Original Research Article

Psychological Reports
2022, Vol. 0(0) 1–22

DOI: 10.1177/00332941221144604
journals.sagepub.com/home/prx
SAGE

Investigating the Relation of Political Orientation and Vaccination Outcomes: Identifying the Roles of Political Ideology, Party Affiliation, and Vaccine Hesitancy

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Abstract

Popular press and academic articles alike suggest that political orientation is a primary determinant of vaccination willingness, vaccination, and vaccine word-of-mouth (i.e., sharing of information regarding vaccines). In the current article, we test the validity of these suggestions, and we also assess the differential roles of political ideology (e.g., liberal-conservative) and party affiliation (e.g., Democrat-Republican) as well as the mediating effect of vaccine hesitancy's dimensions. To do so, we perform a four-wave survey study with 223 participants that completed all waves. Our results support that political orientation indeed relates to our outcomes of interest. Our results also show that political ideology has a more pronounced effect than party affiliation, and the vaccine hesitancy dimensions of Health Risks and Healthy mediate many of these relations. From these results, we suggest many directions for future research and practice, including the integration of political discourse theories in studies on political orientations and vaccination.

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Keywords
Covid-19, Political Orientation, Political Ideology, Political Affiliation, Political Party Affiliation, Vaccine, Vaccination, Vaccine Hesitancy, Social Perceptions, Mental and Physical Health, Public Health Issues

The COVID-19 pandemic has pushed vaccination to the forefront of worldwide political discourse, and political parties around the world greatly differ regarding their stances towards vaccination (de Munter et al., 2021; Lovari et al., 2021). In the context of the current article, the United States, liberal-leaning political parties are more likely to endorse mandatory vaccination policies, whereas conservative-learning political parties are more likely to endorse voluntary vaccination policies (Sharfstein et al., 2021; Toth-Manikowski et al., 2022). These differences have caused popular press and academic articles alike to suggest that political orientation is a primary determinant of vaccination willingness, vaccination, and vaccine word-of-mouth (i.e., sharing of information regarding vaccines) (de Munter et al., 2021; Lovari et al., 2021; Sharfstein et al., 2021). In the current article, we propose that this is indeed the case, but we also propose that these relations are more nuanced than commonly assumed in two manners.

As the resonance model explains (Iyengar & Simon, 2000), political messaging efficacy is determined by its fit with voters' existing values. For this reason, parties' messaging typically aligns with their members' ideology, causing party affiliation (e.g., Republican and Democrat) and political ideology (e.g., conservative and liberal) to often produce similar relations with outcomes (e.g., support for policies) (Cruz, 2017; Diemer et al., 2019; Kannan & Veazie, 2018); however, messaging regarding face mask wearing and vaccination in the United States may not follow this trend, as they are politicized health behaviors. The COVID-19 pandemic began during the presidency of Republican, Donald Trump. Beginning early and persisting throughout, Republican politicians downplayed the severity of the COVID-19 pandemic and need for preventive measures, whether to stabilize the economy or maintain voters' trust in the president (Calvillo et al., 2020; Samore et al., 2021). Democrats, on the other hand, repeatedly stressed the pandemic's severity and called for greater adoption of public health measures, such as face mask wearing and vaccination, whether to ensure public health or spark voters' distrust in the president. Former President Trump himself stated, "some Americans wore facial coverings not as a preventive measure but as a way to signal disapproval" (Bender, 2020, para. 8). Conservative (liberal) media was also more likely to share negative (positive) information regarding face mask wearing and vaccination at a greater extent than expected based on the association of these behaviors with political ideology, and these dynamics persisted into the presidency of Democrat, Joe Biden (Ruiz & Bell, 2021; Simonov et al., 2022).

This repeated messaging caused members of political parties in the United States to be differentially exposed to information, such that Republications were more exposed to negative information and Democrats were more exposed to positive information

about preventive health behaviors (Ruiz & Bell, 2021; Simonov et al., 2022). Typically, party affiliation and political ideology regularly produce similar relations because messages espoused by political parties are often congruent with their member's values (Iyengar & Simon, 2000), and party affiliation and political ideology would be expected to produce similar relations with preventive behaviors for this reason; however, the politicization of preventive behaviors caused members of these parties to be exposed to different information, which would cause members of these parties to develop different perceptions of these behaviors – more so than expected from their values alone. We therefore suggest that these differences in perceptions cause political party affiliation to relate more strongly to preventive behaviors than political ideology. Howard (2021b) supported this proposal for face mask wearing, and the current article tests this proposal for vaccination willingness, vaccination, and vaccine word-of-mouth.

