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Political and Social Drivers of COVID-19 Prevention and Climate Change Behaviors and Attitudes

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Abstract: Attitudes and behaviors related to the COVID-19 pandemic and the climate change crisis might be driven by similar political beliefs and attitudes. The current study used a neo-Gramsci perspective to examine how political attitudes may be linked to COVID-19 prevention and climate change attitudes and behaviors. A longitudinal online survey in the US assessed climate change and COVID-19 attitudes and behaviors, and wave 7 (2021) data were used to predict outcomes at wave 8 (2022) among 572 respondents. There were significant correlations among the variables of political ideology, climate change concerns, COVID-19 vaccine hesitancy, COVID-19 skepticism, COVID-19 vaccine as a personal choice, COVID-19 conspiracy, political correctness, percent of Republican friends, and dislike of the Democratic Party. In the multivariate models, COVID-19 vaccination as a personal choice was significantly associated with the four outcomes: vaccination status, climate change actions, vaccine hesitancy, and climate change concerns. COVID-19 skepticism was significantly associated with vaccination status, vaccine hesitancy, and climate change concerns. These findings suggest that there are similar drivers of COVID-19 prevention and climate change attitudes and behaviors, and interventions need to be tailored to target individual-level and societal-level factors.

Keywords: climate change; longitudinal; activism; political; COVID-19; vaccination; Gramsci

1. Introduction

The COVID-19 pandemic and the climate crisis have profoundly affected the public's health in the United States and globally. The COVID-19 pandemic has caused significant societal disruption due to the morbidity and mortality caused by the virus and the physical distancing measures implemented to reduce transmission and burdens on healthcare systems [1–5]. The climate crisis is linked to numerous emergencies caused by wildfires, severe storms, droughts, extreme heat, and flooding, among other factors, that have led to the destruction of people's livelihoods, homes, and communities, as well as significant population displacement and loss of life [6,7]. Understanding the interconnected factors that have influenced these contemporary crises is critical to developing strategies to address climate change as well as COVID-19 and future pandemics.

Contemporary applications of Gramsci's work on cultural hegemony offer a useful lens for elucidating the relationship between attitudes and behaviors related to COVID-19 and those related to climate change [8,9]. A key component of the neo-Gramscian concept of hegemony is that the acceptance of ideas, attitudes, and beliefs reinforce existing relationships of power, leadership, and the status quo by "manufacturing consent" [10]. In turn, hegemony influences how people interpret their world as well as expectations of how to act and how their needs should be met. These ideologies are reinforced through language, perpetuated by social institutions such as the media, and embedded in laws and policies [10]. Importantly, a neo-Gramscian perspective recognizes opportunities for agency and resistance to hegemonic ideologies in people's daily lives [11].

Gramsci does not view hegemony as an all-encompassing belief system but rather as a process of how a group, through media, institutions, and resources, imposes its will

and worldview on other groups without coercion. According to Levy and Egan (2003), "hegemony rests on a broad base of consent, which relies on coalitions and compromises that provide a measure of political and material accommodation with other social groups, and on ideologies that convey a mutuality of interests" [12]. These authors also emphasize that hegemony is contingent and unstable.

The political dynamics of the 1980s in the United States and many Western European countries provide a background helpful in understanding current hegemonic ideologies that may influence both climate change and COVID-19 attitudes and behaviors. During that period, political leaders within dominant conservative political parties and corporate and ideological supporters reinforced and promoted beliefs in individualism, the wisdom of the unfettered free market, and weak governmental regulations. At the same time, unions were explicitly weakened, and political leaders promoted distrust of the government [13]. During this time, fossil fuel hegemony was achieved through coalitions opposing the regulation of greenhouse gas emissions, financing political parties, funding advertising campaigns, and supporting conservative coalitions and think tanks [14–16]. Consequently, a fossil fuel hegemony was created that prioritized the economic interests of fossil fuel industries and promoted climate change skepticism in order to combat environmentalism. With the rise of the far right, distrust in government was exacerbated and extended with an emphasis on distrust in the mainstream media, especially during the Trump era [17]. Coupled with greater access to social media, this dynamic has resulted in expanded access to and proliferation of misinformation about critical issues, including the COVID-19 pandemic and climate change. During the COVID-19 pandemic, hostility to social distancing mandates was partly driven by conservative leaders advocating for the economic interests of businesses. To promote their agenda, many conservative leaders downplayed the pandemic's severity, leading to COVID-19 skepticism, which was magnified on social media.

Neo-Gramscian frameworks have been used to examine the political process surrounding the coral bleaching of the Great Barrier Reef, international negotiations to control emissions of greenhouse gases, as well as to understand conspiracy theories related to COVID-19 [12,18,19]. In this present study, we build on these previous applications of a neo-Gramscian perspective to examine how the interplay between conspiracy theories, political correctness, institutional trust, individualism, political ideology, and party affiliation and how these factors are related toCOVID-19 and climate change attitudes and actions.

