

How (Dis)trust in Scientific Information Links Political Ideology and Reactions Toward the Coronavirus Pandemic: Associations in the U.S. and Globally

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Abstract

U.S.-based research suggests conservatism is linked with less concern about contracting coronavirus and less preventative behaviors to avoid infection. Here, we investigate whether these tendencies are partly attributable to distrust in scientific information, and evaluate whether they generalize outside the U.S., using public data and recruited representative samples across four studies ($N_{\text{total}}=37,790$). In Studies 1–3, we examine these relationships in the U.S., yielding converging evidence for a sequential indirect effect of conservatism on compliance through scientific (dis)trust and infection concern. In Study 4, we compare these relationships across 19 distinct countries, finding that they are strongest in North America, extend to support for lockdown restrictions, and that the indirect effects do not fully appear in any other country in our sample other than Indonesia. These effects suggest that rather than a general distrust in science, whether or not conservatism predicts coronavirus outcomes depends upon national contexts.

Main Text

While the coronavirus pandemic has affected hundreds of millions of people, the impact has not been evenly distributed. The United States, despite comprising approximately 4.25% of the global population, has led the world in both coronavirus cases and deaths throughout 2020 and the first half of 2021 [1]. While there are societal-level reasons why the pandemic has hit the U.S. particularly hard (e.g., delayed pandemic responses, mismanagement by leadership; see [2]), individual attitudes and behaviors have helped shape how communities are affected by the pandemic. Social scientists have striven to understand factors that underlie such individual differences [3]. One potential factor identified by empirical studies, at least among Americans, is a link between conservatism with less concern about contracting the coronavirus and less behaviors (i.e., social distancing) to prevent its spread [4; 5; 6; 7].

From one perspective [8], these patterns are puzzling because political conservatives are thought to be more vigilant against physical threats (such as infectious disease) than liberals [9; 10; 11]. From another, these patterns are consistent with recent evidence that conservatives and liberals may instead be sensitive to different specific types of collective threats based upon their political identities [12; 13; 14]. Here, we investigated relationships between political ideology (i.e., conservatism/liberalism or right-wing/left-wing ideology) and reactions to the coronavirus pandemic. We hypothesized that (lack of) trust in information from scientific and medical sources would underlie relationships between conservatism and concern about contracting the coronavirus (i.e., personal threat perceptions). We further hypothesized that these patterns should be strongest, possibly even unique, where trust in scientific information is strongly polarized—in this case, the United States [see 15].

Political Ideology & Threat Perception during the Coronavirus Pandemic

Theoretically, heightened threat sensitivity has been viewed as an antecedent of right-wing political ideologies [16; 17; 8]. Evidence suggests that political conservatives have higher needs for stability and security, motivating sensitivity and responsivity toward potential threats [17; 18; 8]. Yet, the presence and strength of this relationship may be more complex. While conservatism is ostensibly linked with greater sensitivity to physical threats, there are circumstances in which liberals and leftists are more sensitive than conservatives to more global, abstract (but still physical) threats such as climate change or health care infrastructure [19]. Conservatives appear to be more threat-sensitive when there are clear perpetrators of local threats, construed as psychologically proximal, whereas liberals appear to be more sensitive to threats that will emerge without preemptive action that are more psychologically distant [20; 14].

Thus, there may be contexts in which conservatism would logically predict *less* concern about contracting the coronavirus. Conservatives in the U.S. may express less concern about contracting the virus and engage in less protective behaviors to avoid spreading it (4) based upon their partisan identities and information that they consume rather than *conservatism* per se. Using geo-tracking data from 15 million American smartphones, Gollwitzer and colleagues (2020) not only found that country-level votership for Donald Trump over Hillary Clinton in 2016 predicted less physical distancing, but that county-level consumption of Fox News was associated with less physical distancing, more coronavirus infections, and more coronavirus deaths.

However, this evidence is limited in that it is drawn exclusively from Americans, and may not necessarily generalize globally. Among Americans, trust in President Donald Trump was among the strongest predictors of coronavirus responses [21], while Trump and other right-wing figures notably downplayed the threat of the virus by their own admission [22; 23; 24; 25 see also 26]. In contrast, among Germans, absent such leadership, conservatism was positively associated with concern about contracting the coronavirus [27], as predicted by prior theory [8]. In Israel, then-Prime Minister Netanyahu instead emphasized the threat of the pandemic [28], taking a hard line with strict lockdowns that went so far as to outlaw mass protests altogether during the pandemic, yielding opposition from more left-wing citizens of Israel [29]. These patterns suggest that rather than conservatism promoting lack of concern for contracting coronavirus, such relationships may be informed indirectly through trust in information about the virus.

Trust in Scientific and Medical Information

One of the strongest predictors of threat perceptions from coronavirus infection, compliance with preventative behaviors, and support for lockdown restrictions, is how much participants trust information from scientists and scientific institutions [30]. This trust, in turn, may be related to political ideology. Resistance to change, religiosity, and traditionalism can lead conservatives to distrust scientific findings [31;32]. However, such distrust may be localized to particular scientific areas (e.g., climate change) [33], and there is also evidence that liberals may also be skeptical of ideologically inconsistent information [34;35;35]. Thus, we here argue that while conservatism may lead to a distrust in scientific information about the coronavirus, such relationships may not be the inevitable result of core features of political ideology, but rather arise from political group identities and polarized information networks [see 15].

Where such polarization in trust in science is severe, such as the United States [33;36;34;15], these implications can be particularly deleterious. American conservatives are distrustful of scientists and scientific information [37; 36; 38] in part because they view scientists themselves as outgroup members owing to a belief that the scientific community is compromised by a liberal bias [15]. Thus, we here argue that conservatives in the United States may be less concerned about contracting the coronavirus, and therefore comply less with preventative behaviors, in part because they trust scientific information about the coronavirus less.

However, these links may not generalize outside the United States, where such alternative media networks are prevalent [39; 40; 37]. Here, the case of climate change skepticism may be instructive. Among Americans, conservatism is among the strongest predictors of skepticism in anthropogenic climate change [41; 42; 43]. Yet, meta-analytic cross-national data reveals that this association is far stronger in the U.S. than anywhere else in the world [44]. Indeed, Hornsey and colleagues (2018) point out that three-quarters of the countries they surveyed displayed no significant meta-analytic relationship between conservatism and climate change skepticism, but note that in countries where such a relationship was found, conservative politicians and media frame “green” goals as incompatible with their ideology and spread misinformation about climate change. Rather than an inevitability of

conservatism, there is cross-national variation in the link between conservatism and an abstract threat such as climate change [44]. Thus, it is plausible that there is similar variation in the association between conservatism and attitudes toward the coronavirus pandemic, a similarly abstracted threat [14;19].

Research Overview

In four studies ($N_{\text{total}}=37,790$), we examined the association of political ideology with attitudes and beliefs towards the coronavirus pandemic, directly, and indirectly through the mechanism of trust in science. Firstly, we hypothesized that, among Americans, conservatism would indirectly affect concerns about contracting the coronavirus through trust in scientific authorities and institutions (H1). In Study 1, we utilized public data from the American National Election Studies (ANES) 2020 Exploratory Testing Study. In Studies 2a-2b, we utilized public, representative data from the ANES 2020 Social Media Study before and after the 2020 Presidential election. In Studies 3a-3b, we collected two distinct representative samples of Americans both before and after the 2020 Presidential Election, including measures of compliance with recommended preventative behaviors, testing a sequential mediation hypothesis whereby conservatism affects trust in science, which affects concern about viral contagion, thereby affecting compliance with restrictive policies.

In Study 4, we used data from a large, three-wave, cross-sectional study of attitudes and behaviors in the coronavirus pandemic from 21 countries to evaluate how present such relationships are across the world. We hypothesized that relationships tested in H1 would be strongest where reactions to coronavirus are strongly polarized, particularly the United States (H2).

Study 1

In Study 1, we investigated the relationships between concern about conservatism, concern about contracting the coronavirus, and trust in scientific information using publicly available data obtained from the ANES 2020 Exploratory Testing Survey, collected during April 2020. Specifically, we explored whether any relationship between conservatism and concern would be mediated through trust in scientific information. Details about the sampling strategy for this study, and all materials and data, are publicly available here: <https://electionstudies.org/data-center/2020-exploratory-testing-survey/>.

