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Political ideology predicts preventative behaviors and infections amid COVID-19 in democracies

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ABSTRACT

Can one's political ideology predict his or her testing positive for COVID-19 and how? The present study leveraged a recent (April–May 2020) survey of 27,260 individuals across 27 democracies to investigate the associations between political ideology and coronavirus infections. Our individual-level data and mediation analyses allow us to tease out different correlational paths according to which one's political ideology affects his or her infection. We found a more right-leaning attitude to be associated with a higher probability of testing positive both directly and indirectly through conspiracy theory beliefs and physical distancing. Moreover, our cross-national investigation also found that becoming more right-leaning in ideology was associated with a higher level of perceived risk of COVID-19 infection, which made one less likely to test positive. Combined, we provide a more nuanced understanding of the role played by political ideology in the current pandemic, on which the design of a more effective risk communication strategy can be based.

During the earlier phase of the pandemic outbreak, we witnessed from Lansing (Michigan, US) in April 2020 (Wilson, 2020) to Berlin and London in August 2020 (Pleitgen, 2020) several protests organized by right-wing COVID-deniers to challenge their governments' decisions to lock down their local economies, make it compulsory to wear masks in public, and enforce social distancing among people. Several existing studies, however, have provided solid evidence that such preventative measures are effective in containing the spread of the coronavirus and protecting individuals from being infected with COVID-19 (Badr et al., 2020; Fazio et al., 2021; Moosa, 2020; Rubin et al., 2020). In other words, while such measures have been strenuously advised by the WHO (Please see the following webpage for the WHO's official COVID-19 advice: www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public) and widely enforced (sometimes violently) by most governments all over the world (Cheng et al., 2020), as those protests show, individuals' compliance with them and perceptions of the pandemic could be substantially modulated by their political ideologies.

These incidents naturally give rise to a simple question: Can political ideology predict one's testing positive for COVID-19? The literature on political ideology has told us, despite definitional variation among different studies of left-right (or liberal-conservative) political

orientation, one commonly shared feature is the right's aversion to government interventions (Caprara and Vecchione, 2018; Carmines & D'Amico, 2015). Compared to liberals, conservatives' endorsement of individualism and resistance to social changes make them more inclined to favor limited government and personal initiatives. There has been ample evidence in the case of anthropogenic climate change that conservatives, compared to liberals and moderates, tend to be its skeptics and reject climate science (Jacquet et al., 2014; Lewandowsky et al., 2013; McCright et al., 2016). Since dealing with both the COVID-19 pandemic and the anthropogenic climate change involves extensive (and sometimes intrusive) government interventions, it is therefore reasonable to hypothesize that those who hold an ideological position closer to the right and conservatism will be more motivated to deny the COVID-19 pandemic and more likely to test positive for defying the measures imposed by their governments.

Another related factor that could also result in the COVID skepticism is conspiratory thinking. Defined as "false beliefs in which the ultimate cause of an event is believed to be due to a plot by multiple actors working together with a clear goal in mind, often lawfully and in secret," (Swami and Furnham, 2014) conspiracy theories usually arise when a crisis hits. During the past year after the coronavirus outbreak took place

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in China, there have been several versions ranging from claiming the coronavirus as a bioweapon invented by scientists to accusing governments of creating the virus as a hoax for expanding their powers. When people regard a crisis such as climate change or COVID-19 as a conspiracy, the view not only induces them to question the science and evidence behind it (Lewandowsky et al., 2013), but also resist the official public health interventions.

Using the US data, various studies have shown that conservatism was associated with a lower threat perception of the coronavirus and a smaller probability of behavioral changes to comply with official preventative measures (Calvillo et al., 2020; Van Holm et al., 2020). Moreover, a cross-national study also finds that those who hold a more negative view of government responses are more likely to endorse conspiracy beliefs (Georgiou et al., 2020). Despite limited in number, the existing studies lend partial empirical support to the hypothesis of ideologically-induced preventative behavior and infections amid COVID. The current study tried to enrich this literature in the following ways. First of all, as most of the COVID-related studies we have had so far tend to be country-specific, this study took this political ideology thesis to a global sample of 25,892 individuals across 27 democracies based on our collaborative survey project conducted during April and May in 2020 when the pandemic just began. Moreover, we also went beyond people's threat perceptions and took a step further to see if people's ideological positions could predict their COVID-19 infections. The study therefore helps identify a key source of the variation in people's compliance with the official preventative measures and their infections. Finally, we also conducted mediation analyses to unearth the mechanisms and paths through which political ideology directly and indirectly affects one's infection probability. Such findings can also help policymakers design a more effective risk communication strategy.

