attitudes for association with vaccine hesitancy using the aVHS (the WHO's VHS, modified for adults to reflect on self-vaccination), which was the primary source the vaccine hesitancy measure used in this study (Akel et al., 2021). Socio-demographic variables (e.g. monthly income, gender identity, racial identity, and age) were also gathered in the web-based survey. Monthly income was a 4-item ordinal variable modeled after the measurement used in the vaccine hesitancy article by Akel et al. (2021). Age, starting at 18, was collected as a continuous variable. Gender identity was measured in the survey with three categories: male, female, and non-binary. The non-binary category returned minimal observations ( $n = 18$ , 3.15%), so for analysis, the three categories were collapsed into a binary measurement of male vis-a-vis non-male. Racial identity was measured in the survey using the 5-item categorization from the US Census, plus an 'other' option and a 'more than one' option, which allowed write-in responses. The racial identity categories other than White returned very few observations ( $n = 52$ , 9.06%), the majority of which were from the 'other' designation ( $n = 23$ , 4.01%) or 'two or more races' ( $n = 18$ , 3.14%). For analysis, the multiple racial identity categories were collapsed into a binary variable coded for White vis-a-vis non-White. Health was measured using a score from a 10-item PROMIS scale for mental and physical health, all items rated using a 5-point Likert-type scale. A dummy variable was included for whether the respondent lives in a rural location.

### Missing Data

A total of 908 individuals consented to take the survey, with 553 (60.9%) completing the survey in full. However, the key measures (e.g. for vaccine hesitancy, populism, naïve realism, and political education) and covariates included in the current study were available for 575 (63%) participants. The rate of missing data for the key measures relevant to the analysis was 4.9%, and determined to be missing at random. To help mitigate the effects of missing data, multiple imputation with chained equations was used, with five iterations. The three predictor measures—naïve realism, populism, and political education—were standardized as  $z$ -scores to allow comparison between their associations with vaccine hesitancy. Summary statistics for vaccine hesitancy and the other key measures are shown in Table 1, from before the populism, naïve realism, and political education components were all standardized as  $z$ -scores.

### Results

Data were analyzed using Stata v.16 (College Station, TX). Table 2 shows the correlations between vaccine hesitancy and each of the measures representing attitudes toward elite knowledge, before multiple imputation. All of the measures were significantly moderately associated with vaccine hesitancy. No evidence of multicollinearity among the measures of elite knowledge attitudes suggesting they were assessing different elements of the concept.

The key predictive measures (e.g. populism, naïve realism, and political education) were used in multiple regression with vaccine hesitancy as the outcome variable. Covariates were included to account for demographic factors known to be associated with the outcome. The vaccine hesitancy measure being a continuous variable, the regression model was ordinary least squares (OLS).



**Table 1.** Sample Demographics ( $n=575$ ).

Variable	<i>M</i> ( <i>SD</i> ) or <i>n</i> (%)
<b>Sociodemographics</b>	
Vaccine hesitancy	$M=2.412, SD=1.079$
Naïve realism	$M=2.508, SD=0.757$
Populism	$M=4.914, SD=0.728$
Political education	$M=4.347, SD=0.694$
Age	$M=51.04, SD=15.632$
Sexual identity (male)	0 = non-male: 57.7% 1 = male: 42.3%
Racial identity	0 = non-White: 9.1% 1 = White: 90.9%
Monthly income	1 = US\$0–US\$1999: 22.3% 2 = US\$2000–US\$4999: 41.1% 3 = US\$5000–US\$9999: 27.6% 4 = more than US\$10,000: 9.0%
Rural	0 = non-rural: 58.3% 1 = rural: 41.7%

*SD*: standard deviation.

**Table 2.** Correlation Matrix for Key Measures ( $n=575$ ).

	1	2	3	4
1. Vaccine hesitancy	–			
2. Naïve realism	.372***	–		
3. Populism	.393***	.430***	–	
4. Political education	–.334***	–.140***	.015**	–

\*\* $p < .01$ , \*\*\* $p < .001$ .

Multiple regression results are presented in Table 3. Controlling for covariates, all three measures of attitudes toward elite knowledge were significantly associated with vaccine hesitancy. Naïve realism (.184,  $p < .001$ ) and populism (.356,  $p < .001$ ) were positively associated with vaccine hesitancy. Support of political education (–.296,  $p < .001$ ) was negatively associated with vaccine hesitancy. Thus, higher levels of naïve realism and populism and lower levels of political education were significantly associated with higher levels of vaccine hesitancy. In addition, health status, age, racial identity, gender identity, and rural residence were significantly associated with vaccine hesitancy. Participants who were healthier, older, identified as White, female, and resided in an urban area were significantly less likely to be vaccine hesitant. The model had an  $R^2$  of .391.

