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Politics of COVID-19 vaccine mandates: Left/right-wing authoritarianism, social dominance orientation, and libertarianism

Yilang Peng

Department of Financial Planning, Housing, and Consumer Economics, University of Georgia, Athens, GA 30602, USA

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ABSTRACT

Mandatory and punitive vaccination policies, such as requiring vaccination certificates for public activities and firing employees who refuse vaccination, have raised considerable objections. With a sample of U.S. crowd-sourced workers ($N = 983$), this study investigates how four ideologies—left-wing authoritarianism (LWA), right-wing authoritarianism (RWA), social dominance orientation (SDO), and libertarianism—explain vaccine acceptance and attitudes toward vaccine policies. Results show that LWA predicts higher vaccine acceptance and support for COVID-19 vaccine mandates and the punishment of unvaccinated individuals, whereas libertarianism and RWA show negative relationships. SDO is linked to opposition to vaccine mandates. This study underscores the role of specific ideological components in shaping attitudes toward vaccine policies while also contributing to the arguments that LWA and libertarianism have important implications for studying sociopolitical attitudes.

1. Introduction

Many Americans refuse COVID-19 vaccination, with conservatives and Republicans being more hesitant than liberals and Democrats (Tyson, Funk, Kennedy, & Johnson, 2021). To boost vaccination rates and achieve herd immunity, various mandatory and punitive vaccination policies are being proposed or implemented, such as requiring vaccination certificates for public activities and firing employees who refuse vaccination. While vaccine mandates may be an important policy tool to reach near-universal vaccination, mandatory policies could result in more resistance among the public (Batteux, Mills, Jones, Symons, & Weston, 2022; Schmelz & Bowles, 2022). Vaccine mandates have raised considerable objections: protests against COVID-19 vaccination have broken out in multiple countries (Smith, 2022); the vaccine mandate for employees at large companies from the Biden administration has been blocked (Sherman, 2022). Therefore, we need to understand what influences not only citizens' vaccination decisions but also their support for mandatory and punitive vaccination policies.

This study advances prior research by investigating how four ideological factors—left-wing authoritarianism (LWA), right-wing authoritarianism (RWA), social dominance orientation (SDO), and libertarianism—shape attitudes toward COVID-19 vaccines and vaccine policies. Previous research has shown that ideological factors such as SDO and RWA predict COVID-19 risk perceptions, adherence to public health recommendations, and vaccine hesitancy (Bilewicz & Soral,

2021; Choma, Hodson, Sumantry, Hanoch, & Gummerum, 2021; Fischer, Chaudhuri, & Atkinson, 2020; Peng, 2022). This research extends this line of scholarship and shows that ideologies also underscore the support for vaccine mandates and the punishment of unvaccinated individuals, which are heavily debated topics regarding the pandemic.

In addition, this study highlights the importance of LWA in shaping vaccine attitudes. Scholars have debated whether liberals can embrace authoritarianism (Altemeyer, 1996; Nilsson & Jost, 2020). Recent work has developed LWA as a valid construct and revealed its associations with authoritarian tendencies such as cognitive rigidity and prejudice toward ideological outgroups (Conway, Houck, Gornick, & Repke, 2018; Costello et al., 2022). Still, compared to the extensive literature on RWA, it remains relatively understudied what policy attitudes are relevant to LWA. This research aims to fill this gap and underscores the role of LWA in shaping sociopolitical attitudes.

1.1. Left-wing authoritarianism

Authoritarianism is characterized by deference to established authorities, conformity to group norms, and endorsement of harsh, punitive social control (Altemeyer, 1996; Duckitt, Bizumic, Krauss, & Heled, 2010). Scholars have debated whether authoritarianism distinctly pertains to right-wing politics or exists for both liberal and conservative extremists (Altemeyer, 1996; Conway et al., 2018; Costello et al., 2022; Nilsson & Jost, 2020). Recent works have clarified the measurement of

E-mail address: yilang.peng@uga.edu.