1. Methods and Analysis

1.1. Data

This study taps into a global survey dataset we jointly collected with other national teams in April–May 2020 through an international collaborative project to investigate how political ideology and health behaviors affected one's possibility of testing positive for COVID-19. The project collected samples through online surveys¹ that included 46,744 individuals across 67 countries, of which representative samples were achieved in 31 countries. We focused on the 27 democracies² (Table 1 and Table S-1 in the Supplement) among these 31 representative national samples for this study. The summary statistics are available in the Supplement (Tables S-2- and S-3).³

¹ We did two things to mitigate potential biases owing the online nature of our survey. First of all, we only included the representative national samples from the original collaborative project. While all the respondents were indeed recruited from the internet by the national teams, the sampling distributions of various features such as age, education, and gender were close to the actual population distributions in these countries. The resulting samples therefore might not necessarily be very skewed compared to the actual distributions. Second, we also exploited in our sensitive analysis the differentiated levels of development within our sample to see if more advanced set such as the OECD countries might actually have different results. According to Tables S-6- and S-7 in the appendix, they are basically the same as the main results.

² Taiwan was excluded for its low number of COVID-19 cases when the survey was conducted in May 2020. The number of accumulated cases was only a little more than 400 (<https://covid19.mohw.gov.tw/en/sp-timeline0-206.html>).

³ Given the paper length limit, please access the following link for the questionnaire: <https://drive.google.com/file/d/1teJH0ig23GD8bhXWXXaXZyVx9krOvRPj/view>.

Table 1
Countries included in this study.

Australia	Germany	Nigeria	Spain
Austria	Israel	Norway	Sweden
Brazil	Italy	Philippines	Switzerland
Canada	Japan	Poland	Ukraine
Croatia	Latvia	Romania	United Kingdom
Denmark	Netherlands	Slovakia	United States
France	New Zealand	South Korea	

2. Measurements

2.1. Testing positive

We considered whether respondents self-reported their testing positive for COVID-19 as the outcome of interest.

2.2. Political ideology

As far as our major explanatory variable of interest is concerned, one's political ideology is measured by the following question (Please see Table S-14 for country-specific differences in average ideological leaning between our sample and the most recent version of the World Value Survey):

One potential concern for such an indicator is that it might not measure the same thing in different countries. We therefore conducted another analysis for checking if this variable was consistent in predicting health behavior across countries. We provide the details for our analysis in the method section below. In addition to left-right/liberal-conservative distinction, the study also includes other ideological variables such as collective narcissism and national identification, both of which have been shown to matter to one's compliance with the COVID-related preventative measures (Van Bavel et al., 2022).

2.3. COVID-related conspiracy thinking

Conspiracy theories are usually very popular when a crisis hits. The COVID-19 pandemic is a perfect example. During the past year after the first outbreak took place in China, there have been several different conspiracy theories that tried to offer people a proper explanation for why it happened and how it arose. Our survey includes four different versions of conspiracy theories: a) The coronavirus (COVID-19) is a bioweapon engineered by scientists; b) The coronavirus (COVID-19) is a conspiracy to take away citizen's rights for good and establish an authoritarian government; c) The coronavirus (COVID-19) is a hoax invented by interest groups for financial gains; d) The coronavirus (COVID-19) was created as a cover up for the impending global economic crash. For each version, every respondent was asked to choose his/her level of agreement measured on a scale from "Strongly disagree" (0) to "Strongly agree" (10). While these four conspiracy theories are conceptually distinct, people's beliefs in them, however, could be correlated. We therefore used the PCA method to extract the first principal components.

2.4. Risk perception

Subjective risk perceptions capture people's beliefs in the likelihood that they themselves or people around them might be infected in the coming year (by April 30, 2021). It has been well-established in the literature (Franzen and Wöhner, 2021; Sinclair et al., 2021) that a higher risk perception leads to greater compliance with official preventative measures and a lower infection probability. In the survey on which this study is based, each respondent was asked to offer an estimate in percentage terms.

2.5. Preventative behaviors: physical distancing and personal hygiene

As Wellenius et al. (2021) nicely show using their US data, the reduction in mobility (10%) was associated with a substantial decrease (17.5%) in the number of infected cases two weeks later. Similarly, based on a 14-country study, Szczuka et al. (2021) document a negative association between the adherence to hygienic behaviors such as handwashing and COVID-related morbidity and mortality. Respondents were asked how much (0–10 scale) they complied with various preventative measures ranging from physical distancing to hygienic behaviors during the pandemic. The former includes more home-staying, keeping physical distance from people, and avoiding hand-shaking. The latter includes hand-washing and sanitation of frequently used objects. Since these different behaviors could also be correlated, we therefore also used the PCA method to extract the first principal components.

2.6. Socio-economic characteristics

Our study also includes usual socio-economic characteristics such as one's gender, age, marital status, and employment as controls. What is worth mentioning here is that, since there might be subnational variation in the anti-COVID policy in some countries,⁴ we also incorporated an additional variable of whether one lived in a rural or urban area as a way to control for this potential heterogeneity. While this is probably not be a perfect solution, the urban/rural divide can be a pretty nice proxy for the policy enforcement especially in a large country like the US. In a rural area where the population density is lower, people's physical distancing was more difficult to monitor or less needed for containing the contagion.