Additionally, we propose that vaccine hesitancy mediates the relations between political orientation and our outcomes of interest, which we study by applying Howard's (2021a) eight-dimension conceptualization of vaccine hesitancy. This conceptualization suggests that vaccine hesitancy is multifaceted, and people may have several different – possibly even conflicting – hesitancies towards vaccines. Howard (2021a) supported that together their eight dimensions strongly predict vaccination, suggesting that vaccine hesitancy is a key mediator between more distal antecedents (e.g., political orientation) and vaccination outcomes. At the same time, the author did observe that the dimensions each differently relate to vaccination, indicating that vaccine hesitancy must be studied from a multidimensional perspective to adequately understand its dynamics. Particularly, the two vaccine hesitancy dimensions representing beliefs that vaccines pose health risks and beliefs that healthy individuals do not need vaccines are the strongest predictors of vaccination outcomes (Howard, 2021a; Howard & Davis, 2022), and we likewise expect them to be the strongest mediators in the current investigation. Therefore, the current article integrates these two cutting-edge streams of research to investigate the mediating role of vaccine hesitancy's dimensions in the relations of political ideology and political party affiliation with vaccination willingness, vaccination, and vaccine word-of-mouth.

The current article produces several benefits for research and practice. First, many authors have argued that political orientation influences vaccination outcomes, and the current article can provide empirical support for the veracity of these arguments. If supported, broader aspects of these arguments can be more confidently tested and applied. Second, linking political orientation to vaccination outcomes can enable the integration of models and theory on political discourse. Future researchers can expand our investigation by integrating constructs from these broader perspectives, such as the resonance model (Iyengar & Simon, 2000). Third, researchers have only recently recognized the importance of differentiating political ideology and party affiliation in predicting outcomes (Cruz, 2017; Howard, 2021b). Our findings can further support that these aspects of political orientation should be studied separately. Fourth, Howard (2021) likewise only recently conceptualized their eight-dimensions of vaccine hesitancy, and the current results can provide further support for the validity of this

conceptualization. Fifth, our results identify which vaccine hesitancy dimensions resonate with those of specific political orientations. Public health organizations could develop interventions to target these dimensions, enabling more widespread acceptance of vaccination. Sixth, willingness and receipt are often the primary outcomes of studies on vaccination, as they are the most proximal attitude and behavior associated with receiving a vaccine; however, we also investigate an additional important yet understudied behavior in vaccine word-of-mouth. Sharing positive or negative information effects those beyond the focal individual, potentially influencing whether multiple other people receive vaccines. Word-of-mouth may have differing antecedents than willingness and receipt, indicating that varied approaches may be needed to maximize community vaccination rates.

Method

All data used in the current study can be found in Supplemental Material A.

Participants

Participants (M_{age} = 39.15, SD_{age} = 11.86, 49% female; 100% United States) were recruited from Amazon's Mechanical Turk (MTurk) and provided a small amount of monetary compensation[1]. We only included those with more than 50 completed MTurk tasks and greater than a 95% lifetime approval rate. All statistics, including the sample sizes below, reflect the sample after removing participants that failed more than one of eight attention checks.

Procedure

Five-hundred and 12 participants completed the first survey on 30 September 2021, which only included items measuring demographic information alone. One week after the first survey, 280 participants completed the second survey that includes items measuring political ideology and political affiliation. One week after the second survey, 252 participants completed the third survey that included the measure of vaccine hesitancy. One week after the third survey, 223 participants completed the fourth survey that included the measures of vaccination willingness, vaccination, and vaccine word-of-mouth. A priori power analyses indicated that this final sample size was sufficient to test our effects of interest. Particularly, our tests of indirect effects (described below) demand the largest sample sizes for sufficient statistical power. Our estimates were calculated with a bootstrapping approach using the percentile method via the PROCESS macro (Hayes, 2017). Fritz and MacKinnon (2007) provided power tables indicating that a sample size of 162 is needed to provide sufficient statistical power (.80) to detect an indirect effect composed of two small-to-moderate direct effect. Because our sample size (223) significantly exceeds this recommendation, we felt that this sample size was appropriate.

Measures

Political Ideology. As done in prior studies (Brandt, 2017; Federico & Ekstrom, 2018; Howard, 2021b), participants were asked to report their political ideology on a nine-point scale with the endpoints of Strongly Liberal (1) and Strongly Conservative (9). Higher values indicate a more conservative political ideology. Our sample was slightly skewed towards being more liberal (mean = 4.3, SD = 2.40).

Political Party Affiliation. As also done in prior studies (Effron & Raj, 2020; Fessler et al., 2017; Howard, 2021b), participants were asked to report their political party affiliation as Republican, Democrat, or Other. We created two dummy codes to analyze this variable. The first coded those who responded as Republicans as one and all other categories as 0, whereas the second coded those who reported as Other as one and all other categories as 0. Like political ideology, our sample was skewed towards being more representative of Democrats (163) than Republicans (73) or other political parties (43) (e.g., Independent).

Vaccine Hesitancy. We applied Howard's (2021a) Multidimensional Vaccine Hesitancy Scale (MVHS), who provided robust support for the validity of the measure. This scale includes four items for each of eight dimensions, resulting in a total of 32 items with responses on a seven-point scale. Example items are, "Vaccines can cause long-term health issues" (Health Risks), and, "I do not need vaccines because I rarely get sick" (Healthy). Each dimension had a Cronbach's alpha of .88 or above. Table 1 provides descriptions of each dimension.

