



Perceptions of the ethical permissibility of strict travel restrictions to mitigate transmission of SARS-CoV-2

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ABSTRACT

Although there has been extensive exploration of public opinion surrounding many non-pharmaceutical interventions (NPIs) aimed at mitigating transmission of SARS-CoV-2 (e.g. mask-wearing and social distancing), there has been less discussion of the public's perception of the ethical appropriateness other NPIs. This paper presents the results of a survey of U.S. adults' opinions of the ethical permissibility of both state-to-state and international travel restrictions to mitigate transmission of SARS-CoV-2. Our research revealed overall high agreement with the ethical permissibility of both state-to-state and international travel restrictions, though we saw significant difference across political party affiliation and conservative/liberal ideologies. Other factors associated with agreement with state-to-state travel restrictions included increasing education, increasing income, and both high and low commitment altruism. When considering international travel restrictions, income, education, and low commitment altruism were associated with increased agreement with the ethical permissibility of international travel restrictions. Ethical analysis and implications are explored.

1. Introduction:

In December of 2019, the World Health Organization (WHO) was advised of the hospitalization of a patient with an unexplained pneumonia in the city of Wuhan, China (Andersen, et al., 2020; WHO, 2021). The virus was subsequently identified as SARS-CoV-2 and first appeared in the United States approximately a month later, on January 20, 2020 (IHME, 2021). By March of 2020, the virus was confirmed in more than 110 countries worldwide (Andersen, et al., 2020). As governments grappled with how to effectively mitigate transmission of this novel coronavirus, one early measure that was taken included limiting travel by people both within and between countries affected by the virus.

The United States issued its first global air travel restriction on February 2, 2020 (AJMC, 2021; Chinazzi, et al. 2020) and later expanded restrictions to include a complete ban on entry to the United States by non-Americans traveling from 26 European countries (AJMC, 2021). Whether related to these travel restrictions, various “stay-at-home” orders, or as a result of voluntary reductions in movement

(Abouk and Heydari, 2021; Jacobsen and Jacobsen, 2020), travel specifically in the United States declined sharply during this same time period. Notably, TSA records indicate air travel dropped from 2,151,626 travelers on March 31, 2019, to 136,023 travelers on March 31, 2020 (TSA, 2021). This is consistent with research demonstrating substantial reduction in mobility (Wellenius, et al., 2021) and use of “shared modes” of travel (e.g. public transportation, ride hailing, carshare) during the early months of the pandemic (Ozbilen, et al. 2021).

The relationship between disease spread and mobility is significant and complex. Rafiq, et al, provide an excellent summary of the existing literature concerning the relationship between mobility and spread of infectious diseases, including SARS-CoV-2. For example, as early as the 14th century during the bubonic plague pandemic, it was understood that limiting the movement of people would limit the spread of the disease. Similarly, during the first surge of the COVID-19 pandemic, mobility was the best predictor of daily cases (Rafiq, et al., 2022). Additionally, there is a significant “bi-directional relationship” between mobility and spread of infectious disease, meaning “mobility can affect

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the spread and the spread can also influence the mobility in reverse" (Rafiq, et al., 2022). This bi-directional relationship is illustrated in modeling that suggests increased vaccination may facilitate transmission as vaccination is positively correlated with human mobility (Guo et al., 2022).

A county-level analysis of this bi-directional relationship in the United States between January 2020 and April 2021 demonstrated, among other important findings, that even at the county level, human mobility had a positive effect on the COVID-19 infection rate (Rafiq, et al., 2022). Additionally, orders restricting mobility resulted in lower mobility indicating that regardless of public outcry, these orders do affect people's patterns of movement (Rafiq, et al., 2022).

Despite the ostensible positive effect of mobility restrictions on reduced transmission, restrictions on travel and mobility implicate important ethical considerations. WHO initially advised member nations against travel or trade restrictions in its February 29, 2020, "Recommendations for international traffic in relation to COVID-19 outbreak", noting in particular the threat such measures pose to dissemination of aid to affected counties (WHO, 2020). WHO has been relatively consistent in its criticism of travel restrictions even before this pandemic. For example, the April 4, 2019, IHR Report of the Director-General included a recommendation against travel bans related to an Ebola outbreak in the Democratic Republic of the Congo (WHO, 2019). Nevertheless, along with other non-pharmaceutical interventions (NPIs) such as social distancing, mask-wearing, and business and school closures, travel restrictions, both within and between countries, have been implemented by numerous countries in an attempt to limit the spread of this contagious virus (IHME, 2021). These restrictions have, in some instances, hampered the movement of essential medical personnel and supplies necessary to adequately respond to the pandemic (Devi, 2020). They further have impaired the ability to provide technical support for things like contact tracing to countries in the developing world and to utilize passenger aircraft to deliver cargo carrying PPE and ventilators (Devi, 2020).