Individual and collective actions to address the COVID-19 pandemic and climate change are influenced by attitudes, beliefs, and norms [20–22]. For example, belief in conspiracy theories has been linked to COVID-19 and climate change attitudes and behaviors [23–28]. At the individual level, beliefs in conspiracies have been hypothesized to offer individuals the promise of control in uncontrollable environments [29]. At the community and political level, conspiracies are also a method of identity formation and othering that both facilitate shared bonds and reinforce societal divisions [24]. During the COVID-19 pandemic and in response to scientific data on climate change, conspiracy beliefs have discounted evidence on both public health threats as well as the governmental institutions that engage in public health and climate change research and policy, often leading to resistance to recommended collective COVID-19 or climate change action. Another belief that may also be linked to COVID-19 and climate change attitudes and behaviors is the notion of "political correctness" [30]. "Political correctness" is often a derisive view of the use of inclusive language to recognize and acknowledge people's diversity and identities as well as the avoidance of expressions or actions that may marginalize or offend socially disadvantaged people. Regarding COVID-19, political correctness has been levied against mask use, and the topic of climate change has been ignored or denigrated as political correctness in some conservative media [31,32]. From a neo-Gramscian perspective, the political correctness debate can be seen as an attempt to control basic functions of language, that of labeling and categorizing, which is a central mechanism whereby ideologies and hegemony are produced and reinforced in people's daily lives.

Another factor that affects both the COVID-19 pandemic and climate change mitigation efforts is institutional trust. The successful functioning of governmental institutions requires trust from members of society for governmental organizations to have legitimacy and fulfill expected roles [33,34]. Institutional trust includes trust in science as well as governmental institutions that are responsible for public health research on vaccine safety and efficacy. Together, these factors affect individuals' trust in healthcare providers and, ultimately, their trust in the COVID-19 vaccine and acceptance of public health mandates [35–38]. Such institutional trust in science and governmental institutions is also associated with attitudes toward climate change. For many people, climate change does not or is perceived not to directly impact their lives; hence, there is a need to trust information from science and governmental institutions about the future impact and severity of climate change.

Individualism and the importance placed on individual freedom in the United States have affected the COVID-19 pandemic response as well as efforts to mitigate the effects of climate change. During the COVID-19 pandemic, a prominent narrative in the United States perpetuated via conservative media channels was the rejection of governmental public health mandates and scientific evidence purported to impinge upon personal freedoms. In the context of eroding trust in institutions, COVID-19 vaccinations were framed by some as an intrusive government mandate on a behavior that should be a matter of personal choice, which centered individual interests rather than collective, communitarian action to protect vulnerable populations in one's community [38–41]. Prior studies also suggest that individualistic beliefs are often negatively associated with concerns about climate change and other environmental justice issues [42,43]. The psychological concept of reactance stipulates that when people feel that their autonomy is threatened, they react in ways to restore it that may not be beneficial or in their own interest [44]. During the COVID-19 pandemic, the framing of the augment of vaccine mandates as impingements on personal freedom may generate reactance and lead people who would otherwise become vaccinated to refuse. In a similar way, framing the debate of climate change policies as infringements on personal freedom may lead to reactance for those who believe that they have the freedom to have any size carbon footprint.

Political ideologies can lead to and be reinforced by social identities, social networks, and differential exposure to sources of information, which can, in turn, influence people's beliefs and actions related to COVID-19 and climate change. In an experimental study in the US, for example, Democratic participants became more positive about a climate change policy when it was proposed by the Democratic Party than when the policy was proposed by the Republican Party. Similarly, Republican participants became more positive about the policy when it was perceived to be proposed by the Republican Party [45]. Prior research has also demonstrated not only lower vaccine rates among Republicans but also high death rates in counties that tended to vote for Trump in the 2016 presidential election [46].

Political ideologies and party membership imply a certain social identity, which is associated with specific attitudes and beliefs. A cognitive bias, known as outgroup homogeneity, suggests that individuals tend to view people in outgroups as more homogenous than those in an ingroup [47]. This bias can lead to the failure to understand the diversity among a social group, such as the results from a study by the Pew Research Center that found that within and across political parties in the US, there were groups with distinct political beliefs and attitudes [48]. Despite this diversity of political beliefs and attitudes, in the US some people may not feel a strong affinity to the Republican Party but have a strong negative sentiment toward more liberal beliefs held by liberals or Democrats [49]. As a result, if COVID-19 or climate change are framed as Democratic issues or priorities, then those who are hostile to the Democratic Party may also be hostile to efforts to address COVID-19 or climate change.

Social networks and sources of information are central to this identity formation and the proliferation of particular political ideologies. A study in late 2020 found that conservatives reported that the COVID-19 vaccine was less effective if they were frequently exposed to liberal news sources and if they had frequent conversations with fellow conservatives [50].

This pattern suggests a boomerang effect with individuals' beliefs strengthening from exposure to opposing views. One experimental study found that among those participants identifying as "middle-of-the-road" compared to "weak" political partisans, there were statistically significantly greater levels of vaccination intentions after exposure to pro-vaccine messages from co-partisan sources [51]. These findings suggest that there is important diversity in political ideologies based on social networks and sources of information that can influence individual attitudes and behaviors related to COVID-19 and climate change.

Prior research indicates an association between climate change and COVID-19 attitudes, and both are associated with political conservatism; yet, few studies have compared whether the same factors are associated with attitudes and behaviors in both domains [52]. The current study addressed this gap by examining how different political attitudes and behaviors are correlated with COVID-19 and climate change attitudes and behaviors. In particular, we examined COVID-19 skepticism, beliefs related to COVID-19 conspiracies, attitudes about COVID-19 mandates, attitudes toward political correctness, attitudes toward political parties, and the political composition of one's social network. Another gap in the current body of literature is that many studies include political ideology, from liberal to conservative, or political party affiliation but have failed to examine these factors with other COVID-19 and climate change attitudes and beliefs that may be linked to dominant ideologies in the United States. The current study examined how controlling for conservatism altered the associations between the variables. We then assessed how political ideology as well as attitudes related to conspiracy theories, institutional trust, and individualism were associated with behaviors of COVID-19 vaccination and engaging in climate change action. Finally, we used multiple regression models to assess attitudinal and behavioral correlates of COVID-19 vaccine hesitancy, vaccine uptake, climate change concerns, and climate change actions.