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LWA and documented its links to authoritarian orientations (Conway et al., 2018; Costello et al., 2022). Conway et al. (2018) created a scale of LWA by rewriting the RWA scale to reflect obedience to liberal leaders and values. Similar to RWA, this LWA scale exhibited associations with dogmatism and prejudice. Costello et al. (2022) proposed an LWA measure with three subdimensions: anti-hierarchical aggression (a motivation to forcefully overturn the established hierarchy), top-down censorship (a desire to use institutional authority to restrain conservative beliefs and behaviors), and anti-conventionalism (opposition to traditional values and dismissal of conservative ideas). This LWA measure was associated with authoritarian tendencies such as cognitive rigidity, moral absolutism, and aggression toward ideological outgroups (Costello et al., 2022).

LWA should be highly relevant to vaccine mandates. First, in the United States, liberals often have higher trust in science, concern about COVID, and confidence in vaccines than conservatives (Fridman, Gershon, & Gneezy, 2021; Kerr, Panagopoulos, & van der Linden, 2021; Tyson et al., 2021). In addition, pandemic mitigation measures such as mask mandates and vaccine mandates often require obedience to established authorities, conformity to social norms, and punitive policies against rulebreakers. In prior research, LWA predicts support for mandatory and coercive COVID-19 policies (Manson, 2020). Finally, LWA is associated with aggression toward political outgroups, such as affective polarization and partisan moral disengagement (Costello et al., 2022). Left-wing authoritarians might see the punishment of unvaccinated individuals as a justifiable way to achieve collective goods. Therefore, LWA likely predicts higher support for vaccine mandates and the punishment of unvaccinated people.

1.2. Right-wing authoritarianism

RWA reflects obedience to established authorities, endorsement of traditional values and morality, and support for harsh, punitive social control (Duckitt et al., 2010). RWA and SDO are two ideological constructs in the dual process model of ideology and are frequently examined together to explain attitudes related to the pandemic (Bilewicz & Soral, 2021; Fischer et al., 2020). On one hand, RWA might lead to more cautious responses to COVID-19 as RWA is associated with a worldview that sees the world as threatening and dangerous and deference to institutional authorities (Duckitt et al., 2010). On the other hand, RWA is also associated with an anti-science attitude, adherence to the traditional way of life, and obedience to conservative leaders (Duckitt et al., 2010; Kerr & Wilson, 2021), which might make right-wing authoritarians less likely to respond to the pandemic.

Previous findings regarding how RWA shapes reactions to the pandemic seem mixed. Some studies have shown that RWA is related to worry about COVID-19, preventive responses to COVID-19, and support for government restrictions and lockdown (Bochicchio et al., 2021; Fischer et al., 2020; Manson, 2020). In contrast, other research shows that RWA predicts lower anxiety about COVID-19 and lower knowledge of the pandemic (Choma et al., 2021; Kempthorne & Terrizzi, 2021). The mixed findings also extend to attitudes toward COVID-19 vaccination. Across different contexts, RWA has been shown to have positive (Bilewicz & Soral, 2021), negative (Oleksy et al., 2022), or mixed (Murphy et al., 2021) relationships with COVID-19 vaccine acceptance. Some research has also shown that RWA predicts skepticism toward vaccination in general (Kempthorne & Terrizzi, 2021).

1.3. Social dominance orientation

SDO reflects a preference for hierarchical intergroup relationships, justification of group-based dominance, and less empathy toward disadvantaged groups (Pratto et al., 2013; Pratto, Sidanius, Stallworth, & Malle, 1994). SDO frequently predicts less concern about COVID, less adherence to public health guidelines, and less support for government measures (Choma et al., 2021; Clarke, Klas, & Dyos, 2021; Fischer et al.,

2020; Peng, 2022). Recent research also finds that SDO predicts more hesitancy against COVID-19 vaccines (Bilewicz & Soral, 2021; Murphy et al., 2021). Therefore, SDO should predict higher opposition to mandatory and punitive vaccine policies, as SDO is often associated with a lower perceived risk of COVID-19 and higher vaccine hesitancy.