Vaccine Willingness. We measured both flu vaccine willingness and COVID-19 vaccine willingness with two items each with responses on a seven-point scale. The items read, "Please indicate how willing you would be to get a [flu vaccine / COVID-19 vaccine (or booster vaccine shot if already received vaccine)] next year if it was [free / US$40.00]." The Cronbach's alpha for flu vaccine willingness was .80, and the Cronbach's alpha for COVID-19 vaccine willingness was .86. These two scales were adopted from Howard (2021a),

Table 1. Descriptions of Vaccine Hesitancy Dimensions.

Dimension	Description Each begins with: "The belief that vaccines…"
Health risks	Have possible short- or long-term health risks
Cost	Cost too much money
Physical pain	Are physically painful to receive
Inconvenience	Are inconvenient to receive
Personal reactions	Can cause certain reactions that are specific to me (e.g., allergies)
Access	Are difficult to receive
Healthy	Are not needed because I am healthy
Forget	Are easy to forget.

which were based on prior research (Perez et al., 2016; Shapiro et al., 2016). The values of free and US40.00 were chosen because, at the time of data collection, (a) anyone could receive the COVID-19 vaccine for free, (b) many people could receive a flu vaccine for free through their workplace or insurance, (c) some expected the cost of the COVID-19 vaccine when no longer free to be about US$40.00 (Jennings, 2021; Sagonowsky, 2021), and (d) the cost of flu vaccines when not free is often about US$40.00 (Slobin, 2022). For these reasons, we felt that these values had direct connections to current practices, and people could likely give accurate responses regarding their willingness to receive for these prices. Lastly, the two items for each type of vaccine (e.g., flu free & flu US$40.00) were too strongly correlated to meaningfully include as separate variables.

Vaccination. We measured flu vaccination, other vaccinations, and COVID-19 vaccination. Participants were asked the following questions: "Have you received the flu vaccine within the past year?", "Are you up to date on your vaccines other than the flu vaccine?", "Have you ever received the COVID-19 vaccine?", and "Have you tried to receive the COVID-19 vaccine but were unable to receive it due to factors outside of your control?". Participants could answer Yes (1) or No (0) to each of these questions. The last two items were combined to represent COVID-19 vaccination as a single variable, which was coded as one if participants responded Yes to either question and 0 if they responded No to both questions. A total of 103 (47%) of participants received a flu vaccine in the past year, 179 (89%) considered themselves up to date on other vaccines, and 174 (78%) either received or tried to receive the COVID-19 vaccine.

Vaccine Word-of-Mouth. We measured positive word-of-mouth and negative word-of-mouth using three self-created items each with responses on a seven-point scale. The decision to study positive and negative word-of-mouth separately was supported by an exploratory factor analysis (principal axis factoring, oblimin rotation), which supported a two-factor solution for these six items (eigenvalues = 2.34, 1.17, .01…). Supportive results for these items were also found in XXXXXX (2022 [author identifying information removed for submission]). An example positive word-of-mouth item is, "I talk to others about the benefits of vaccines", whereas a positive negative word-of-mouth item is, "I share negative information about vaccines on social media". Both scales had Cronbach's alphas of .82 or above.

Results

Correlations and Cronbach's alphas are included in Table 2. Table 3 includes regression results of political ideology and party affiliation predicting the vaccine hesitancy dimensions, whereas Table 4 includes regression results of political ideology, party affiliation, and the vaccine hesitancy dimensions predicting our outcomes. Table 5 provides the tests of indirect effects, which assess whether vaccine hesitancy mediates the relations of political ideology and party affiliation with our outcomes of interest. For

Table 2. Correlations and Cronbach's Alphas of Study Variables.

	1	2	3	4	5	6	7	8	9
1) Political Ideo									
2) Dum1 (R)	.70**								
3) Dum2 (O)	.06	−.25**							
4) Health Risks	.47**	.29**	.06	.93					
5) Cost	.17**	.10	−.05	.32**	.88				
6) Physical Pain	.08	.02	.03	.24**	.28**	.91			
7) Inconvenience	.21**	.13*	−.00	.38**	.53**	.34**	.94		
8) Personal Reactions	.26**	.06	.02	.56**	.39**	.43**	.41**	.95	
9) Access	.09	.02	−.06	.19**	.43**	.16*	.53**	.44**	.92
10) Healthy	.32**	.16*	.05	.60**	.35**	.27**	.54**	.50**	.39**
11) Forget	.14*	.03	.01	.34**	.45**	.28**	.64**	.30**	.36**
12) Flu V. Will	−.29**	−.15*	−.13*	−.56**	−.22**	−.21**	−.34**	−.38**	−.16*
13) COVID-19 V. Will	−.44**	.28**	−.10	−.37**	−.25**	−.16*	−.39**	−.41**	−.17*
14) Flu Vacc	−.11	.02	−.08	−.27**	−.15*	−.11	−.18**	−.25**	−.08
15) COVID-19 Vacc	−.30**	−.15*	−.02	−.54**	−.12	−.08	−.28**	−.39**	−.11
16) Other Vacc	−.15*	−.08	−.05	−.27**	−.06	−.06	−.30**	−.18*	−.20**
17) Positive WoM	−.33**	−.19*	−.19*	−.55**	−.18**	−.12	−.25**	−.26**	−.04
18) Negative WoM	.32**	.20*	−.05	.57**	.18**	.28**	.34**	.49**	.32**

