Jab my arm, not my morality: Perceived moral reproach as a barrier to COVID-19 vaccine uptake☆

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ABSTRACT

Background: Vaccinating the public against COVID-19 is critical for pandemic recovery, yet a large proportion of people remain unwilling to get vaccinated. Beyond known factors like perceived vaccine safety or COVID-19 risk, an overlooked sentiment contributing to vaccine hesitancy may rest in moral cognition. Specifically, we theorize that a factor fueling hesitancy is *perceived moral reproach*: the feeling, among unvaccinated people, that vaccinated people are judging them as immoral.

Approach: Through a highly powered, preregistered study of unvaccinated U.S. adults ($N = 832$), we found that greater perceived moral reproach independently predicted stronger refusal to get vaccinated against COVID-19, over and above other relevant variables. Of 18 predictors tested, perceived moral reproach was the fifth strongest—stronger than perceived risk of COVID-19, underlying health conditions status, and trust in scientists.

Conclusion: These findings suggest that considering the intersections of morality and upward social comparison may help to explain vaccine hesitancy.

1. Introduction

Since becoming a pandemic on March 11, 2020, COVID-19 has devasted social and economic systems around the world, while ending and upheaving the lives of far too many. After long stretches of challenges and signs of despair, much hope now lies in the distribution and uptake of COVID-19 vaccines. Vaccinating as many people as possible is critical for resolving this pandemic effectively, reducing the risks of new variants and future outbreaks emerging, and promoting the health and safety of every individual. However, unwillingness to get vaccinated remains high. For example, as of this writing, approximately two-thirds of adults in the United States have received at least one COVID-19 vaccination dose (CDC, 2021), an estimated remaining 21–34% report that they will never get vaccinated (Murray, 2021; Neergaard and Fingerhut, 2021).

Social divides have become apparent between vaccinated and unvaccinated individuals, as debates have arisen over whether to segregate these two groups in public spaces; as some vaccinated people wish to distance themselves from those unvaccinated and condemn their decision; and as unvaccinated people feel shamed by those vaccinated (Craven, 2021; Kelly, 2021; Peddy, 2021). These divides can seem highly moralized, fraught with judgments of right vs. wrong. Vaccinated people may readily judge the decision to eschew a vaccine as a failure to prevent undue harm and suffering, as perceptions of harm drive much of moral judgment (Schein and Gray, 2018). Intuitively, condemning people for eschewing vaccinations may seem like an effective strategy for creating prescriptive moral norms that encourage behavior change. Yet we theorize that this approach may be not just ineffective, but paradoxically *counterproductive*, for promoting COVID-19 vaccine uptake. Based on perspectives integrating moral psychology and social comparison theory, we posit that when people feel morally condemned for eschewing a COVID-19 vaccine, they in turn become less willing to get vaccinated.

As social animals, humans benefit from the capacity to establish moral norms and to reject individuals who violate those norms; these moral cognitions are integral to suppressing selfishness and fostering cooperation in group life (Ellemers & van den Bos, 2012; Tomasello and Vaish, 2013). Yet just as people have a basic motivation to reject moral transgressors, people are also motivated to reject self-righteous do-gooders who appear to take a moral high ground (Cramwinckel et al., 2013; Minson and Monin, 2012; Monin et al., 2008). According to Monin's (2007) theory of upward moral comparison, upward social

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comparisons in the moral domain are particularly psychologically threatening, and individuals may react defensively when they feel as though others are looking down upon their morality. The rejection of do-gooders who impose such moral threat has been documented in research on attitudes toward vegetarians, for instance, finding that meat-eaters express more negative attitudes toward vegetarians to the extent that they believe vegetarians are morally judgmental of meat-eating (Minson and Monin, 2012). A way to defend oneself against such perceived moral reproach is to distance oneself from the source of threat (Monin, 2007), which has been shown relevant to healthcare settings. For example, the more strongly that people believe a physician would be disapproving of their potentially unhealthy habits, the less they would want that physician to be their doctor (Howe and Monin, 2017). Moreover, when smokers experience stigma, they may actually become *less* likely to quit smoking (Helweg-Larsen et al., 2019). These findings lend support for theorizing that the precarity of moral self-image makes people sensitive to experiencing moral failure, which in turn can motivate externalization, distancing, and avoidance in response to perceived moral reproach (Gausel and Leach, 2011; Monin, 2007).

In light of these perspectives, we see upward moral comparison as a plausible driver of COVID-19 vaccine hesitancy. We advance that rather than instilling a motivation to get vaccinated, feeling moral reproach from the vaccinated majority may make unvaccinated people *less* open to receiving a vaccine. We posit that unvaccinated individuals perceiving moral reproach from vaccinated others may defuse this threat and affirm their moral self-image by distancing themselves from vaccinated others and from their message—that is, by resisting getting vaccinated.