2.7. Statistical analysis

We considered a flat association, estimated by a logistic probability model, and a structural relationship, estimated by a mediation model, between Covid-19 infection and political ideology, together with attitudes and behaviors toward the pandemic. In both the associational and the mediation analyses, we adopted three model specifications: 1) Only including political ideology, conspiracy theory, perceived risk, physical distancing, and personal hygiene as the predictors for the infection of COVID-19; 2) Adding respondents' other socioeconomic and psychological features (e.g., age, gender, marital status, employment, optimism, self-esteem, etc ...) as controls; 3) Incorporating several country-level characteristics (e.g., GDP per capita, Human Development Indicator, etc ...) as further controls. In the full specification (3), the sample size was reduced from 43,192 to 41,100 given the unavailability of some country-level variables in certain countries. The Variance-covariance matrices for all analyses were clustered by country. Both the logistic and the mediation models were estimated using STATA 14 (see Fig. 1).

2.8. Ideology, beliefs, and preventative behaviors

In Fig. 2, we show descriptively the distributions of the main belief and preventative behavior variables on the left-right spectrum. The violin plot suggests that, at a descriptive level, political ideology does have some correlations with COVID-related conspiratory thinking. The more right-leaning subjects are, the more likely they would believe in a conspiracy theory. However, for perceived risk and preventative behaviors, there don't seem to have obvious differences in the distributions across ideologies. Their relations will need further statistical analyses to unpack.

2.9. Mediation analysis

We considered a 3-level mediation structure to disentangle the mechanisms for how political ideology, belief and behavior regarding the pandemic could take effects on the disease outcome. The proposed path is shown in Fig. 3. Political ideology serves as the latent endowment and directly contributes to the belief in conspiracy theories as well as perceived risks (level-2 mediators). Holding these beliefs, one can change his/her behavior to cope with the pandemic in physical distancing or personal hygiene (level-1 mediators). These health behaviors are then the direct attributes of the COVID-19 infection results.

The direct and indirect effects of ideology, attitudes, and behaviors on COVID19 infections were estimated by a generalized structural equation model (GSEM), where there are both the linear linkages between the latent factors and the mediators, and the logistic linkages. The direct and indirect effects were then estimated and presented in odds ratios. The primary goal of this paper is to investigate the potential effect of political ideology on the COVID-19 infection through the disease-related attitudes and behaviors. However, we allowed for direct effects to take place between ideology and the infection and between mediators and the infection, so we could capture any potential direct or indirect effects that ideology, attitude, and s may have on infections through other unobserved channels.

3. Results

We considered a flat association, estimated by a logistic probability model, and a structural relationship, estimated by a mediation model, between COVID-19 infection and political ideology, together with attitudes and behaviors toward the pandemic. In both the associational and the mediation analyses, we adopted three model specifications: 1) only including political ideology, conspiratory thinking, perceived risk, physical distancing, and personal hygiene as the predictors for the infection of COVID-19 (Model 1), 2) adding respondents' other socioeconomic and psychological features (e.g., age, gender, marital status, employment, optimism, self-esteem, etc.) as controls (Model 2), and 3) incorporating country fixed effects as further controls (Model 3). We used the Principal Component Analysis (PCA) method to derive the principal components for the conspiratory thinking, the physical distancing, and the personal hygiene variables respectively. The variance-covariance matrices for all analyses were clustered by country. Moreover, as we have explained in the section of Methods and Analysis, we also did further tests to make sure our results were robust to the potential conceptual heterogeneity of political ideology, the levels of national development, and the country fixed effects in our cross-national sample.

Table 2 documents the odds ratios of the aforementioned key inputs on the probability of being infected with the COVID-19 from logistic regressions. All of these key inputs are significantly associated with testing positive. These significant associations are also persistent throughout alternative model specifications.

Overall, a more right-leaning political ideology, stronger COVID-related conspiratory thinking, a higher perceived risk, and more physical distancing are associated with a higher probability of the infection. When one's political ideology shifted rightward by one unit, his or her odds of infection increased by 13% (OR = 1.127, p-value<0.001, 95% CI=(1.084,1.171)). The association dropped to 7% (OR = 1.074, p-value<0.001, 95% CI=(1.042,1.106)) when the model was adjusted by individual-level characteristics of demographics, socioeconomic status, non-cognitive traits, and attitude towards collectiveness (Model 2). Further adjusting for country-fixed effects (Model 3) made the association slightly go down to 6% (OR = 1.062, p-value<0.001, 95% CI=(1.029,1.096)).

The attitudes on the disease were also strongly associated with the infection risk. One standard deviation increase in the belief of conspiracy theories came with a 47% increase (OR = 1.468, p-value<0.001,

⁴ We greatly appreciate an anonymous reviewer for pointing this out.

Overall, how would you describe yourself in terms of political ideology on the following scale?

