Moral reframing of messages about mask-wearing during the COVID-19 pandemic

Jonas T. Kaplan, Anthony Vaccaro, Max Henning, and Leonardo Christov-Moore

Brain and Creativity Institute and

Department of Psychology,

University of Southern California

Abstract

Despite evidence in support of the benefits of wearing masks, attitudes about mask-wearing during the COVID-19 pandemic became politicized, and therefore tied with political values and group identities. When communicating about political issues, messages targeted to resonate with the core values of the receiver may be effective, an approach known as *moral reframing*. We first tested the relationships between moral values and mask-wearing in a sample (N=540) of self-identified liberals, conservatives, and moderates in the United States. Anti-mask attitudes were stronger in conservatives, and were associated with increased concerns for in-group loyalty, national identity, and personal liberty. We then crafted messages about the benefits of mask-wearing framed to resonate with these moral concerns, and in a pre-registered study of N=597 self-identified U.S. conservatives, tested the effect of moral reframing on anti-mask attitudes and behaviors. We found that messages framed in terms of loyalty, with appeals to the protection of the community and America, were effective in reducing anti-mask beliefs, compared with unrelated control messages and messages delivering purely scientific information, and that these changes in belief persisted for at least one week. Exploratory analyses showed that participants who saw loyalty-framed messages reported wearing masks in public more frequently in the subsequent week. These data provide evidence that moral reframing of messages about politicized issues can be effective, and specifically that framing messages about health behaviors in terms of group loyalty may be the most productive way of communicating with conservative audiences.

Introduction

Despite strong evidence that facemasks are effective in reducing the transmission of SARS-CoV-2 (Anfinrud, Stadnytskyi, Bax, & Bax, 2020; Brainard, Jones, Lake, Hooper, & Hunter, 2020; V. C. Cheng et al., 2020; Chu et al., 2020; Howard, 2020; Leffler et al., 2020; Leung, Cheng, Lam, & Migliori, 2020; N. H. L. Leung et al., 2020; Lyu & Wheby, 2020; Rader et al., 2020; Stutt, Retkute, Bradley, Gilligan, & Colvin, 2020; Wang et al., 2020), Americans are divided in their disposition towards mandated mask-wearing. Recent polling found that 63% of Democrats agreed that masks should be worn in public, versus 29% of Republicans (Pew, 2020). Increased conservatism is associated with reduced intention to wear masks (J. Cheng, 2020; Plohl & Musil, 2020; Utych, 2020), less social distancing (Rothgerber, 2020) and perception of COVID-19 as less threatening (Calvillo, Ross, Garcia, Smelter, & Rutchick, 2020). Mask-wearing in America has become politicized.

During politicization, belief becomes associated with political identity, and is therefore tied to an adversarial ingroup/outgroup conflict (J. Cheng, 2020; Simon & Klandermans, 2001; Zaal et al., 2017). This may entail *moralization*, where a political position changes from a utilitarian means-to-an-end into a matter of right and wrong (Brandt, Wisneski, & Skitka, 2015; Ginges, 2019; Skitka & Bauman, 2008), making people less likely to compromise, and more likely to experience strong emotions in relation to the belief (Ginges, 2019; Haidt, 2001; Rhee, Schein, & Bastian, 2019; Skitka, 2010; Skitka, Hanson, Scott Morgan, & Wisneski, 2020).

Moralized beliefs are often resistant to change in response to challenging information, though research on the subject is mixed: while corrective information sometimes changes beliefs (Wood & Porter, 2019), the effects of misinformation often persist (Lewandowsky,

Ecker, Seifert, Schwarz, & Cook, 2012; Nyhan & Reifler, 2010; Shwarz, Newman, & Leach, 2016; Walter & Tukachinsky, 2020), particularly when associated with moral convictions and political identities (Kaplan, Gimbel, & Harris, 2016; Luttrell, Petty, Brinol, & Wagner, 2016; Ryan, 2019; Walter & Murphy, 2018). For example, although a link between autism and vaccination has been repeatedly debunked, many people still believe vaccines cause autism (Nyhan & Reifler, 2015; Nyhan, Reifler, Richey, & Freed, 2014).

One promising approach to communicating about moralized beliefs is *moral reframing*: messages framed to resonate with the moral values of the listener (Feinberg & Willer, 2019; Hoover, Johnson, Boghrati, Graham, & Dehghani, 2018) are more effective (Luttrell, Philipp-Muller, & Petty, 2019). One framework that has been used in this regard is Moral Foundations Theory (MFT), which describes five moral domains: care/harm, fairness/cheating, loyalty/betrayal, authority/subversion, and sanctity/degradation (Graham et al., 2011). Notably, conservatives tend to show stronger concern for moral values related to loyalty, authority, and sanctity (Graham et al., 2011), e.g. they are more receptive to environmental appeals framed in terms of the sanctity of nature (Feinberg & Willer, 2013; Sachdeva, Boghrati, & Dehghani, 2019).

Due to politicization, there is likely a connection between mask-wearing attitudes and moral values. In a first study, we examined relationships between participants' beliefs and attitudes surrounding mask-wearing and their moral concerns. Based on prior evidence, we expected to find an association between conservative beliefs and the moral concerns of loyalty, authority, and purity in a sample of American participants. In a second pre-registered study, we crafted messages to communicate the benefits of mask-wearing, targeting the core moral

values shared by people who hold strong anti-mask beliefs. We hypothesized that messages whose framing matched the moral concerns of receivers would lead to greater belief and behavior change compared with messages that do not match, or with those that contained only scientific information.

Study 1: *The association of moral concerns with mask-related beliefs.*

In this first exploratory study we examined relationships between participants' beliefs about mask wearing during COVID, and their moral concerns, their trust in science, identification with community, authoritarianism, and attitudes towards COVID and mask-wearing in general.