While public opinion and compliance surrounding the two most common NPIs (i.e. mask-wearing and social distancing) have been well studied during the COVID-19 pandemic (Allcott, et al., 2020; Kahane, 2021; Kasting, et al. 2020; Wong, et al., 2020), there has been limited analysis of what might be considered more restrictive interventions: those implicating one's freedom of movement. In the United States, the federal restrictions on travel affected primarily international air traffic while state restrictions relative to travel have been inconsistent with fewer than half of states having any restriction whatsoever placed on individuals engaged in state-to-state travel (National Academy for State Health Policy, 2021). Of those that did, most were limited to quarantine requirements for out-of-state travelers, meaning those *entering* the state. This paper examines the public's perception of the ethical appropriateness of these arguably more intrusive government measures, specifically, (1) state and federal officials prohibiting residents from traveling to other states; and (2) federal officials prohibiting Americans from traveling to other countries.

2. Study data and methods

Detailed methodology has been previously published elsewhere (Head, et al., 2020; Kasting, et al. 2020; Sturm, et al., 2021). In brief, an online Qualtrics survey was conducted the week of May 4th-May 11th, 2020. Eligible participants (i.e., residents age 18 and older who could read and respond to an online survey in English) were recruited via e-mail invitation by Dynata, a survey research company that maintains panels of volunteer survey respondents who receive monetary compensation for participation. The study was given exempt status by the [blinded for review] Institutional Review Board.

2.1. Primary outcomes

This study examined participant agreement with the ethical permissibility of state-to-state and international travel restrictions during the COVID-19 pandemic. These two primary outcomes were assessed by asking participants' agreement with the following statements, "*During a pandemic like COVID-19, in order to protect citizens' health, it is ethical for state and federal officials to prohibit people from traveling to other states (state-to-state travel).*" and "*During a pandemic, in order to protect citizens' health, it is ethical for federal officials to prohibit people from traveling to other countries (i.e. international travel to and from the United States).*" Participants responded on a 5-point Likert scale with options of: Strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree. Each item was dichotomized so that we could compare those who agree or strongly agree with each travel restriction to those in the other three categories.

2.2. Covariates

Covariates fell into two categories: demographic variables and beliefs/attitudes. Demographic variables included age, sex, race/ethnicity, education, income, being employed in healthcare, and geographic location. Belief/attitudes variables included altruism, COVID-related beliefs, and political beliefs.

2.2.1. Altruism.

Participants were asked a modified version of a previously validated 18-item altruism scale (Rushton, et al. 1981). This original scale consisted of 18 questions assessing frequency of engagement in various altruistic activities (e.g. helping a stranger push their car out of the snow or mud) on a Likert-type scale from 1 = never to 5 = very often. The scale was modified to 17-items to reflect more modern altruistic activities. We conducted a principal components exploratory factor analysis, which extracted two factors. We labeled the first factor, which consisted of six items (Cronbach's $\alpha = 0.85$), high commitment altruism (i.e., behaviors that require a relatively high level of personal involvement; e.g., "I have, before being asked, volunteered to look after a neighbor's pets or children without being paid for it"). We labeled the second factor, which consisted of four items (Cronbach's $\alpha = 0.81$), low commitment altruism (i.e., behaviors that require a relatively low level of personal involvement; e.g., "I have given money to charity"). We calculated a mean score for each of the altruism subscales.

2.2.2. COVID-related beliefs.

Relevant beliefs included COVID-related worry, perceived severity, and perceived community threat. Worry and perceived severity were assessed with a three-term scale modified from the literature and posed only to those participants who had not had COVID. Worry was assessed with a three-item scale modified from the literature (Fan, et al., 2018; Liao, et al., 1998). Items assessed participants' worry related to getting COVID-19 on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree. The three items (Cronbach's $\alpha = 0.82$) were summed and averaged into a single scale with higher numbers indicating higher COVID-19-related worry. Perceived severity was measured using a modified four-item scale (Cahyanto, et al., 2016). Items assessed participants' perceptions of the severity of COVID-19 disease (e.g. "I am afraid that I may die if I contract COVID-19") on a scale of 1 (strongly disagree) to 5 (strongly agree) so that higher scores indicate higher perceived severity. The four items (Cronbach's $\alpha = 0.71$) were summed and averaged to derive a single perceived severity score. Perceived community threat was assessed with a single item, "Do you think COVID-19 infection is a major problem in your community?" with a binary yes/no response option.

2.2.3. Political beliefs.

We assessed both political ideology and political party affiliation.

Political ideology was assessed with a single question, “In general, how would you describe your political views?” with participants being classified as liberal, moderate, or conservative. They were then asked, “How would you describe your political party affiliation?” with response options including Democratic, Republican, Independent, Other, and prefer not to answer.