Method

Participants

The ANES 2020 Exploratory Testing Survey Data comprises data from 3080 Americans adults, recruited from three opt-in online panels (1607 Female, 52.18%; 1473 Male, 47.82%; Age: $M = 48.87$, $SD = 16.79$, range: 18-110). In terms of race and ethnicity, 2161 (70.16%) self-identified as White, 327 (10.62%) self-identified as Black or African American, 112 (3.64%) as Asian or Asian American, and 6 (0.19) as Native Hawaiian or Pacific Islander. Across all these categories, 369 participants (11.98%) self-described as “Hispanic, Latino, or Spanish in origin.” Other demographic information is available in Supplementary Materials (Table S1.)

Materials and Procedure

From the larger pool of questionnaire items, those relevant to our analyses were measures of political ideology, measures of general confidence in science and scientists, and concerns about personally contracting the coronavirus (COVID-19).

A single 7-point Likert scale (1=Very Liberal; 7=Very Conservative; midpoint=4, “Neither liberal nor Conservative”) was used to measure self-reported political ideology, $M=3.81$, $SD=2.29$. The sample was very slightly left-of-center, $t(3076)=-4.66$, $p<.001$, $d=-0.08$, but this effect size was small-to-trivial by convention [45].

The average of two items (“In general, how important should science be for making government decisions?” and “How much do ordinary people need the help of experts to understand complicated things like science and health?”) measured on 5-point Likert scales (1=Not at all; 5=A great deal) was used to index general trust in science and scientists ($M=3.41$, $SD=0.99$, $\alpha=.69$).

A single item on a Likert scale (“How worried are you personally about getting the coronavirus (COVID-19)?”; 1=Extremely worried; 5=Not at all worried) measured concerns about contracting COVID-19 ($M=3.23$, $SD=1.30$).

Results

Correlations

First, we computed zero-order correlations between conservative ideology, trust in science and scientific experts (“trust in science”), and concerns about personally contracting the coronavirus. Conservatism was negatively correlated with trust in science, $r(3076)=-.222$, $p<.001$, and with concerns about contracting the virus, $r(3076)=-.129$, $p<.001$. However, general trust in science was positively correlated with concern about contracting the virus, $r(3078)=.235$, $p<.001$.

Indirect Effect Test

We tested for indirect effects of conservatism on concern about contracting the coronavirus through trust in science using Hayes’s PROCESS (Model 4) [47] with 10000 bootstrap samples. Controlling for age, binarized gender (male=1, female=-1), income, and education level, we found a significant indirect effect whereby conservative ideology decreased concern about contracting the coronavirus through (dis)trust in science, $b=-.028$, $SE=.003$, 95% $CI[-.034, -.022]$ (Figure 1). Importantly, there was still a direct effect whereby conservative ideology was associated with less concern, $b=-.046$, $SE=.010$, 95% $CI[-.066, -.026]$.

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INSERT FIGURE 1 HERE

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Discussion

The ANES data used in Study 1 support the hypothesis that, among a large sample of Americans, a relationship between self-described conservatism and concern about contracting the coronavirus is mediated, in part, by trust in scientists for public health, although this relationship does not fully explain the link between conservatism and (relative lack of) concern about personally contracting the coronavirus. However, this sample was not representative of the American population; thus, in subsequent studies, samples without this limitation were examined.

Studies 2a-2b

To conceptually replicate and expand the basic findings reported in Study 1, we made use of publicly available data from a larger, truly representative samples of the American population, also from ANES. Specifically, data for Studies 2a-2b were obtained from the ANES Social Media Study, conducted between before (Study 2a) and after (Study 2b) the 2020 U.S. presidential election. All data and materials for this study can be found here: <https://electionstudies.org/data-center/2020-social-media-study/>. With these data, we again examined associations between conservatism, concern about contracting the coronavirus, and trust in science and scientific information. Owing to the vastly different set of variables available in this data, we examined trust in a specific organization dispensing scientific and medical information in Studies 2a-2b, specifically, the Center for Disease Control (CDC).

Method

Participants

A sample of 5750 Americans was collected by ANES in T1 (August 2020). Here, 2905 participants were male (50.52%) and 2845 were female (49.48%). At T1, 3983 participants identified as White (69.27%), 611 as Black or African American (10.63%), 736 as Hispanic (7.30%), and 420 as other racial or ethnic identities, including Asian Americans (7.30%). The average age was 49.51 years ($SD=16.27$).

For T2 (November 2020) 5,277 participants took part in the survey. In this sample, 2664 participants were male and 2613 were female. In terms of race and ethnicity, 3702 participants identified as White, 544 as Black, 647 as Hispanic, and 384 as Asian, mixed, or some other race/ethnicity. The average age was 50.91 years ($SD=16.78$). Further demographic information for both studies is presented in Table S1.

Materials and Procedure

From the ANES Social Media Study, the variables relevant to our investigation were a measure of political ideology, concern about contracting the coronavirus personally, and confidence in the CDC (serving as a measure of trust in a specific source of scientific information). Political ideology was measured using an identical item as in Study 1, pre-election: $M=4.07$, $SD=1.78$; post-election: $M=4.04$, $SD=1.81$), as was concern about contracting the virus, pre-election: $M=2.72$, $SD=1.21$; post-election: $M=2.78$, $SD=1.21$. One item, (“How much confidence do you have in the U.S. Centers for Disease Control (CDC)?”), measured on a 1 (“None”) to 5 (“A great deal”) Likert scale was used as a proxy for trust in scientific information sources, $M=3.15$, $SD=1.12$; post-election: $M=3.34$, $SD=1.16$.

As the data collected in Studies 2a-2b were non-probability samples, with the aim of matching the population of the United States, ANES recommends the use of sampling weights for regression analyses with these data. All analyses in Study 2 were therefore conducted accounting for sampling weights using SAS’s *proc calis* command rather than Hayes’s PROCESS, which does not permit the use of sampling weights (see <https://processmacro.org/faq.html>).

Results

Correlations

As with Study 1, we began by computing correlations, although here, we accounted for sampling weights as per ANES’s recommendations for this sample (<https://electionstudies.org/data-center/2020-social-media-study/>). In the T1 sample, conservatism was negatively correlated with confidence in the CDC, $r(5733)=-.253$, $p<.001$, and with

concern about contracting the coronavirus, $r(5737)=-.336, p<.001$. Similar to trust in science in Study 1, confidence in the CDC was positively correlated with concern, $r(5741)=.223, p<.001$.

For the post-election survey as well, conservatism was negatively correlated with confidence in the CDC, $r(5261)=-.367, p<.001$, and with concern about contracting the coronavirus, $r(5263)=-.330, p<.001$. Confidence in the CDC was positively correlated with concern, $r(5272)=.277, p<.001$.

Indirect Effect Test

Similar to Study 1, for both the pre and post-election surveys, we conducted tests for indirect effects of conservatism on concern through a proxy for trust in scientific institutions, here confidence in the CDC, controlling for age, binarized gender (male=1, female=-1), income, and education level.

In Study 2a, we found a significant indirect effect whereby conservatism was associated with less confidence in the CDC, which was associated with more concern about contracting the virus, thus conservatism indirectly was linked to less concern through confidence in the CDC, $b=-.027, SE=.003, t=-9.99, p<.001$ (Figure 2a). As in Study 1, the direct effect of conservatism on concern remained significant, $b=-.209, SE=.009, t=-23.08, p<.001$.

In Study 2b, we also found a significant indirect effect, such that conservatism was associated with less confidence in the CDC, which was associated with more concern about contracting the virus, thus conservatism indirectly related to less concern through confidence in the CDC, $b=-.045, SE=.004, t=-11.94, p<.001$ (Figure 2b). Once again, the direct effect of conservatism on concern remained significant, $b=-.18, SE=.009, t=-19.10, p<.001$. The estimated models for both the pre-election survey ($\chi^2(8)=304.70, p<.001, CFI=.90, RMSEA=.08, SRMR=.04$) and the post-election survey ($\chi^2(10)=313.27, p<.001, CFI=.97, RMSEA=.08, SRMR=.04$) displayed good fit (see Kline, 2016).