Methods

Participants. Participants were recruited online using Prolific (<http://www.prolific.co>). All participants resided in the United States and were over 18 years of age. We aimed to enroll 540 participants, 180 in each of three groups: liberals, moderates, and conservatives, based on their self-identified political orientation as provided by Prolific. We ultimately received responses from 181 Liberals, 182 Moderates, and 179 Conservatives. The survey was completed on June 11, 2020. After removing incomplete responses (defined as more than one item unanswered in any of the measures), we were left with 179 Liberals, 182 Moderates, and 172 Conservatives for a total of N=533. Participants were 51% female, 48% male, with 1% preferring not to describe their gender, and ranged in age from 18 to 84 years ($M = 33.1$, $SD = 13.39$).

Procedure. Participants completed an online survey using the Qualtrics software

(<http://www.qualtrics.com>) featuring the following measures:

Moral Foundations Questionnaire. The shortened Moral Foundations Questionnaire (MFQ20) is a 20-item questionnaire assessing individuals' prioritization of five moral domains in their decision-making (Graham et al., 2011): Harm/Care ($\alpha = 0.76$), Fairness/Reciprocity ($\alpha = 0.70$), Ingroup/Loyalty ($\alpha = 0.68$), Authority/Respect ($\alpha = 0.76$), and Purity/Sanctity ($\alpha = 0.79$). In Part 1, respondents indicate the relevance of various situational considerations to their assessments of the moral right- or wrongness of a described scenario using a six-point scale from "not at all relevant" to "extremely relevant". In Part 2 respondents indicate their agreement or disagreement with a series of moral statements, using a six-point scale from "strongly disagree" to "strongly agree".

Trust in Science and Scientists Inventory. This is a 21-item questionnaire assessing an individual's domain-general level of trust in science and scientists (Nadelson et al., 2014) in two areas: (1) perceptions of the tentative nature of scientific knowledge, and (2) perceptions of certain research processes or scientists' integrity. Respondents rank their level of agreement with a series of statements, using a five-point scale from "strongly disagree" to "strongly agree". Internal consistency for this scale was high ($\alpha = 0.93$).

Identification With All Humanity (America/Community/All humanity). The Identification With All Humanity (IWAH) is a 9-item questionnaire assessing concern for the interests and concerns

of all people (McFarland, Webb, & Brown, 2012). The IWAH has been shown to measure a construct encapsulating both the absence of ethnocentrism and its correlates, as well as the presence of empathy, general morality, universalism, and principled moral reasoning. Items assess respondent identification with (1) “People in my community” ($\alpha = 0.85$), (2) “Americans” ($\alpha = 0.83$), and (4) “People all over the world” ($\alpha = 0.80$) on a five-point scale from 1 (not at all) to 5 (very much).

Very Short Authoritarianism Scale (VSA). The VSA Scale is a six-item questionnaire, a shortened version of Altemeyer’s Right Wing Authoritarianism (RWA) scale (Bizumic & Duckitt, 2018). The RWA assesses three subdimensions of RWA: Authoritarian Submission, Authoritarian Aggression, and Conventionalism. The VSA was designed to assess overall RWA, equally representing the three content subdimensions of the RWA while also balancing the direction of wording effects within these subdimensions as in the Authoritarianism Conservatism Traditionalism (ACT) scale (Duckitt & Bizumic, 2013). Respondents indicate agreement/disagreement with statements on a nine-point scale from “unsure/neutral” to “very strongly agree/disagree”. Internal consistency for this scale was high ($\alpha = 0.81$).

Anti-mask Belief (16 items). The Anti-Mask Belief scale was constructed from 16 questions reflecting common sentiments expressed by individuals who advocate against mask-wearing, as well as beliefs they do not endorse which are shared by the scientific community and which advocate for the use of masks. 14 of the questions were responded to on a 7-point scale from “Strongly Disagree” to “Strongly Agree”. The remaining two questions (“How effective do you

believe wearing a mask is at protecting yourself from COVID-19?” and “How effective do you believe wearing a mask is at preventing you from transmitting COVID-19 to others?”) were responded to on a 7-point scale from “Not effective at all” to “Extremely effective”. Internal consistency for this measure was high ($\alpha = 0.87$). The questions for this scale can be found in the Appendix.

COVID Guideline Adherence (12 items). This measure consisted of 12 questions related to how often participants followed current health guidelines for preventing the spread of COVID-19 (social distancing, hand-washing, etc.). Questions were responded to on a 5 point scale from “Not at all” to “Always”. Internal consistency for this measure was high ($\alpha = 0.89$). The questions for this scale can be found in the Appendix.

Mask-wearing reasons. Participants were also asked to click a check box next to any of several reasons why they might not wear a mask. Those reasons are listed in the Appendix.

Data analysis. Data were analyzed using R version 4.0.1 (R Core Team, 2020). We first computed a multiple linear regression model predicting Anti-mask Belief as a function of the 12 other measures (Trust In Science, COVID Guideline Adherence, MFQ Harm/Care, MFQ Fairness/Reciprocity, MFQ Ingroup/Loyalty, MFQ Purity/Sanctity, MFQ Authority/Respect, Conservatism, Authoritarianism, Identification with America, and Identification with Community, Identification with All Humanity).

To test for political group differences in mask-related belief and attitudes towards COVID, one-way independent samples ANOVAs were used to compare Anti-mask Belief and COVID Guideline Adherence across the three groups of participants (liberals, conservatives, moderates). Pairwise post-hoc comparisons between groups were performed using the Tukey HSD test.

Next, we computed Pearson correlations among 13 measures of interest: Anti-mask Belief, Trust In Science, COVID Guideline Adherence, MFQ Harm/Care, MFQ Fairness/Reciprocity, MFQ Ingroup/Loyalty, MFQ Purity/Sanctity, MFQ Authority/Respect, Conservatism, Authoritarianism, Identification with America, and Identification with Community, Identification with All Humanity. We corrected for multiple comparisons using a Bonferroni correction across the 78 unique pairwise correlations.