2.3. Data analysis

First, we described the sample using $n(\%)$ or means and standard deviations. We further described the sample by indicating the percentages (for continuous variables) or point-biserial correlations (for dichotomous variables) for each variable's association with each primary outcome. We then conducted binary logistic regression analyses separately for each variable with agreement with both state-to-state and international travel restrictions. Variables that were significant in bivariate analyses at $p < 0.01$ (this conservative cutoff was selected because of our large sample size) were included in subsequent two-step hierarchical logistic regression analysis. Specifically, demographic variables were entered in step 1, and attitudes/beliefs were entered in step 2. Statistical analyses were conducted using SPSS statistical software (SPSS Inc., version 25, Armonk, NY, 2017).

3. Findings

A total of 16,706 invitations were sent out for the survey, 4,042 people opened the survey, 351 indicated they did not wish to participate, and 42 indicated they were younger than 18 years. A total of 3,586 completed the survey and 3,499 answered both questions regarding travel restrictions and were included in the statistical analyses comparing the groups. The mean age of the sample was 45.7 ($SD = 16.9$); the sample was 47.6% male, 52.4% female, and 0.3% other. The majority of participants identified as non-Hispanic White (63.2%), with other groups represented, including non-Hispanic Black/African American (15.0%), and Hispanic (14.0%). For the primary outcomes, the majority of participants agreed with state-to-state travel restrictions (65.4%; $n = 2,288$), and even more agreed with international travel restrictions (75.7%; $n = 2,649$). State-to-state and international travel restriction responses were moderately, but not highly, correlated ($r = 0.59$, $p < 0.01$) (Table 1. Table 2. Table 3.).

3.1. State-to-State travel restrictions

In bivariate analyses, demographic factors that were associated with increased odds of agreeing with state-to-state travel restrictions included increasing age ($OR = 1.01$; 95% $CI = 1.00$ – 1.01), increasing education ($OR = 1.34$; 1.08 – 1.67 for graduate school vs. those with a high school diploma or less), increasing income ($OR = 1.45$; 95% $CI = 1.12$ – 1.88 for $>\$150,000/\text{year}$ vs $<\$25,000/\text{year}$), and never having worked in healthcare ($OR = 1.29$; 95% $CI = 1.06$ – 1.57). Demographic factors associated with decreased odds of agreeing with state-to-state travel restrictions were male sex ($OR = 0.74$; 95% $CI = 0.64$ – 0.85), and living in the Midwest, compared to the Northeast ($OR = 0.79$; 95% $CI = 0.64$ – 0.98). Health beliefs and attitudes associated with increased odds of agreement with state-to-state travel restrictions include high commitment altruism ($OR = 1.12$; 95% $CI = 1.04$ – 1.21), low commitment altruism ($OR = 1.46$; 95% $CI = 1.35$ – 1.58), worry ($OR = 1.82$; 95% $CI = 1.69$ – 1.96), severity ($OR = 1.45$; 95% $CI = 1.34$ – 1.57), and believing COVID-19 is a problem in one's community ($OR = 2.38$; 95% $CI = 2.06$ – 2.74). Odds of agreement with state-to-state travel restrictions decreased with more conservative ideologies ($OR = 0.54$; 95% $CI = 0.45$ – 0.66). In addition, every political affiliation was associated with decreased odds of agreeing with state-to-state travel restrictions, compared to those who identified as Democratic ($ORs = 0.39$ – 0.53).

In the hierarchical logistic regression, in step 1, only age ($aOR = 1.01$; 95% $CI = 1.00$ – 1.01) and male sex ($aOR = 0.69$; 95% $CI =$

0.58 – 0.81) were significant. When health beliefs were added in step 2, age was no longer significant, but sex remained significant. Furthermore, health beliefs that were associated with increased odds of agreeing with state-to-state travel restrictions included low commitment altruism ($aOR = 1.41$; 95% $CI = 1.24$ – 1.60), worry ($aOR = 1.53$; 95% $CI = 1.38$ – 1.69), and believing COVID-19 is a problem in one's community ($aOR = 1.55$; 95% $CI = 1.29$ – 1.87). High commitment altruism switched directions and was associated with decreased odds of agreeing with state-to-state travel restrictions ($aOR = 0.86$; 95% $CI = 0.76$ – 0.98). Political leaning was no longer significant in the adjusted model, but political party affiliation was, with every affiliation having a decreased odds in agreement as compared to those who identify with the Democratic party ($aORs = 0.53$ – 0.66). The adjusted r -squared value increased from 0.016 in step 1 to 0.167 in step 2.