1.4. Libertarianism

Libertarianism, an ideology that values individual freedom and rejects government interventions (Iyer, Koleva, Graham, Ditto, & Haidt, 2012), should pertain to the COVID-19 pandemic, as the discussions about COVID-19 mitigation and vaccine policies have largely centered around individual liberty and the boundaries of government regulations. Politicians and ordinary citizens often cite personal freedom as an important reason against COVID-19 policies such as vaccination, mask mandates, and lockdowns (Stockton & King, 2021; Smith, 2022). Studies show that respondents scoring high on communitarian-individualism—a scale that reflects opposition to government involvement in people's lives—express lower concern about COVID-19 and higher opposition to government mitigation policies such as the closure of schools and restaurants, mask mandates, and vaccine mandates (Dryhurst et al., 2020; Liu & Yang, 2021; Peng, 2022; Siegrist & Bearth, 2021). In previous research, individuals valuing liberty express more resistance against compulsory childhood vaccines (Amin et al., 2017). Libertarianism should fuel a dismissal of COVID-19 risks, higher vaccine hesitancy, and opposition to vaccine mandates and the punishment of unvaccinated individuals.

2. Material and methods

2.1. Preregistration and hypotheses

The study is preregistered (<https://aspredicted.org/484j9.pdf>). The primary hypothesis is that LWA is positively associated with support for vaccine mandates and punishment of unvaccinated people. Also, the preregistration proposes that SDO and libertarianism are negatively related to COVID-19 concern, vaccine acceptance, and support for mandatory and punitive vaccine policies. The role of RWA is not specified.

2.2. Participants

In January 2022, 983 U.S. participants with an approval rate above 95% and with more than 500 tasks completed were recruited from Amazon Mechanical Turk (MTurk) (female = 54.1%, male = 45.1%; mean age = 43.2, $SD = 13.1$; Democrat = 45.8%, Republican = 27.7%; Hispanic = 17.8%, non-Hispanic Asian/Black/White = 6.2%/6.0%/66.5%; high school graduate or less = 6.8%, some college or Associate degree = 23.4%, Bachelor's degree = 50.1%, postgraduate degree = 19.7%). An API (<https://iphub.info/api>) screened out respondents who were using proxies or not located in the United States.

2.3. Measures

2.3.1. LWA

Participants responded to statements (1 = strongly disagree, 5 = strongly agree) that measured LWA, RWA, SDO, and libertarianism. Thirteen items ($\alpha = 0.92$) measured LWA, with four about anti-hierarchy aggression (e.g., "The rich should be stripped of their belongings and status"), four about anti-conventionalism (e.g., "Anyone who opposes gay marriage must be homophobic"), and five about top-down censorship (e.g., "University authorities are right to ban hateful speech from campus." Costello & Patrick, 2021).

2.3.2. RWA

Twelve items ($\alpha = 0.88$) from the Authoritarianism–

Conservatism–Traditionalism scale ($\alpha = 0.88$) measured RWA, with four about authoritarian submission (e.g., “Obedience and respect for authority are the most important virtues children should learn”), four about authoritarian aggression (e.g., “The way things are going in this country, it’s going to take a lot of ‘strong medicine’ to straighten out the troublemakers, criminals, and perverts”), and four about conventionalism (“The ‘old-fashioned ways’ and ‘old-fashioned values’ still show the best way to live.” Duckitt et al., 2010).

2.3.3. SDO

Four items ($\alpha = 0.74$) measured SDO (e.g., “In setting priorities, we must consider all groups.” Pratto et al., 2013).

2.3.4. Libertarianism

The six-item ($\alpha = 0.76$) communitarianism–individualism scale (Kahan et al., 2012) was used to measure libertarianism. This scale captures opposition to government intervention in society and largely reflects the idea of libertarianism (e.g., “It’s not the government’s business to try to protect people from themselves”).

2.3.5. Political orientation and party identity

Two seven-point scales measured respondents’ political orientation (1 = extremely liberal, 7 = extremely conservative) and party identity (1 = strong Democrat, 7 = strong Republican).

2.3.6. Support for vaccine mandates

Respondents indicated support for seven policies ($\alpha = 0.96$; 1 = strongly oppose; 5 = strongly favor), with two about federal vaccine mandates (e.g., “requiring all federal government employees to be vaccinated against COVID-19”) and five about requiring proof of vaccination for public activities (e.g., “travel by airplane” (Tyson et al., 2021)).