We then computed the proportion of respondents that checked each of the reasons for not wearing a mask and computed a chi-square test to compare the frequencies across the three political groups for each question. Each question was tested separately and a Bonferroni correction was applied to control for multiple comparisons across the 12 items.

Results

Correlations among measures. These are reported in the Appendix and depicted in Figure S2.

Group Comparisons. There was a significant main effect of political group for Anti-mask Belief ($F(2,530) = 99.04, p < .0001, \text{partial } \eta^2 = 0.272$), and post-hoc Tukey HSD tests revealed greater Anti-mask Belief for Conservatives ($M = 56.3, SD = 16.8$) compared to Moderates ($M = 43.6, SD =$

12), for Moderates compared to Liberals ($M = 36.5$, $SD = 10.5$), and for Conservatives compared to Liberals (see Figure 1). There was also a significant main effect of political group for COVID Guideline Adherence ($F(2,530) = 13.14$, $p < 0.0001$, partial $\eta^2 = 0.047$), with the Tukey test showing Conservatives ($M = 47.0$, $SD = 9.95$) with lower adherence compared to Moderates ($M = 49.6$, $SD = 7.99$), and compared with Liberals ($M = 51.5$, $SD = 6.86$)(See Figure 2).

Regression. The regression model significantly predicted Anti-mask Belief ($F(10,521) = 46.02$, $p < 0.0001$), with an R^2 of 0.492. Trust In Science inversely predicted Anti-mask Belief ($\beta = -0.53$, $t(521) = -12.351$, $p < 0.0001$), as did MFQ Harm/Care ($\beta = -0.680$, $t(521) = -3.476$, $p = 0.00055$) and MFQ Fairness/Reciprocity ($\beta = -0.503$, $t(521) = -2.62$, $p = 0.0092$), and Identification with All Humanity ($\beta = -0.204$, $t(521) = -2.163$, $p = 0.03099$). Two variables positively predicted Anti-mask belief: MFQ Ingroup/Loyalty ($\beta = 0.555$, $t(521) = 2.99$, $p = 0.0029$) and Identification With America ($\beta = 0.334$, $t(521) = 3.077$, $p = 0.0022$). Conservatism, Authoritarianism, MFQ Authority/Respect, MFQ Purity/Sanctity and Identification with Community were not significant predictors of Anti-mask Belief.

Reasons for not wearing masks. The proportion of respondents selecting each reason for not wearing masks is shown in Table 1. The following items showed significant differences across the political groups: “Because masks are uncomfortable”, “Because I don't think it will prevent me from getting sick”, “Because I don't think it will prevent others from getting sick”, “Because it looks silly”, “Because it's my choice not to wear one”, “Because it looks weak”, and “Because it is my right not to wear one”. In each case, conservatives endorsed the reason more

frequently than the other groups. The most common reason for not wearing masks cited among conservatives was “Because it’s my choice not to wear one” (34.9% of conservatives, 14.2% of moderates, and 3.4% of liberals chose this reason), followed by “Because masks are uncomfortable” (30.2% of conservatives, 15.9% of moderates, and 8.9% of liberals chose this reason).

Discussion

First, conservatives in our sample did indeed harbor stronger beliefs against mask-wearing compared with liberals, with moderates showing a level of endorsement somewhere between conservatives and liberals. Conservatives generally reported complying less with COVID-related guidelines. This is consistent with polling and recent research suggesting mask wearing, social distancing measures and other issues surrounding the pandemic have become politicized.

Importantly, we found that anti-mask beliefs were associated with people’s underlying moral concerns. Specifically, in our regression model, concerns for Harm and Fairness were associated with lower anti-mask belief, while concerns for Loyalty were associated with increased anti-mask belief. Interestingly, these loyalty concerns do not appear to be directed at the level of ones’ community, but rather at national identity; stronger Identification with America predicted stronger anti-mask beliefs, while Identification with Community did not. Notably, identification with America predicted anti-mask belief even when controlling for Loyalty.

Conservatives' most commonly reported reason for not wearing masks were that "it's my choice not to wear one" and they were over 10 times more likely than liberals to report this reason for not wearing a mask. Conservatives also were likely than liberals to say that they don't wear masks because "it is my right not to wear one". This result suggests that a concern for personal liberty may be at play for conservatives when thinking about the issue of mask wearing. The version of the MFQ that we used did not measure the value axis of Liberty/Oppression, which has been hypothesized as a sixth moral foundation (Iyer, Koleva, Graham, Ditto, & Haidt, 2012), thus it is not clear from these findings to what extent conservatives are generally more concerned with libertarian values.

Study 2: Moral reframing of messages

The second study was designed to test if moral reframing of messages about mask wearing, targeted to resonate with the values of conservatives, would be more effective at changing beliefs and behaviors, compared to science-framed messaging, or to a control video with no information about the benefits of mask wearing. Study 1 identified two promising values that could be used to reframe mask-wearing messages: 1) ingroup/loyalty, with a specific focus on identification with America, and 2) personal liberty. We pre-registered this study at the Open Science Foundation: <https://osf.io/kbzd4>. Participants in this study watched a short video online, then answered questions about their mask-related beliefs immediately following the video and again, one week later.

We sought to test three hypotheses:

H1: Scientific information about the benefits of mask wearing would not increase intention to wear masks and would not decrease anti-mask beliefs. Relative to the group who watches the control video (“Trains”), the group who watches the Science video would show no increase in intention to wear masks, no decrease in anti-mask beliefs, and no change in mask-wearing after one week.

H2: Moral reframing of the benefits of wearing masks in terms of liberty or loyalty would be more effective than the control condition. This would be evident in decreased anti-mask beliefs immediately following the videos and increased intention to wear masks across groups.

Reported mask-wearing after one week would be greater and anti-mask belief after one week would be lower compared to the control condition.