3.2. International travel restrictions

In bivariate analyses, demographic factors associated with increased odds of agreeing with restrictions on international travel included increasing age ($OR = 1.03$; 95% $CI = 1.03$ – 1.04), increasing education ($OR = 1.63$; 1.28 – 2.08 for graduate school vs. those with a high school diploma or less), income ($OR = 1.35$; 95% $CI = 1.02$ – 1.79 for $>\$150,000/\text{year}$ vs $<\$25,000/\text{year}$), and never having worked in healthcare ($OR = 2.37$; 95% $CI = 1.93$ – 2.90). Demographic factors associated with decreased odds of agreeing with restrictions on international travel were race/ethnicity, with every race/ethnicity having lower odds of agreement compared to non-Hispanic White participants ($ORs = 0.53$ – 0.60). Health beliefs and attitudes that are associated with increased odds of agreement with an international travel ban include low commitment altruism ($OR = 1.81$; 95% $CI = 1.66$ – 1.98), worry ($OR = 1.76$; 95% $CI = 1.63$ – 1.90), severity ($OR = 1.23$; 95% $CI = 1.13$ – 1.34), believing COVID-19 is a problem in their community ($OR = 1.68$; 95% $CI = 1.43$ – 1.96). Odds of agreement with international travel restrictions decreased with moderate political ideology ($OR = 0.82$; 95% $CI = 0.67$ – 1.00) but was not significant for more conservative ideologies. In addition, every political affiliation was associated with decreased odds of agreeing with restrictions on international travel, compared to those who identified as Democratic ($ORs = 0.34$ – 0.77).

In the hierarchical logistic regression, in step 1, age ($aOR = 1.02$; 95% $CI = 1.02$ – 1.03), income ($aOR = 1.38$; 95% $CI = 1.07$ – 1.78 for $\$75,000$ – $\$150,000$ compared to $<\$25,000$), and never having worked in healthcare ($aOR = 1.80$; 95% $CI = 1.38$ – 2.34) were significantly associated with increased odds in agreeing with international travel restrictions. Non-Hispanic Other race/ethnicity was associated with decreased odds in agreement, compared to non-Hispanic White participants ($aOR = 0.71$; 95% $CI = 0.52$ – 0.98). When the health beliefs were added in step 2, age and working in healthcare were the only demographic variables that remained significant. Furthermore, health beliefs that were associated with an increased odds of agreeing with an international travel ban included low commitment altruism ($aOR = 1.57$; 95% $CI = 1.40$ – 1.76), worry ($aOR = 1.73$; 95% $CI = 1.55$ – 1.94), and believing COVID-19 is a problem in their community ($aOR = 1.55$; 95% $CI = 1.29$ – 1.87). Severity switched directions and was associated with decreased odds in agreeing with international travel restrictions ($aOR = 0.81$; 95% $CI = 0.71$ – 0.92). There were no significant differences in agreement with restrictions on international travel between Democratic and Republican respondents, but Independent ($aOR = 0.63$; 95% $CI = 0.42$ – 0.80) and other/no answer ($aOR = 0.48$; 95% $CI = 0.33$ – 0.68) both had decreased odds in agreement. The adjusted r -squared value increased from 0.076 in step 1 to 0.209 in step 2.

4. Discussion

To our knowledge, this is the only analysis of whether the American public view travel restrictions as an ethically permissible option to combat transmission of SARS-CoV-2. Our research suggests that early in

Table 1
Descriptive Statistics and Binary Logistic Regression Results for Support for Travel Restrictions.

	% (n) OrMean (SD)	Support for State-to-State Travel Ban: Percentages (categorical variables) and point- biserial correlations (continuous variables)	OR (95%CI)	Support for International Travel Ban: Percentages (categorical variables) and point- biserial correlations (continuous variables)	OR (95%CI)
State-to-State Travel Ban					
Disagree	34.6% (1,211)				
Agree	65.4% (2,288)				
International Travel Ban					
Disagree	24.3% (850)				
Agree	75.7% (2,649)				
Demographic & Background:					
Age	45.70 (16.91)	0.063	1.01 (1.00–1.01)**	0.21	1.03 (1.03–1.04)**
Sex					
Female	52.4% (1822)	68.6%	Ref	76.8%	Ref
Male	47.6% (1652)	61.7%	0.74 (0.64–0.85)**	74.6%	0.89 (0.76–1.04)
Other	0.3% (10)				
Race/Ethnicity					
White-NH	63.2% (2,189)	65.4%	Ref	79.7%	Ref
Black-NH	15.0% (518)	63.7%	0.93 (0.76–1.13)	68.9%	0.56 (0.46–0.70)**
Other-NH	7.8% (269)	66.3%	1.04 (0.84–1.28)	67.7%	0.53 (0.40–0.70)**
Hispanic	14.0% (486)	66.5%	1.05 (0.80–1.38)	70.4%	0.60 (0.48–0.75)**
Education					
HS Grad or Less	23.7% (817)	60.6%	Ref	70.0%	Ref
Some College	28.3% (975)	66.5%	1.28 (1.05–1.55)*	77.1%	1.44 (1.17–1.78)**
Bachelor's	29.1% (1,005)	66.6%	1.28 (1.06–1.55)*	76.9%	1.43 (1.16–1.76)**
Grad School	19.0% (654)	67.6%	1.34 (1.08–1.67)**	79.2%	1.63 (1.28–2.08)**
Income					
< \$25,000	31.4% (1,071)	61.6%	Ref	71.6%	Ref
\$25,000–\$75,000	30.6% (1,044)	65.8%	1.20 (1.00–1.43)*	76.3%	1.28 (1.05–1.55)*
\$75,000–\$150,000	27.6% (939)	67.6%	1.30 (1.08–1.56)**	79.4%	1.53 (1.25–1.88)**
> \$150,000	10.4% (353)	70.0%	1.45 (1.12–1.88)**	77.3%	1.35 (1.02–1.79)*
Employed in Healthcare					
Currently	15.4% (526)	60.8%	Ref	62.5%	Ref
In the Past	15.0% (512)	65.4%	1.22 (0.95–1.57)	72.3%	1.56 (1.20–2.03)**
Never	69.5% (2,369)	66.7%	1.29 (1.06–1.57)*	79.8%	2.37 (1.93–2.90)**
US Region					
Northeast	20.6% (714)	66.2%	Ref	75.2%	Ref
Southeast	26.0% (901)	66.6%	1.02 (0.82–1.25)	76.7%	1.08 (0.86–1.36)
Midwest	21.7% (751)	60.7%	0.79 (0.64–0.98)*	75.4%	1.01 (0.80–1.28)
Southwest	10.8% (373)	67.0%	1.04 (0.79–1.35)	78.0%	1.17 (0.87–1.58)
West	21.0% (726)	67.8%	1.07 (0.86–1.34)	75.1%	0.99 (0.78–1.26)
Beliefs & Attitudes:					
High Commitment	2.53 (0.94)	0.05	1.12 (1.04–1.21)**	0.02	1.05 (0.97–1.14)
Altruism	3.39 (0.91)	0.16		0.23	