Note. Political Ideo. = Political Ideology; Dum1 (R) = Dummy Code with Republican Coded as one; Dum2 (O) = Dummy Code with Other Coded as one; Flu V. Will. = Flu Vaccine Willingness; COVID-19 V. Will. = COVID-19 Vaccine Willingness; Flu Vacc. = Vlu Vaccination; COVID-19 Vacc. = COVID-19 Vaccination; Other Vacc. = Other Vaccination; Positive WoM = Positive Word-of-Mouth; Negative WoM = Negative Word-of-Mouth. Cronbach's alphas listed on diagonal.
*$p < .05$.
**$p < .01$.

Table 2. (continued)

	10	11	12	13	14	15	16	17	18
1) Political Ideo									
2) Dum1 (R)									
3) Dum2 (O)									
4) Health Risks									
5) Cost									
6) Physical Pain									
7) Inconvenience									
8) Personal Reactions									
9) Access									
10) Healthy	.95	—							
11) Forget	.50**	.94	—						
12) Flu V. Will	−.54**	−.29**	.80	—					
13) COVID-19 V. Will	−.62**	−.29**	.77**	.86	—				
14) Flu Vacc	−.31**	−.16*	.66**	.44**					
15) COVID-19 vacc	−.47**	−.27**	.56**	.66**	.38**	—			
16) Other Vacc	−.31**	−.24**	.33**	.25**	.28**	.25**	—		
17) Positive WoM	−.47**	−.27**	.57**	.67**	.32**	.48**	.19**	.87	—
18) Negative WoM	.47**	.28**	−.35**	−.46**	−.21**	−.32**	−.35**	−.20**	.82

Note. Political Ideo. = Political Ideology; Dum1 (R) = Dummy Code with Republican Coded as one; Dum2 (O) = Dummy Code with Other Coded as one; Flu V. Will. = Flu Vaccine Willingness; COVID-19 V. Will. = COVID-19 Vaccine Willingness; Flu Vacc. = Vlu Vaccination; COVID-19 Vacc. = COVID-19 Vaccination; Other Vacc. = Other Vaccination; Positive WoM = Positive Word-of-Mouth; Negative WoM = Negative Word-of-Mouth. Cronbach's alphas listed on diagonal.
*$p < .05$.
**$p < .01$.

Table 3. Linear Regression Results of Political Orientation Predicting Vaccine Hesitancy Dimensions.

	HR	C	PP	I	PR	A	H	F
1) Political Ideo	.50**	.24**	.14	.24**	.47**	.19*	.41**	.24**
2) Dum1 (R)	−.06	−.10	−.07	−.04	−.29**	−.14	−.12	−.15
3) Dum2 (O)	.03	−.08	.00	−.02	−.07	−.10	−.00	−.04
R^2	.22	.04	.01	.04	.11	.02	.11	.03

Note. Political Ideo. = Political Ideology; Dum1 (R) = Dummy Code with Republican Coded as one; Dum2 (O) = Dummy Code with Other Coded as one; HR = Health Risks; C = Cost; PP = Physical Pain; I = Inconvenience; PR = Personal Reactions; A = Access; H = Healthy; F = Forget. Values in first three rows are standardized betas, whereas values in last row are R-square values

* $p < .05$

** $p < .01$.

all analyses, no variance inflation factor value was above three, which is a conservative cutoff for multicollinearity concerns (Hair et al., 2019). Therefore, multicollinearity was not considered to be an issue in our analyses.

When assessed together, political ideology significantly related to seven of eight vaccine hesitancy dimensions (β = .19–.50, $p < .05$), whereas party affiliation only related to one ($\beta = -.29$, $p < .01$). When political orientation and vaccine hesitancy were assessed together in predicting outcomes, Health Risks and Healthy significantly related to both flu vaccine willingness (HR, $\beta = -.37$, $p < .01$; H, $\beta = -.27$, $p < .01$) and COVID-19 vaccine willingness (HR, $\beta = -.39$, $p < .01$; H, $\beta = -.34$, $p < .01$). Inconvenience only related to COVID-19 vaccine willingness ($\beta = -.14$, $p < .05$). Only Health Risks significantly related to receiving the flu vaccine ($\beta = -.17$, $p < .05$). Health Risks ($\beta = -.29$, $p < .01$), Personal Reactions ($\beta = -.17$, $p < .05$), and Healthy ($\beta = -.20$, $p < .05$) significantly related to receiving the COVID-19 vaccine. Cost ($\beta = .18$, $p < .05$) and Inconvenience ($\beta = -.23$, $p < .05$) significantly related to receiving other vaccines. Health Risks significantly related to both positive ($\beta = -.41$, $p < .01$) and negative word-of-mouth ($\beta = .38$, $p < .01$). Healthy only significantly related to positive word-of-mouth ($\beta = -.26$, $p < .01$), whereas Cost ($\beta = -.18$, $p < .01$) and Access ($\beta = .19$, $p < .01$) significantly related to only negative word-of-mouth. The dummy-code representing the difference between Democrats and other political parties was statistically significant in predicting positive word-of-mouth ($\beta = -.17$, $p < .01$). All other effects were not statistically significant. Across all these effects, Health Risks and Healthy were significantly related to five of seven outcomes, whereas all other predictors significantly related to two or fewer.