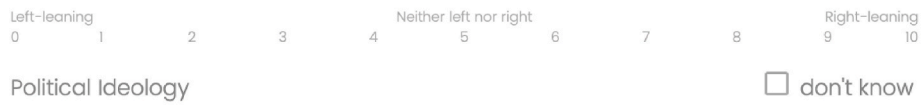


Fig. 1. The question on political ideology.

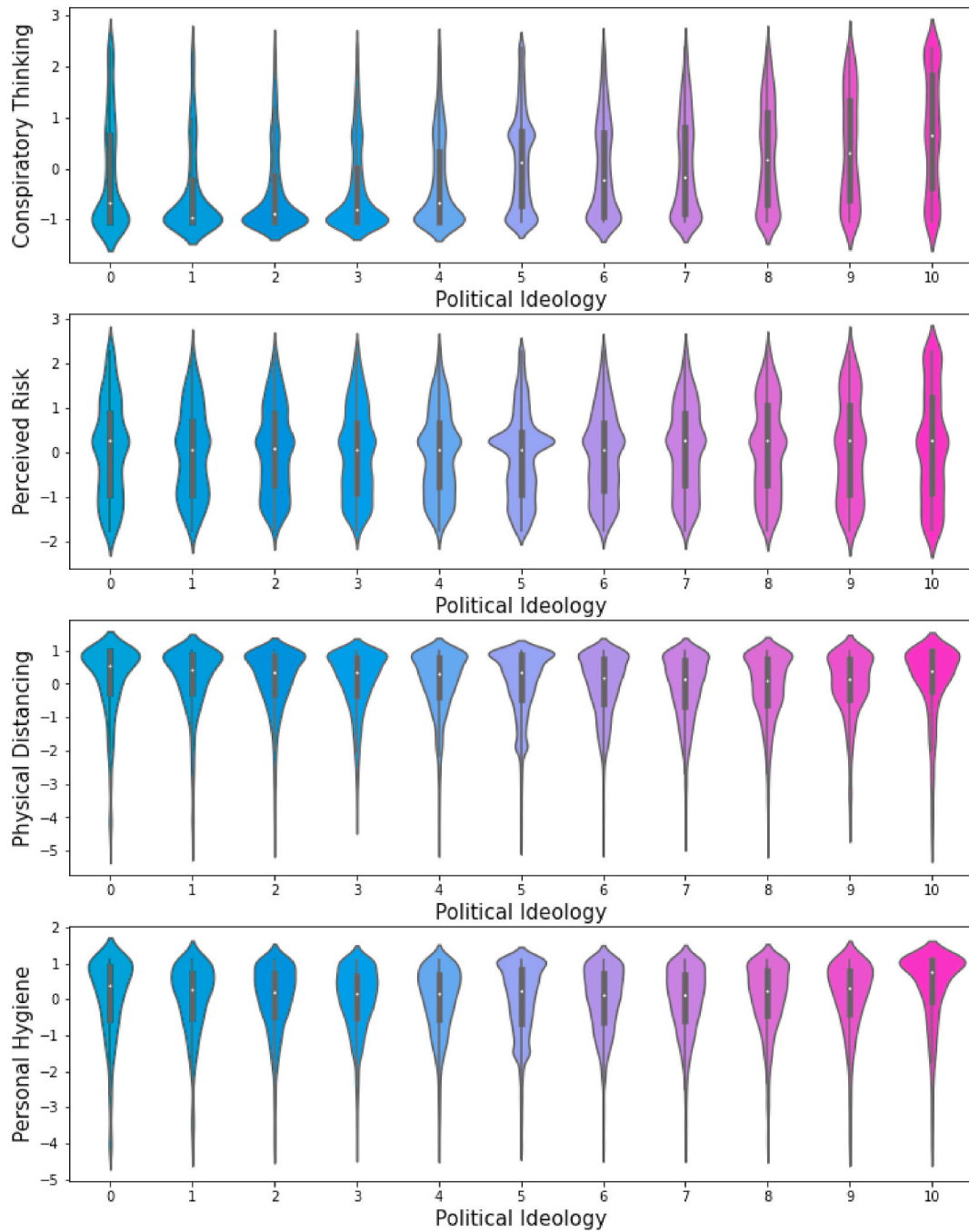


Fig. 2. Violin plots.

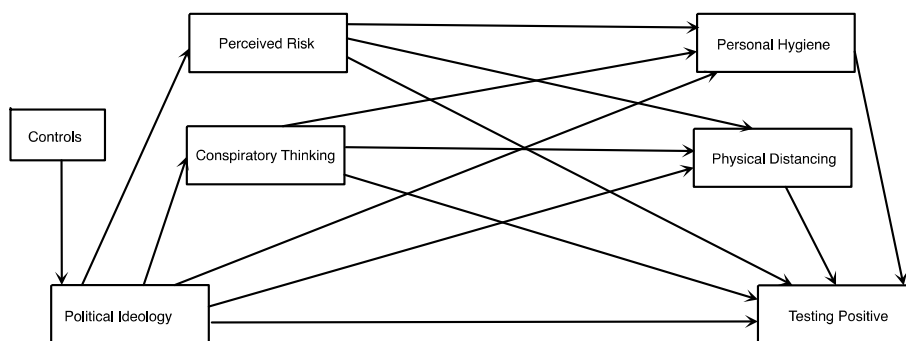


Fig. 3. Serial multiple mediation.