2.3.7. Punishment of unvaccinated individuals

Respondents indicated agreement with three statements ($\alpha = 0.82$): “The government should NOT cover the medical costs of unvaccinated COVID-19 patients.” “Companies can fire employees who refuse to get vaccinated against COVID-19.” “When resources are scarce, unvaccinated COVID-19 patients should be given a lower priority on hospital care.”

2.3.8. COVID-19 concern

Participants indicated how worried they were about the COVID-19 pandemic (1 = not worried at all, 5 = very worried) and how much of a threat the coronavirus pandemic was for “the health of the U.S. population as whole,” “your personal health,” “the U.S. economy,” and “your personal financial situation” (1 = not a threat at all, 5 = a major threat; Tyson et al., 2021). Reliability analysis revealed that dropping the last two items related to economy and personal finance could increase the reliability of the scale, so only the first three items were combined ($\alpha = 0.83$).

2.3.9. Vaccine acceptance

First, participants indicated their vaccination status and likelihood of getting a vaccine if they were not vaccinated. These two items were transformed into one scale (1 = definitely will NOT get a vaccine, 5 = definitely will get a vaccine, 6 = had one shot but still need one more, 7 = have had all the shots needed to be fully vaccinated). The second scale measured participants’ intention to get a booster shot (1 = definitely will NOT get a vaccine booster, 5 = definitely will get a vaccine booster, 6 = I have already received a vaccine booster). The third scale measured participants’ confidence in the safety and effectiveness of COVID-19 vaccines (1 = no confidence at all, 5 = a great deal of confidence). These three scales were converted into five-point items and combined ($\alpha = 0.85$). A majority of the respondents (78.0%) were fully vaccinated and 35.0% received a booster. The final measure of vaccine acceptance

has a skewness of -1.4 (see Supplementary Material).

3. Results

Table 1 shows the correlations among key variables in the study. The four outcomes, concern for COVID-19, vaccine acceptance, support for vaccine mandates, and support for the punishment of unvaccinated people, were all positively correlated with LWA and negatively with libertarianism. SDO was negatively correlated with COVID-19 concern, vaccine acceptance, and support for vaccine mandates. These results provided initial support for the hypotheses, except that SDO did not predict punishment endorsement.

OLS regression models examined how ideological variables together predict the four outcomes. The first two models predicted concern for COVID-19 and vaccine acceptance (Table 2). Then, hierarchical regression models investigated whether the four ideologies predicted support for vaccine mandates (Table 3) and the punishment of unvaccinated individuals (Table 4), with or without the inclusion of COVID-19 concern and vaccine acceptance. In prior research, these two factors are associated with ideological variables such as SDO, RWA, and libertarianism (Bilewicz & Soral, 2021; Choma et al., 2021; Clarke et al., 2021; Murphy et al., 2021; Peng, 2022) as well as support for vaccine mandates (Gagneux-Brunon et al., 2021). An inspection of the normal P-P plots and the residual plots suggested that the assumptions for regression analyses were not violated. The variance inflation factors (VIF) of all the variables were below 2.5.

3.1. COVID-19 concern and vaccine acceptance

LWA was associated with higher concern for COVID-19 ($\beta = 0.34$) and higher vaccine acceptance ($\beta = 0.21$, both $ps < 0.001$). RWA was associated with higher concern with COVID-19 ($\beta = 0.08$, $p = .032$) but lower vaccine acceptance ($\beta = -0.19$, $p < .001$). SDO was associated with lower COVID-19 concern ($\beta = -0.18$, $p < .001$) but insignificantly related to vaccine acceptance. Libertarianism was related to lower COVID-19 concern ($\beta = -0.22$) and lower vaccine acceptance ($\beta = -0.32$, both $ps < 0.001$; Table 2).