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INSERT FIGURE 2a-2b HERE

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Discussion

Study 2 conceptually replicated the results of Study 1 using a representative sample of American adults in two surveys conducted prior and following the 2020 presidential elections. Rather than general items for trusting expertise in science, these results were found using items about a specific organization, suggesting a degree of generalizability across contexts and time for the mediating role of trust in information sources.

Studies 3a-3b

We collected data in two nationally representative samples, before and after the 2020 U.S. presidential election. Given our ability to control the survey instruments, we conceptually replicated our findings with more comprehensive and detailed measures of trust in science and concern for COVID-19. Further, we also expanded on our findings by investigating the additional outcome of compliance to COVID-19 recommendations.

Method

Participants

While these analyses were not pre-registered, the sampling method was pre-determined for both samples (see AsPredicted #48042 and #53678). All research involving these participants was approved by the University of Massachusetts Amherst Institutional Review Board and complied with all APA guidelines and policies for human subjects research.

Study 3a. The first sample ($N=1672$ Americans) was collected via CloudResearch [48] in late September 2020. TurkPrime includes features which allow the recruitment of census-matched samples (see <https://www.cloudresearch.com/resources/blog/how-to-gather-demographically-representative-samples-in-online-studies/>). In this sample, 595 (43.98%) participants were male, 753 (55.65%) were female, and 5 were nonbinary or other genders (0.37%), while 319 provided no response for gender identity. In terms of participant race and ethnicity, 957 (70.78%) identified as White, 158 (11.69%) as Black, 142 (10.50%) as Hispanic or Latino, 58 (4.29%) as Asian, 15 (1.11%) as Native American, and 22 (1.63%) as other races/ethnicities, while 320 participants provided no response. The average age was 43.80 years ($SD=17.36$).

Study 3b. The second sample ($N= 1431$ Americans) was collected via Lucid in early December 2020. Lucid is another crowdsourcing website capable of recruiting a demographically diverse and nationally representative sample at a low cost with good reliability [49]. In this sample, 555 (47.93%) participants were male, 597 (51.55%) were female, 6 (0.52%) were non-binary or other genders, and 273 provided no response for gender. In terms of race and ethnicity, 840 (72.66%) participants identified as White, 133 (11.51%) as Black, 87 (7.53%) as Hispanic or Latino, 52 (4.50%) as Asian, 19 (1.64%) as Native American, 25 (2.16%) as other races/ethnicities, and 275 provided no response. The average age was 45.46 years ($SD=16.80$).

Materials and Procedure

Participants were presented with a battery of measures followed by demographic questions. They were then subsequently debriefed about the purpose of the study. For the purposes of the current investigation, were solely interested in measures of ideology, trust in science, concern about the pandemic, and compliance intentions. The same measures that follow were displayed in the same manner and scale across both studies.

Conservative ideology. We measured individual's political ideology with a single-item measure obtained from the most recent YouGov poll ("In general, I am..."). Scores ranged from "1=Very liberal" to "7=Very Conservative", (Study 3a: $M=3.65$, $SD=1.76$; Study 3b: $M=3.86$, $SD=1.85$).

Trust in science. Given that both trust in science in general, as well as trust in specific scientific institutes was found to be an antecedent of concerns for the coronavirus pandemic, we incorporated both components in our measure of trust in science. These items were preceded by the stem "To what extent do you trust information about the coronavirus if it comes from each of the following information sources?" and were measured on a 1-5 Likert scale (1 = not at all, 5 = very much). These were: (1) The Center for Disease Control and Prevention (CDC); (2) Scientific authorities and professionals (e.g., epidemiologists, virologists); and (3) Medical professionals (e.g., doctors, nurses, surgeons, EMTs). This composite demonstrated good reliability in both Study 3a ($M=3.87$, $SD=0.95$, $a = .82$), and Study 3b ($M=3.91$, $SD=0.96$, $a = .83$).

Coronavirus concern. A single item was used to measure concern about contracting the coronavirus, "Which, if any, of the following statements describes your feelings toward getting the coronavirus?" measured on a 1 to 4 point Likert scale (I am not at all/not very/ somewhat/ very scared I will contract the coronavirus (COVID-19), in both Study 3a, $M=2.73$, $SD=0.99$, and Study 3b, $M=2.91$, $SD=0.97$).

Coronavirus compliance. Four items on 0-10 Likert scale ranging from “0 = Never” to “10 = All the Time”, were used to capture individual differences in reported compliance to COVID-19 recommendations (e.g., “How often have you avoided social gatherings due to COVID-19?”, “How often have you avoided non-essential travel?”). This composite demonstrated good reliability in both Study 3a ($M=7.89$, $SD=2.31$, $\alpha = .87$), and Study 3b ($M=8.17$, $SD=2.23$, $\alpha=.87$).

Results

Correlations

In both studies, having a more conservative political ideology was associated with less trust in science, less concerns about COVID-19, and less compliance to COVID-19 recommendations. Trust in science was positively associated with more COVID-19 concerns and compliance. Finally, COVID-19 concerns were positively associated with compliance (Table 1).

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Indirect Effect Test

To test our full hypothesis in each study, we computed an indirect effect test. We controlled for age, being male (compared to being either female or non-binary, male=1; not male =-1; analyzed thusly as there is evidence that men are less likely to comply with recommended behaviors than other genders; [51]), income and education level. Results across both studies suggested that conservative ideology was associated with both less trust in science and less concern about the pandemic. Both trust in science and concerns about COVID-19, in turn, were associated with greater compliance. All indirect effects were significant across both studies (Table 2). While the direct effect of conservatism upon compliance remained significant before the 2020 Presidential election (Study 3a), the direct effect was non-significant after the election (Study 3b; Figures 3a–3b).

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INSERT TABLE 2 HERE

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INSERT FIGURES 3A-3B HERE

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Discussion

Studies 3a and 3b further highlighted how in the United States, a conservative political ideology is associated with less compliance with COVID restrictions via less personal fear of contracting the virus and less trust in science. In two nationally representative samples we replicated the associations from Studies 1 and 2 with more

comprehensive measures. Importantly, in Studies 2 and 3 we added a measure of compliance with COVID restrictions, finding that conservatism indirectly relates to less compliance to guidelines to reduce the spread of COVID-19. The two underlying mechanisms of this indirect association were found to be trust in science and personal concerns about contracting the virus.

Study 4

In Study 4, we sought to re-examine our hypothesis across different nations, once again employing representative samples. Our aim was to determine whether the negative link between a conservative political ideology with trust in science and beliefs towards the Coronavirus pandemic (i.e., concern about the pandemic, compliance with COVID-19 recommendations, and support for stricter measures to prevent the spread of the pandemic), is found across nations, or is localized to particular countries, such as the United States, given the relationships between conservative U.S. media ecosystems and coronavirus responses (see 7).

Method

Participants

We recruited data across 21 countries and special administrative regions, recruiting a total of 25,159 participants. These included: Australia, Canada, China, Spain, France, Germany, Hong Kong, Hungary, Indonesia, the Republic of Ireland, Israel, Italy, Korea, Malaysia, the Netherlands, the Philippines, Poland, Serbia, Turkey, the United Kingdom, and the United States. In China and Hong Kong no measure of political ideology was included in the survey because of risks to participants, and thus participants from these countries were excluded from the current investigation, leaving us with a total of 19 countries ($N=20,580$; Table S1 for country specific N s and descriptive statistics). Participants were recruited across three cross-sectional waves: Wave 1: May 4th, 2020 - May 21st, 2020; Wave 2: June 15th, 2020 - June 23rd, 2020; Wave 3: July 20th, 2020- July 28th, 2020, via CloudResearch [50; 48]. Samples sizes were determined based on an *a priori* power analysis detect interactions between time-point comparisons and cross-country comparisons for a small-to-medium effect size (Cohen's $f=.160$). Thus, we aimed to recruit at least 300 participants per wave in each country. To approach a more representative sample from each country, data was collected to fill known representative percentages for a variety of demographic characteristics, such as level of education, race/ethnicity, urbanization, religion, age, gender, income. These levels were established through census-level data of each country population. In the U.S we aimed to recruit truly representative samples, via the same demographic characteristics as above but with a larger number of participants ($N=1200$) per wave. While these analyses were not pre-registered, the sampling method was pre-determined for all samples (see <https://osf.io/g29z4/>). All research involving these participants was approved by the University of Massachusetts Amherst Institutional Review Board and complied with all APA guidelines and policies for human subjects research.