Table 2
Odds Ratios of COVID-19 Infection, estimated from Logistic Regression.

	Model 1	Model 2	Model 3
Political Ideology	1.127 (0.000)	1.074 (0.000)	1.062 (0.000)
Conspiratory Thinking	1.468 (0.000)	1.398 (0.000)	1.234 (0.001)
Perceived Risk	1.415 (0.000)	1.109 (0.032)	1.183 (0.000)
Physical Distancing	0.800 (0.000)	0.844 (0.000)	0.839 (0.000)
Personal Hygiene	0.984 (0.667)	0.943 (0.236)	0.940 (0.173)
Female		1.025 (0.748)	0.955 (0.583)
Other Sex		1.117 (0.871)	0.957 (0.956)
Age		0.973 (0.000)	0.976 (0.000)
Married		1.087 (0.288)	1.024 (0.727)
Unemployed		1.149 (0.285)	1.065 (0.585)
Urban		1.112 (0.300)	1.065 (0.586)
Optimism		0.965 (0.583)	1.025 (0.666)
Self-Control		0.883 (0.004)	0.913 (0.053)
Self-Esteem		1.067 (0.404)	1.070 (0.324)
Belonging		0.893 (0.014)	0.933 (0.148)
Collective Narcissism		1.319 (0.000)	1.193 (0.001)
National Identity		0.909 (0.058)	0.925 (0.131)
General Health		0.986 (0.787)	0.996 (0.933)
Psycho Wellbeing		1.111 (0.159)	1.076 (0.257)
Socioeconomic Ladder		0.910 (0.029)	0.916 (0.060)
Knowledge of Others' Infections		8.509 (0.000)	9.608 (0.000)
Country-Fixed Effects	No	No	Yes
Observations	25,892	25,892	25,892

Exponentiated coefficients; *p*-values in parentheses.

95% CI=(1.221,1.767)) in the odds of infection. The risk stayed at a similar level of 40% (OR = 1.398, *p*-value<0.001, 95% CI=(1.206,1.620)) for Model 2, while dropping to 23% (OR = 1.234, *p*-value<0.001, 95% CI=(1.090,1.396)) for Model 3. A bit counter-intuitively, one standard deviation increase in the perceived infection risk was associated with a 42% increase (OR = 1.415, *p*-value<0.001, 95% CI=(1.263,1.586)) in the real infection risk, but the size of the association declined to 11% (OR = 1.109, *p*-value = 0.032, 95% CI=(1.009,1.220)) for Model 2. For Model 3, the excess risk went up slightly to the level of 18% (OR = 1.183, *p*-value<0.001, 95% CI=(1.103,1.269)).

The association between one's physical distancing and the infection is much greater than that between personal hygiene and infection. One standard deviation increase in one's propensity to conduct physical distancing was correlated with a 20% decrease (OR = 0.800, *p*-value<0.001, 95% CI=(0.729,0.877)) in the infection risk for Model 1 and the negative association went down a bit to 16% (OR = 0.844/0.839, *p*-value<0.001/<0.001, 95% CI=(0.768,0.928)/(0.772,0.911)) for both Models 2 and 3. Compared with the contact-infection association, one

standard deviation increase in one's personal hygiene was associated with a smaller decrease in the infection risk by 2 percent (OR = 0.984, *p*-value = 0.667, 95% CI = 0.915,1.059), but it was not statistically significant. The association remained insignificant for both Model 2 (OR = 0.943, *p*-value = 0.236, 95% CI=(0.857,1.039)) and Model 3 (OR = 0.940, *p*-value = 0.173, 95% CI=(0.859,1.028)).

Table 3 (illustrated by Fig. 4) reports the detailed inter-factor associations among one's political ideology, testing positive for COVID-19, and several mediators through which the effect of political ideology on the infection might take place. We focus on reporting the estimates

Table 3
Structural linkage between ideology, attitudes, behaviors, and infection, estimated from Generalized SEM.