2. Methods

Study participants were drawn from an online longitudinal study that began in March 2020. This study aimed to examine individual, social, and societal-level fluctuations in health and well-being amid the rapidly changing landscape of the COVID-19 pandemic. Respondents were assessed every 3–4 months. Study participants were recruited online through Amazon's Mechanical Turk (MTurk), a platform frequently used by health and social researchers as it allows for a diverse sample to be collected in a rapid and timely fashion [53]. Research suggests that MTurk provides better-quality data than other online samples [54]. Although samples recruited through MTurk are not representative, they have been documented to outperform other opinion samples on several dimensions, including reliability and attentiveness to instructional manipulation checks [55]. Studies using MTurk also demonstrate high levels of reliability [56].

The study protocols followed MTurk best practices research guidelines, including ensuring participant confidentiality, integrating attention and validity checks throughout the survey, repeating study-specific qualification questions, and removing ineligible participants [54,57,58]. In addition, despite COVID-19, the demographic characteristics of MTurk participants have been documented to be stable [59]. Eligibility criteria included being aged 18 or older, living in the United States, being able to speak and read English, having heard of the coronavirus or COVID-19, and providing written informed consent. Eligible participants were also required to pass attention and validity checks inserted in the survey to mitigate inattentive and random responses [60]. These checks included survey questions with extremely low probabilities, such as deep-sea fishing in Alaska and having multiple appendages removed. We also repeated questions to ensure consistency. Finally, we examined the time participants took to complete the survey and verified survey completeness.

The initial study waves focused on COVID-19, but as the pandemic continued, we assessed other global health issues and factors linked to health and well-being. The primary analyses utilized survey items from waves 7 (16–29 November 2021) and 8 (13–24 April

2022), which extensively focused on climate change. Participants were compensated approximately USD 12 per hour. The study protocols were approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

2.1. Measures

There were two behavioral outcomes and two attitude outcomes, one each for climate change and COVID-19, assessed at wave 8. These outcomes were based on previously validated measures. The climate change outcomes were engagement in climate change action in the prior year and the level of climate change concerns. For COVID-19, the outcomes were COVID-19 vaccine status and COVID-19 vaccine hesitancy.

Climate change actions were assessed at wave 8 using climate change activism behaviors that have been previously validated by Doherty and colleagues [61]. These items asked about participation (yes/no) in the following actions in the last year: "Wrote letters, e-mailed, or phoned government officials to urge them to take action to reduce climate change"; "Voted for candidates who support measures to reduce climate change"; "Signed a petition to curb climate"; "Volunteered with organizations working to curb climate change"; "Donated money to organizations working to reduce climate"; and "Attended protests or rallies to reduce climate change". If respondents reported that they had engaged in any of the six behaviors, they were classified as engaging in climate change action.

We used the Yale Program on Climate Change Communication's Short Climate Survey to assess climate change concerns at waves 7 and 8 [62,63]. This 4-item scale includes the items such as "How important is the issue of global warming to you personally"? The response categories were "Extremely important", "Very important", "Somewhat important", "Not too important", and "Not at all important". The Cronbach's alpha was 0.93.

Vaccination status was assessed at wave 8 by the survey item, "How many doses of the coronavirus vaccine have you received (not including a booster)"? Responses of 1 or more were classified as being vaccinated based on the protection offered by a single dose add the distribution, with only 7% reporting one dose.

COVID-19 vaccine hesitancy attitudes were assessed at waves 7 and 8 by 4 items, which have been validated in prior studies. The scale included the statements, "I am very concerned that bad side effects from the coronavirus vaccine may show up years from now", "I am concerned that short cuts have been taken with coronavirus vaccine development because of political pressures", "I am worried about having bad side effects from a coronavirus vaccine", and "I am concerned that the coronavirus vaccines are being developed too quickly". The response categories were "Strongly agree", "Agree", "Neither agree nor disagree", "Disagree", and "Strongly disagree". The Cronbach's alpha was 0.93.

Conspiracy beliefs were assessed by the two items "China purposely spread the coronavirus" and "Much of what happens in the world today is decided by a small and secretive group of individuals". The latter item is commonly used to assess conspiracy beliefs and is associated with beliefs about COVID-19. The correlation between the two items was 0.51 [64,65].

COVID-19 skepticism was assessed by the three survey items, "The health risks from coronavirus have been exaggerated", "The coronavirus is a hoax", and "The coronavirus isn't any worse than the flu". The response categories were "Strongly agree", "Agree", "Neither agree nor disagree", "Disagree", and "Strongly disagree". These three items were summed as a scale, which had a Cronbach's alpha of 0.82.

COVID-19 vaccine as a personal choice was measured by three items: "Getting a coronavirus vaccine should be a matter of personal choice", "The government has no right to require people to get vaccinated for the coronavirus", and "Businesses should not be able to require their employees to get vaccinated for the coronavirus vaccine". The Cronbach's alpha was 0.93.