We investigated this proposition through a highly powered, preregistered study of U.S. adults. We tested the hypothesis that greater perceived moral reproach would predict lower openness to getting vaccinated over and above other relevant predictors. Based on recent studies that have examined predictors of COVID-19 vaccine hesitancy (Allington et al., 2021; Murray, 2021; Razai et al., 2021; Robertson et al., 2021; Salmon et al., 2021; Schwarzinger et al., 2021), we identified a wide range of relevant variables that served as covariates, to conduct a rigorous test of perceived moral reproach's unique predictive power. These covariates included participants' perceived risk of COVID-19, whether they had any underlying conditions making them more susceptible to a severe case of COVID-19, their perceptions of COVID-19 vaccines' safety and effectiveness, their trust in scientists and the medical community, their reliance on social media for information about COVID-19, and their political ideology, among other demographic characteristics (age, gender, race, income, educational attainment, urban-rural residence).

2. Methods

This study's sample size, materials, exclusion criteria, hypotheses, and analyses were preregistered at https://osf.io/zdqkj/?view_only=64e54fd1ec154b6fa42fc8230397b738.

We note that our two outcomes reported below deviate from our preregistration plan. In order to optimize measurement of openness to getting vaccinated, we conducted *post hoc* psychometric analyses on our preregistered 8-item scale for this variable. These analyses revealed that our preregistered single-factor structure for these eight items fit the data poorly; we found strong support instead for a 2-factor structure, with one factor capturing *openness to getting vaccinated* and a second factor capturing *refusal to get vaccinated*. Inspection of a scree plot, results of an exploratory factor analysis, and comparisons of model fit converged to support the separation of these two subscales into distinct variables. Five items loaded strongly onto the openness factor (which had an eigenvalue of 4.23) and three items onto the refusal factor (eigenvalue of 2.68), with no significant cross-loading: Each item loaded onto its designated factor at a value greater than 0.80 and onto the other factor at a value

less than 0.20. Detailed results of these psychometric analyses appear in Supplemental Material and are available at https://osf.io/q54ea/?view_only=6bba2a1f8d6a432f8c45ada951a67974. Openness and refusal were correlated at $r = -0.65$. We note that this change in measurement led us to treat openness and refusal as separate outcome variables and thus to conduct two regression tests—one test for each outcome—instead of a single test. In the results below, we report findings on openness and refusal separately. For transparency, full results of the initially preregistered single test are available at the aforementioned link.

Our data exhibited a trivial rate of missingness below 0.1%. Given this low rate and our highly powered sample, we used listwise deletion in analyses.

2.1. Participants

When it comes to epidemiological matters like preventing the spread of COVID-19, even small effects can have meaningful implications. Accordingly, in determining this study's sample size, we sought ample power to detect whether perceived moral reproach could uniquely explain at least 1% of variance in vaccine openness. A power analysis using G*Power 3.1 specifying this effect size revealed that a total sample of 782 participants would provide 80% power at $\alpha = 0.05$, two-tailed. To ensure ample power after excluding participants who fail an attention check, which asked participants to "Please select response #3 for this question," we recruited a total of 850 unvaccinated U.S. adults via Amazon Mechanical Turk (MTurk). Data were collected from June 10–13, 2021. Participants were prescreened based on their COVID-19 vaccination status, and only those who reported having received no vaccine dose were invited to participate in the study. After excluding four participants who failed the attention check in the survey; two participants who identified as transgender, three as non-binary, one as an "other" gender; and eight participants who selected a response listed as "other" for their race, 832 participants (435 men, 397 women) between the ages of 18 and 89 ($M_{age} = 39.85$, $SD = 11.46$) were retained for analyses. Of these participants, 659 identified as White, 113 as Black, 40 as Asian, and 20 as biracial/multiracial. Moreover, 108 identified as Hispanic/Latinx. (We note that our *post hoc* decision to exclude participants who identified as transgender, nonbinary, or "other" gender deviated from our preregistration plan, as did our *post hoc* decision to exclude participants who identified with an "other" racial group. We made these decisions at the suggestion of an anonymous reviewer who expressed concerns about dummy-coding these variables in regression models due to their small sample sizes (each $n < 10$). Results of a regression test using all variables as we preregistered them are available in Supplemental Material.)

