



2023

A Randomized Experiment on the Effects of Moral Appeals on U.S. Parents' Intentions to Vaccinate Their 5e11-Year-Old Children Against COVID-19

Xiao Wang

Jie Xu

Follow this and additional works at: <https://digital.car.chula.ac.th/jhr>

2586-940X/© 2023 The Authors. Published by College of Public Health Sciences, Chulalongkorn University. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

A Randomized Experiment on the Effects of Moral Appeals on U.S. Parents' Intentions to Vaccinate Their 5–11-Year-Old Children Against COVID-19

Xiao Wang ^{a,*}, Jie Xu ^b

^a Rochester Institute of Technology, USA

^b Villanova University, USA

Abstract

Background: Democrats and Republicans in the United States were divided on their COVID-related risk perceptions and their adoption of preventive measures (e.g., getting vaccinated). Based on moral foundations theory and the matching hypothesis, this study hypothesized that parents with a Democratic affiliation would be persuaded by messages featuring a harm/care or a fairness moral appeal, whereas parents with a Republican affiliation would be persuaded by messages featuring an authority or ingroup loyalty appeal.

Method: An experiment was conducted among 567 parents with children aged 5–11, whereby each participant was randomly assigned to read one of the four moral appeals or a control message. Each participant then completed a questionnaire.

Results: The results showed that, in general, the moral appeals did not interact with parents' political affiliations, and the moral appeal messages did not significantly increase the parents' risk perceptions or vaccine uptake intent for their children. Additional analysis showed that trust in government and future orientation were strong predictors of parents' risk perceptions and vaccine uptake intent, whereas COVID fatigue was a weak predictor of their message evaluation.

Conclusion: Moral framing in persuasive messages may have limited effects on a health problem widely known to the public. Instead, participants' internalized value orientations and personal differences may be more predictive of their attitudes and adoption of preventive measures.

Keywords: COVID-19, Vaccine uptake intent, Parents, Moral appeals, Political affiliation

1. Introduction

After a highly politicized pandemic and the 2020 U.S. presidential election, Democrats and Republicans in the United States have shown different levels of risk perceptions toward COVID-19 in general and mistrust toward COVID-19 vaccines in particular [1,2]. Republicans, compared with Democrats, perceive lower COVID-19 risks and have higher vaccine hesitancy [1]. When facing a decision to vaccinate their children, parents of different political affiliations can exhibit similar risk perceptions and vaccine uptake intent for their children. Nine months after the U.S. Food and Drug Administration's Emergency Use Authorization for use among

children 5–11 years of age, statistics show that the full vaccination rates among children aged 5–11 were lower in the more Republican-affiliated states than in the more Democrat-affiliated states [3]. For example, the full vaccination rates among children aged 5–11 in New York, Connecticut, and Massachusetts were 39%, 45%, and 52%, respectively. In contrast, the full vaccination rates in Indiana, Tennessee, and Alabama were 21%, 17%, and 12% [3].

Recent theorizing and opinions often regard vaccinating against COVID-19 or getting children vaccinated as a moral act [4]. The use of moral appeals can help facilitate attitude and behavioral change: Different moral appeals are more effective when matched with the target audience's political affiliation [5]. This randomized experiment thus

Received 1 August 2022; revised 1 September 2022; accepted 7 September 2022.
Available online 1 March 2023

* Corresponding author.
E-mail address: [hsiaowang@gmail.com](mailto:hxiaowang@gmail.com) (X. Wang).

<https://doi.org/10.56808/2586-940X.1022>

2586-940X/© 2023 The Authors. Published by College of Public Health Sciences, Chulalongkorn University. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

explores the efficacy of using moral appeals among parents with Democratic and Republican affiliations. In addition, it aims to understand the reasons that underlie parents' vaccine uptake intent for their children. Such an investigation can help understand the efficacy or failure of the health marketing strategies in the United States. This is particularly important because the United States has been a hotbed for COVID-19 infections and deaths. Higher rates of vaccine uptake can help contain COVID-19 and protect children's and adults' health [3].