Materials and Procedure

Participants first provided consent, and then completed a questionnaire with various measures. After completing all the measures and providing demographic information, participants were asked questions pertaining to any upcoming or recently concluded elections in their country, and were then subsequently debriefed and remunerated. All measures were first generated in English. They were then translated/back-translated into applicable languages for each country. In the sections that follow, descriptive statistics and reliabilities capture values across all waves and countries (Table S2 for country-specific information). Unless otherwise noted, all measures were captured on a 1-9 slider scale.

Political Ideology

An item identical to that utilized in Studies 3a and 3b, measured on a 1-7 Likert scale was used to capture left/right wing ideology ($M=3.80$, $SD=1.57$).

Trust in Science

We generated two items to measure trust in science, which preceded by the sentence: “To what extent do you trust information about coronavirus if it comes from each of the following information sources?” (“Scientific authorities and professionals (e.g., epidemiologists, virologists)” and “Medical professionals (e.g., doctors, nurses, surgeons, EMTs)”). Trust in science was measured with the average of these two items ($\alpha=.77$, $\alpha_{range}=.68-.82$, $M=7.11$, $SD=1.64$).

Behaviors and Beliefs about the Coronavirus

Concerns about contracting COVID-19. A single-item measure (“Which, if any, of the following statements describes your feelings toward getting the coronavirus? I am not at all/not very/ somewhat/ very scared I will contract the coronavirus (COVID-19)”); this measure was identical to one of three items used to capture COVID-19 concerns in Studies 3a and 3b). This measure was captured on a 1-4 Likert scale ($M=2.49$, $SD=1.10$).

Compliance with coronavirus guidelines. A four-item measure was developed to capture the degree to which participants complied with scientifically-recommended coronavirus (COVID-19) guidelines to reduce the infection of the virus (“How often do you wash your hands with soap and water for at least 20 seconds when you enter or exit your home?”; “How often do you stay at least 6 feet (or 2 meters) away from anyone who is not a member of your household when you are outside your home (e.g., social distancing?)”; “Do you avoid social gatherings due to the coronavirus?”; “Have you been cancelling, and are you avoiding, any non-essential travel”). The measure was overall reliable ($\alpha=.77$, $\alpha_{range}=.61-.83$, $M=7.49$, $SD=1.51$).

Support for lockdown restrictions. Seven-items were generated to measure how much participants supported preventative restrictions upon civil liberties during lockdowns (e.g., “National intelligence services should track and collect data from people suspected to be infected with coronavirus;” “The military should be used domestically in order to assist with responses to the coronavirus”). This measure was reliable as well ($\alpha=.84$, $\alpha_{range}=.76-.89$, $M=6.17$, $SD=1.80$).

Results

Correlations

Political Ideology. We estimated correlations within each country for each wave (Tables S3-S6), between political ideology and: (1) trust in science, (2) concerns about contracting COVID-19, (3) compliance with COVID-19 regulations, (4) support for lockdown restrictions to prevent the spread of the virus. Then, we utilized Goh and colleagues’ (2016) methodology to compute meta-correlations across the three waves for each country (Tables S7-S10) that are visualized in Figures 4a-4d.

The United States and Canada alone exhibited significant negative meta-correlations between conservative ideology and all outcome variables. For trust in science and concern about contracting coronavirus, their meta-correlations were also larger than those of the other 17 countries (Figures 4a-4b). Also, while there was no significant relationship between conservatism and trust in science in 10 of 19 countries, a positive meta-correlation was never

observed (Figure 4a). However, for compliance, Indonesia and Germany exhibited meta-correlations of a similar strength to those of the U.S. and Canada, although the U.S. and Canada were still among the largest across countries (Figure 4c). With respect to lockdown restrictions, only three countries demonstrated a negative meta-correlation with conservatism: The United States, Canada, and South Korea, whereas the meta-correlations were positive for 10 of 19 countries, with Israel's being the strongest (Figure 4d).

Trust in Science. A similar process was used to compute meta-correlations between trust in scientific information about coronavirus and other outcome variables (Table S11). The meta-correlations we found suggest that while direct associations between conservatism and coronavirus responses might be localized to particular countries, links between trust in scientific information and outcomes are more consistent. Meta-correlations between trust in scientific information about coronavirus and concern about contracting the coronavirus were significant and positive in 16 of 19 countries ($r_{\text{median}}=.12$, $r_{\text{min}}=.07$, $r_{\text{max}}=.20$, all $ps<.05$), and were never significant and negative (Figure S1). Further, both the meta-correlation between trust in scientific information about coronavirus and compliance with preventative behaviors ($r_{\text{median}}=.35$, $r_{\text{min}}=.22$, $r_{\text{max}}=.47$, all $ps<.001$; Figure S2) and the meta-correlation between trust in scientific information about coronavirus and support for lockdown restrictions ($r_{\text{median}}=.29$, $r_{\text{min}}=.15$, $r_{\text{max}}=.44$, all $ps<.001$, Figure S3) were significant and positive in all countries. These meta-correlations suggest that while the role of conservatism and trust in scientific information may vary across countries, the subsequent relationships between that trust and outcome variables are consistent. Therefore, the extent to which conservatism affects these outcomes should be influenced by the extent to which conservatism affects trust in scientific information about coronavirus.

Multigroup Path Analysis

To replicate the indirect effects observed in the previous studies, while adding support for lockdown restrictions as an additional outcome, we conducted a series of path analyses. Again, we allowed all exogenous variables to predict both sequential mediators (i.e., trust in science, concerns about contracting COVID-19), and both sequential mediators to predict both outcomes (compliance and support for lockdown restrictions), yielding a fully saturated model (Figure 5).

We then compared the path from political ideology to trust in science in the U.S. and Canada (separately) to each other and to each of the 17 other countries in our sample. Findings suggested that the association did not differ between the U.S. and Canada, but were significantly stronger in the United States for 15 out of the 17 countries and in Canada for 13 out of the 17 countries (Table 3). Further evidence in these models suggest that this association is strongest in North America, with one exception (Indonesia). The indirect effect of political ideology on concerns about contracting COVID-19 (i.e., ideology→trust in science→COVID-19 concern) was only significant in one other country (Italy); as was the indirect effect for compliance (i.e., ideology→trust in science→COVID-19 concern→COVID-19 compliance; in Spain), and the indirect effect for support for lockdown restrictions (i.e., ideology→trust in science→COVID-19 concern→lockdown restrictions) was only significant in two other countries (Spain, the Netherlands), one of which exhibited an effect in the opposite direction (the Netherlands).

Discussion

Study 4 provided further evidence of a sequential pathway whereby, in some countries, namely, the U.S., Canada, and Indonesia, conservative ideology was associated with lower trust in scientific information about the coronavirus, which in turn was associated with less concern about contracting the coronavirus, which finally led to less compliance with preventative behaviors. Further, Study 4 extended this model by adding support for lockdown

restrictions as an additional outcome. Multigroup path analyses further suggested that the association of political ideology and trust in science is significantly stronger in these three countries than in other countries sampled. However, trust in science exhibited consistent correlation patterns across countries, suggesting that its importance in coronavirus responses (see 30) is consistent across nations. While the presence of negative meta-correlations between conservatism and trust in scientific information about the coronavirus was expected in the U.S. based on the extreme polarization of scientific trust in that country (see 15; 7) and Studies 1-3, and to a lesser extent in Canada due to a shared media ecosystem with the U.S. [see 52; 53], the emergence of the same pattern in Indonesia was unexpected. However, recent evidence suggests that, like the U.S., Indonesia is experiencing intense political polarization about the coronavirus pandemic in particular (54), which may suggest that the pattern in the U.S. has more to do with the severity of polarization about this specific issue, rather than unique features of American conservatism.