	Model 1	Model 2	Model 3
Conspiratory Thinking			
Political Ideology	0.106 (0.000)	0.051 (0.000)	0.048 (0.000)
Perceived Risk	0.015 (0.131)	0.024 (0.001)	0.017 (0.002)
Physical Contact	-0.206 (0.000)	-0.220 (0.000)	-0.219 (0.000)
Conspiratory Thinking	0.035 (0.633)	0.055 (0.137)	0.068 (0.004)
Perceived Risk	-0.002 (0.748)	-0.019 (0.002)	-0.008 (0.043)
Political Ideology	-0.064 (0.528)	-0.111 (0.021)	-0.123 (0.000)
Personal Hygiene	0.077 (0.087)	0.086 (0.000)	0.085 (0.000)
Conspiratory Thinking	0.016 (0.206)	-0.013 (0.017)	-0.010 (0.003)
Test Positive (Coefficients)			
Personal Hygiene	-0.016 (0.668)	-0.058 (0.236)	-0.062 (0.173)
Physical Distancing	-0.224 (0.000)	-0.169 (0.000)	-0.176 (0.000)
Conspiratory Thinking	0.384 (0.000)	0.335 (0.000)	0.210 (0.001)
Perceived Risk	0.347 (0.000)	0.104 (0.032)	0.168 (0.000)
Political Ideology	0.120 (0.000)	0.071 (0.000)	0.060 (0.000)
Test Positive (Odds Ratios)			
Personal Hygiene	0.984 (0.668)	0.943 (0.236)	0.940 (0.173)
Physical Distancing	0.800 (0.000)	0.844 (0.000)	0.839 (0.000)
Conspiratory Thinking	1.468 (0.000)	1.398 (0.000)	1.234 (0.001)
Perceived Risk	1.415 (0.000)	1.109 (0.032)	1.183 (0.000)
Political Ideology	1.127 (0.000)	1.074 (0.000)	1.062 (0.000)
Country-Fixed Effects	No	No	Yes
Observations	25,892	25,892	25,892

p-values in parentheses.

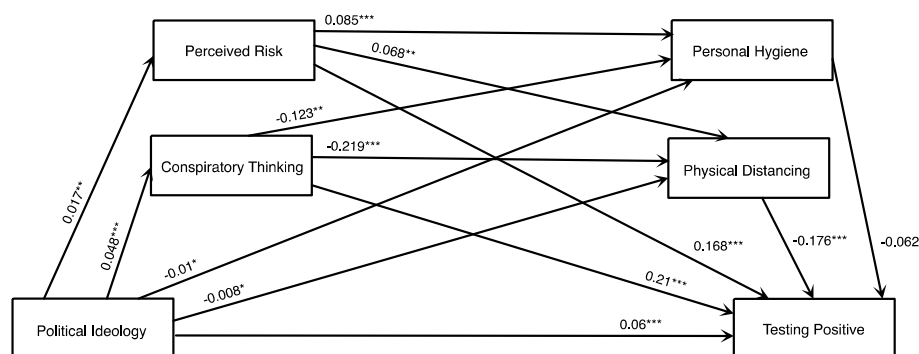


Fig. 4. Serial-multiple Mediation of Conspiracy Thinking Perceived Risk, Personal Hygiene, and Physical Distancing in the relationship between Political Ideology and Test Positive.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

for the fully adjusted model and begin from the indirect effects derived from them. What should be noticed here is that the coefficients reported in Table 3 are either exponentiated (odds ratios) or not depending on the linkage functions between the latent, intermediate, and outcome variables in the generalized SEM. First of all, we found serial-multiple mediation of COVID-related conspiratory thinking and physical distancing on the relationship between political ideology and testing positive (OR = 1.002, $p < 0.001$, 95% CI=(1.000,1.003)). An opposite effect with a much smaller magnitude was found when COVID-related conspiratory thinking was replaced by another attitudinal variable, perceived risk (OR = 1.000, $p < 0.001$, 95% CI=(1.000,1.000)). The divergent directions in the mediation between the channels of conspiratory thinking and perceived risk resulted from their opposite associations with both preventative behavior variables. On the one hand, one standard deviation increase in conspiratory thinking is associated with a 0.219 (p -value < 0.001 , 95% CI=(0.191,0.248)) standard deviation reduction in physical distancing and a 0.123 (p -value < 0.001 , 95% CI=(0.055,0.191)) decrease in personal hygiene. On the other hand, one standard deviation increase in perceived infection risk is associated with a 0.068 (p -value = 0.004, 95% CI=(0.022,0.114)) increase in physical distancing and a 0.085 (p -value < 0.001 , 95% CI=(0.057,0.113)) increase in personal hygiene.

Moreover, we also found significant indirect effects of political ideology on one's testing positive through COVID-related conspiratory thinking and perceived risk absent the mediation of physical distancing and personal hygiene (COVID-related conspiratory thinking: 1% increase in the odds of infection probability (OR = 1.012, p -value <0.001 , 95% CI=(1.001,1.020)); perceived risk: OR = 1.003, p -value <0.001 , 95% CI=(1.000,1.005)).⁵