H3: Combining moral reframing with scientific information would be more effective than both scientific information alone and moral reframing alone. This would be evidenced by decreased anti-mask beliefs and increased intention to wear masks immediately following the video relative to the science, liberty, and loyalty conditions. We also predicted decreased anti-mask belief and reported mask-wearing after one week for participants in this condition compared to the control, science, loyalty, and liberty conditions.

Methods

Participants. Participants were recruited through Prolific (<https://www.prolific.co/>) and were directed to a Qualtrics survey that presents the stimuli and collects the responses. The participants self-identified as conservative and resided in the United States. Participants were

paid \$3 per session for participating, upon completion of the two sessions, one week apart. To reach our target of 800 participants, or 160 in each of 5 groups, we recruited 848 people, of whom 760 returned a week later to complete the second part of the study. The rationale for the sample size and a power analysis is detailed in the pre-registration documents. According to our pre-registered exclusion criteria, we excluded participants if any of the following applied: 1) they answered both content questions following the video incorrectly (28 participants met this criteria), 2) they answered a score of less than 5 on a 7 point scale where 1 is very liberal, and 7 is very conservative (76 participants met this criteria), or 3) if the timing of the survey indicated that they spent less than 2 minutes on the video screen (121 participants met this criteria). Ultimately these criteria led to the exclusion of 163 participants, since some participants met multiple exclusion criteria. The remaining group of 597 participants had an age range of 18 to 77 ($M = 39.17$, $SD = 14.18$), 259 identified as female, 336 as male, and 2 preferred not to describe their gender.

Procedure. We manipulated the type of health message received by the participants by presenting each group with a different short video. Each video was about 3 minutes long. Each video presented 8-10 “scenes” which consisted of photos or videos with text in front of them. The “combined” condition, in order to effectively include elements of the other conditions, was longer than the others and contains 13 scenes. In a between-subjects design, each participant was randomly assigned to one of the 5 conditions. The links to the videos on YouTube are in Appendix 1, and the text of the videos is found in Appendix 2.

The 5 conditions were: CONTROL: A short video about trains, which contained no information about mask-wearing. SCIENCE: Scientific information about the benefits of mask-wearing. LIBERTY: Moral reframing of mask-wearing based on the value of liberty - because wearing masks keeps the disease from spreading, it prevents government interference in the form of lockdowns, and hastens restarting the economy and returning to normal life. LOYALTY: Moral reframing of mask-wearing based on loyalty to the community and to America - because wearing masks keeps the disease from spreading, it is a way of caring for our community and protecting America. COMBINED: This video combined elements from the SCIENCE, LIBERTY, and LOYALTY videos - scientific information about the benefits of mask-wearing, and moral reframing in terms of liberty and loyalty. To validate the moral content of the stimuli, six experts in the field who were familiar with the MFT but unacquainted with the stimuli rated the videos for each of the related moral concerns. For each morally framed video the intended moral concern was the highest rated, although notably the Liberty video was found to contain substantial reference to Loyalty as well. Full results of this analysis can be found in the Appendix. The text contained in each video is in the appendix, as are the links to the videos on YouTube.

Because of the exclusion criteria detailed above, the final number of participants in each group was not equal. The final numbers were CONTROL=130, SCIENCE=110, LOYALTY=112, FREEDOM=121, and COMBINED=124.

The survey at T1 measured basic demographics, political orientation, mask wearing behavior, anti-mask belief, and video reactions. The main dependent measures were mask-wearing

behavior and anti-mask belief. Additional variables of interest modeled in the analysis included conservatism, gender, and age. The survey at T2 assessed mask wearing behavior and anti-mask belief, and added COVID threat perception and COVID health behavior compliance. We did not ask about mask-wearing behavior at T1 because a) we wanted participants to watch the videos without having been primed to think about mask-wearing and b) if we asked after the video, their responses would be affected by having seen the video, thus failing to provide an uncontaminated baseline.

Study 2 survey measures.

Anti-mask Belief ($\alpha = 0.91$): described in Study 1.

COVID risk perception ($\alpha = 0.91$): described in Study 1.

Video attention check questions: After watching the video, participants answered two questions about the content of the specific video that they saw.

Video reaction questions. Participants were asked to rate on a scale from 1-5 (from “not at all” to “extremely”) to what extent they found the video to have each of the following qualities: compelling, informative, interesting, enjoyable.

Data analysis.

Pre-registered analyses. Data were analyzed using the general linear model. First, we modeled the dependent variables from T1: Anti-mask belief at T1 was modeled as a linear function of video type, age, gender, and political orientation. Video type is a 5-level categorical variable .

An ANOVA was performed for the main effect of video type. We compared each video to the control using the Dunnett procedure to test H1 and H2.

To test H3, the Combined condition was compared to Liberty, Loyalty, and Science conditions using a contrast weighted [0 -1 -1 -1 3] for Control, Science, Liberty, Loyalty, and Combined, respectively.

For data from T2, the same procedure as T1 was employed, but with two dependent variables, modeled separately: Anti-mask belief, and mask-wearing behavior.

Exploratory analysis. Following T1, participants reported how compelling, interesting, informative, and enjoyable they found each video. We re-computed each model including this measure. Since these 4 ratings were highly intercorrelated ($\alpha = 0.93$), we averaged them into one reaction rating. Because these analyses were not pre-registered, and to account for multiple comparisons (5 models tested), we used a stricter alpha threshold of $p = 0.01$.

Results

Pre-registered analyses.

Tests of H1 and H2. The regression model for T1 significantly predicted Anti-mask Belief ($F(8,588) = 2.846$, $p = 0.0041$), with $R^2 = 0.242$, as did Conservatism ($\beta = 2.564$, $t(588) = 2.493$, $p = 0.0129$). The ANOVA test for main effect of video type was significant ($F(4,588) = 3.106$, $p = 0.0155$, partial $\eta^2 = 0.0215$). The Dunnett test comparing each group to CONTROL found

significantly lower Anti-mask Belief for LOYALTY ($t(588) = -3.083, p = 0.0079$) and COMBINED ($t(588) = -2.791, p = 0.0196$). The contrast comparing COMBINED to LOYALTY, LIBERTY and SCIENCE was not significant.