General Discussion

Across four studies, we found strong evidence that among Americans, conservatism is associated with less compliance with recommended preventative behaviors to avoid coronavirus infection, sequentially mediated through trust in scientific information sources and concern about the threat of personal infection by coronavirus. Studies 1, 2a, and 2b found evidence for indirect effects of conservatism on concern about contracting coronavirus through trust in science, while Studies 3a, 3b, and Study 4 found evidence that this indirect effect sequentially extends to compliance with preventative behaviors and, in Study 4, support for lockdown restrictions. Such findings are consistent with other studies of American populations [see 4; 5; 6; 7]. Beyond replicating these results, however, we also find cross-national support for the role of scientific trust in concern about contracting the virus, compliance, and support for lockdown restrictions (Figures S1-S3).

Evidence was more mixed, however, for the hypothesis that the indirect effects we observed would be strongest in, or unique to, the United States, given the extreme polarization of the coronavirus pandemic there and the severity of its impact. On one hand, while other countries did have significant meta-correlations between conservatism and coronavirus variables, and some (Canada, Indonesia, Spain, Italy, the Netherlands) even had significant indirect effects, negative meta-correlations between conservative ideology and trust in scientific information about coronavirus, concern about contracting coronavirus, self-reported behavior compliance, and support for lockdown restrictions were consistently stronger in the U.S. than in most other countries sampled in Study 4. Further, no other country had significantly stronger indirect effects than the U.S. These findings are, in a sense, similar to findings on climate denial in the U.S. compared to other countries [see 44]. However, on the other hand, Canada consistently had roughly equivalent meta-correlations between conservatism and these variables, as well as indirect effects, and Indonesia also exhibited significant indirect effects consistently.

That Canadians exhibited similar responses to Americans is partly explainable through its proximity to, and shared media ecosystem with, the United States [see 52] and indeed, misinformation about the coronavirus in Canadian social media appears to originate from U.S. media [53]. The same pattern emerging in Indonesia, however, cannot logically be explained by media overlap with the United States. Rather, the emergence of similar indirect effects in Indonesia may be explainable by a similarly extreme polarization around trust in the scientific consensus, within the context of the coronavirus pandemic [54]. Nevertheless, a key limitation of our findings is that we cannot directly test *why* these three countries in particular demonstrated the patterns we observed compared to the 16 other countries that did not.

That aside, another key implication of these findings is that across the countries we sampled from, conservatism neither universally nor necessarily predicts non-compliant coronavirus behaviors or even lack of concern in and of itself. While care should be used comparing meta-correlations for conservatism across countries, as its precise meaning can vary cross-nationally [55] and across time and cultural groups [56; 57], evidence of political groups clustering along a left-right axis can be used to make cautious statements of patterns [see 58; 57; 59]. Although there are psychological factors associated with conservatism that may predispose conservatives to generally distrust science more [see 32], our results suggest that this association is not an inevitability across the globe, but rather, emergent from specific national contexts. Nevertheless, that we never found conservatism to positively predict trust in scientific information about coronavirus, even in Israel, where conservative leadership took a hard line during the pandemic, suggests a tendency may still be present. Nevertheless, it is also worth noting that conservatism was, in many countries, positively associated with lockdown restrictions, perhaps resonating with authoritarian tendencies [see 32]. That said, the results from the U.S., Canada, and Indonesia also clearly suggest that, under the right circumstances, liberals can be more sensitive to certain threats than conservatives, in line with multidimensional approaches to understanding ideology and threat [20, 13].

The results we observe suggest that part of how political ideology relates to threat perceptions, however multidimensional, operates through trust in information about the relevant threat—in this case, the threat of personal infection with coronavirus. While conservatives and liberals both *can* be more or less sensitive to threats depending on the type of threat (commission vs omission, see [14]), what our results suggest is that distrust in warnings about the threat may lessen the degree to which the threat is perceived at all. However, it should be noted that such associations need not inevitably lead to disaster. That Canada and Indonesia, despite sharing the patterns found in the U.S., did not experience the same degree of catastrophic losses from the coronavirus pandemic as the United States hints that, individual differences aside, early, unified action by political elites and systemic preparation may help protect against the negative effects instantiated by low trust in science [see 60], a possibility supported by findings that countries with earlier, more restrictive pandemic responses have fared better thus far [see 61; 62; 63]. Further, the positive meta-correlations we observe between conservatism and support for lockdown restrictions in many of the countries sampled implies that, perhaps owing to overlap between conservatism and authoritarianism, conservatives will support such measures if they are not positioned as contradictory to their ingroup by partisan media (as in the U.S. and Canada, where the meta-correlations were negative).

Nevertheless, a second limitation of these studies is that while they examine *conservatism*, as understood by participants, they conceptualize conservatism as a unitary construct [55] and they do not examine ideological factors among conservatives that might have divergent effects upon attitudes and behaviors within the coronavirus pandemic, such as right-wing authoritarianism (RWA; see [17, 18]) or social dominance orientation (SDO; see [64, 65]). While we did not find, for example, a relationship between conservatism and concern about coronavirus infection in our Australian samples in Study 4, Clarke et al. (2021) found relationships between some specific dimensions of SDO and RWA [66], such that they predicted less concern about contracting the coronavirus, similar to the associations with RWA in American samples [67]. In a similar vein, our single-item measure of unitary conservatism cannot distinguish between laissez-faire conservatism and authoritarian conservatism [see 68]. These limitations are particularly important for understanding the positive meta-correlations between conservatism and support for lockdown restrictions that we observe in the majority of countries that we sampled. Thus, further research should examine more specific elements and dimensions of ideology as well as high-level endorsement of “conservatism” or “liberalism.” Future research should also endeavor to gather information on these associations in South America, Africa, India, and other parts of the globe we were unable to reach.

Conclusion

Here, four studies reinforce links between conservatism and attitudes and behaviors during the coronavirus among Americans, while also explicitly highlighting the role that trust in science and scientific information sources about the pandemic plays in these processes. Apart from conceptually replicating and extending existing research on Americans, Study 4 suggests that Canadians and Indonesians may also exhibit the same polarization of attitudes through trust in scientific information about the coronavirus. These results suggest that, rather than conservatism *per se* inevitably leading to skepticism about pandemics, the emergence of such a link is contextual, similar to prior findings regarding polarizing issues such as climate change skepticism (44). Therefore, management of future pandemics may hinge upon how well scientific communicators can manage the contextual framing of the pandemic as it arises, lest the particularly disastrous patterns observed in places like the United States be repeated.

Declarations

Author Contributions Statement

Authors Q.M. and S.S. primarily wrote the manuscript and conducted all data analyses. Authors B.L., G.H., K.Y., & R.A.Z. further contributed to the writing of the manuscript. All authors (including those already listed) participated in the construction of materials and the collection of data, including A.B., M.B., M.v.B, A.C., P.C.,C.H., H.E., A.G., P.K., Y.H.K., J.L., A.B., S.L., S.M., R.T.,O.M.,M.N.,M.P.P.,N.P., H.S.,O.M.U.,M.J.W., V.Y., C.J.

Data Availability Statement

For all studies, materials, data, and analysis code are available here: [https://osf.io/ugde5/?view_only=dc4c3b9d8a79433cab5a2fbc9e663a1d].

Additional Information

The authors declare no conflicts of interest.

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Tables

Table 1.

Bivariate correlations for Study 3a (below the diagonal) and Study 3b (above the diagonal).

| | 1 | 2 | 3 | 4 |
|--------------------------|------|------|------|------|
| 1. Conservative Ideology | – | -.16 | -.15 | -.08 |
| 1. Trust in Science | -.16 | – | .31 | .42 |
| 1. COVID-19 Concerns | -.22 | .27 | – | .41 |
| 1. COVID-19 Compliance | -.21 | .49 | .41 | – |

Note: All coefficients are higher than .10 are significant at $p < .001$, all coefficients below .10 are significant at $p < .01$

Table 2.