Moral foundations theory states that human morality is pluralistic and that five major moral foundations underlie human thinking and behavior [6]. These moral foundations include harm/care (i.e., care for and not inflict harm on others), fairness (i.e., reciprocity, equality, and justice), ingroup loyalty (e.g., loyal to one's group), authority (e.g., respect the authority and tradition), and purity (i.e., being pure from a religious perspective). Although different groups may subscribe to all five moral foundations, they may emphasize some but not others [6]. More specifically, Democrats in the United States emphasize harm and fairness, whereas Republicans subscribe to ingroup loyalty, authority, and purity [6].

The matching hypothesis states that when a (moral) value appeal in a message is matched with the value that an audience holds, the audience will assign higher importance and relevance to the message than one that contains a mismatched value appeal [7]. Furthermore, the literature on moral framing [8] states that using a moral value in persuasive messaging, if matched with the value orientation among the intended target audience, can guide the audience's moral thinking and provide an interpretive context for them. Hence, it can be more persuasive when information (e.g., risk) is communicated through a moral appeal matched with parents' moral values.

Our observations show that COVID-19 messaging in the United States and the world has used various moral appeals. COVID-19 can inflict severe illness and death and disrupt one's daily routines, work, and schooling. Vaccination can help prevent children from contracting COVID-19 (i.e., harm/care) or promote a healthy country or group (i.e., ingroup loyalty). It is also fair for every parent to vaccinate their children instead of hoping for other parents to vaccinate their children to prevent community spread (i.e., fairness). Lastly, vaccination messages can be conveyed via authoritative figures or health departments, for example, Pope Francis [4] or health commissioners. Considering the harm/care moral appeals, it is parents' responsibility to care for their

children and prevent them from contracting COVID-19. Based on the theorizing in the preceding paragraph, when risks or the suffering associated with COVID-19 are conveyed along with a harm/care moral value (vs. without), parents will be more likely to have more favorable message evaluation, heightened risk perceptions, and vaccine uptake intent.

However, there is a caveat to the relationships discussed above. Political affiliation can moderate the effectiveness of moral appeals. According to Graham et al. [6], liberals (e.g., Democrats) are more likely to value harm/care and fairness, whereas conservatives (e.g., Republicans) are more likely to value ingroup loyalty and authority. As such, harm/care and fairness moral appeals will be more effective for political liberals than conservatives because they value harm/care and fairness. At the same time, ingroup loyalty and authority appeals will be more effective for political conservatives than liberals. Feinberg and Willer [5] found that after seeing a message advocating the use of English as the official language of the United States, political liberals (vs. conservatives) showed stronger support when the argument was made from a fairness perspective. In contrast, political conservatives (vs. liberals) showed stronger support when the argument was made from the authority perspective. Democrats used and were more persuaded by moral appeals related to harm/care and fairness (vs. the other three moral values), whereas Republicans used and were more persuaded by moral appeals related to ingroup loyalty, authority, and religious purity/sanctity [e.g., 5]. Based on the preceding, this project will examine the following:

H1. (a) Harm/care and (b) fairness moral appeals will elicit stronger perceptions of COVID risks, COVID vaccine benefits and safety, value-expressive attitudes, and intention to vaccinate their children among parents with a Democratic affiliation than with a Republican affiliation.

H2. (a) Ingroup loyalty and (b) authority moral appeal will elicit stronger risk perceptions, COVID vaccine benefits, value-expressive attitudes, and intentions to vaccinate their children among parents with a Republican affiliation than with a Democratic affiliation.

Previous research has provided some preliminary evidence that several other factors can influence individuals' reception of COVID-19 messages and prevention, including COVID-19 fatigue [e.g., 9, 10], future orientation [11], and trust in government [12]. Therefore, the present research will statistically

control for the influence of these variables using regression analysis and further explore the relationships between them and message evaluation, risk perceptions, and parents' vaccine uptake intent for their 5-11-year-old children.