Test of H3. For T2, the regression model significantly predicted Anti-mask Belief ($F(8,588) = 2.077, p = 0.0362$), with $R^2 = 0.0143$, as did Conservatism ($\beta = 2.577, t(588) = 2.499, p = 0.0127$). There was no significant main effect of video type, but Dunnett comparisons showed that Anti-mask Belief was significantly lower in the group that watched the LOYALTY video one week earlier compared with those who watched the CONTROL video ($t(588) = -2.642, p = 0.0302$). The contrast comparing COMBINED to LOYALTY, LIBERTY and SCIENCE was not significant.

At T2, reported mask wearing was generally high in crowded places ($M = 87.56, SD = 28.0$) and in public ($M = 73.66, SD = 34.9$), but lower around family and friends ($M = 33.63, SD = 36.43$). For mask wearing around family and friends at T2, the regression model did not predict mask wearing in public ($F(8,588) = 1.33, p = 0.23$), nor was there any effect of group. We found no pairwise difference in the Dunnett test comparing each condition to CONTROL. For mask wearing in crowded places at T2, the model was not significant ($F(8,588) = 1.829, p = 0.069$), nor was the main effect of Group, though Conservatism negatively predicted mask wearing ($\beta = -4.04, t(588) = -2.684, p = 0.0075$). For mask wearing in public, the overall model was not significant ($F(2,588) = 0.464, p = 0.88$), nor was there any effect of Group, or any differences from CONTROL in the Dunnett test.

Exploratory analysis.

We modeled Anti-mask belief at T1 as a function of Group, Gender, Conservatism, Age, and Video Reaction. Anti-Mask Belief was significantly predicted by the model ($F(9,587) = 30.31$, $p < .00001$), Conservatism ($\beta = 4.19$, $t(587) = 4.808$, $p = 0.000002$) and negatively by Video Reaction ($\beta = -8.72$, $t(588) = -15.516$, $p < .000001$). The ANOVA showed a significant main effect of Group ($F(4,587) = 4.37$, $p = 0.0017$, partial $\eta^2 = 0.047$), and the Dunnett test comparing each group to CONTROL showed significantly reduced Anti-Mask belief for those who saw the LOYALTY video ($t(587) = -4.71$, $p < 0.001$) and the COMBINED video ($t(587) = -4.493$, $p < 0.001$).

The next analysis examined Anti-mask belief at T2. The model predicted Anti-mask belief at T2 significantly, ($F(9,587) = 27.35$, $p < .00001$), as did Conservatism ($\beta = 4.17$, $t(587) = 4.71$, $p = 0.000003$) and Video Reaction ($\beta = -8.523$, $t(588) = -14.941$, $p < .000001$). The ANOVA model showed a trend towards a main effect of Group that did not survive multiple comparisons correction ($F(4,587) = 2.58$, $p = 0.036$, partial $\eta^2 = 0.029$). The Dunnett test comparing each condition to CONTROL showed significantly reduced Anti-mask belief at T2 in participants who watched the LOYALTY video ($t(587) = -4.116$, $p < 0.001$), and a trend towards reduced belief that did not survive multiple comparisons correction for those who watched the COMBINED video ($t(587) = -2.617$, $p = 0.0324$).

The model significantly predicted frequency of mask wearing in public at T2, ($F(9,587) = 11.09$, $p < .00001$) as did Video Reaction ($\beta = 11.16$, $t(587) = 9.773$, $p < 0.000001$). Conservatism did not survive multiple comparisons correction ($\beta = -4.2$, $t(587) = -2.371$, $p < 0.018$). Frequency of mask wearing in crowded places at T2 was significantly predicted by the model, ($F(9,587) = 5.9$, $p < .00001$) and by Video Reaction ($\beta = 5.81$, $t(587) = 6.128$, $p < 0$).

000001) and Conservatism ($\beta = -5.133$, $t(587) = -3.485$, $p < 0.00053$). There were no significant effect of Group overall or in the Dunnett test comparing each condition to CONTROL in either analysis.

Frequency of mask wearing around family and friends at T2 was significantly predicted by the model, ($F(9,587) = 15.57$, $p < .00001$) and by Video Reaction ($\beta = 13.06$, $t(587) = 11.281$, $p < 0.000001$). There was no main effect of Group in the ANOVA, ($F(4,587) = 3.37$, $p = .09$), but the Dunnett test showed significantly increased mask wearing for those who watched the LOYALTY video compared to the CONTROL video ($t(587) 3.07$, $p = 0.00822$).

Discussion

In our first study, conservatives reported stronger anti-mask beliefs compared with moderates and liberals and were also less likely to report compliance with COVID safety protocols. Crucially, these beliefs were related to underlying moral concerns. Anti-mask belief was positively associated with ingroup loyalty, and negatively associated with concern for harm and fairness. The association between anti-mask belief and with Identification with America suggests that national identity is specifically relevant to these beliefs. Furthermore, conservatives frequently reported not wearing masks due to concerns about freedom of choice and individual rights. These results suggest that beliefs surrounding mask wearing in the United States have become moralized, and thus linked to specific moral concerns.

In our second, pre-registered study, we crafted messages about mask wearing framed to specifically target the moral concerns reported by conservatives. Consistent with other research (Feinberg & Willer, 2013, 2019; Sachdeva et al., 2019; J. Voelkel, Mernyk, & Willer, 2020; J. G.