3.2. Support for vaccine mandates

LWA ($\beta = 0.33$, $p < .001$) predicted support for vaccine mandates, whereas RWA ($\beta = -0.14$, $p < .001$), SDO ($\beta = -0.06$, $p = .047$), and libertarianism ($\beta = -0.42$, $p < .001$) were associated with higher opposition (Model 1 in Table 3). In the follow-up model (Model 2 in Table 3), LWA ($\beta = 0.18$), RWA ($\beta = -0.09$), and libertarianism ($\beta = -0.25$, all $ps < 0.001$) remained as significant predictors, but SDO no longer showed significant effects. COVID-19 concern ($\beta = 0.22$) and vaccine acceptance ($\beta = 0.37$, both $ps < 0.001$) contributed to support for vaccine mandates.

3.3. Support for the punishment of unvaccinated individuals

LWA was associated with higher support for punishment of unvaccinated people ($\beta = 0.47$), whereas RWA ($\beta = -0.16$) and libertarianism ($\beta = -0.24$, all $ps < 0.001$) were linked to more opposition (Model 1 in Table 4). Although SDO was not correlated with attitudes toward punishment, it became a significant positive predictor in regression ($\beta = 0.13$, $p < .001$). In the follow-up model (Model 2 in Table 4), LWA ($\beta = 0.37$, $p < .001$), RWA ($\beta = -0.09$, $p = .005$), SDO ($\beta = 0.15$, $p < .001$), libertarianism ($\beta = -0.10$, $p < .001$) remained as significant predictors. Also, vaccine acceptance ($\beta = 0.42$, $p < .001$), not COVID-19 concern, predicts support for punishing unvaccinated people (Table 4).

Table 5 presents additional analyses that partition ideological constructs’ direct effects from their indirect effects mediated via COVID-19 concern and vaccine acceptance. Using PROCESS (Hayes, 2018; Model 4, 5000 bootstraps), each model included one ideological predictor

Table 1
Correlation and descriptive analysis of variables.

	1	2	3	4	5	6	7	8	9	10	11	M	SD
1. Gender (1 = men)												0.45	
2. Age	-0.06											43.2	13.1
3. Left-wing authoritarianism	0.05	-0.33***										3.01	0.96
4. Right-wing authoritarianism	0.01	-0.02	0.08**									2.96	0.85
5. Social dominance orientation	0.15***	-0.10**	0.05	0.51***								2.28	0.95
6. Libertarianism	-0.03	0.10**	-0.41***	0.16***	0.27***							3.15	0.83
7. Political orientation	0.04	0.01	-0.05	0.57***	0.51***	0.35***						4.02	1.93
8. Party identity	0.02	0.09**	-0.26***	0.36***	0.39***	0.36***	0.52***					3.49	2.32
9. Vaccine mandate	0.04	-0.02	0.48***	-0.26***	-0.27***	-0.64***	-0.34***	-0.40***				3.46	1.34
10. Punishment of unvaccinated individuals	0.13***	-0.10**	0.55***	-0.08*	0.04	-0.43***	-0.18**	0.70***	0.70***			3.12	1.24
11. COVID-19 concern	-0.02	-0.02	0.42***	-0.05	-0.21**	-0.41***	-0.08*	-0.24***	0.60***	0.39***		3.46	1.03
12. Vaccine acceptance	0.08*	0.04	0.32***	-0.27***	-0.22***	-0.49***	-0.27***	-0.31***	0.71***	0.60***	0.50***	3.94	1.14

Note. *** $p < .001$; ** $p < .01$; * $p < .05$. $N = 983$.

(LWA, RWA, SDO, or libertarianism), one outcome (support for vaccine mandates or support for punishment), and both COVID-19 concern and vaccine acceptance as mediators. The other three ideological variables and the control variables in regressions (Table 3, Model 1) were included as covariates. For support for vaccine mandates, COVID-19 concern significantly mediated the effects of all four ideologies, whereas vaccine acceptance significantly mediated the effects of LWA, RWA, and libertarianism. For support for the punishment of unvaccinated people, all the indirect effects via COVID-19 concern were insignificant, but vaccine acceptance significantly mediated the effects of LWA, RWA, and libertarianism.