(continued on next page)

Table 1 (continued)

	% (n) OrMean (SD)	Support for State-to-State Travel Ban: Percentages (categorical variables) and point- biserial correlations (continuous variables)	OR (95%CI)	Support for International Travel Ban: Percentages (categorical variables) and point- biserial correlations (continuous variables)	OR (95%CI)
Low Commitment Altruism			1.46 (1.35–1.58)**		1.81 (1.66–1.98)**
COVID-19 Worry	3.47 (1.08)	0.30	1.82 (1.69–1.96)**	0.26	1.76 (1.63–1.90)**
COVID-19 Severity	2.86 (0.95)	0.16	1.45 (1.34–1.57)**	0.08	1.23 (1.13–1.34)**
COVID-19 a Problem in your Community					
No	42.2% (1,455)	54.3%	Ref	70.5%	Ref
Yes	57.8% (1,989)	73.9%	2.38 (2.06–2.74)**	80.0%	1.68 (1.43–1.96)**
Political Leanings					
Liberal	31.7% (1,039)	72.7%	Ref	76.8%	Ref
Moderate	38.3% (1,255)	65.7%	0.72 (0.60–0.86)**	75.1%	0.82 (0.67–1.00)*
Conservative	30.0% (985)	59.1%	0.54 (0.45–0.66)**	76.5%	0.89 (0.72–1.09)
Party Affiliation					
Democratic	36.9% (1,270)	75.3%	Ref	81.4%	Ref
Republican	28.0% (964)	59.2%	0.48 (0.40–0.57)**	77.2%	0.77 (0.63–0.95)*
Independent	27.1% (932)	61.7%	0.53 (0.44–0.64)**	71.7%	0.58 (0.47–0.71)**
Other/Prefer not to answer	8.0% (274)	54.0%	0.39 (0.30–0.50)**	59.9%	0.34 (0.26–0.45)**

* p < 0.05

** p < 0.01

Table 2
Two-Step Hierarchical Logistic Regression for State-to-State Travel Restrictions
(N = 2780).

	Step 1AOR (95% CI)	Step 2AOR (95% CI)
Demographic & Background:		
Age	1.01 (1.00–1.01)**	1.00 (1.00–1.01)
Sex		
Female	Ref	Ref
Male	0.69 (0.58–0.81)**	0.84 (0.70–1.00)*
Education		
HS Grad or Less	Ref	Ref
Some College	1.06 (0.85–1.33)	0.94 (0.74–1.20)
Bachelor's	1.04 (0.82–1.31)	0.81 (0.63–1.05)
Grad School	1.00 (0.76–1.31)	0.76 (0.57–1.02)
Income		
< \$25,000	Ref	Ref
\$25,000–\$75,000	1.18 (0.96–1.44)	1.13 (0.90–1.40)
\$75,000–\$150,000	1.18 (0.94–1.48)	1.15 (0.90–1.47)
> \$150,000	1.25 (0.91–1.70)	1.15 (0.82–1.60)
Beliefs & Attitudes:		
High Commitment Altruism		0.86 (0.76–0.98)*
Low Commitment Altruism		1.41 (1.24–1.60)**
COVID-19 Worry		1.53 (1.38–1.69)**
COVID-19 Severity		1.03 (0.92–1.15)
COVID-19 a Problem in your Community		
No		Ref
Yes		1.55 (1.29–1.87)**
Political Leanings		
Liberal		Ref
Moderate		1.10 (0.85–1.43)
Conservative		1.07 (0.85–1.34)
Party Affiliation		
Democratic		Ref
Republican		0.57 (0.44–0.73)**
Independent		0.66 (0.52–0.83)**
Other/No Answer		0.53 (0.35–0.80)**