2. Method

2.1. Procedure and sample

A randomized online experiment was conducted to examine the effectiveness of moral appeals (harm/care, fairness, ingroup loyalty, authority, and control). G*Power was used to determine the sample size: We set alpha to .05 and power to .80. The number of experimental groups was five, and a small-medium effect size $f = 0.17$ was used. The required sample size was 418. Alternatively, a sample of 567 could detect an effect size $f = 0.15$. Participants were randomly assigned by Qualtrics' online survey algorithm to view one of the five moral appeal messages and then responded to several batteries of questions. There were approximately equal numbers of participants in each condition.

The final sample ($N = 567$) included a Qualtrics sample of 496 participants and an MTurk sample of 71 participants in November and December 2021. For the Qualtrics sample, Qualtrics coordinated data collection, including setting a quota of racial composition to mirror that of the United States, sending the survey link to randomly sampled panel members, and screening those to meet the criteria for participation (i.e., parents with children ages 5–11). A total of 1318 Qualtrics panel members first answered screening questions related to their parental status and the age of their children. Those who had children aged 5–11 continued the experiment and read an informed consent form. Due to Qualtrics' difficulty recruiting male parents, additional data were collected via Amazon Mechanical Turk, resulting in a sample of 71 male parents. Independent-samples t tests showed no differences in the dependent variables between the male participants from the Qualtrics and MTurk samples. The final sample included 68.3% female and 31.7% male parents. Four non-binary parents were not included in the final analyses because the number of non-binary participants was small and did not allow statistical comparison. The racial makeup was as follows: 5.5% Asians, 13.4% Blacks, 10.4% Latinos, 3.2% Native Americans, 64.6% White, and 3.0% other racial backgrounds. The average household income was US\$64,321 ($SD = 51,432$), the average number of years of education was 12.8 ($SD = 4.45$), and the mean of political philosophy was 4.27

($SD = 1.83$, 1 = strong Republican, 7 = strong Democrat).

2.2. Ethical issue

The procedure and the questionnaire received ethical approval (HSRO #05022321) for the procedure and the questionnaire from Rochester Institute of Technology University in the United States.

2.3. Experimental manipulation

We created and pretested five health messages (Table 1) after reviewing the COVID-19 vaccination messages in the United States. The main structure and the message in each condition were kept consistent across the conditions; the only difference was that the four experimental conditions included an additional sentence that emphasized one of the four moral foundations (i.e., harm/care, fairness, ingroup loyalty, and authority). These messages were pretested and rated by a group of 44 undergraduate students in the United States. The ratings showed that each moral message was rated higher on their respective moral foundation than the control message ($ps < .05$; Table 1). The messages with the intended moral appeals received higher ratings on the intended moral dimension and lower ratings on the other four dimensions.

Items were adapted from or constructed based on the definitions in the literature [13–18]. Scale items, associated information, and references were listed in Table 2. All the scale items loaded on their respective factors based on confirmatory factor analysis and demonstrated good construct validity and reliabilities.

3. Results

3.1. Main analysis

The means and standard deviations of the dependent variables are shown in Table 3. ANOVA tests showed that none of the comparisons were significant.

To test H1 and H2, this present research examined the interaction effects between political philosophy and the experimental conditions using moderated multiple regression because political affiliation was measured as an interval-level variable. Each of the four experimental conditions was coded as 1 for that specific condition, which created four variables. The control condition was coded as 0 for all four variables and was used as “contrast.” Four interaction terms between mean-centered political affiliation

Table 1. Message manipulation and manipulation checks.