Attitudes about political correctness were measured by three items: "People do not say what they actually believe because of political correctness", "Political correctness has

gone way too far in this country", and "I am afraid of offending others by what I say on topics like sex and race" [65]. The Cronbach's alpha was 0.65.

The response categories for self-reported race/ethnicity included "White", "Black", "Asian", "Hispanic", "Mixed", and "Other". Due to the small sample size, "Mixed" and "Other" were collapsed into a single category. Political ideology was assessed with the question, "Where would you place yourself on a scale running from 'Very liberal' to 'Very conservative?'" The response categories were (1) "Very liberal", (2) "Liberal", (3) "Slightly liberal", (4) "Moderate", (5) "Slightly conservative", (6) "Conservative", (7) "Very conservative", and (8) "Not applicable". Those who reported "not applicable" were recoded to the median. Political party affiliation was assessed with the question, "Do you consider yourself Republican, Democrat, Independent, Libertarian or Other"? Family income was assessed and dichotomized, based on the median, at less than USD 60,000 versus USD 60,000 or more. Educational attainment was dichotomized as a bachelor's degree and higher versus an associate degree or less. Sex was assessed as biological sex at birth.

2.2. Analyses

Descriptive statistics of means, standard deviations, and percentages were first calculated, and a correlation matrix was used to examine the relationship among scales and measures of political ideology and behaviors. A partial correlation controlled for the measure of political ideology (very liberal to very conservative). Political party affiliation is strongly associated with political ideology, but political ideology has been found to be more strongly associated than political party affiliation with COVID-19 vaccine attitudes and behaviors; hence, we included political ideology in the model's affiliation [66]. Then bivariate analyses using t-tests, chi-square statistics, and multivariable logistic regression models were used to examine the dichotomous climate change actions and the vaccination status outcomes. OLS regression models were also employed to assess the linear attitude outcomes of vaccine hesitancy and climate change concerns.

3. Results

There were 572 respondents included in the analysis who completed wave 7 and wave 8 surveys. The majority (54.72%) of participants were born female and most (56.47%) had an annual income of less than USD 60,000. In terms of race, 69.93% were White, 13.29% Non-Hispanic Black, 7.17% Hispanic, 6.29% Asian, and 3.32% Other. The majority of participants (51.75%) identified as liberal, 18.71% as moderate, and 29.55% as conservative. In terms of political party affiliation, 23.95% identified as Republican, 43.36% Democrat, 28.32% Independent, 1.75% Libertarian, and 2.62% Other (Table 1).

In Table 2, the Pearson correlation coefficient was used to measure the linear association among (1) political ideology, (2) climate change concerns, (3) COVID-19 vaccine hesitancy, (4) COVID skepticism, (5) COVID-19 vaccine as a personal choice, (6) COVID-19 conspiracy, (7) political correctness, (8) percent of Republican friends, and (9) dislike of the Democratic Party. Each of these variables was significantly correlated with one another ($p < 0.01$). The majority of variables had a positive linear correlation between pairs, excluding the correlation between climate change concerns and the remaining 8 variables, which had a significant negative correlation. The strength of these correlations ranged from an absolute value of 0.32 to 0.69. Most of these correlations remained significant in the partial correlation analysis (Table 3).

Table 1. Descriptive statistics of background factors at wave 7.

Variables	n (%)
Sex	
Male	259 (45.28)
Female	313 (54.72)
Race	
White	400 (69.93)
Non-Hispanic Black	76 (13.29)
Hispanic	41 (7.17)
Asian	36 (6.29)
Other	19 (3.32)
Income	
Less than USD 60 K	323 (56.47)
Greater than USD 60 K	249 (43.53)
Education	
Associate degree or less	242 (42.31)
Bachelor's degree or higher	330 (57.69)
Political Ideology	
Very Liberal	80 (13.99)
Liberal	148 (25.87)
Slightly Liberal	68 (11.89)
Moderate	107 (18.71)
Slightly Conservative	54 (9.44)
Conservative	70 (12.24)
Very Conservative	45 (7.87)

Table 2. Correlation matrix of COVID vaccination, climate change, and political attitudes and behaviors at wave 7. Bold = $p < 0.01$.

Variable	Political Ideology	Climate Change Concern	COVID Vaccine Hesitancy	COVID Skepticism	COVID Vaccine Choice	COVID Conspiracy	Political Correctness	% Republican Friends	Dislike the Democratic Party
Political Ideology (very liberal to very conservative)	1.00								
Climate Change Concern	**−0.57**	1.00							
COVID Vaccine Hesitancy	**0.45**	**−0.35**	1.00						
COVID Skepticism	**0.52**	**−0.53**	**0.55**	1.00					
COVID Vaccine Choice	**0.59**	**−0.52**	**0.69**	**0.64**	1.00				
COVID Conspiracy	**0.47**	**−0.35**	**0.54**	**0.51**	**0.53**	1.00			
Political Correctness	**0.50**	**−0.33**	**0.46**	**0.38**	**0.45**	**0.40**	1.00		
% Republican Friends	**0.68**	**−0.47**	**0.35**	**0.44**	**0.49**	**0.37**	**0.42**	1.00	
Dislike the Democratic Party	**0.47**	**−0.37**	**0.32**	**0.44**	**0.41**	**0.37**	**0.36**	**0.39**	1.00

Table 3. Partial correlation matrix of COVID-19 vaccination, climate change, and political attitudes and behaviors at wave 7.