4. Discussion

This research investigates how four ideological constructs—LWA, RWA, SDO, and libertarianism—explain COVID-19 concern, vaccine acceptance, and support for vaccine mandates and punitive policies against unvaccinated individuals.

First, LWA emerges as an important predictor of vaccine-related attitudes: It predicts heightened COVID-19 concern, more vaccine acceptance, and higher support for vaccine mandates. Liberals generally place higher trust in science and express more positive attitudes toward various science issues than conservatives (Kerr & Wilson, 2021; Peng, 2020; Peng, 2022). As the polarization of science intensifies, a pro-science view might have been integrated into the liberal political identity, thus making left-wing authoritarians more inclined to endorse pro-science positions. Especially, some science issues such as vaccination and climate change potentially could introduce policies that restrict civil liberties, demand deference to authorities, and pose punishment on rulebreakers. Future research should investigate if LWA also plays a role in other science-related issues such as climate change mitigation.

Also, LWA predicts a higher endorsement of punitive policies against unvaccinated individuals. This echoes previous findings that LWA is related to aggression toward political outgroups, affective polarization, and support for political violence (Conway et al., 2018; Costello et al., 2022). As the political divide in the COVID-19 pandemic becomes salient, people may develop a stereotype that unvaccinated people are largely conservatives. Therefore, left-wing authoritarians may see unvaccinated individuals as a political outgroup and deem punitive policies as morally justifiable. Future research can examine whether perceptions of unvaccinated people and affective polarization explain the link between LWA and support for punitive policies.

Libertarianism emerges as another important contributor to COVID-19 dismissal, vaccine hesitancy, and opposition to mandatory and punitive vaccination policies. These conclusions concur with previous findings that individuals endorsing liberty tend to disregard COVID-19 risks, oppose government COVID restrictions (Dryhurst et al., 2020; Liu & Yang, 2021; Peng, 2022; Siegrist & Bearth, 2021), and reject compulsory childhood vaccines (Amin et al., 2017). News stories also emphasize the role of personal freedom in COVID-19 vaccination decisions (Stockton & King, 2021). In addition, these findings highlight that libertarianism should deserve more attention from political psychologists. Previously, scholars have used SOD and RWA to represent two major ideological subfactors and extensively researched how they shape socio-political attitudes (Bilewicz & Soral, 2021; Clarke et al., 2021; Duckitt, 2006). Future inquiries may integrate libertarianism and examine how these ideological subcomponents simultaneously influence sociopolitical attitudes when being controlled for each other.

SDO and RWA, two ideologies frequently examined in pandemic-related attitudes, also play a role. RWA is related to vaccine hesitancy and opposition to both vaccine mandates and the punishment of unvaccinated individuals. This could indicate that COVID-19 vaccines and mandatory policies are seen as a violation of moral traditions and purity. Confirming previous research (Choma et al., 2021; Murphy et al., 2021; Peng, 2022), SDO is correlated with lower COVID-19 concern and vaccine acceptance, although its relationship with vaccine acceptance

Table 2
Regression predicting COVID-19 concern and vaccine acceptance.

	COVID-19 concern			Vaccine acceptance		
	β	<i>t</i>	<i>p</i>	β	<i>t</i>	<i>p</i>
Gender (men = 1)	-0.01	-0.31	0.759	0.06	2.39	0.017
Age	0.11	3.60	<0.001	0.16	5.62	<0.001
Education (ref. = postgraduate degree)						
High school or less	0.02	0.77	0.441	-0.13	-4.37	<0.001
Some college	0.02	0.64	0.524	-0.15	-4.32	<0.001
Bachelor's degree	0.08	2.12	0.034	-0.03	-0.83	0.406
Race (ref. = Hispanic)						
Non-Hispanic Asian	-0.04	-1.19	0.233	0.00	0.03	0.973
Non-Hispanic Black	-0.06	-1.83	0.068	-0.10	-3.12	0.002
Non-Hispanic White	-0.05	-1.36	0.173	-0.03	-0.72	0.470
Other/mixed races	-0.09	-2.93	0.003	-0.02	-0.60	0.552
Political orientation	-0.03	-0.86	0.392	-0.01	-0.24	0.812
Party identity	-0.04	-1.07	0.284	-0.07	-2.08	0.038
Left-wing authoritarianism	0.34	9.67	<0.001	0.21	6.34	<0.001
Right-wing authoritarianism	0.08	2.15	0.032	-0.19	-5.50	<0.001
Social dominance orientation	-0.18	-5.16	<0.001	-0.04	-1.25	0.212
Libertarianism	-0.22	-6.51	<0.001	-0.32	-10.32	<0.001
	<i>F</i> (15, 967) = 26.8, <i>p</i> < .001			<i>F</i> (15, 967) = 38.1, <i>p</i> < .001		
	Adjusted <i>R</i> ² = 0.28			Adjusted <i>R</i> ² = 0.36		