Message condition	Control		Harm/care		Fairness		Ingroup loyalty		Authority	
Experimental manipulation ^a	For parents with children aged 5 to 11,		As parents, we often wonder how to help protect our children and alleviate their suffering. A young child can also experience severe consequences of COVID-19 and be hospitalized. To show your care,		As parents, we often wonder whether it is fair to wait for other parents to vaccinate their young children against COVID-19, while we hold ours back. To show fairness,		As parents, we often wonder how we can contribute to our school districts and our country that have been affected by COVID-19. To show your loyalty to your community and the United States,		As parents, we often wonder who we should listen to. Dr. Eric Larson is a veteran and an authority in pediatric vaccine research in a children's hospital in Boston. He has endorsed Pfizer's COVID-19 vaccine for younger children. To follow his recommendation,	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Harm/care	4.07 ^b	0.87	4.34 ^b	0.78	3.84	0.86	3.66	0.94	3.95	0.81
Fairness	2.75 ^b	0.99	3.35	0.92	4.09 ^b	0.98	2.98	1.00	2.80	1.07
Ingroup loyalty	3.26 ^b	1.14	3.28	1.08	3.25	1.12	4.39 ^b	0.87	3.27	0.97
Authority	2.89 ^b	1.13	2.74	1.07	2.55	1.00	3.20	1.27	3.64 ^b	1.10
Purity	1.86	1.09	2.02	1.26	1.89	1.04	1.93	1.02	1.89	0.90

Note. *N* = 44.

^a All experimental manipulations were followed by “... it is more important now to get children 5–11 years of age (or “them” in the control condition) vaccinated against COVID-19. With the emergence of the Delta variant in recent months, more children have tested positive relative to older adults. This is largely because more older Americans are vaccinated and children have returned to in-person schooling. Pfizer's COVID-19 vaccine has been tested and proven safe and effective among young children 5–11 years old. It has been approved by the FDA. Get your child vaccinated against COVID-19 when one becomes available in your area.”

^b Pair-samples *t* tests showed that the differences between the intended moral appeal manipulation and the control condition (means in the same row sharing superscript b) were significant ($p < .05$).

and each of the specific experimental conditions were created. Then, the mean-centered political philosophy was entered in the first step, the experimental conditions in the second, and the interaction terms in the third.

The results (Table 4) showed that for message evaluation and perceived susceptibility, the interactions between the experimental conditions and political philosophy were nonsignificant. The experimental conditions did not influence participants' message evaluation or perceived susceptibility.

For value-expressive attitudes, the interaction effects were not significant. The main effect of the fairness condition showed that the fairness condition increased the participants' value-expressive attitudes ($B = 0.32$, $p = .040$). Other main effects of the experimental conditions were not significant.

For parents' vaccine uptake decisions for their children, the interaction effect between political affiliation and the care manipulation was significant ($B = 0.20$, $p = .044$). Further analysis showed that for those in the care condition, the relationship between

political affiliation and vaccine uptake intent was $B = 0.35$, $p < .001$. For those in the control condition, the relationship between the two variables was 0.15, $p = .022$.

Taken together, the results provided limited support for the theorizing on the matching effects of moral appeals to one's political affiliations. Overall, the block of experimental conditions and the interaction effects added 0.0%–0.8% of the variance to the four dependent variables and were not significant.

3.2. Additional analysis

The additional analysis examined the role of demographic, personality, and value-based variables without including experimental conditions. The inclusion of experimental conditions did not change the magnitudes of the reported relationships. Table 5 showed that females were less likely to evaluate the messages favorably ($B = -0.29$, $p < .001$), held less strong value-expressive attitudes ($B = -0.19$, $p = .042$), and were less likely to

Table 2. Confirmatory factor analysis and standardized factor loadings of scale items of the variables.