Indirect effects depicted in Figures 3a – 3b.

| | Study 3a | | | | Study 3b | | | |
|---|----------|-------|--------------|--------------|----------|-------|--------------|--------------|
| | Effect | SE | Lower 95% CI | Upper 95% CI | Effect | SE | Lower 95% CI | Upper 95% CI |
| Total Indirect effect | -0.14 | 0.02 | -0.18 | -0.10 | -0.12 | 0.02 | -0.16 | -0.08 |
| Ideology à Trust in Science à Compliance | -0.07 | 0.01 | -0.10 | -0.04 | -0.06 | 0.01 | -0.09 | -0.04 |
| Ideology à Concerns à Compliance | -0.06 | 0.01 | -0.08 | -0.04 | -0.03 | 0.01 | -0.06 | -0.01 |
| Ideology à Trust in science à Concerns à Compliance | -0.01 | 0.004 | -0.02 | -0.008 | -0.02 | 0.005 | -0.03 | -0.01 |

Table 3.

Indirect effects of political ideology on each variable, and multigroup comparisons for the association between ideology and trust in science, from Figure 5.

| Country | Path a comparisons: United States | Path a comparisons: Canada | Ideology à Trust Science | Indirect effect on Concern | Indirect effect on Compliance | Indirect effect on Curtailments |
|---------------|---|---|--------------------------|----------------------------|-------------------------------|---------------------------------|
| United States | – | $b = -.01, SE = .03, t = -0.40, p = .692$ | -19 (.01)*** | -.02 (.01)*** | -.09 (.01)*** | -.09 (.01)*** |
| Canada | $b = .01, SE = .03, t = 0.40, p = .692$ | – | -.20 (.03)*** | -.01 (.01)* | -.10 (.02)*** | -.08 (.01)*** |
| Australia | $b = -.15, SE = .03, t = -4.21, p < .001$ | $b = -.17, SE = .05, t = -3.27, p = .001$ | n.s. | n.s. | n.s. | n.s. |
| Spain | $b = -.07, SE = .03, t = -2.17, p = .030$ | $b = -.08, SE = .04, t = -1.93, p = .053$ | -.11 (.03)*** | n.s. | -.04 (.01)** | -.04 (.01)*** |
| France | $b = -.13, SE = .04, t = -3.29, p = .001$ | $b = -.14, SE = .05, t = -3.00, p = .002$ | n.s. | n.s. | n.s. | n.s. |
| Germany | $b = -.09, SE = .04, t = -2.38, p = .017$ | $b = -.11, SE = .05, t = -1.92, p = .054$ | n.s. | n.s. | n.s. | n.s. |
| Hungary | $b = -.26, SE = .04, t = -6.41, p < .001$ | $b = -.27, SE = .05, t = -5.28, p < .001$ | n.s. | n.s. | n.s. | n.s. |
| Indonesia | $b = -.05, SE = .03, t = -1.77, p = .076$ | $b = -.07, SE = .04, t = -1.51, p = .131$ | -.12 (.03)*** | -.01 (.01)* | -.05 (.01)*** | -.05 (.01)*** |
| Ireland | $b = -.11, SE = .03, t = -3.24, p = .001$ | $b = -.13, SE = .05, t = -2.56, p = .010$ | n.s. | n.s. | n.s. | n.s. |
| Israel | $b = -.12, SE = .03, t = -3.36, p < .001$ | $b = -.13, SE = .05, t = -2.78, p = .005$ | n.s. | n.s. | n.s. | n.s. |
| Italy | $b = -.09, SE = .04, t = -2.35, p = .018$ | $b = -.10, SE = .05, t = -2.14, p = .032$ | -.10 (.04)** | -.01 (.01)* | n.s. | n.s. |
| South Korea | $b = -.23, SE = .03, t = -7.57, p < .001$ | $b = -.24, SE = .04, t = -5.35, p < .001$ | n.s. | n.s. | n.s. | n.s. |
| Malaysia | $b = -.14, SE = .03,$ | $b = -.16, SE = .05,$ | n.s. | n.s. | n.s. | n.s. |

| | <i>t</i> = -4.36, <i>p</i> < .001 | <i>t</i> = -3.36, <i>p</i> < .001 | | | | |
|----------------|---|---|------|------|------|-------------------|
| Netherlands | <i>b</i> = -.18, <i>SE</i> = .03, <i>t</i> = -5.18, <i>p</i> < .001 | <i>b</i> = -.20, <i>SE</i> = .05, <i>t</i> = -3.95, <i>p</i> < .001 | n.s. | n.s. | n.s. | .03 (.02)* |
| Philippines | <i>b</i> = -.13, <i>SE</i> = .03, <i>t</i> = -4.09, <i>p</i> < .001 | <i>b</i> = -.14, <i>SE</i> = .04, <i>t</i> = -3.15, <i>p</i> = .002 | n.s. | n.s. | n.s. | n.s. |
| Poland | <i>b</i> = -.11, <i>SE</i> = .04, <i>t</i> = -3.06, <i>p</i> = .002 | <i>b</i> = -.12, <i>SE</i> = .05, <i>t</i> = -2.53, <i>p</i> = .011 | n.s. | n.s. | n.s. | n.s. |
| Serbia | <i>b</i> = -.09, <i>SE</i> = .04, <i>t</i> = -1.94, <i>p</i> = .052 | <i>b</i> = -.10, <i>SE</i> = .06, <i>t</i> = -1.70, <i>p</i> = .088 | n.s. | n.s. | n.s. | n.s. |
| Turkey | <i>b</i> = -.24, <i>SE</i> = .04, <i>t</i> = -6.47, <i>p</i> < .001 | <i>b</i> = -.26, <i>SE</i> = .05, <i>t</i> = -5.29, <i>p</i> < .001 | n.s. | n.s. | n.s. | n.s. |
| United Kingdom | <i>b</i> = -.20, <i>SE</i> = .03, <i>t</i> = -5.81, <i>p</i> < .001 | <i>b</i> = -.21, <i>SE</i> = .04, <i>t</i> = -4.68, <i>p</i> < .001 | n.s. | n.s. | n.s. | n.s. |

Note: * *p* < .05, ** *p* < .01, *** *p* < .001, n.s. = not significant. The USA and Canada were the reference group in each comparison. Bold values depict significant results.

Figures

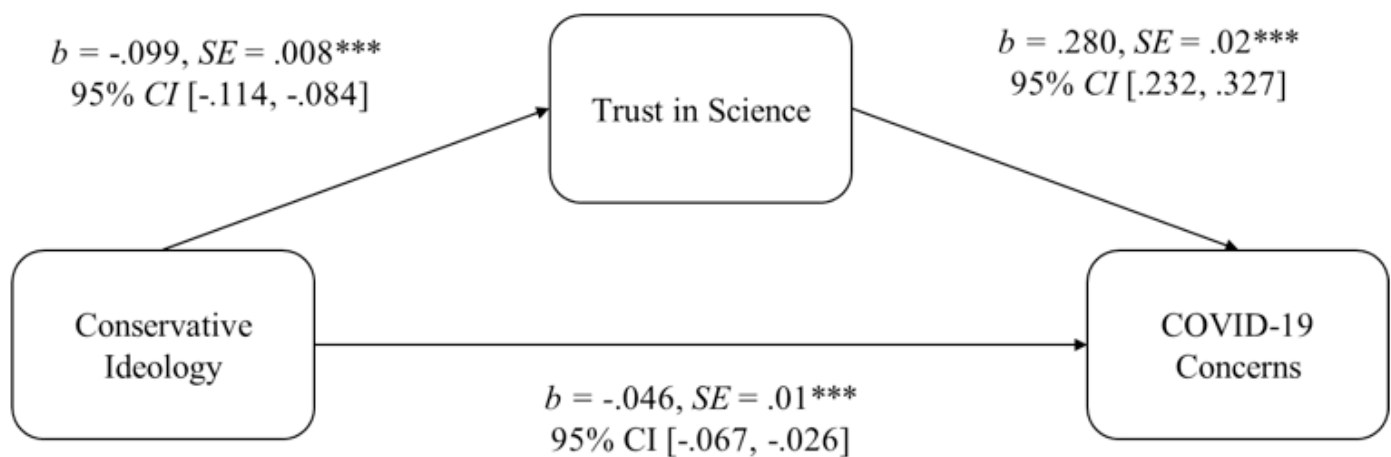


Figure 1

Indirect effect test (Process Macro, Model 4, 10,000 bootstrapped samples) of conservative ideology on concerns about COVID-19 via the mechanism of trust in science, controlling for binarized gender (male = 1, female = -1),

education level, income level, and age, in Study 1;***, $p < .001$.