Voelkel & Feinberg, 2018), we found that moral reframing of messages was successful. Video messages framed in terms of loyalty to America led to reduced anti-mask belief immediately following the video compared to a control video, and this reduction in anti-mask belief persisted for at least one week. In our exploratory analysis, when we included participants' ratings of their reaction to the video in our model, we also found that those who watched the loyalty-framed video reported wearing their masks more frequently in the following week when they were around friends and family. The effect was not evident in other contexts (wearing masks in public or in crowded places), but those analyses are likely limited by a ceiling effect, since mask wearing was already very high in those contexts. When the information about masks was framed in terms of pure science, there was no significant reduction in anti-mask beliefs or change in mask-wearing behavior. This finding is consistent with research showing that scientific information is often rejected (Lewandowsky et al., 2012; Nyhan et al., 2014), particularly when there is an underlying motivation to do so (Lewandowsky & Oberauer, 2016).

The liberty framing did not have a significant effect on belief or behavior, despite indications from our data that this was an important value to our participants. This framing, which urged the wearing of masks in order to maintain individual liberty by avoiding government lockdowns, may have been unconvincing to those who did not believe strongly in the benefits of mask wearing to begin with. The concept that "Masks allow us to safely leave our homes, to interact with each other" seems to have been a bridge too far for our participants to accept. This result suggests that in order to be successful, moral reframing must not only resonate with the receiver's moral concerns, but also must do so in a way that is

sufficiently plausible to the audience. It is also possible that concern for liberty was not as strong as concern for loyalty among those who harbored anti-mask beliefs.

We hypothesized that the combined video, which contained elements of all three of the other frames (science, loyalty, liberty), would be more effective than the individual frames alone. The data did not support this hypothesis. The combined video did lead to decreased anti-mask belief immediately following the video, but this effect did not persist one week later, and was not accompanied by an increase in mask wearing. Given that elements of the loyalty frame appeared in the combined video, and the other frames did not lead to significant changes, it is reasonable to conclude that the limited effect the combined video had on belief was due to the presence of portions of the loyalty frame within the video. Furthermore, the measurement of anti-mask belief at the first time point, immediately following the video, may also be more susceptible to demand characteristics compared with the measurements one week later. Therefore, we consider the evidence that the combined video affected mask-wearing belief to be weak.

In exploratory analyses, we found that people's ratings of the video as enjoyable, informative, compelling, and interesting, was a significant predictor of anti-mask belief following the videos immediately and one week later. This variable also predicted the frequency of mask wearing in all three contexts. It is possible that reaction to the videos captures some individual personality characteristic that might relate more directly to mask-related behavior. For example, video enjoyment has been found to correlate with openness to experience and agreeableness (Scott, Guntuku, Lin, & Ghinea, 2016). Since we do not have a measure of mask-related beliefs before the video, we cannot attribute this effect to the videos

themselves. Nevertheless, the possibility that more engaging videos affect behavior more should be addressed in future research. Evidence shows that more engaging messaging tends to be more effective, perhaps due to increased attention, and/or enhanced emotional responses (de Graaf, Hoeken, Sanders, & Beentjes, 2009; Murphy, Frank, Chatterjee, & Baezconde-Garbanati, 2013).

When accounting for video reaction in our model, we found that watching the loyalty video alone resulted in increased mask wearing during the subsequent week. For health messages to be useful, they must ultimately translate to behavior aligned with the message (Carpenter, 2010). This is therefore a promising result for moral reframing as a method of health messaging.

Limitations

While our sampling method did not ensure equal representativeness across the entire population of American conservatives, constraining the generalizability of this result, we did not find any effects of gender, age, or any interaction between the effects of message type and other variables.

Our video stimuli contained a combination of text and moving images in order to be as compelling as possible. However, this means that the relative contributions of text and imagery to our effect are unclear. While our expert raters found that the targeted moral value was the most strongly represented value in each video, they did also sometimes detect the presence of other values in the videos. Notably, the LOYALTY video was found to contain some representation of liberty. However, since the LIBERTY video did not affect anti-mask beliefs and

behaviors, the presence of this value alone is not likely to explain the success of the LOYALTY video.

Conclusions

These results further support the notion that reframing messages to resonate with an audience's values can enhance the messages' persuasiveness. In this specific case, framing health policy messaging in terms of protection of family, community, and nation may be effective with otherwise resistant conservative audiences.

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Figures

Figure 1: Anti-mask Belief by Group in Study 1

Figure 2: COVID Guideline Adherence by Group in Study 1

Figure 3: Study 2, Anti-mask Belief by video condition

Table 1: Proportion of respondents endorsing each reason for not wearing a mask.

Reason	Liberals	Moderates	Conservatives	X-squared	p	significant
Because masks are uncomfortable	0.089	0.159	0.302	27.669	9.81E-07	*
Because I don't think it will prevent me from getting sick	0.039	0.077	0.238	38.057	5.45E-09	*
Because I don't think it will prevent others from getting sick	0.022	0.06	0.157	23.185	9.23E-06	*
Because it looks silly	0.011	0.033	0.116	31.594	2.05E-05	*
Because it's my choice not to wear one	0.034	0.142	0.349	62.779	2.33E-14	*
Because it looks weak	0.017	0	0.087	23.001	1.01E-05	*
Because I don't have one	0.101	0.093	0.11	0.284	8.68E-01	
Because it fogs up my glasses	0.084	0.093	0.145	4.009	1.35E-01	
Because my friends aren't wearing them	0.039	0.033	0.041	0.165	9.21E-01	
Because it is socially awkward to wear one	0.039	0.033	0.076	4.005	1.35E-01	
Because it is my right not to wear one	0.011	0.088	0.186	31.667	1.33E-07	*
Because it's hard to exercise while wearing a mask	0.122	0.159	0.198	3.658	1.61E-01	

Appendix

Stimulus Validation.