* p < 0.05

** p < 0.01

the pandemic, there was overall support for travel restrictions with 65.31% of all participants either agreeing or strongly agreeing that it is ethically appropriate for state and federal officials to prohibit state-to-state travel. There was even higher agreement with the ethical permissibility of restrictions on international travel with 75.49% of respondents indicating they either agreed or strongly agreed that such measures were ethical.

Despite high overall support for both measures, support for the ethical permissibility of both state and international travel restrictions declined in association with any political party affiliation other than Democrat. However, when considering political ideology and state-to-state travel restrictions, only those who self-identified as conservative demonstrated decreased agreement with the ethical permissibility of the restrictions. This is in contrast with international travel restrictions, for which those who identified as politically “moderate” showed decreased agreement. Additionally, when health beliefs were added in Step 2 of the regression, Democrats and Republicans did differ in their support for state-to-state travel restrictions (with Republicans showing decreased likelihood of support). However, when considering international travel restrictions, the addition of health beliefs in Step 2 of the regression revealed no difference in agreement between Republicans and Democrats.

In considering the relationship between political party affiliation and decreased support for state-to-state travel restrictions, one explanation for this may be tied to attitudes towards individual liberties, states' rights, and suspicion of “big government” which tend to track party lines (GALLUP, 2017; Parker, et al., 2019; Pew Research, 2010; Quinnepiac, 2017). Thus, those identifying as ideologically “conservative” unsurprisingly resemble their political party analogue. However, recent “travel bans,” including most notably Executive Order (EO) 13,769 “Protecting the Nation from Foreign Terrorists Entry into the United States” during the Trump Administration, were not supported by a majority of Americans and were particularly unpopular among Democrats (Quinnepiac, 2017), as they were felt by many to unfairly target racial and ethnic minority populations, particularly immigrant and

Table 3

Two-Step Hierarchical Logistic Regression for International Travel Restrictions (N = 2875).

	Step 1AOR (95% CI)	Step 2AOR (95% CI)
Demographic & Background:		
Age	1.02 (1.02–1.03)**	1.02 (1.01–1.03)**
Race/Ethnicity		
White-NH	Ref	Ref
Black-NH	0.93 (0.72–1.21)	0.90 (0.68–1.20)
Other-NH	0.71 (0.52–0.98)*	0.83 (0.59–1.17)
Hispanic	0.96 (0.72–1.27)	0.90 (0.67–1.22)
Education		
HS Grad or Less	Ref	Ref
Some College	1.24 (0.97–1.59)	1.05 (0.81–1.37)
Bachelor's	1.10 (0.85–1.43)	0.80 (0.60–1.06)
Grad School	1.32 (0.97–1.80)	0.97 (0.69–1.35)
Income		
< \$25,000	Ref	Ref
\$25,000–\$75,000	1.34 (1.07–1.68)*	1.10 (0.86–1.40)
\$75,000–\$150,000	1.38 (1.07–1.78)*	1.07 (0.81–1.41)
>\$150,000	1.25 (0.88–1.79)	0.92 (0.63–1.35)
Employed in Healthcare		
Currently	Ref	Ref
In the Past	1.34 (0.97–1.86)	1.39 (0.98–1.97)
Never	1.80 (1.38–2.34)**	1.89 (1.42–2.52)**
Beliefs & Attitudes:		
Low Commitment Altruism		1.57 (1.40–1.76)**
COVID-19 Worry		1.73 (1.55–1.94)**
COVID-19 Severity		0.81 (0.71–0.92)*
COVID-19 a Problem in your Community		
No		Ref
Yes		1.31 (1.06–1.62)**
Party Affiliation		
Democratic		Ref
Republican		0.83 (0.64–1.08)
Independent		0.63 (0.42–0.80)**
Other/No Answer		0.48 (0.33–0.68)**

Exhibit List:**EXHIBIT 1 (table)**

Caption: Descriptive Statistics and Binary Logistic Regression Results for Support for Travel Restrictions

Source: Authors' analysis

EXHIBIT 2 (table)

Caption: Two-Step Hierarchical Logistic Regression for State-to-State Travel Restrictions (N = 2780)

Source: Authors' analysis

EXHIBIT 3 (table)

Caption: Two-Step Hierarchical Logistic Regression for International Travel Restrictions (N = 2875)

Source: Authors' analysis

* p < 0.05

** p < 0.01

Muslim communities (Quinnepiac, 2017) – so much so, that the EO was colloquially referred to as the “Muslim Ban.” It seems plausible that this high-profile national conversation may have had some impact on the perception of Democrat and moderate respondents when confronted with questions of the ethical permissibility of what is effectively another international travel ban. This might also explain why race and ethnicity do not appear as significant predictors of views of the ethical permissibility of state-to-state travel restrictions, but *do* become significant predictors of decreased agreement with international travel restrictions.