Factor and scale item	Standardized factor loading
Message evaluation (Wang & Zhao, 2018; $\alpha = .90$)	
Regarding the message you just read, all in all, this message is good	0.86
this message is convincing	0.88
this message is well-written	0.70
this message is accurate	0.89
Risk susceptibility (Rosenstock, 1974; $\alpha = .88$)	
If your 5–11 years old child (ren) doesn't get vaccinated,	
there is a chance s/he would get COVID-19	0.76
it is possible s/he would get COVID-19	0.88
the likelihood that s/he would get COVID-19 is high.	0.90
Value-expressive attitude ($\alpha = .96$)	
Getting my child (ren) vaccinated shows I'm a responsible person	0.94
shows I have good values	0.92
is my moral responsibility to do so	0.92
is the correct thing to do	0.93
Vaccine uptake intent for kids (e.g., Conner & Sparks, 1995; $\alpha = .97$)	
For your child (ren), 5–11, thinking about the next two months, I would like to get my child (ren) vaccinated	0.95
I expect to get my child (ren) vaccinated	0.95
I plan to get my child (ren) vaccinated	0.96
I will book an appointment as soon as possible	0.93
Trust in government (Quinn et al., 2013; $\alpha = .94$)	
In general, the U.S. government agencies' response to COVID-19 is open	0.81
is committed	0.84
is in my best interest	0.90
is competent	0.91
would protect people from COVID-19	0.90
COVID-19 fatigue (Lilleholt et al., 2021; $\alpha = .86$)	
All in all ..., I'm tired of practicing social distancing	0.75
I feel strained from following all the COVID regulations and recommendations	0.73
I'm losing my spirit in the fight against COVID	0.66
I'm tired of COVID-19 discussions	0.82
I'm sick of hearing about COVID	0.78
Future orientation (Strathman et al., 1994; $\alpha = .82$)	
I'm willing to sacrifice my immediate happiness to achieve long-term outcomes	0.73
I should try to influence future outcomes through my day-to-day activities	0.81
I should engage in a particular behavior to achieve outcomes that may not result for many years.	0.81

Note. $N = 567$. Confirmatory factor analysis showed a good fit to the data: $\chi^2(329, N = 567) = 797.7, p < .001$, root mean square error of approximation (RMSEA) = 0.050, 90% CI of RMSEA [0.046 ~ 0.054], comparative fit index = 0.96, and standardized root mean residual = 0.059. Items were adapted from the literature and edited for language and context.

intend to vaccinate their children ($B = -0.26, p = .018$). Political affiliation was positively, but weakly related to value-expressive attitudes ($B = 0.08, p < .001$) and vaccine uptake intent ($B = 0.10, p < .001$).

COVID-19 fatigue was only negatively related to message evaluation ($B = -0.08, p = .019$) and was

not related to perceived susceptibility, value-expressive attitudes, and vaccine uptake intent.

Future orientation showed a positive relationship with message evaluation ($B = 0.18, p < .001$) and perceived susceptibility ($B = 0.29, p < .001$). Trust in government showed a positive relationship with message evaluation ($B = 0.51, p < .001$), perceived

Table 3. Descriptive statistics of means and standard deviations of message conditions on the dependent variables.

	Control		Care		Fairness		Ingroup loyalty		Authority	
	$n = 108$		$n = 111$		$n = 120$		$n = 115$		$n = 113$	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Message evaluation	3.56	1.03	3.49	1.03	3.73	0.95	3.66	1.08	3.66	1.01
Risk susceptibility	3.56	1.01	3.35	0.99	3.57	1.04	3.54	1.00	3.61	1.08
Value-expressive attitude	3.29	1.29	3.24	1.23	3.61	1.17	3.40	1.36	3.47	1.25
Vaccine uptake intent	3.19	1.44	3.10	1.30	3.42	1.35	3.27	1.42	3.41	1.33

Table 4. Moderated multiple regression analysis of moral appeals and political affiliation on parents' message evaluation, COVID-19-related beliefs, and vaccine uptake intent.