Six self-described experts in the MFT, drawn from academic circles including graduate students and faculty in related fields, watched each of the five videos, in random order, and rated for each video how strongly they felt one of six values were represented in the video (Care/Harm, Fairness/Cheating, Loyalty/Betrayal, Authority/Subversion, Sanctity/Degradation, Liberty/Oppression) on a scale from 0-10. The results are shown in Figure S1. The raters found little to no moral content in the CONTROL video, as expected. In the SCIENCE video, the most highly rated value was Harm/Care. In the LIBERTY video the most commonly rated value was Liberty/Oppression, as expected. In the LOYALTY video the most commonly rated value was Loyalty as expected, but raters also appeared to identify substantial reference to Liberty/Oppression in this video as well. The COMBINED video reflected multiple values according to the raters, including substantial Harm/Care, Loyalty/Betrayal, and Liberty/Oppression.

Figure S1: Expert ratings of the moral content of the video stimuli

Study 1: Correlation results

There were significant relationships among many of the measured variables in Study 1, depicted in Figure S2. Notably, Anti-mask Belief correlated negatively with Trust in Science ($r(531) = -0.633, p < 0.0001$), COVID Guideline Adherence ($r(531) = -0.583, p < .0001$), MFQ Harm/Care ($r(531) = -0.365, p < 0.0001$), MFQ Fairness/Reciprocity ($r(531) = -0.361, p < 0.0001$), and positively with MFQ Purity/Sanctity ($r(531) = 0.252, p < 0.0001$), MFQ Ingroup/Loyalty ($r(531) = 0.356, p < .0001$), MFQ Authority/Respect ($r(531) = 0.354, p < 0.0001$), Authoritarianism ($r(531) = 0.426, p < 0.0001$), Conservatism ($r(531) = 0.197, p = 0.0007$), and Identification with America ($r(531) = 0.177, p < 0.0001$) scores. COVID Guideline Adherence correlated positively with MFQ Harm/Care ($r(531) = 0.390, p < 0.0001$), MFQ Fairness/Reciprocity ($r(531) = 0.372, p < 0.0001$), Identification with Community ($r(531) = 0.248, p < 0.0001$), and Trust in Science ($r(531) = 0.313, p < 0.0001$), and negatively with Anti-mask Belief ($r(531) = -0.583, p < 0.0001$) and Authoritarianism ($r(531) = -0.214, p < 0.0001$).

Figure S2: Correlations among measurements in Study 1

Survey Measures

Anti-mask Belief (16 items)

For the following statements, indicate how strongly you agree or disagree

(7 point scale: “Strongly disagree”, “Disagree”, “Moderately disagree”, “Neither agree nor Disagree”, “Slightly agree”, “Moderately agree”, “Strongly agree”)

1. Wearing a mask is a sign of weakness
2. Wearing a mask is a sign of being a follower
3. (-) Wearing a mask is a sign of caring for others
4. (-) Science shows that wearing masks is effective to prevent disease transmission
5. Government-mandated mask wearing is an attack on individual freedom
6. Wearing a mask is uncomfortable
7. My decision to wear a mask predominantly affects me
8. (-) My decision to wear a mask predominantly affects others
9. (-) Businesses should have a right to refuse entry and service to people NOT wearing masks
10. Businesses should have a right to refuse entry and services to people who ARE wearing masks
11. I look down on people who wear masks in public
12. (-) I look down on people who do not wear masks in public
13. Masks are helpful for doctors and healthcare professionals, but not for me
14. People look silly when wearing masks in public
15. (-) How effective do you believe wearing a mask is in protecting yourself from COVID-19?
(scored on a 1-7 scale labeled “not effective at all”, “somewhat effective”, “extremely effective”
at the 1, 4, 7 marks respectively)

16. (-) How effective do you believe wearing a mask is in preventing you from transmitting COVID-19 to others? (scored on a 1-7 scale labeled “not effective at all”, “somewhat effective”, “extremely effective” at the 1, 4, 7 marks respectively)

COVID Guideline Adherence (12 items)

To what extent do you act in accordance with the following COVID-19 prevention guidelines? (5 point scale: “Not at all”, “Sometimes”, “About half the time”, “Most of the time”, “Always”)

1. Regularly and thoroughly cleaning your hands with an alcohol-based hand rub
2. Avoiding touching your eyes, nose and mouth with unwashed hands
3. Covering your mouth and nose with your bent elbow or tissue when you cough or sneeze
4. Frequently washing your hands with soap and water for at least 20 seconds
5. Avoiding meetings, events, and other social gatherings
6. Practicing social distancing by doing your grocery shopping at off-peak hours and/or less often
7. Maintaining at least 6 feet distance between yourself and others
8. Practicing social distancing by avoiding crowds in confined and poorly ventilated spaces
9. Avoiding contact with sick people
10. Regularly cleaning and disinfecting frequently touched surfaces
11. Staying home if you are sick, or, hypothetically staying home if you were sick (except to get medical care).
12. Wearing a mask when you leave the house.

Mask-Wearing Reasons. Participants were also asked to click a check box next to any of several reasons why they might not wear a mask. Those reasons included:

- Because masks are uncomfortable
- Because I don't think it will prevent me from getting sick
- Because I don't think it will prevent others from getting sick
- Because it looks silly
- Because it's my choice not to wear one
- Because it looks weak
- Because I don't have one
- Because it fogs up my glasses
- Because my friends aren't wearing them
- Because it is socially awkward to wear one
- Because it is my right not to wear one
- Because it's hard to exercise while wearing a mask

Video Stimuli

Video 1: Control (Trains)

<https://www.youtube.com/watch?v=ds6Ypkl0mhc>

Video 2: Science

<https://www.youtube.com/watch?v=KTaMAgB00O4>

Video 3: Liberty

<https://www.youtube.com/watch?v=RQypElI6yeo>

Video 4: Loyalty

<https://www.youtube.com/watch?v=iqrwhwbvF14>

Video 5: Combined

<https://www.youtube.com/watch?v=5696fmQFxl>

Text of Video Stimuli

VIDEO 1: CONTROL video (Trains):

Trains are one of the worlds' most important modes of transportation.