These findings may also be understood in the light of implementation of actual international travel restrictions during this pandemic, specifically restricting travel to and from China. Some media outlets characterized these measures as xenophobic and part of the same racially motivated behavior that gave rise to use of pejorative phrases like “The China Virus” and “The Wuhan Flu” (Campbell, 2020; Ollstein, 2020; Penney, 2020). As participants were not invited to explain why they opposed or supported one view over another, further research which

queries individuals' reasoning for their responses may assist particularly in better understanding discordant attitudes towards state-to-state and international travel restrictions in the face of a public health crisis.

In addition to these unanticipated findings, we also noted that in Step 2 of our regression, high commitment altruism switched from predicting agreement with state-to-state restrictions to predicting views that such restrictions were *not* ethically permissible. Thus, when various health behaviors such as individual worry about contracting or becoming severely ill from COVID were factored in, high commitment altruism correlated with decreased rather than increased agreement with the restrictions.

It is unclear what led to this phenomenon, which implicates more targeted research to identify the source of this result. However, one possible explanation may be that in the presence of negative views about one's individual risk of harm from COVID, a concern for others (as is inherent in altruistic behaviors) translates to an agreement that it is ethically permissible to “escape” the risk, thus a decreased agreement with restrictions on that ability to escape. Similarly, in Step 2 of our regression, perceived severity of COVID (i.e. concern that one may die if they contract COVID) switched from predicting agreement with international travel restrictions to predicting decreased agreement perhaps for similar reasons.

As a final matter, one's receptiveness to mitigation measures undertaken by federal and state governments, broadly, must be understood in the light of significant levels of distrust of public health organizations. Research by the Robert Wood Johnson Foundation and the Harvard School of Public Health found that although positive ratings of the medical system increased between 2009 and 2020 (from 36% to 51%, respectively), the public's perception of the public health system declined during that same period of time (from 43% to 34%, respectively) (Robert Wood Johnson Foundation, 2021). Importantly, less than half of Americans surveyed above indicated “a great deal of trust” in: their local health department (44%); their state health department (41%); the Surgeon General (40%); the NIH (37%); and the Department of Health and Human Services (33%).

This lack of trust tracks party lines, as well. Significantly fewer Republicans than Democrats indicated a “great deal of trust” in key public health organizations, and this was consistent across every level of government as compared to Democrats: local health department (38% v. 53%), state health department (22% v. 59%), and Department of Health and Human Services (22% v. 43%) (Robert Wood Johnson Foundation, 2021). Our study did not analyze these variables or measure trust within the context of support for travel bans; though future research examining the relationship between political affiliation, trust, and views of individual public health entities could be fruitful.

Despite the unusual results in Step 2 of our regression, the overall, broad agreement with travel restrictions gives rise to important considerations regarding the potential consequences of instituting such restrictions, particular international travel restrictions. As has been previously articulated in the literature, the spread of infectious diseases is strongly determined by the travel patterns of individuals between regions (Camitz and Liljeros, 2006). This is a reflection of “outbreak dynamics” as a combination of both “the local epidemiology of the disease and the global mobility of diseased individuals” (Linka, et al., 2020). This has been illustrated with the global spread of SARS-CoV-2 in which regional and international travel has contributed to the pandemic (Petersen, et al., 2020) suggesting that restriction of mobility may be a “highly effective measure to manage the outbreak dynamics” (Linka, et al., 2020). Research specifically as to the SARS-CoV-2 pandemic has demonstrated clear benefit from travel restrictions. For example, modeling done by Chinazzi, et al, of the initial February 2020 international travel bans demonstrated a “77% reduction in cases imported from mainland China to other countries.”

Despite the association between international travel and spread of infectious diseases, as noted above the WHO and others have warned that “travel bans” “are usually not effective in preventing the

importation of cases, but have a significant economic and social impact” (Petersen, et al., 2020). Still, others have noted that restrictions on international travel merely delay the spread of infectious diseases, and that the effect is short-lived unless combined with measures aimed at reducing transmissibility such as detection and isolation of infected individuals along with the use of NPIs in the population (Chinazzi, et al., 2020; Huizer, et al., 2015). This is particularly true when considering air travel for which research demonstrates relative ineffectiveness of measures such as exit and entry screening, quarantine, or travel restrictions (Huizer, et al., 2015; Swaan, et al., 2014). Accordingly, the concerns of WHO pertaining to the negative economic impact of travel restrictions – a phenomenon that disproportionately impacts poor and developing nations – should be understood in the light of a merely temporary and limited benefit of delayed spread.