Note. *N* = 983. Standardized regression coefficients are presented. Significant coefficients (*p* < .05) are in bold.

Table 3
Predicting support for vaccine mandates.

	Model 1			Model 2		
	β	<i>t</i>	<i>p</i>	β	<i>t</i>	<i>p</i>
Block 1						
Gender (men = 1)	0.03	1.47	0.143	0.01	0.64	0.522
Age	0.14	5.78	<0.001	0.06	2.91	0.004
Education (ref. = postgraduate degree)						
High school or less	-0.04	-1.67	0.096	0.00	-0.01	0.995
Some college	-0.06	-2.06	0.040	-0.01	-0.46	0.643
Bachelor's degree	-0.03	-0.87	0.382	-0.03	-1.32	0.186
Race (ref. = Hispanic)						
Non-Hispanic Asian	0.02	0.76	0.448	0.03	1.30	0.194
Non-Hispanic Black	-0.05	-1.79	0.074	0.00	0.04	0.969
Non-Hispanic White	-0.03	-0.92	0.358	-0.01	-0.30	0.761
Other races/mixed races	-0.03	-1.07	0.284	0.00	-0.05	0.963
Political orientation	-0.04	-1.27	0.204	-0.03	-1.15	0.250
Party identity	-0.09	-3.13	0.002	-0.05	-2.39	0.017
Left-wing authoritarianism	0.33	11.73	<0.001	0.18	7.50	<0.001
Right-wing authoritarianism	-0.14	-4.71	<0.001	-0.09	-3.50	<0.001
Social dominance orientation	-0.06	-1.99	0.047	0.00	-0.11	0.916
Libertarianism	-0.42	-15.66	<0.001	-0.25	-11.02	<0.001
Block 2						
COVID-19 concern				0.22	9.46	<0.001
Vaccine acceptance				0.37	15.18	<0.001
	<i>F</i> (15, 967) = 75.2, <i>p</i> < .001			ΔF (2, 965) = 242.0, <i>p</i> < .001		
	Adjusted <i>R</i> ² = 0.53			Adjusted <i>R</i> ² = 0.69		

Note. *N* = 983. Standardized regression coefficients are presented. Significant coefficients (*p* < .05) are in bold.

became insignificant in regression. SDO is linked to a rejection of vaccine mandates, and this effect is largely explained by its association with a lower COVID concern. SDO is not significantly correlated with endorsing punishing unvaccinated individuals, but it shows a positive relationship once other ideologies are controlled for in regression analyses. This may reflect that SDO is often linked to a lack of empathy toward others and prejudice toward disadvantaged groups (Duckitt, 2006). It has been reported that racial minorities such as African Americans showed higher COVID vaccine hesitancy than Whites (Khubchandani & Macias, 2021), although this gap has closed recently (Padamsee et al., 2022). One possibility is that individuals with high SDO, while dismissing COVID threat, might paradoxically endorse punishing unvaccinated individuals motivated by racial prejudice, which could be investigated by future research.