Lastly, party affiliation did not produce any significant indirect effects. Political ideology had significant indirect effects via Health Risks on flu vaccine willingness (95% C.I.[-.25, −.06]), COVID-19 vaccine willingness (95% C.I.[-.27, −.09]), received COVID-19 vaccine (95% C.I.[-.47, −.10]), positive word-of-mouth (95% C.I.[-.26, −.07]), and negative word-of-mouth (95% C.I.[.04, .17]). It also had significant

Table 4. Linear Regression Results of Political Orientation and Vaccine Hesitancy Predicting Outcomes.

	Flu Vaccine Willingness		COVID-19 Vaccine Willingness		Received Flu Vaccine in Past Year		Received COVID-19 Vaccine	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
1) Political Ideo	−.32**	−.00	−.46**	−.12	−.24*	−.07	−.41**	−.10
2) Dum1 (R)	.05	−.01	.03	−.02	.18	.14	.15	.07
3) Dum2 (O)	−.10	−.11	−.07	−.07	−.02	−.03	.04	.04
4) Health Risks	—	−.36**	—	−.42**	—	−.11	—	−.33**
5) Cost		.02		−.00		−.04		.12
6) Physical Pain		−.03		.05		.03		.14*
7) Inconvenience		−.08		−.14*		−.03		−.10
8) Personal Reactions		−.02		.02		−.09		−.17*
9) Access		.04		.05		.07		.10
10) Healthy		−.29**		−.33**		−.20*		−.21**
11) Forget		.02		.09		.02		−.06
R^2	.10	.40	.20	.56	.03	.13	.10	.37

Note. Political Ideo. = Political Ideology; Dum1 (R) = Dummy Code with Republican Coded as one; Dum2 (O) = Dummy Code with Other Coded as 1. Values in first 11 rows are standardized betas, whereas values in last row are R-square values.
*$p < .05$ **$p < .01$.

Table 4. (continued)

	Positive Word-of-Mouth		Negative Word-of-Mouth	
	Step 1	Step 2	Step 1	Step 2
1) political ideo	−.30**	−.03	.40**	.10
2) Dum1 (R)	−.02	−.06	−.11	−.02
3) Dum2 (O)	−.18*	−.17**	−.10	−.09
4) health risks	—	−.41**	—	.38**
5) cost		−.03		−.18**
6) physical pain		.01		.11
7) inconvenience		−.01		.03
8) personal reactions		.10		.14
9) access		.11		.19**
10) healthy		−.26**		.08
11) forget		−.03		.03
R^2	.14	.38	.11	.43

Note. Political Ideo. = Political Ideology; Dum1 (R) = Dummy Code with Republican Coded as one; Dum2 (O) = Dummy Code with Other Coded as 1. Values in first 11 rows are standardized betas, whereas values in last row are R-square values.
*$p < .05$ **$p < .01$.

Table 5. Confidence Intervals of Indirect Effects.