Variable	Partial Correlation							
	Climate Change Concern	COVID Vaccine Hesitancy	COVID Skepticism	COVID Vaccine Choice	COVID Conspiracy	Political Correctness	Republican Friends	Dislike of Democratic Party
Climate Change Concerns	1.00							
COVID Vaccine Hesitancy	−0.13 **	1.00						
COVID Skepticism	−0.33 **	0.41 **	1.00					
COVID Vaccine Choice	−0.27 **	0.58 **	0.49 **	1.00				
COVID Conspiracy	−0.12 **	0.42 **	0.35 **	0.36 **	1.00			
Political Correctness	−0.06	0.30 **	0.17 **	0.22 **	0.22 **	1.00		
% Republican Friends	−0.13 **	0.06	0.14 **	0.16 **	0.08 *	0.13 **	1.00	
Dislike of Democratic Party	−0.14 **	0.17 **	0.27 **	0.18 **	0.20 **	0.16 **	0.11 *	1.00

*—$p < 0.05$, **—$p < 01$.

In the bivariate models (Table 4), all *t*-test results were significant ($p < 0.05$) for both outcomes of vaccination status and climate change action. However, chi-square results were only significant for the vaccination status outcome ($p < 0.05$) by education level and income.

Table 4. *T*-tests and chi-square models of vaccination and climate change attitudes and behaviors at wave 7 and wave 8—behavioral outcomes. Bold = $p < 0.05$.

Variable (Wave 7)	Vaccination Status (Wave 8)			Climate Change Action (Wave 8)		
	Yes n = 434	No n = 138	*p*-Value	Yes n = 284	No n = 288	*p*-Value
Pearson's Chi-square, %						
Sex (Ref: Male)	45.62	44.20	0.77	43.66	46.88	0.44
Female	54.38	55.80		56.34	53.12	
Race (Ref: White)	70.05	69.57	0.32	66.55	73.26	0.48
Non-Hispanic Black	12.21	16.67		14.08	12.50	
Hispanic	7.60	5.80		8.45	5.90	
Asian	7.14	3.62		7.04	5.56	
Other	3.00	4.35		3.87	2.78	
Education (Ref: AA degree or less)	37.56	57.25	**0.00**	39.44	45.14	0.17
Bachelor's degree or higher	62.44	42.75		60.56	54.86	
Income (Ref: USD 60 K or less)	52.30	69.57	**0.00**	54.58	58.33	0.37
Greater than USD 60 K	47.70	30.43		45.42	41.67	
T-test, mean (SD)						
Political Ideology (liberal to conservative)	3.20 (1.80)	4.52 (1.72)	**0.00**	2.72 (1.54)	4.31 (1.82)	**0.00**
Climate Change Concern	12.59 (3.58)	9.99 (4.27)	**0.00**	14.14 (2.59)	9.81 (3.81)	**0.00**
Vaccine Hesitancy	9.26 (4.26)	16.98 (3.76)	**0.00**	9.86 (4.89)	12.38 (5.39)	**0.00**
COVID-19 Beliefs						
Skepticism	4.64 (2.10)	7.76 (3.23)	**0.00**	4.57 (2.20)	6.21 (3.01)	**0.00**
Vaccine Choice	7.83 (3.78)	13.26 (2.75)	**0.00**	7.58 (3.94)	10.68 (3.98)	**0.00**
Conspiracy	4.26 (1.99)	5.80 (2.04)	**0.00**	4.05 (1.85)	5.21 (2.19)	**0.00**
Political Correctness	9.09 (2.84)	10.79 (2.15)	**0.00**	8.80 (2.85)	10.20 (2.52)	**0.00**
% Republican Friends	3.50 (2.41)	4.77 (2.70)	**0.00**	3.09 (2.18)	4.52 (2.67)	**0.00**
Dislike of the Democratic Party	2.47 (1.23)	3.38 (1.35)	**0.00**	2.33 (1.18)	3.04 (1.35)	**0.00**

In the multivariate models (Table 5), COVID-19 vaccination as a personal choice was the only variable significantly associated with each of the four outcomes: vaccination status, climate change actions, vaccine hesitancy, and climate change concerns (Table 5). High scores on the scale of measuring COVID-19 vaccination as a personal choice were associated with a significant decrease in the odds of having been vaccinated for COVID-19 (OR = 0.67, 95% CI = 0.61, 0.75) and taking part in climate change actions (OR = 0.93, 95% CI = 0.87,

0.99). Additionally, a higher level of endorsing vaccination as a personal choice was also associated with a higher level of vaccine hesitancy (COEF = 0.56, 95% CI = 0.46, 0.66) and less concern about climate change (COEF = −0.16, 95% CI = −0.24, −0.07).

Table 5. Multivariable logistic and OLS regression models of vaccination and climate change attitudes and behaviors, N = 572. Bold = $p < 0.05$.