Today 40% of the world's freight cargo is transported via trains.

The miles of railroad track in the United States reached its peak in 1916. That year there were more than 250,000 miles of track—enough to reach the moon from Earth.

The first steam-powered locomotives were built in England in the early 1800s.

In the United States, passenger trains carry more than 500 million riders per year.

The longest railway tunnel in the world is in Switzerland, and is more than 35 miles long.

The word “train” can be traced to a Latin word that means *pull* or *draw*.

Trains: the workhorses of the transportation system.

VIDEO 2: SCIENCE video:

According to the CDC, cloth coverings may slow the spread of the coronavirus, and prevent people who do not know they have it from transmitting it to others.

The coronavirus is spread largely through droplets that come out of the mouth and nose while talking, sneezing, coughing, or breathing. Even simple cloth face coverings can prevent these droplets from spreading.

This picture shows droplets exiting the mouth while speaking, with and without a face covering.

The CDC now recommends that everyone wear cloth face coverings when leaving their homes, regardless of whether they have fever or symptoms of COVID-19

Stanford Professor Larry Chu says: “As many as 40% of people infected with the virus that causes COVID-19 may have no symptoms. But when they talk, cough or sneeze, they can still spread the virus to others in the form of respiratory droplets expelled into the air. So, wearing a mask regularly can prevent spreading at the source even when we don’t know we are sick.”

A study that looked at coronavirus transmission rates across 198 countries found countries that introduced mask wearing earlier in the outbreak had drastically fewer deaths. According to the

lead author of the study, “It wasn’t just by a few per cent, it was up to a hundred times less mortality.”

This chart shows deaths in countries that implemented mask-wearing compared to those that didn't.

Some people are concerned about masks trapping in carbon dioxide (CO₂). According to Sarah Stanley, Professor of Infectious Diseases at Berkeley, there is no risk of CO₂ poisoning or “hypercapnia” from wearing a mask. Remember, surgeons habitually wear masks for extended periods of time.

Recent reviews of the scientific literature and data models found that masks work best when everyone is wearing them. Science suggests masks are the most inexpensive way to curb the impact of the disease on our health and on the economy.

The evidence is clear. Wear a mask.

VIDEO 3: LIBERTY

America was founded on the principle that each individual has the right to life, liberty, and the pursuit of happiness.

Government-mandated lockdowns may slow the pandemic but they are an alarming suppression of freedom.

Suppressing freedom through lockdowns also hurts our economy. Without jobs, we have no livelihood.

There is a better way to slow the pandemic. And we can do it on our own, without big government, and with less impact on the economy.

The coronavirus is spread largely through droplets that come out of the mouth and nose while talking, sneezing, coughing, or breathing. Even simple cloth face coverings can prevent these droplets from spreading.

Masks allow us to safely leave our homes, to interact with each other. Masks allow us to do our work, to run our businesses, and to go about our lives.

Thanks to wide use of masks, countries like Japan, Singapore, and South Korea had little to no lockdowns or restrictions on their freedoms. They managed to prevent large outbreaks, keep death rates extremely low, and, most importantly, retained their freedom and went about their normal lives sooner.

We can take responsibility for ourselves and choose to wear masks, so that the government doesn't resort to imposing another lockdown.

Choose freedom. Choose to wear a mask.

VIDEO 4: LOYALTY

Together, we can save America from the coronavirus and restore our nation's economy.

A pandemic is not an individual's disease. A pandemic endangers us all. It uses each one of us to spread to many others.

Thousands of Americans are getting sick and dying every day. The most vulnerable are of America's greatest generations, the same Americans who fought for us in past wars.

The coronavirus is spread largely through droplets that come out of the mouth and nose while talking, sneezing, coughing, or breathing. Even simple cloth face coverings can prevent these droplets from spreading.

Masks can save American lives, and restore our nation's economy, but only if everyone wears them.

In this time of national crisis, like our forefathers before us, it is our patriotic duty to come together and fight for our way of life, our traditions, and each other.

History has shown that when America is threatened, we rise as one.

Help protect America. Wear a mask.

VIDEO 5: COMBINED

(L) Together, we can save our nation from the coronavirus and restore America's economy.

(L) Thousands of Americans are getting sick and dying every day., The most vulnerable are of America's greatest generations, the same Americans who fought for us in past wars.

(F) Government-mandated lockdowns may slow the pandemic but they are an alarming suppression of freedom.

(F) There is a better way to slow the pandemic. And we can do it on our own, without big government, and with less impact on the economy.

The coronavirus is spread largely through droplets that come out of the mouth and nose while talking, sneezing, coughing, or breathing. Even simple cloth face coverings can prevent these droplets from spreading.

(S) This picture shows droplets exiting the mouth while speaking, with and without a face covering.

(S) A study that looked at coronavirus transmission rates across 198 countries found countries that introduced mask wearing earlier in the outbreak had drastically fewer deaths. According to the lead author of the study, "It wasn't just by a few per cent, it was up to a hundred times less mortality."

(S) This chart shows deaths in countries that implemented mask-wearing compared to those that didn't.

(F/L) Masks allow us to safely leave our homes, to interact with each other. Masks allow us to do our work, to run our businesses, and to go about our lives.

(S) Recent reviews of the scientific literature and data models found that masks work best when everyone is wearing them. Science suggests masks are the most inexpensive way to curb the impact of the disease on our health and on the economy.

(L) In this time of national crisis, like our forefathers before us, it is our patriotic duty to come together and fight for what we believe in, our way of life, our traditions, and each other.

(F) Thanks to wide use of masks, countries like Japan, Singapore, and South Korea had little to no lockdowns or restrictions on their freedoms. They managed to prevent large outbreaks, keep death rates extremely low, and, most importantly, retained their freedom and went about their normal lives sooner.

The evidence is clear. Choose freedom. Help protect America. Wear a mask.