	Message evaluation			Perceived susceptibility			Value-expressive attitude			Vaccine uptake intent for children		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Political philosophy	0.12	0.05	.21*	0.06	0.05	.10	0.22	0.06	.32***	0.15	0.07	.21*
Care appeal	0.04	0.13	.02	0.19	0.13	.08	0.01	0.16	.00	0.05	0.17	.02
Fairness appeal	0.20	0.13	.08	0.20	0.13	.08	0.32	0.16	.10*	0.26	0.17	.08
Ingroup loyalty appeal	0.14	0.13	.06	0.25	0.13	.10 ⁺	0.19	0.16	.06	0.28	0.17	.08
Authority appeal	0.20	0.13	.08	0.22	0.13	.09 ⁺	0.21	0.16	.07	0.21	0.17	.06
PP \times CA	0.08	0.07	.06	0.12	0.08	.09	0.11	0.09	.07	0.20	0.10	.11*
PP \times FA	0.08	0.07	.07	0.11	0.07	.09	0.03	0.08	.02	0.14	0.09	.09
PP \times LA	0.11	0.07	.09	0.11	0.07	.09	0.06	0.08	.04	0.15	0.09	.09
PP \times AA	0.06	0.07	.05	0.12	0.07	.09	-0.02	0.09	-.02	0.09	0.09	.05

Note. $N = 567$. Each of the four experimental conditions was coded as 1 for that specific condition, which created four variables. The control condition was coded as 0 for all four variables and was used as "contrast." ⁺ $p < .10$, * $p < .05$, *** $p < .001$.

Table 5. Additional analysis of the demographic and value-related predictors of COVID-19 vaccination message evaluation, beliefs, and vaccine uptake intent for children.

	Message evaluation			Perceived susceptibility			Value-expressive attitude			Vaccine uptake intent for children		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Your gender	-0.29	0.08	-.13***	-0.11	0.09	-.05	-0.19	0.09	-.07*	-0.26	0.11	-.09*
Race	0.05	0.07	.02	-0.08	0.08	-.04	0.06	0.08	.02	-0.06	0.09	-.02
Education	0.00	0.00	-.03	0.00	0.00	.04	0.00	0.00	.05	0.00	0.00	.04
Income	0.02	0.01	.07	-0.01	0.01	-.03	0.00	0.01	.01	0.00	0.01	.01
Political philosophy	0.04	0.02	.08*	0.05	0.02	.08*	0.08	0.02	.12***	0.10	0.03	.14***
COVID fatigue	-0.08	0.03	-.07*	-0.07	0.04	-.07 ⁺	-0.06	0.04	-.05	-0.08	0.04	-.06 ⁺
Trust in government	0.51	0.04	.54***	0.34	0.04	.35***	0.77	0.04	.65***	0.70	0.05	.54***
Future orientation	0.18	0.04	.15***	0.29	0.05	.24***	0.04	0.05	.02	0.10	0.06	.06 ⁺

Note. $N = 567$. ⁺ $p < .10$, * $p < .05$, *** $p < .001$.

susceptibility ($B = 0.34$, $p < 0.001$), value-expressive attitudes ($B = 0.77$, $p < .001$), and vaccine uptake intent ($B = 0.70$, $p < .001$).

4. Discussion

Table 4 showed that the effects of message appeals were limited. By the procedure of randomization, we removed the initial differences among the participants; that is, the participants were assumed to be equal across the conditions. As such, the limited effects on the dependent variables should be attributed to the ineffectiveness of the experimental manipulations. Table 5 showed that among the demographic and other individual variables, future orientation and trust in the government were stronger predictors of the dependent variables than were demographic variables and COVID-19 fatigue. The results have theoretical implications for using moral appeals and practical implications for COVID-19 vaccination programs and future pandemics.

First, our results, as well as previous research [19], indicate the need for reconceptualizing the use of moral foundations theory and the matching hypothesis in persuasive messaging. First, according to

the current theorizing, care and fairness moral appeals should be more persuasive for those with a Democrat affiliation than for those with a Republican affiliation in the United States, whereas authority and ingroup moral appeals should be more persuasive for Republicans than for Democrats. Table 4 showed nonsignificant interaction effects between these moral appeals and political affiliation among the four dependent variables for all the moral appeals, except for one significant interaction effect between care and political affiliation on vaccine uptake intent. Similarly, Arpan et al. did not find a matching effect in using realistic environmental communication in facilitating favorable message evaluation or willingness to pay more for renewable energy [19]. On the other hand, Feinberg and Willer [5] found a matching effect among hypothetical scenarios (using English as the official language). Arpan et al. stated that it could be difficult to reframe renewable energy messaging [19].