Variable	Logistic Regression aOR (95% CI)		OLS Regression Coefficient (95% CI)	
	Vaccination Status	**Climate Change Actions**	**Vaccine Hesitancy**	**Climate Change Concern**
Sex (Ref: Male)	1.17 (0.69, 1.98)	1.18 (0.81, 1.73)	**1.32 (0.73, 1.90)**	0.20 (−0.30, 0.71)
Race (Ref: White)				
Non-Hispanic Black	0.46 (0.21, 0.99)	1.08 (0.61, 1.90)	**1.22 (0.32, 2.12)**	−0.13 (−0.91, 0.64)
Hispanic	0.70 (0.24, 2.04)	1.10 (0.53, 2.29)	0.25 (−0.88, 1.39)	0.44 (−0.54, 1.42)
Asian	1.15 (0.34, 3.93)	1.29 (0.60, 2.79)	1.05 (−0.16, 2.25)	**1.28 (0.24, 2.33)**
Other	0.38 (0.10, 1.51)	1.21 (0.43, 3.40)	0.21 (−1.41, 1.82)	0.35 (−1.05, 1.74)
Education (Ref: AA degree or less)	**1.81 (1.06, 3.10)**	1.06 (0.71, 1.57)	−0.52 (−1.14, 0.09)	−0.53 (−1.06, 0.00)
Income (Ref: USD 60 K or less)	**2.25 (1.27, 3.97)**	1.37 (0.92, 2.03)	−0.39 (−0.99, 0.22)	−0.06 (−0.58, 0.47)
Political Ideology (liberal-conservative)	1.04 (0.85, 1.29)	**0.66 (0.56, 0.77)**	−0.07 (−0.32, 0.17)	**−0.55 (−0.76, −0.34)**
COVID-19 Beliefs				
Skepticism	**0.81 (0.73, 0.91)**	0.98 (0.89, 1.08)	**0.26 (0.11, 0.40)**	**−0.31 (−0.43, −0.18)**
Vaccine Choice	**0.67 (0.61, 0.75)**	**0.93 (0.87, 0.99)**	**0.56 (0.46, 0.66)**	**−0.16 (−0.24, −0.07)**
Conspiracy	1.02 (0.89, 1.17)	0.95 (0.85, 1.07)	**0.43 (0.25, 0.60)**	0.06 (−0.09, 0.21)
Political Correctness	0.95 (0.84, 1.08)	0.99 (0.92, 1.08)	**0.30 (0.17, 0.42)**	0.01 (−0.09, 0.12)
% Republican Friends	1.11 (0.96, 1.28)	1.05 (0.94, 1.17)	−0.06 (−0.23, 0.10)	**−0.17 (−0.31, −0.03)**
Dislike of the Democratic Party	0.89 (0.71, 1.11)	0.92 (0.77, 1.09)	0.07 (−0.19, 0.33)	−0.12 (−0.34, 0.10)

The COVID-19 skepticism scale was significantly associated with three of the outcomes in the multivariate models: vaccination status, vaccine hesitancy, and climate change concerns (Table 5). A higher COVID-19 skepticism score was associated with significantly decreased odds of receiving a COVID-19 vaccination (OR = 0.81, 95% CI = 0.73, 0.91), greater vaccine hesitancy (COEF = 0.26, 95% CI = 0.11, 0.40), and lower climate change concerns (COEF = −0.31, 95% CI = −0.43, −0.18) (Table 5).

A higher score on the COVID-19 conspiracy scale and greater antipathy toward political correctness were both only significantly associated with the outcome of increased vaccine hesitancy (Table 5). Having a greater percentage of Republican friends was significantly associated with decreased climate change concerns (COEF = −0.17, 95% CI = −0.31, −0.03). Disliking the Democratic Party was not significantly associated with any outcomes in the multivariate models.

In terms of demographic variables in the multivariate regressions, being female was only significantly associated with an increased vaccine hesitancy score (COEF = 1.32, 95% CI = 0.73, 1.90). Similarly, being Non-Hispanic Black was also significantly associated with a greater vaccine hesitancy score compared to being White (COEF = 1.22, 95% CI = 0.32, 2.12). Being Asian was significantly associated with greater climate change concerns compared to being White (COEF = 1.28, 95% CI = 0.24, 2.33).

Participants with a bachelor's degree or greater had significantly increased odds of being vaccinated for COVID-19 (aOR = 1.81, 95% CI = 1.06, 3.10) compared to those with an associate's degree or less. Respondents with incomes higher than USD 60 K a year also had significantly greater odds of being vaccinated for COVID-19 (OR = 2.25, 95% CI = 1.27, 3.97) compared to those whose income was USD 60 K or less per year. Greater political conservativism was also significantly associated with decreased odds of engaging in climate change action (aOR = 0.66, 95% CI = 0.56, 0.77) and less concern about climate change (COEF = −0.55, 95% CI = −0.76, −0.34).

4. Discussion

Prior studies have found that conservatism is associated with COVID-19 and climate change attitudes and behaviors [67–70]. This study extends the previous research by delineating specific attitudes and beliefs and the associations among them that may help explain how political attitudes and beliefs are linked to COVID-19 and climate change attitudes and behaviors. This study identified strong correlations between measures of political and ideological attitudes—conspiracy theories, political correctness, institutional trust, individualism, political ideology, and party affiliation—and COVID-19 vaccine hesitancy and climate change concerns. The measures of COVID-19 skepticism, antipathy toward political correctness, the belief that COVID-19 vaccination should be a personal choice, vaccine hesitancy, COVID-19 conspiracy beliefs, the proportion of Republicans in one's social network, and antipathy to Democrats were all strongly positively correlated with each other, and all were negatively correlated with concerns about climate change. Although the associations were attenuated when controlling for political orientation, all correlations remained statistically significant, which suggests that these associations are not simply a result of political ideological orientation. These correlated factors can be viewed as reflections of a hegemony that centers on individualism and reinforces distrust of governmental institutions [19]. These factors are not only aspects of people's political ideologies; they also influence ideas about how society should function (i.e., individualistic or communitarian), the sources of information to which people are exposed, and the type of people with whom they interact. Aligning with Gramsci's work, these findings suggest that acceptance of particular ideas around skepticism, conspiracy beliefs, individualism, and political conservativism may reflect hegemonic ideologies in the United States that influences both COVID-19 and climate change attitudes and behaviors [8,9].