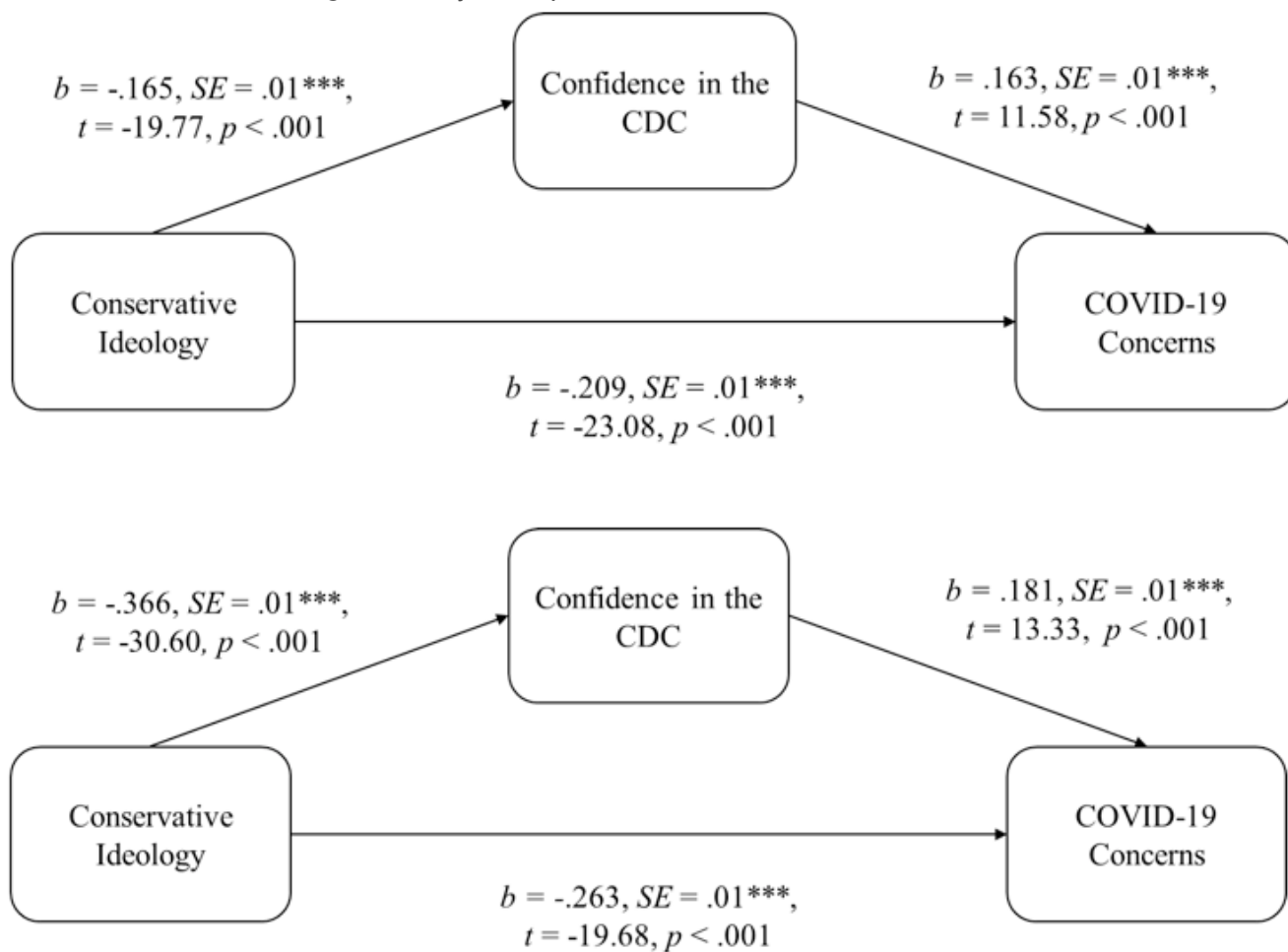


Figure 2

2a & 2b. Indirect effect test (Process Macro, Model 4, 10,000 bootstrapped samples) of conservative ideology on concerns about COVID-19 via the mechanism of trust in science, controlling for binarized gender (male = 1, female = -1), education level, income level, and age, in Study 2a (Figure 2a, top) and Study 2b (Figure 2b, bottom);***, $p < .001$.

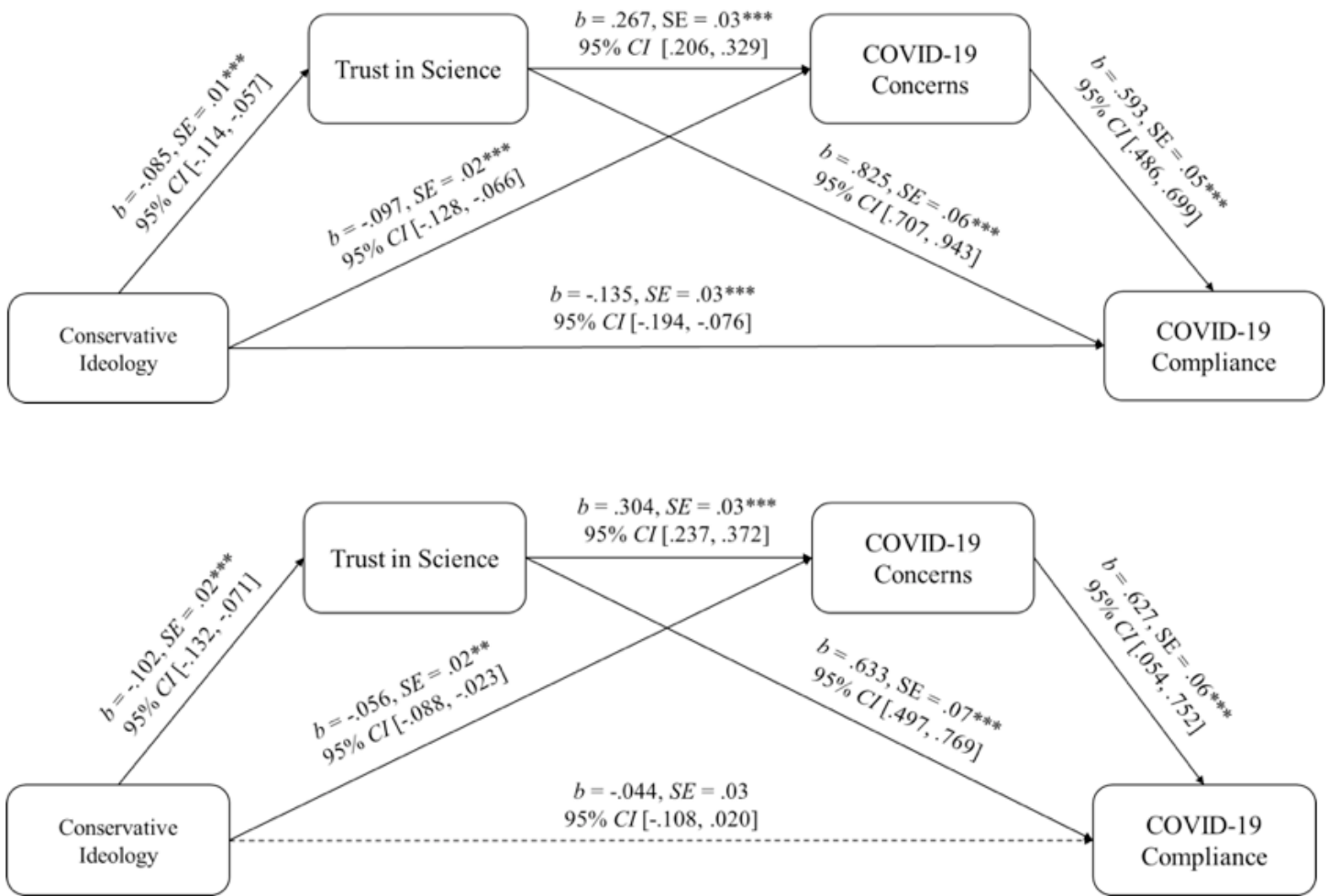


Figure 3

3a-3b. Indirect effect tests (Process Macro, Model 6, 10,000 bootstrapped samples) of conservative ideology on compliance to COVID-19 recommendations, via the indirect sequential pathways of trust in science and concerns about COVID-19, controlling for maleness (male = 1, not male = -1), income, education level, and age, in both Study 3a (Figure 3a, top) and 3b (Figure 3b, bottom). **, $p < .01$; *** $p < .001$.