	HR	C	PP	I	PR	A	H	F
				Flu vaccine willingness				
1) Political Ideo	−.25, −.06*	−.02, .02	−.02, .01	−.05, .03	−.07, .05	−.02, .04	−.17, −.03*	−.03, .04
2) Dum1 (R)	−.24, .46	−.07, .08	−.07, .09	−.12, .14	−.18, .19	−.18, .06	−.10, .52	−.20, .16
3) Dum2 (O)	−.23, .24	−.09, .06	−.05, .05	−.09, .10	−.09, .10	−.13, .04	−.22, .21	−.08, .06
				COVID-19 vaccine willingness				
1) Political Ideo	−.27, −.09*	−.02, .02	−.01, .03	−.07, .01	−.04, .06	−.01, .03	−.19, −.05*	−.01, .06
2) Dum1 (R)	−.27, .53	−.07, .08	−.10, .05	−.14, .20	−.22, .12	−.16, .05	−.12, .63	−.29, .04
3) Dum2 (O)	−.26, .28	−.07, .07	−.05, .05	−.12, .13	−.10, .06	−.13, .03	−.25, .25	−.11, .08
				Received flu vaccine in past year				
1) Political Ideo	−.16, .05	−.06, .02	−.02, .04	−.08, .05	−.19, .03	−.03, .06	−.21, −.01*	−.04, .07
2) Dum1 (R)	−.13, .26	−.11, .16	−.13, .09	−.16, .19	−.08, .60	−.30, .15	−.10, .62	−.31, .21
3) Dum2 (O)	−.11, .15	−.07, .19	−.07, .08	−.12, .15	−.12, .30	−.25, .07	−.23, .24	−.11, .10
				Received COVID-19 vaccine				
1) Political Ideo	−.47, −.10*	−.02, .13	−.02, .11	−.14, .05	−.27, .00	−.03, .09	−.25, −.00*	−.12, .04
2) Dum1 (R)	−.46, .82	−.46, .32	−.57, .23	−.29, .37	−.06, .91	−.48, .13	−.12, .73	−.19, .58
3) Dum2 (O)	−.42, .44	−.48, .15	−.25, .27	−.21, .26	−.22, .44	−.33, .08	−.27, .29	−.15, .21
				Received other vaccines				
1) Political Ideo	−.37, .08	−.01, .22	−.03, .08	−.26, .02	−.18, .15	−.10, .03	−.18, .10	−.19, .11
2) Dum1 (R)	−.32, .55	−.67, .39	−.31, .23	−.14, .82	−.46, .57	−.17, .45	−.29, .40	−.46, .82
3) Dum2 (O)	−.32, .28	−.73, .10	−.15, .32	−.30, .39	−.28, .21	−.12, .35	−.27, .14	−.24, .21
				Positive vaccine word-of-mouth				
1) Political Ideo	−.26, −.07*	−.03, .02	−.02, .02	−.03, .04	−.02, .09	−.01, .05	−.15, −.03*	−.05, .02
2) Dum1 (R)	−.27, .47	−.07, .10	−.08, .07	−.12, .09	−.32, .06	−.22, .06	−.08, .46	−.12, .22
3) Dum2 (O)	−.24, .25	−.07, .11	−.05, .04	−.08, .06	−.17, .05	−.16, .04	−.19, .19	−.06, .08

(continued)

Table 5. (continued)

	HR	C	PP	I	PR	A	H	F
				Negative vaccine word-of-mouth				
1) Political Ideo	.04, .17*	−.04, .00	−.01, .02	−.02, .03	−.01, .08	−.02, .04	−.03, .07	−.02, .03
2) Dum1 (R)	−.30, .16	−.09, .15	−.09, .06	−.08, .07	−.26, .03	−.23, .08	−.18, .06	−.15, .09
3) Dum2 (O)	−.18, .14	−.04, .16	−.06, .05	−.05, .04	−.15, .06	−.16, .05	−.07, .06	−.05, .05

Note. Political Ideo. = Political Ideology; Dum1 (R) = Dummy Code with Republican Coded as one; Dum2 (O) = Dummy Code with Other Coded as 1. Values are confidence intervals of indirect effects, such that the row is the predictor, the column is the mediator, and the section header is the outcome. Estimates were calculated using PROCESS in SPSS. For each analysis, the other aspects of political orientation and vaccine hesitancy dimensions were included as covariates.

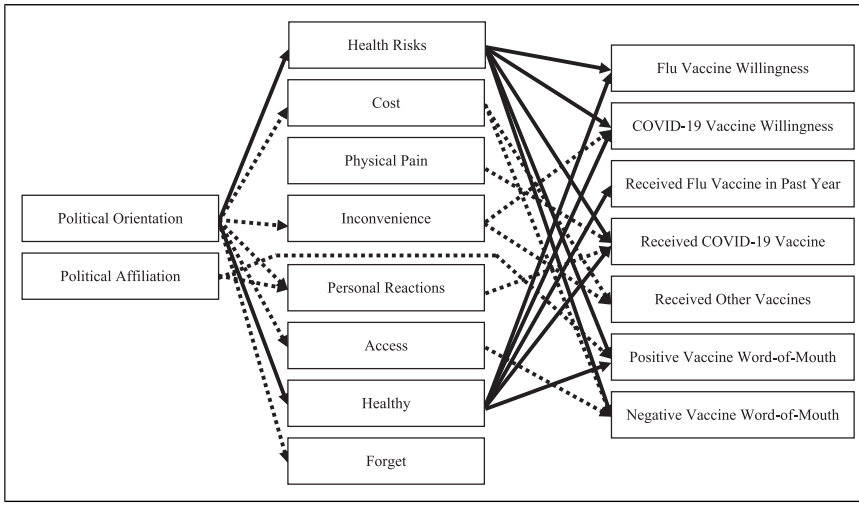

Figure 1. Visual Representation of Study Results. Note: All arrows represent statistically significant relations. Solid arrows represent relations involved in significant indirect effects. Dashed arrows represent relations not involved in significant indirect effects.

indirect effects via Healthy on flu vaccine willingness (95% C.I.[-.17, −.03]), COVID-19 vaccine willingness (95% C.I.[-.19, −.05]), received flu vaccine (95% C.I.[-.21, −.01]), received COVID-19 vaccine (95% C.I.[-.25, −.00]), and positive word-of-mouth (95% C.*I.*[-.15, −.03]). Figure 1 provides a visual illustration of our findings.