Belief in individualism and distrust of institutions, mainstream media, liberals, and science are components of rightwing ideology (Pew, 2021) which coincide with the interests of the fossil fuel industry [48]. Our findings illustrate that these ideological factors are not only linked to climate change attitudes and behaviors but also COVID-19 attitudes and behaviors. For decades, the oil companies and their allies criticized climate change science. Many of the same social groups that promote distrust of government and science also promote distrust in science-based approaches to addressing the COVID-19 pandemic and climate change. Initially, this was manifested in hostility to social distancing measures since they impeded economic commerce. However, the anti-government perspective, coupled with the emphasis on personal choice, which is an integral component of neoliberalism, may have led some people to refuse vaccination. Moreover, although a large proportion of the population is pro-vaccine and pro-climate change action, opposing political factions have led to high rates of COVID-19 mortality and actively impede policies to address climate change.

However, while we found that COVID-19 and climate change attitudes and behaviors overlap, they are not tightly coupled, as indicated by the magnitude of associations. We do not know if changing one of these factors may lead to changes in others or if the other factors will not only impede change but attenuate the impact of any change. For example, a change in belief in the severity of the COVID-19 pandemic may not lead to a greater level of climate change concerns. However, a change in belief in the severity of COVID-19 may lead to greater openness to scientific information on other topics, which could lead to greater climate change concerns. The space offered by Gramsci and others within hegemonic systems of power suggests that agency or resistance are possible, and longitudinal research should focus on identifying how these changes can and do take place over time [8,11].

The correlations among attitudes with social network composition based on political party affiliation suggest that social networks may reinforce political beliefs and attitudes that reflect and perpetuate a particular hegemonic worldview. At the same time, they also suggest that people may affiliate with others who hold similar beliefs [71,72]. Although the correlational analyses in this study were cross-sectional, and hence inferences on causal pathways are limited, it is likely that the attitudes and behaviors examined here are

mutually reinforcing. For example, a specific political ideology may influence the sources of information accessed, and that information received may, in turn, reinforce attitudes related to conspiracy theories, institutional trust, or individualism, as well as that political ideology over time.

Although some conservative leaders intentionally downplayed the severity of the pandemic and promoted COVID-19 skepticism, anti-COVID-19 vaccine attitudes and behaviors can also be viewed as a by-product of distrust of governmental agencies and other social institutions (including science and mainstream media) and individualism. It is not surprising that COVID-19 skepticism is associated with vaccine hesitancy and vaccine status. At the same time, COVID-19 skepticism was strongly negatively associated with climate change concerns. These findings suggest that people who both hear messages and believe them about the pandemic being exaggerated may (1) be more receptive to misinformation, (2) not be exposed to diverse sources of information, or (3) lack institutional trust in science or governmental institutions, which may lead them to deny scientific information across both COVID-19 and climate change topics. This negative association between COVID-19 skepticism and climate concerns may be due in part to sources of news. It is well established that sources of information differ by political ideologies, and high levels of misinformation from social media have been documented for vaccine hesitancy and climate change denial [73].

Among respondents with highly dismissive attitudes about the severity of the COVID-19 pandemic or climate change, it is questionable whether messages that directly address the scientific bases of their beliefs would be an effective method of persuasion. Some interventions have explored ways to address misinformation by testing the effects of preventive or "inoculating" messages on misinformation, with promising results [74]. Some have advocated for more intentional use of persuasion and rhetoric to address science denialism by first identifying the rhetoric used to discredit science and improving communication about the meaning of scientific research [75]. However, interventions that attempt to disabuse anti-vaccine beliefs can have a boomerang effect [76]. It may be more effective to work with conservative leaders and trusted opinion leaders to craft messages and provide COVID-19 and climate change-related information. Future research should identify trusted informational sources on climate change that may be outside the political arena and, as Guess et al. (2020) tested, support people to identify trusted sources of information in their daily lives [77].

The belief that vaccination was a personal choice and that there should not be governmental vaccine mandates was both strongly positively associated with vaccine hesitancy and negatively associated with climate change concerns. These associations may be due, in part, to the distrust of science and governmental institutions. Without trust in science and government, vaccines, which are deemed efficacious and safe by governmental organizations, and climate change projections, which are based on governmental climatological forecasts, are likely to be viewed skeptically. Interconnected with distrust in science and governmental institutions are individualism and beliefs about individual freedom, which may provide another explanation for the associations between negative attitudes toward vaccine mandates and vaccine hesitancy and climate change concerns and actions. Framing governmental policies by some conservative leaders as infringing upon freedom, especially if there is distrust in government, can be used as a tool to help organize and energize political groups to oppose a policy [78]. Vaccine mandates may, therefore, generate psychological reactance, rooted in distrust of the government, and lead people who would otherwise get vaccinated to refuse. Future research should further examine the mechanisms that link beliefs about individualism and personal choice with concerns about climate change. A neo-Gramscian perspective enables us to identify how such prevailing individualistic and anti-government sentiments reflect a hegemony in the United States driven by extractive capitalism and neoliberalism. Communication and interventions designed to strengthen institutional trust must recognize the interplay between individualism and institutional

trust to develop messages and then provide them through the information sources they access [79].