## Discussion

It has been argued that the challenge of vaccine hesitancy has little to do with the vaccines per se; instead, much of the problem relates to other social elements that influence how people respond toward the idea of vaccination (Pertwee et al., 2022). Of specific interest for us was the theory that vaccine hesitancy during the heights of the COVID-19 pandemic in the United States sat at a

**Table 3.** Predictors of Vaccine Hesitancy ( $n=575$ ).

	B	SE	t	p
Naive realism	0.184	0.041	4.47	<.001
Populism	0.356	0.042	8.28	<.001
Political education	-0.296	0.040	7.42	<.001
Health	0.343	0.068	5.03	<.001
Age	0.008	0.004	2.31	0.036
Income				
2000–4999	0.051	0.100	0.5	0.614
5000–9999	0.076	0.110	0.69	0.488
More than 10,000	0.076	0.150	0.5	0.614
Racial identity	-0.418	0.138	-3.04	0.003
Gender identity	0.254	0.095	2.67	0.012
Rural	0.152	0.076	2.01	0.045

SE: standard error.

The naive realism, populism, and political education variables are standardized as z-scores.  $R^2 = .391$ , adjusted  $R^2 = .379$ . Higher scores on vaccine hesitancy, naive realism, populism, political education, and health indicate greater vaccine hesitancy, naive realism, populism, support for political education, and health, respectively.

convergence site between dynamically interrelated forces of legitimation crisis and epistemic crisis (Morelock and Narita, 2022). The study was conducted to examine the roles of attitudes toward elite knowledge on vaccine hesitancy in adults residing in the United States during the pandemic. Specifically, we found that each of three distinct measures of attitudes toward elite knowledge had significant, independent associations with vaccine hesitancy, namely, naive realism as an epistemological style, belief whether education should promote political understanding, and populism. The findings controlled for important covariates and provide important support for the role rejection that elite knowledge plays in vaccine hesitancy.

The positive association of populism with vaccine hesitancy corroborates the findings from other studies concerning populism and its relations with vaccine hesitancy and COVID-19 conspiracy theories (Eberl et al., 2021; Lasco, 2020; Ruisch et al., 2021; Žuk and Žuk, 2020). What is novel in the present study is that the issue of attitudes toward elite knowledge is given further emphasis even after controlling for populism, and with significant results for both predictors. This suggests that the rejection of elite knowledge should be understood not as reducible to populist politics, but rather as an important area also outside of populism proper, even if there is some overlap and relationship between the two.

The finding in the present study concerning support for political education is that support for political education is negatively associated with vaccine hesitancy. In other words, the higher support for political education is, the lower vaccine hesitancy is likely to be. This adds to the findings of Dyer and Hall (2019) of a negative association for college students between receiving education for critical thinking and holding ‘Epistemically Unwarranted Beliefs’ (EUBs), that is, ‘beliefs not founded on reliable reasoning or credible data’, especially health pseudoscience. In their study, it was the actual reception of education for critical thinking that may act as a deterrent of EUBs. In the present study, it is the *belief* that education *should* foster critical understanding of politics, that was negatively associated with vaccine hesitancy (i.e. support for this education was positively associated with lower vaccine hesitancy)—which is often found in conjunction with beliefs in conspiracy and pseudoscientific claims, for example, that COVID-19 is a hoax or that vaccination causes autism.

The finding of a positive association between naïve realism and vaccine hesitancy also may speak of findings in a different study that holding more robust epistemic beliefs is associated with producing arguments of greater quantity and quality (Baytelman et al., 2020). In other words, having a more multidimensional or nuanced view of epistemology may act as a kind of buffer against the susceptibility to unwarranted, pseudoscientific, or conspiratorial claims that can underscore anti-vaccination positions (MacMillen and Rush, 2021). Finally, the positive association between populism and vaccine hesitancy may also point to the same general tendency, namely, as one more different dimension of the same broad phenomenon. This phenomenon would be the association of rejection of elite knowledge with susceptibility to conspiracy theory. This interpretation would fit with a recent study that found a linkage between populist beliefs and the acceptance of unsubstantiated claims (Van Prooijen et al., 2022).

Although the study has important contributions to this field and included a large sample, there are several limitations that should be noted. First, the study involves a convenience sample, who completed an online survey, limiting the generalizability of the findings. Although the primary goal of this study was not to examine the role of demographic characteristics in relation to vaccine hesitancy, the lack of racial diversity in the sample is limiting. Specifically, the sample was overwhelmingly White with 91% identifying as White compared with 76% of adults in the United States identifying as White. For gender identity, this sample contained 42.3% identifying as male, in contrast to 49.5% in the larger population (US Census, 2021). The regression model explained roughly 39% of the total variance ( $R^2 = .391$ ), which, while indicating the model is salient, still leaves roughly 61% of the total variance unexplained. This result should not be overinterpreted—the 39% explained by the variables in the regression model might also at least partly be explained by confounding variables or alternate constructs, and because the sample is not nationally representative, the results are not properly generalizable. Nevertheless, at minimum, the results are descriptively telling. Properly, they should be interpreted as exploratory rather than as conclusive.