Second, our manipulation checks showed that the message manipulations were successful. However, all the messages were rated high on the care dimension because the ultimate moral in the vaccination messages is about saving lives, whether

done via an ingroup appeal, an authority appeal, or a fairness appeal. We concur with Arpan et al.'s overall thesis [19] and believe that the matching effect may be unsuccessful if the ultimate moral of an issue or the previous, consistent messaging trumps the reframing efforts. That is, the moral framing/matching effects may be more pronounced when an issue is novel or does not have a dominant moral foundation (e.g., the care foundation for medicine- or life-and-death-related issues).

Thirdly, additional analysis (Table 5) revealed that future orientation and trust in government, compared to the demographic variables and other individual difference variables (e.g., COVID-19 fatigue), were much more important. These variables explained a large proportion of the variance in message evaluation, risk perceptions, and vaccine uptake intent. The results indicate that vaccination programs' success can largely depend on the populace's pre-existing individual or cultural differences. That would have explained why COVID-19 promotions were more successful and encountered less resistance in some states (vs. others) in the United States and some countries than in others.

A few limitations should be acknowledged. The first limitation is associated with the use of an online sample. Internet panels are known for their opt-in characteristic and may not represent the general population or parents. Although the racial makeup in the sample was generally consistent with the national statistics, the sample included more female participants than male participants, probably because the topic and vaccination decisions are more relevant to mothers than fathers. Second, participants read only one message in one sitting, which might have heightened their sensitivity to the issue. On the other hand, participants recruited from the Internet may skip a message before completing the ensuing questionnaire. Thirdly, we point out one caveat that our experiment was based on one-time forced exposure. Repeated exposure to the messages in the media or elsewhere might produce a different effect.

5. Conclusion

The present research found that the matching effects of moral appeals and political affiliation were limited, probably due to the underlying consideration that all the messages were related to care and harm. As such, reframing the message using other moral appeals may not elicit more or less favorable responses. That is, these moral appeal messages were equally effective in facilitating message evaluation, risk perception, value attitudes, and vaccine uptake

intent. Our study is of theoretical importance because it helps cumulate knowledge on the conditions when moral appeals may not fare better than a generic health message. We also found that internalized values were strong predictors of message evaluations, risk perceptions, value-expressive attitudes, and vaccine uptake intent for children.

5.1. Recommendations

With the absence of evidence to refute the use of different moral appeals, we posit that it is safe to continue to use these moral appeals and that they most likely will not result in lower persuasiveness than a health message without an explicit moral appeal. We recommend that future research further explores the role of moral appeals and political philosophy in other public health settings and be cognizant of the role of internalized values when designing health campaigns.

Funding

This research was funded by a faculty research grant from Rochester Institute of Technology University in the United States.

Conflict of interest

The authors reported that there were no known conflicts of interest.

References

- [1] Brennan M. Willingness to get COVID-19 vaccine ticks up to 63% in U.S. [updated 2020 Dec 8; cited 2022 Jun 1]. Available from: <https://news.gallup.com/poll/327425/willingness-covid-vaccine-ticks.aspx>.
- [2] Lewis T. Nine COVID-19 myths that just won't go away [updated 2020 Aug 18; cited 2022 Jun 1]. Available from: <https://www.scientificamerican.com/article/nine-covid-19-myths-that-just-wont-go-away/>.
- [3] See how vaccinations are going in your county and state [cited 2022 Aug 25]. Available from: <https://www.nytimes.com/interactive/2020/us/covid-19-vaccine-doses.html#age>.
- [4] Hsu T. Pope Francis encourages Covid vaccines in media campaign [updated 2021 Aug 17; cited 2022 June 1]. Available from: <https://www.nytimes.com/2021/08/17/business/media/pope-covid-vaccine-ad.html>.
- [5] Feinberg M, Willer R. From gulf to bridge: when do moral arguments facilitate political influence? *Pers Soc Psychol Bull* 2015;41(12):1665–81. <https://doi.org/10.1177/0146167215607842>.
- [6] Graham J, Haidt J, Koleva S, Motyl M, Iyer R, Wojcik SP, et al. Moral foundations theory: the pragmatic validity of moral pluralism. In: Devine P, Plant A, editors. *Advances in experimental social psychology*. Amsterdam: Academic Press; 2013. p. 55–130.
- [7] Maio GR, Olson JM. *Why we evaluate: functions of attitudes*. Mahwah, NJ: Lawrence Erlbaum Associates; 2000.
- [8] Schemer C, Wirth W, Matthes J. Value resonance and value framing effects on voting intentions in direct-democratic