Political ideology, as measured by conservatism, was negatively associated with climate change concerns and actions. As a result, framing messages to directly appeal to conservatives and larger American values of economic progress and individualism may be an effective approach. For example, a set of media stories on how the environment is changing and impeding fishing and hunting was found to increase concern about climate change among conservatives [80]. Since climate change affects so many domains, it is feasible to construct messages and arguments that address the distinct values and beliefs of conservatives. It may also be useful to test messages among individuals based on a range of diverse political ideologies. Messages on how climate change may severely affect children and grandchildren may resonate regardless of political ideology. Messages designed for conservative audiences with negative attitudes toward government could highlight, for example, that failure to address climate change may reduce individual freedom and increased reliance on the government, lead to increased taxes and food prices, or affect unemployment rates. Conversely, such messages could also spotlight government successes, such as supporting rapid vaccine development or international treaties that reduce chlorofluorocarbon gases that deplete the ozone layer. It may be beneficial to identify and prioritize topics that individuals hostile to governmental mandates view as legitimate domains for a governmental role and link climate change to those areas.

The findings on the relationship between the proportion of Republicans in one's network and engaging in climate change actions highlight the importance of viewing behaviors as a social process that may be encouraged or discouraged by members of one's social network [81,82]. From the perspective of dynamic social impact theory, this association is likely bidirectional, with people who have similar beliefs affiliating and network members influencing each other [83]. This mutually reinforcing dynamic also suggests the importance of considering the messenger for diffusing and discussing climate change. First, conservative leaders that provide science-based guidance could be effective messengers, given their potential as opinion leaders to influence those in their social networks. A second promising approach could be engaging conservatives who are concerned about climate change to diffuse messages through their social networks. By providing training or guidance on effective communication skills or how to talk effectively about climate change based on evidence, there is an opportunity to shift social norms for both the acceptability of discussing climate change and its threat to planetary health. Finally, the politicization of climate change suggests that messages may be more effective when delivered by non-political figures. Moreover, messages to promote climate change action disseminated by celebrities or cultural icons could signal tastes and preferences that reject dominant narratives framing the issues of climate change as liberal elites foisting their values onto conservatives [84].

To reduce political polarization related to major social issues such as COVID-19 and climate change, it may be feasible for youth to receive robust science education, especially on climate change mitigation, prior to their strongly identifying with political parties. A recent analysis of the 2021 Yale Climate Opinion dataset suggested that the majority of US adults (77%) supported teaching about climate change in schools [85]. Studies on climate change and motivated reasons suggest that political partisanship can lead people to spend less time processing information on climate change [86]. Future research can examine whether, in the context of education, motivations to learn and excel academically supersede motivations and cognition to reduce the time and effort to process information on climate change.

Prior studies have also found educational and income differences in COVID-19 vaccination rates and levels of vaccine hesitancy [87]. We found that high education and income were associated with vaccine uptake in the bivariate analyses but not the multivariate model, which suggests that other variables, such as vaccine skepticism, political conservatism, and belief in vaccine choice, may partially mediate these associations. Our study replicates prior studies in finding that female gender was associated with vaccine

hesitancy [88,89]. One distinct demographic difference in the OLS regression model was that Black individuals had higher vaccine hesitancy levels than whites. However, there was no difference in vaccination rates based on race/ethnicity. Although racial differences in vaccine hesitancy may be partly driven by greater medical mistrust among Black respondents compared to whites, other factors, such as vaccine access, resources, and COVID-19 mortality, which has been higher in Blacks than whites, may influence actual vaccine uptake [90–95].

Study limitations should be noted. The sample was not random, and we only measured a limited range of political attitudes and behaviors. Moreover, the behaviors were self-reported. Assessing a wider range of political attitudes and behaviors may be informative to increase understanding of determinates and correlates of critical global issues. It is also important to understand how factors such as political leaders, lobbyists, and political organizations promote ideologies and behaviors that either foster or are antithetical to public and planetary health and the social conditions that support these ideologies and behaviors. However, it is noteworthy that many organizations and political parties have inconsistent and inherently contradictory beliefs and attitudes. Therefore, it may be useful to examine the role of these beliefs and attitudes in group maintenance, the maintenance of social structures, and political power dynamics. Moreover, a person-center approach, rather than a variable-centered approach, could be beneficial in future research to help determine if there are specific subgroups in the population based on demographic and political attitudes that may help to explain COVID-19 and climate change behaviors and attitudes [96].

Based on the cognitive bias of outgroup homogeneity, there is a tendency to view outgroups as more homogenous than ingroups [47]. The findings from the current study highlight the diversity in political attitudes and behaviors, albeit correlated, based on political ideology. Not all of the political attitudes and behaviors were equally associated with climate change and COVID-19 attitudes and behaviors. Assessing a range of political attitudes can help identify subgroups within and across political parties and group members who may be receptive to engaging in collective action to address climate change.

To address climate change and future public health issues, it is critical to understand how societal dynamics reflect and reinforce cultural hegemony, which in turn influences individual attitudes and behaviors. Identifying the ideological mechanisms of cultural hegemony can elucidate priority areas for public health promotion programs and interventions that not only address attitudes but also focus on the upstream drivers of these attitudes that may facilitate meaningful collective actions to address climate change.

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