Discussion

The goal of the current article was to investigate the relation of political orientation with vaccination outcomes, which we did by differentiating two aspects of political orientation (political ideology and party affiliation) and testing the mediating effects of eight vaccine hesitancy dimensions. Our results showed that political ideology had a more pronounced effect on vaccine hesitancy than party affiliation, and our results also showed that the vaccine hesitancy dimensions of Health Risks and Healthy related to our outcomes more often than the other vaccine hesitancy dimensions. This is likely why a significant indirect effect was found between political ideology and our outcomes via Health Risks and Healthy. Together, political ideology had a predominant effect on our outcomes due to its influence on Health Risks and Healthy.

The current results can spark further empirical investigation of the link between political orientations and vaccination outcomes, as discussions of this topic currently outpace empirical research (de Munter et al., 2021; Lovari et al., 2021; Sharfstein et al., 2021). In performing these investigations, researchers should integrate prior models and theories involving political discourse (Johnson & Johnson, 2000; Van Dijk, 2002).

For instance, the resonance model proposes that political messaging is painted by voters' existing predispositions and sentiments, and effective political messaging often reinforces existing values to sway moderate voters (Bachl, 2016; Iyengar & Simon, 2000). According to this model, those with conservative predispositions may be particularly swayed by anti-vaccine messaging because it aligns with their political ideology, and conservative political parties may particularly benefit from anti-vaccination messaging. Future researchers should investigate whether conservatives are indeed susceptible to anti-vaccination messaging, and public health organizations should investigate the extent that conservative political parties are utilizing anti-vaccination messaging.

Further, recent authors have emphasized the importance of differentiating political ideology and party affiliation (Cruz, 2017; Howard, 2021b), and the current results support this differentiation. Future researchers should likewise identify circumstances in which these two aspects of political orientation produce differing outcomes. It should be noted, however, that our results on vaccination differed from Howard's (2021b) results regarding face mask wearing. That is, the present investigation found that political ideology more strongly predicted vaccine hesitancy and vaccination outcomes, whereas Howard (2021b) found that party affiliation more strongly predicted negative face mask perceptions and wearing. We propose two possible justifications for this disparity in results. First, political ideology is more closely associated with values, whereas party affiliation is influenced by a multitude of factors (e.g., social influences) (Barker & Marietta, 2022; Howard, 2021b; Michaud et al., 2009). Vaccination may be more closely associated with values than face mask wearing, causing vaccination to more strongly relate to political ideology. Second, over time, messages espoused by political party members become intertwined with their associated political ideology (e.g., Democrats-liberal, Republican-conservative) (Lee, 2017; Post, 2017). Our data was collected more recently than Howard (2021b), and political discourse may have caused vaccination to become more intertwined with political ideology than party affiliation alone. Future researchers should therefore continuously reinvestigate the relation of political orientation and health behaviors, as perhaps even the effects observed in Howard (2021b) may differ when studied today.

Additionally, our results encourage the further application of Howard's (2021a) multidimensional perspective of vaccine hesitancy. Howard (2021a) provided validity support for their multidimensional perspective, but replication studies are always necessary to further support the validity of any conceptualization and operationalization. The current results can be considered validity evidence. By again supporting that the vaccine hesitancy dimensions relate to vaccination outcomes as expected, we provide further support for the validity of this perspective. Also, Howard (2021b) found that Health Risks and Healthy were the two dominant dimensions of their conceptualization. The current article was able to replicate this finding, and future researchers should recognize the powerful influence of these two dimensions.

It should be considered, however, why the other dimensions did not produce consistently significant relations with our outcomes with accounting for Health Risks

and Healthy. While each of the dimensions of vaccine hesitancy describe negative perceptions, several of them may be addressable for those who want to be vaccinated. For instance, a person may not be deterred from receiving vaccines if they have elevated perceptions of Cost, Physical Pain, Inconvenience, or Forget, because they may feel that these dimensions are addressable. On the other hand, other non-significant dimensions may be sizable barriers but only occur with a small number of people, causing their overall effect to be minimized (Aguinis & Whitehead, 1997; Millsap, 1989). For example, Personal Reactions and Access may be significant barriers to vaccination, but very few people may perceive these two dimensions. Health Risks and Healthy, however, may be relatively common perceptions that are perceived as insurmountable barriers, causing them to have larger effects. These results therefore further demonstrate the pivotal importance of differentiating different aspects of vaccine hesitancy, as they have differing effects on outcomes.