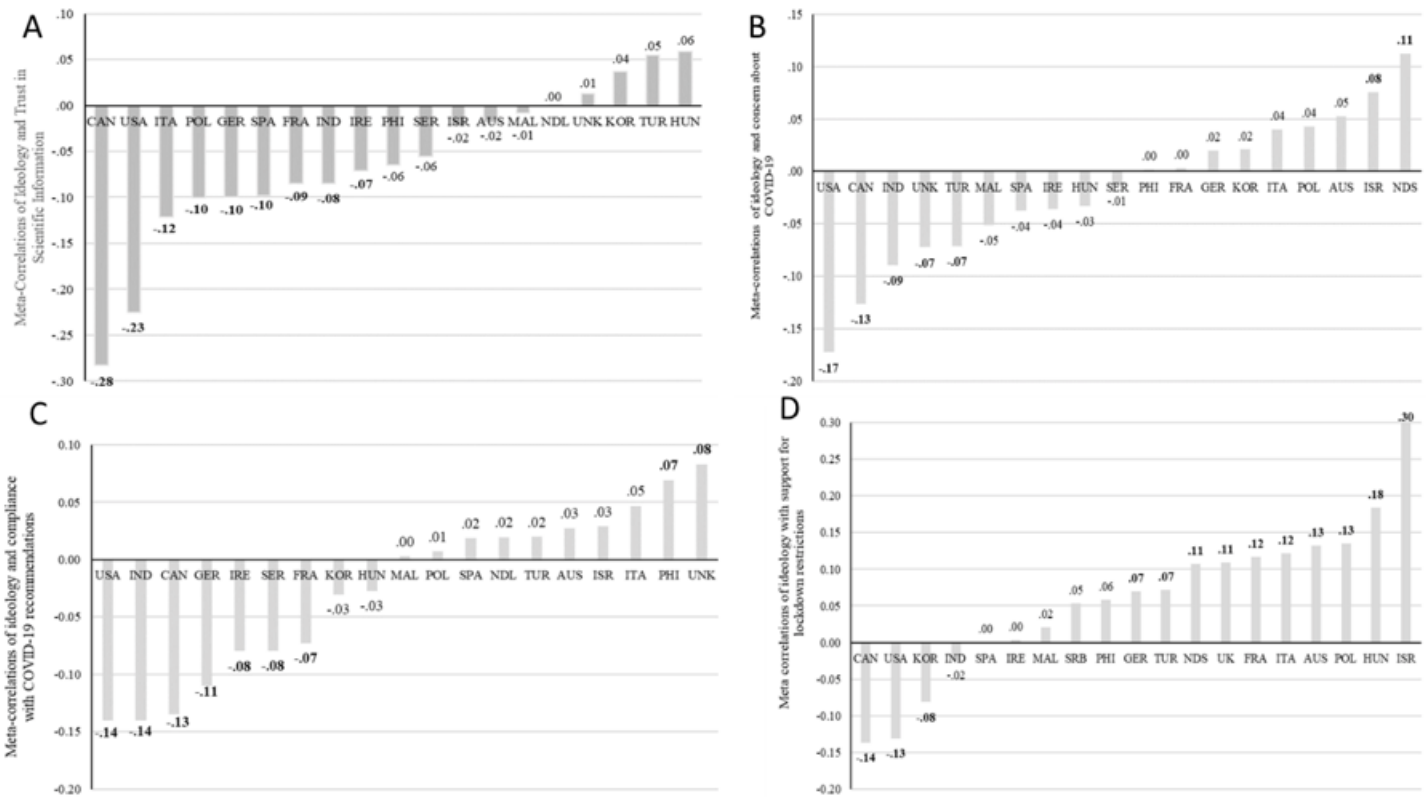


Figure 4

Visual depiction of meta-correlations between conservative/right wing political ideology and (a) trust in scientific information about coronavirus across the three cross-sectional waves for each country. Bolded values depict significant meta-correlations. Values > .08 are significant at $p < .05$, values > .09 are significant at $p < .01$, and values > .10 are significant at $p < .001$; (b) concern about contracting the coronavirus across the three cross-sectional waves for each country. Bolded values depict significant meta-correlations. Values > .08 are significant at $p < .05$, values > .09 are significant at $p < .01$, and values > .10 are significant at $p < .001$ (c) compliance with recommended preventative behaviors to avoid contracting or spreading the coronavirus across the three cross-sectional waves for each country. Bolded values depict significant meta-correlations. Values > .08 are significant at $p < .05$, values > .09 are significant at $p < .01$, and values > .10 are significant at $p < .001$; (d) support for lockdown restrictions across the three cross-sectional waves for each country. Bolded values depict significant meta-correlations. Values > .08 are significant at $p < .05$, values > .09 are significant at $p < .01$, and values > .10 are significant at $p < .001$.

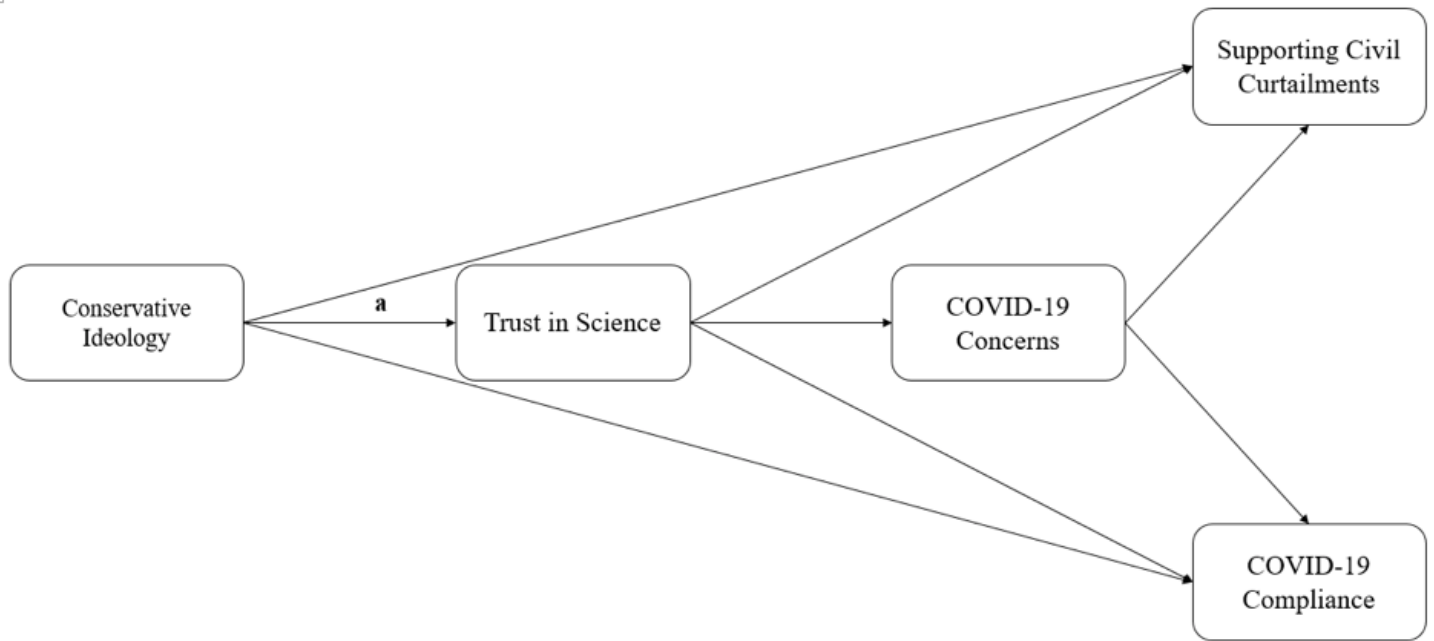


Figure 5

Path Model tested in each of the 19 countries. Path a is the path for which multigroup comparisons were estimated.

Supplementary Files

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- [IdeologyCOVIDSupplementaryMaterials8192021.docx](#)