In the face of the unprecedented COVID-19 pandemic outbreak, knowledge disenchantment remains an area of concern in the United States and around the globe. Outside the United States, research has been conducted to understand the relationship between vaccine hesitancy and populism. In Australia, those with more populist views tend to be more hesitant or resistant to COVID-19 vaccination, and they are also less likely to intend to get vaccinated (Edwards et al., 2021). According to a Pew Research survey, right-wing populist party supporters are less supportive of COVID-19 vaccination. In Germany, for example, only 20% of the supporters of right-wing Alternative for Germany (AfD) say vaccination is very important (Connaughton and Silver, 2022). Similar results have also been identified in France (Peretti-Watel et al., 2020). In the United States, vaccine hesitancy is drawn by partisan affiliation. Republicans are more hesitant than Democrats when it comes to the COVID-19 vaccination (Nadeem, 2021). Kennedy (2019) has explored the link between populism and vaccine hesitancy in Western Europe. The researchers have analyzed data from the Vaccine Confidence Project survey carried out in 2015 across various countries. According to the results, there is a significant positive association between the electorate voting for populist parties and vaccine hesitancy (Kennedy, 2019). A similar finding was also identified by Recio-Román et al. (2021), who explored the case of 28 countries in Europe (the European Union and the United Kingdom). According to the authors, in countries with higher populist attitudes, a higher vaccine hesitancy rate is identified. The present study has a wider scope than just populism, but it is limited to the United States. It could be replicated in other national contexts, or cross-national comparisons could be developed.

Acknowledging the above limitations, this study is suggestive for understanding some of the political and epistemic factors associated with vaccine hesitancy, during the height of the

COVID-19 pandemic. Not just attitudes toward elite knowledge, but partisanship and ideological associations were important in shaping people's attitudes toward the pandemic and vaccination. (Cárdenas et al., 2021; Funk, 2020). Vaccine hesitancy is context-specific (MacDonald, 2015). Historical, political, and sociocultural contexts play an important role in the adoption of protective measures to prevent the spread of virus (Dubé et al., 2013), including vaccination as well as non-pharmaceutical interventions (e.g. wearing masks, implementing hygiene protocols or complying with physical/social distancing measures).

Vaccination attitudes and decisions can be connected with political identification (such as Republican vs Democrats) (Calvillo et al., 2020; Funk, Kennedy and Johnson, 2020; Ruisch et al., 2021), scientific knowledge (access to education and educational level), as well as demographics (race and ethnicity) (Funk et al., 2019; Kennedy, 2019), socioeconomic status, age, and gender (Dohle et al., 2020). If trust is a relevant part of willingness to vaccinate (MacDonald, 2015), then science and communication about science both matter. In other words, vaccination policies should consider that elite knowledge professionals should engage in dialogue with the rest of the population (Ihlen, 2020). The influence of elite knowledge on vaccine decision-making is not only educational. It is also deeply political, in that the acceptance or rejection of elite knowledge cannot be properly understood without reference to the social and political meanings of accepting or rejecting that knowledge. Benkler and colleagues suggest that the current 'epistemic crisis' cannot be detached from partisanship (Benkler et al., 2018). We would suggest that beyond even just partisanship, the current epistemic crisis cannot be detached from the current legitimization crisis (Habermas, 1973; Morelock and Narita, 2022).


Demographic factors are also likely to play a role in political attitudes. Brown-Iannuzzi et al. (2021) have identified that when people *feel* their socioeconomic status is higher, their tendency toward naïve realism in relation to politics also increases, that is, they express more naïve realism regarding the ideas of persons who hold different political beliefs from themselves. This might partly explain why, with a positive association between Republican party membership and higher income,<sup>3</sup> the attitude toward the COVID-19 vaccination is different between Democrats and Republicans (Fridman et al., 2021).

Yet reciprocally, notwithstanding the importance of partisanship and ideology in themselves, the relationship of these factors to vaccine decision-making cannot be understood without exploring the role that attitudes toward elite knowledge—such as the knowledge touted by media professionals, elected officials, career professionals, public policy practitioners, science specialists, and academics—play in political and ideological alignments, thus directly and indirectly influencing vaccine decision-making. Epistemology is integral to health and politics. Vaccine hesitancy during COVID-19 in the United States took on clear partisan tenors, but 'politics' in this case needs to be understood beyond the simple binary of left–right alignment. The crisis of legitimization stretches from establishment politics to elite knowledge. At least in the contemporary configuration, the legitimization crisis and the epistemic crisis are two heads of the same hydra.

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## Notes

1. As of November 2022, the main page for the Coronavirus (COVID-19) disease on the World Health Organization (WHO) website maintains its ‘pandemic’ disclaimer in relation to the disease. No official statement from the WHO has been issued declaring the end of the pandemic <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.
2. In a basic sense, ‘populism’ can be defined as a group self-articulating as ‘the people’ aligning in opposition to a group that the people identify as ‘elites’ (Morelock, 2018). Populism involves an ideology of resentment against elites, undermining them in order to represent the ‘true will of ‘the people’ (Stavrakakis et al., 2018).
3. <https://www.pewresearch.org/religion/religious-landscape-study/compare/party-affiliation/by/income-distribution/>.

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