Building upon these possibilities, future research should perform more nuanced investigations into these dimensions. Current research and the present study often investigate these dimensions in a relatively broad manner, testing the relations and mediating effects of the eight dimensions together (Howard, 2021a; Howard & Davis, 2022). Future research should move beyond whether these dimensions are or are not mediators alone, and they should instead identify why or why not these dimensions are mediators. This may include inspecting the distribution of responses, effects of the dimensions in isolation, or even mediators of the dimension's relations with antecedents and outcomes. By conducting these analyses, future research can obtain a deeper understanding of the dimensions and the mechanisms that cause people to become vaccinated, possibly leading to more effective public health interventions.

Similarly, public health organizations can use our results to create targeted interventions. Because Health Risks and Healthy were the two dominant vaccine hesitancy dimensions, organizations should develop messaging that specifically counteracts these two dimensions, and these messages could highlight the safety of vaccines and health risks of being unvaccinated. These interventions could also include endorsements from conservative politicians, as members who share these values are predisposed to being against vaccination. In creating interventions, researchers should use advanced methodological designs to assess the effect of individual intervention components designed to target specific vaccine hesitancy dimensions, such as the multiphase optimization strategy (Collins et al., 2007; Landoll et al., 2022), which can provide evidence for whether the dimension influences outcomes and the component is effective.

Lastly, similarities and differences among the studied outcomes should be highlighted. Our variables predicted similar amounts of variance in willingness, COVID-19 vaccine receipt, and word-of-mouth. This similarity is somewhat surprising, as psychological variables (e.g., vaccine hesitancy) almost always produce stronger relations with other psychological variables (e.g., willingness) than behaviors (e.g., receipt and word-of-mouth) (Ajzen, 1991; Conner & Armitage, 1998), but it is encouraging for the future development of interventions to influence behaviors. Further, our predictors

explained more variance in COVID-19 vaccine willingness and receipt than flu vaccine willingness and receipt. Health Risks and Healthy were the key predictors for all four of these outcomes, but they had stronger relations with COVID-19 outcomes than flu outcomes. It is possible that people do not hold as strong opinions about flu vaccines, causing hesitancy about vaccines in general to have a smaller effect on flu vaccine outcomes; however, future research is certainly needed to better understand this disparity. Lastly, our predictors explain a significant amount of variance in word-of-mouth, indicating that political ideology and vaccine hesitancy relates to both whether people receive vaccines as well as whether they perform behaviors that may influence whether others receive vaccines. These results should be leveraged to develop interventions with broad community impact.

Limitations

As with any article, certain limitations should be noted. Our sample was slightly skewed towards being more liberal and Democratic, which could be expected with current trends in the United States. People in the United States are more likely to identify as liberal and Democratic; they are also becoming less likely to identify as conservative and Republican, with a growing number of these people now identifying as moderate and Independent (Jones, 2021; Pew Research Center, 2018). The observed skew in the current sample is not considerably different than prior observations (Jones, 2021; Pew Research Center, 2018), but the present effects may be under- or over-estimated due to the possible sampling biases in our dataset. It should be highlighted, therefore, that future research should replicate the current results using more robust sampling techniques, such as probability sampling methods (e.g., random digit dialing). These sampling techniques could provide greater assurances for the accuracy of our results.

We utilized a time-separated research design. This design can partially address common-method bias, and it gives some assurances for the casual direction of our effects (Podsakoff et al., 2003). At the same time, it cannot provide firm support for causality. Future research should therefore replicate the current results using more robust methodological approaches, such as cross-lagged panel designs (Zyphur et al., 2020).

Our measures were chosen due to support in prior research, but many other measures exist to gauge political ideology, party affiliation, vaccination willingness, and vaccination receipt. Some of these measures use response formats other than Likert scales, such as implicit association tests (Schimmack, 2021), and utilizing measures with differing response formats could further address concerns of inflated relations due to common method bias. Therefore, future research should replicate the current results using alternative measures, which would support that our observations were not due to the nuances of these specific measures.

Conclusion

The goal of the current article was to understand the dynamics of political orientation, vaccine hesitancy, and vaccination outcomes. We showed that the vaccine hesitancy dimensions of Health Risks and Healthy are the primary mediators between political ideology and vaccination outcomes. Future research can utilize these findings to incorporate theories of political discourse into the study of vaccination as well as perform more nuanced analyses of vaccine hesitancy's dimensions. Practitioners can leverage these findings to produce more effective interventions, which can provide immediate real-world benefits.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Compliance with Ethical Standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee of the primary author's institution and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent

An information sheet was provided to participants rather than obtaining informed consent signatures to ensure maximum confidentiality and anonymity.

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Supplemental Material

Supplemental material for this article is available online.

Note

1. The present dataset overlaps with the dataset used in Howard (2022), which investigated the relation of personality and vaccination outcomes. The present investigation only includes participants form the USA (subset of larger dataset), whereas Howard (2022) includes participants from multiple countries (entirety of larger dataset). The current study also only includes political ideology and affiliation as its primary antecedents and not any aspect of personality, whereas Howard (2022) only includes aspects of personality as its primary antecedents and not political ideology and affiliation. Therefore, the primary research questions investigated in the two studies are wholly unique.

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