Several limitations exist. First, this study uses a convenience sample

from MTurk. MTurkers tend to be more liberal, educated, and politically knowledgeable than the general population (Clifford, Jewell, & Waggoner, 2015), which might inflate the role of ideologies in explaining attitudes toward various sociopolitical issues (Kalmoe, 2020). For example, the relationships between political orientation and attitudes toward some political issues are often stronger in MTurk samples than in a nationally representative sample (Clifford et al., 2015; Kalmoe, 2020). Future research should test if ideological variables still exhibited considerable effects on vaccine attitudes in a nationally representative sample. In addition, this study focuses on the U.S. context. COVID-19 and vaccines are highly polarized issues in the United States, which should condition the links between ideologies and vaccine attitudes. Future studies can compare the conclusions across contexts.

Table 4
Predicting support for punishment of unvaccinated individuals.

	Model 1			Model 2		
	β	<i>t</i>	<i>p</i>	β	<i>t</i>	<i>p</i>
Block 1						
Gender (men = 1)	0.08	3.00	0.003	0.05	2.18	0.030
Age	0.10	3.75	<0.001	0.03	1.35	0.178
Education (ref. = postgraduate degree)						
High school or less	-0.12	-4.31	<0.001	-0.07	-2.67	.008
Some college	-0.10	-2.98	0.003	-0.04	-1.23	0.219
Bachelor's degree	-0.05	-1.49	0.136	-0.04	-1.30	0.193
Race (ref. = Hispanic)						
Non-Hispanic Asian	0.02	0.79	0.432	0.02	0.89	0.376
Non-Hispanic Black	-0.08	-2.58	0.010	-0.04	-1.31	0.189
Non-Hispanic White	-0.01	-0.34	0.735	0.00	0.00	0.998
Other races/mixed races	-0.04	-1.36	0.173	-0.03	-1.16	0.246
Political orientation	0.08	2.16	0.031	0.08	2.54	0.011
Party identity	-0.06	-2.01	0.045	-0.03	-1.21	0.228
Left-wing authoritarianism	0.47	14.75	<0.001	0.37	12.49	<0.001
Right-wing authoritarianism	-0.16	-4.94	<0.001	-0.09	-2.82	0.005
Social dominance orientation	0.13	4.02	<0.001	0.15	5.13	<0.001
Libertarianism	-0.24	-8.11	<0.001	-0.10	-3.68	<0.001
Block 2						
COVID-19 concern				0.02	0.66	0.511
Vaccine acceptance				0.42	14.07	<0.001
				$F(15, 967) = 47.8, p < .001$		
				$\Delta F(2, 965) = 117.4, p < .001$		
				Adjusted $R^2 = 0.42$		
				Adjusted $R^2 = 0.53$		

Note. *N* = 983. Standardized regression coefficients are presented. Significant coefficients (*p* < .05) are in bold.

Table 5
Mediation effects of COVID-19 concern and vaccine acceptance.

Predictor	Path	Support for vaccine mandates		Support for punishment of unvaccinated individuals	
		β	95 CI	β	95 CI
LWA	DE	0.183	0.135 0.230	0.373	0.314 0.431
	IE via COVID-19 concern	0.073	0.050 0.097	0.006	-0.015 0.027
	IE via Vaccine acceptance	0.077	0.050 0.105	0.087	0.059 0.117
RWA	DE	-0.086	-0.134-0.038	-0.085	-0.144-0.026
	IE via COVID-19 concern	0.017	0.001 0.035	0.001	-0.004 0.008
	IE via Vaccine acceptance	-0.069	-0.101-0.038	-0.078	-0.114-0.045
SDO	DE	-0.003	-0.049 0.044	0.150	0.093 0.207
	IE via COVID-19 concern	-0.040	-0.059-0.023	-0.003	-0.015 0.008
	IE via Vaccine acceptance	-0.015	-0.043 0.014	-0.017	-0.051 0.015
Libertarianism	DE	-0.254	-0.300-0.209	-0.104	-0.160-0.049
	IE via COVID-19 concern	-0.046	-0.067-0.028	-0.004	-0.018 0.009
	IE via Vaccine acceptance	-0.118	-0.150-0.087	-0.134	-0.171-0.099

Note. DE = direct effect; IE = indirect effect. Significant paths (95 confidence intervals do not include zero) are in bold. Standardized coefficients are presented.

CRedit authorship contribution statement

Yilang Peng: Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft, Writing – review & editing, Visualization.

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