Finally, various direct effects among the major variables were also found. First of all, a right-leaning political ideology was positively linked with both one's COVID-related conspiratory thinking and perceived risk, with statistical significance and a higher magnitude for the former ($b = 0.048$, p -value < 0.001 , 95% CI=(0.026,0.070)) than the latter ($b = 0.017$, p -value <0.01 , 95% CI=(0.006,0.029)). Moreover, as far as the two (self-reported) preventative behavior variables are concerned, a right-leaning political ideology had negative correlations with both of them. On the one hand, one standard deviation more right-leaning one became, his or her level of physical distancing also decreased by 0.008 (p -value = 0.043, 95% CI=(0.000,0.015)) standard deviation. On the

other hand, this negative association also applied to one's personal hygiene with a similar magnitude of statistical significance, -0.010 (p -value <0.003 , 95% CI=(0.003,0.016)). Each of these results captured a part of the indirect channels through which political ideology influenced one's testing positive. The direct effect of one's health behaviors on his or her testing positive was mostly captured by physical distancing. One-standard deviation increase in one's physical distancing could lower the odds of infection risk by 14 percent (OR = 0.839, p -value <0.001 , 95% CI=(0.772,0.911)), while that in one's personal hygiene didn't induce a statistically significant effect on the infection risk (OR = 0.940, p -value = 0.173, 95% CI=(0.859,1.028)). Besides the effects through disease-related attitudes and preventative behaviors, political ideology still had a statistically significant direct effect. One-unit rightward shift in political ideology increased the odds of infection risk by 6 percent (OR = 1.062, p -value < 0.001 , 95% CI=(1.029,1.096)).

The results of the conceptualization test and subgroup analyses are very close to the results of the main analysis. What should be noted here is that the association between ideology and perceived risk in the United States was nonlinear. Compared with people who were the very liberal (ideology = 0), those who were mildly conservative (ideology = 5–7) perceived lower risk of COVID-19 infection, while stronger believers in conservatism (ideology >7) perceived higher risk of COVID-19 infection (See Tables S-12- and S-13 in the Supplement for results).

3.1. Sensitivity analysis

It is a potential concern utilizing the left-right measure to assess the effect of political ideology since people in different cultural backgrounds may have different understandings of the left-right measure. In order to address this issue, we conducted a conceptualization test where the analysis was repeated on countries in which political ideology had a statistically significant positive correlation with one's moral circle (See Table S-4 in the Supplement for the list of countries included in the analysis). The variable of the moral circle is a measure of the extent to which respondents care about justice of their surrounding entities (e.g., family members, relatives, friends, all human beings, all creatures, etc).

In addition to the conceptualization check on the coherence of political ideology across selected countries, we also repeated our analyses on the countries with similar characteristics or higher homogeneity. We first considered 30 OECD countries participating in the survey. Compared to other country sets, the level of development is similar within the OECD countries. Alternatively, we also brought the same test to the 20 countries in the sample where numbers of observations are greater than 1,000. This selection guarantees that the sample size in each variance-covariance cluster (i.e., country) is sufficient in generating reliable inferences. We report the results of these conceptualization tests and subgroup analysis in the Supplement (Tables S6-S11). These analyses show that the our main results are robust to these

⁵ What should be explained here about our model specification is that, different from Šrol et al. (2022) where conspiratory thinking and risk perception are found to be correlated, such a relationship is not found from ours. As Table S-5 in the appendix shows, the regression coefficients of the former on the latter are statistically insignificant across all the three model specifications. As a result, we keep our original specifications to make the models more parsimonious in the main text.

different sample selections.

4. Discussion

The present study leveraged a recent (April–May 2020) survey of 25,892 individuals across 27 democracies to investigate whether political ideology predicts one's testing positive for COVID-19. While the findings are somewhat mixed, our individual-level data and (mediation) analyses allow us to tease out different correlational paths according to which political ideology affects one's infection. First of all, a more right-leaning attitude was found to be associated with a higher probability of testing positive both directly and indirectly through conspiracy theory beliefs and physical distancing. The right-wing political beliefs tended to make one less likely to keep physical distance amid the pandemic, even though a higher inclination for the latter was shown by the mediation analyses to make one less likely to be infected by ~16%. Moreover, the effect of political ideology was also found to be exercised through the channel of conspiratorial thinking. The right-wing ideology made one more inclined to accept a conspiracy theory and adopt less physical distance, and led to a ~23% increase in one's infection probability. In addition, while personal hygiene was not found to have a statistically significant effect on one's infection, becoming more right-leaning made one less likely to keep anti-COVID-19 personal hygienic practices either directly or indirectly through conspiratorial thinking. Finally, besides all the indirect effects above, political ideology was found to have a direct effect of making one ~6% more likely to test positive as he or she turned more right-leaning. The direct effect also helps capture other possible channels of influence over one's infection that were not incorporated by our mediation analyses due to data limitations. For example, since our data on people's infections were collected from their self-reports, potentially, there could be a social desirability bias induced by one's political ideology. The right-leaning people might be more candid about their test results since their conspiratorial thinking made it easy for them to blame someone else for their infections.