Ultimately, this places our study in the ironic position of indicating generally high support for a significant restriction on freedom of movement, in the face of research suggesting that less burdensome efforts (e.g. mask-wearing) are likely to have a much more significant impact on mitigating transmission (Huizer, et al., 2015; IHME, 2021). This dissonance may be somewhat contextualized by the time period of data collection (May 2020) when anxiety about the virus was high and the full-scale politicization of NPIs had not yet completely unfolded. Mask-wearing in particular has become a partisan activity which implicates in-group behavior. Interestingly, research has shown that receptivity to mask-wearing corresponds with shared *political* information rather than perceptions of risk (Howard, 2022) or effectiveness (Kasting et al., 2020). Travel has not entered the political discussion to this same degree or in quite so explicit terms. Moreover, mask-wearing has become, at least in part, an outward expression of political party affiliation, making it to some extent analogous to wearing a team hat or campaign t-shirt. Travel, whether domestic or international, does not implicate personal expression in this same way.

Additionally, travel restrictions and mask-wearing, while both NPIs, are not otherwise similar: a travel restriction may have limited impact on an individual affecting perhaps only one or two planned trips, while mask-wearing is a repeated behavior one must enact daily. Future research may clarify the different levels of support and agreement for various NPIs during this pandemic.

4.1. Limitations

Our study does have some limitations. At the time data were collected (May 2020), there was no vaccine available and it was unknown whether and when one would become widely accessible. Thus, the evaluation of the ethical permissibility of travel restrictions is necessarily from the vantage point of limited pharmaceutical interventions. Additionally, while the study includes a large aggregate number of individuals, it is not a representative U.S. sample. Because of this, we were unable to extrapolate our findings to regional or state-specific views and, therefore, have not attempted to do so in this paper. Moreover, these data are self-reported and are therefore subject to recall and social desirability biases. However, given the anonymous nature of the survey, we believe the social desirability bias is minimized. Further, because there was no opportunity for participants to expound on their impressions of these restrictions as ethically appropriate, it is difficult to deduce the source of the unexpected difference in demographics between state and federal travel restrictions. Finally, while participants in our study indicated a general impression of travel restrictions as ethically permissible, this may not translate to a general willingness by Americans to acquiesce to such restrictions. The public’s understanding of mask-wearing as effective in contrast to its practice of actually wearing masks (Kasting, et al., 2021) is an example of the dissonance between what the public know, believe, and understand, and what behavior they are willing to exhibit.

5. Conclusion

As the United States continues to grapple with the SARS-CoV-2 pandemic, and on the heels of the most recent, short-lived, travel restrictions issued by the Biden Administration in response to the emergence of the omicron variant (The White House, 2021), we are left to examine the approaches taken to limiting the transmission of this deadly virus. Despite relatively high support for strict travel restrictions at both a state-to-state and international level, one of the most effective NPIs in combatting the spread of SARS-CoV-2 – wearing a mask (Zhang and Warner, 2020) – is much less burdensome, though it has proved considerably more polarizing in the general public. In addition, the availability of vaccines to prevent COVID-19 disease and reduce viral transmission, while not an NPI, is likely to have the most profound effect on the pandemic. Unfortunately, research suggests overlap in those who refuse to wear masks, refuse vaccination, and oppose travel restrictions, creating a challenge for public health communication and policy.

Although our research reveals some of the same demographic features that have shaped public opinion throughout much of this pandemic response, it also demonstrates a general willingness by the public to view fairly restrictive regulations by the government as ethically permissible. This suggests a need for additional research to examine some of the nuances of people’s views of the role of government in mitigating the spread of infectious diseases. Particular attention is warranted with respect to the differing views of state versus international travel restrictions, in addition to whether people would view restrictions on entry to the United States differently than restrictions on travel out of the United States – a distinction our study did not make. Further research may also be helpful in better understanding why perceptions related to severity and worry resulted in an elimination of political party as a predictor of support for the ethical permissibility of the restriction. Ultimately, our research demonstrates that the role of politics cannot be ignored when assessing public support for crisis-related policies, and this has been repeatedly made evident in other areas of pandemic response.

Finally, ethics is fundamentally an inquiry into what is right or good. Views of what is good may not align with a receptiveness to the policy itself once implemented. The potential dissonance between an understanding of what is the right thing to do and a willingness to perform that behavior, particularly in the context of a public health crisis where one’s behavior has implications for both oneself and others, has significant implications for researchers in philosophy, ethics, and psychology. Given the warnings of experts that global pandemics are likely not to be “once in a century” occurrences going forward (Tollefson, 2020), it is imperative to understand the way the public approaches the various restrictions governments are likely to institute to curb transmission of infectious diseases.

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Declaration of Competing Interest

The authors declare that they have no known competing financial

interests or personal relationships that could have appeared to influence the work reported in this paper.

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