campaigns. *Am Behav Sci* 2012;56(3):334–52. <https://doi.org/10.1177/0002764211426329>.

- [9] Ball H, Wozniak TR. Why do some americans resist COVID-19 prevention behavior? An analysis of issue importance, message fatigue, and reactance regarding COVID-19 messaging. *Health Commun* 2021:1–8. <https://doi.org/10.1080/10410236.2021.1920717>.
- [10] Guan M, Li Y, Scoles JD, Zhu Y. COVID-19 message fatigue: how does it predict preventive behavioral intentions and what types of information are people tired of hearing about? *Health Commun* 2022:1–10. <https://doi.org/10.1080/10410236.2021.2023385>.
- [11] Zhang N, Kou Y. Implicit theories of health, consideration of future consequences, and engagement in health protective behaviors during the COVID-19 pandemic in China. *J Health Psychol* 2022;27(6):1462–9. <https://doi.org/10.1177/13591053211017191>.
- [12] Han Q, Zheng B, Cristea M, Agostini M, Bélanger JJ, Gützkow B, et al. Trust in government regarding COVID-19 and its associations with preventive health behaviour and prosocial behaviour during the pandemic: a cross-sectional and longitudinal study. *Psychol Med* 2021:1–11. <https://doi.org/10.1017/s0033291721001306>.
- [13] Wang X, Zhao X. The mediating role of temporal considerations on the effects of self-affirmation on responses to organ donation messages. *Health Commun* 2018;33(2):148–55. <https://doi.org/10.1080/10410236.2016.1250190>.
- [14] Rosenstock IM. The health belief model and preventive health behavior. *Health Educ Monogr* 1974;2(4):354–86. <https://doi.org/10.1177/109019817400200405>.
- [15] Conner M, Sparks P. Theory of planned behaviour and health behaviour. In: Conner M, Norman P, editors. *Predicting health behaviour: research and practice with social cognition models*. Berkshire: Open University Press; 2005. p. 121–62.
- [16] Quinn SC, Parmer J, Freimuth VS, Hilyard KM, Musa D, Kim KH. Exploring communication, trust in government, and vaccination intention later in the 2009 H1N1 pandemic: results of a national survey. *Biosecur Bioterror* 2013;11(2): 96–106. <https://doi.org/10.1089/bsp.2012.0048>.
- [17] Lilleholt L, Zettler I, Betsch C, Böhm R. Pandemic fatigue: measurement, correlates, and consequences. *PsyArXiv* 2020. <https://doi.org/10.31234/osf.io/2xvbr> [Preprint].
- [18] Strathman A, Gleicher F, Boninger DS, Edwards CS. The consideration of future consequences: weighing immediate and distant outcomes of behavior. *J Pers Soc Psychol* 1994; 66(4):742–52. <https://doi.org/10.1037/0022-3514.66.4.742>.
- [19] Arpan LM, Xu X, Raney AA, Chen CF, Wang Z. Politics, values, and morals: assessing consumer responses to the framing of residential renewable energy in the United States. *Energy Res Social Sci* 2018;46:321–31. <https://doi.org/10.1016/j.erss.2018.08.007>.