Our analysis also shows that the right-wing political beliefs were associated with a higher level of perceived risk and personal vulnerability to the virus. The resulting perceived risk however led to two opposite effects on one's infection. On the one hand, indirectly through the channel of increased physical distancing, a higher risk perception actually reduced one's probability of infection. On the other hand, controlled for this effect on physical distancing, the direct effect of the perceived risk derived from the mediation analysis nonetheless gave rise to a ~20% increase in one's likelihood for testing positive. An explanation for this discrepancy between direct and indirect effects arises from the fact that the mediation analysis is correlational. In other words, the positive coefficient implies that those who tested positive also perceived a higher level of risk. Moreover, our findings are different from a recent similar study (Calvillo et al., 2020) that drew from the US data and found that more right-leaning/conservative people had a lower level of perceived personal vulnerability to COVID-19 instead. Given the cross-national nature of our dataset, we believe our results are more general and unaffected by particular political contexts that might

modulate people's risk assessments.⁶

The observed associations, both direct and indirect, between one's political ideology and infection are fairly robust to different model specifications where various control variables, country-level covariates, and country/region fixed effects are added. In particular, in addition to various variables of one's psychological states (e.g., optimism, self-control, psychological well-being) and socioeconomic status, what is especially worth mentioning is the robustness of the relationships of interest even after controlling for two potentially related political variables, collective narcissism and national identity. A recent study with the same data source showed that the former was associated with lower compliance with COVID-19-related public health measures while the latter predicted the opposite (Van Bavel et al., 2022). Our analyses with a slightly different outcome variable largely replicated their results and showed that political ideology had an independent effect. Moreover, the relationships still held even after statistically adjusting for region fixed effects and various country-level variables such as GDP, Human Development Index, and numbers of coronavirus infections and deaths. Together with all the other recent works on the relationship between ideological differences (partisanship) and public health (Allcott et al., 2020; Capraro and Barcelo, 2020; Gollwitzer et al., 2020; Havey, 2020; Sjastad and Van Bavel, 2020; Van Holm et al., 2020), the current study helps us understand better the politics of COVID-19. More critically, we went beyond the American political context from which all the studies drew their data.

Our study tapped into a very large individual- and country-level dataset across almost all the major democracies in the world and the findings were also robust to various model specifications. It however still has some limitations given various constraints we faced under the pandemic. First, this survey-based study is not experimental, and therefore difficult to have causal interpretations of our findings regarding the associations between political ideology and testing positive for COVID-19. While the mediation analyses help unpack the direct and the indirect effects of political ideology and other channels of influence, we cannot rule out the possibility that infections might also have shaped people's public health attitudes and political beliefs.

Second, some of our national samples are too small to be representative and the results may well be highly influenced by answers given by the respondents from developed and industrialized countries where it was easier for the data collection to be implemented. This challenge was especially hard to overcome under the difficult situation during the early stage of the pandemic. That said, since our unit of analysis was individuals and we made no conclusions about country-level outcomes, this question is less concerning.

Third, our outcome variable, one's COVID-19 infection, was based on respondents' self-reports, which were unavoidably subject to social desirability biases. This concern naturally arises from any individual-level analyses since one's infection is private information inaccessible to most researchers. While we tried to alleviate the issue through mediation analyses, future research can either take advantage of available aggregate data on infections, or include more survey questions that can help model one's propensity to hide his or her true status.

⁶ What should be noticed here is that, as Calvillo et al. (2020) also mention in the paper, conservatism and right-wing ideology traditionally tend to be more sensitive to threat and associated with "seeing the world as dangerous" (1119), but the downplaying of the risks of COVID-19 by the Trump administration this time around however made American conservatives have a lower level of perceived vulnerability to the pandemic. In other words, their contrarian findings are actually US-specific and might result from the priming of the Trump factor in their study. In contrast, the survey on which our study is based mentions nothing about the Trump administration's policy stance on the pandemic, and therefore captures respondents' more general attitudes towards political ideology. More importantly, since we also include country fixed effects in our estimation, our results are by no means driven any country-specific characteristics.

Fourth, at the same time when we upscaled the sample to include 28 democracies for greater generalizability, multiple national contexts might also unavoidably increase heterogeneities in our summary measure of the left-right spectrum and cast doubt on what exactly were measured under this rubric. Given the time limit and the difficult situation our respondents might be facing when the survey was administered, our hands were tied to add enough number of questions to allow our ideological measure to capture more fully the multi-dimensionality of political labels of left and right. As a remedy, we conducted conceptual checks to make sure that, despite potential conceptual heterogeneities cross-nationally, there was no significant difference in the relationship between the measure of political ideology and those of health behavior among countries. When the situation allows, future research should include more substantive questions that allow researchers to measure cultural, economic, political, and social dimensions of the left-right distinction and construct an equivalent measure in a cross-national context (Zuelli C & Scholz, 2019).

Author statement

Hans H. Tung: Conceptualization, Methodology, Writing – original draft, Reviewing and Editing. **Teng-Jen Chang:** Conceptualization, Methodology, Data curation, Software, Visualization. **Ming-Jen Lin:** Conceptualization, Methodology, Investigation, Supervision.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2022.115199>.

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