2.2. Materials

2.2.1. Perceived moral reproach

Perceived moral reproach was assessed by an original 4-item scale ($\alpha = 0.92$), which we created for the purpose of the current study. Items were as follows: "Vaccinated people think that unvaccinated people are immoral," "Vaccinated people morally judge unvaccinated people," "Vaccinated people are self-righteous," and "Vaccinated people think that they are morally better than unvaccinated people." Responses ranged from 1 (strongly disagree) to 7 (strongly agree). A scree test indicated that these four items formed a single factor, and an exploratory factor analysis indicated strong item loadings (items loaded at 0.86, 0.89, 0.78, and 0.91, respectively). Results of these psychometric analyses appear in Supplemental Material and are available at https://osf.io/q54ea/?view_only=6bba2a1f8d6a432f8c45ada951a67974.

2.2.2. Perceived risk of COVID-19

Perceived risk of COVID-19 was assessed by the following question, adapted from Allington et al. (2021): "To what extent to do you feel that

COVID-19 poses a risk to you?" Responses ranged from 1 (no risk at all) to 7 (extremely high risk).

2.2.3. Underlying conditions

The question, "To the best of your knowledge, do you have any underlying conditions that make you more susceptible to experiencing a severe case of COVID-19?" with responses of "yes" (1) and "no" (2), assessed whether participants had any relevant underlying conditions.

2.2.4. Perceived safety of COVID-19 vaccines

Perceived safety of COVID-19 vaccines was assessed by the question, "How safe do you think that COVID-19 vaccines are?" with responses ranging from 1 (extremely unsafe) to 7 (extremely safe).

2.2.5. Perceived effectiveness of COVID-19 vaccines

Perceived effectiveness of COVID-19 vaccines was assessed by the question, "How effective do you think that COVID-19 vaccines are at preventing illness?" with responses ranging from 1 (not effective at all) to 7 (extremely effective).

2.2.6. Trust in scientists

Trust in scientists was assessed by the following two questions (correlated at $r = 0.77$), adapted from Allington et al. (2021): "To what extent do you trust scientists working at universities?" and "To what extent to do you trust scientists working at private companies?" with responses ranging from 1 (not at all) to 7 (extremely much).

2.2.7. Trust in medical professionals

Trust in medical professionals was assessed by the following question, adapted from Allington et al. (2021): "To what extent do you trust doctors and nurses in the U.S.?" Responses ranged from 1 (not at all) to 7 (extremely much).

2.2.8. Social media reliance for COVID-19 information

Social media reliance was assessed by the following question, adapted from Allington et al. (2021): "How much of what you know about COVID-19 has come from social media platforms, such as Facebook, Instagram, YouTube, or Twitter?" Responses ranged from 1 (none of it) to 7 (all of it).

2.2.9. Political ideology

Political ideology was assessed by question, "On the following scale from 1 (extremely liberal) to 7 (extremely conservative), how would you rate your political views?"

2.2.10. Demographics

Basic demographic questions assessed participant age, gender, race, ethnicity, income, educational attainment, and the extent to which one's current community of residence is rural vs. urban. Gender was dummy coded as man (0) and woman (1). Race was dummy coded with White as the reference group and Black, Asian, and biracial/multiracial as comparison levels. Ethnicity was coded as Hispanic/Latinx (1) and not Hispanic/Latinx (0).

2.2.11. Openness to getting vaccinated

Openness to getting vaccinated against COVID-19 was assessed by the following 5-item scale ($\alpha = 0.97$): "I might be open to getting a COVID-19 vaccine one day," "I can imagine myself getting a COVID-19 vaccine within the next year," "I am open to getting a COVID-19 vaccine within the next few months," "I can imagine myself scheduling a COVID-19 vaccine appointment within the next month," and "Regardless of when it will be, I do plan on getting a COVID-19 vaccine one day." Responses ranged from 1 (definitely not) to 7 (definitely yes).

2.2.12. Refusal to get vaccinated

Refusal to get vaccinated against COVID-19 was assessed by the

following 3-item scale ($\alpha = 0.96$): "I will never get a COVID-19 vaccine," "I refuse to ever get a COVID-19 vaccine, even if my doctor insists that I do," and "I refuse to ever get a COVID-19 vaccine, even if I were paid a lot of money to get it." Responses ranged from 1 (strongly disagree) to 7 (strongly agree).

2.3. Procedure

After providing informed consent, participants completed study measures. All measures, except for the outcome variables of vaccine openness and refusal, appeared in a randomized order. Measures of openness and refusal appeared at the end of the survey.

2.4. Analysis

Data and analysis scripts are available at https://osf.io/b89ng/?view_only=b0d38c150e764b6dac69dbe1253a91ea.

3. Results

See Table 1 for variable intercorrelations. On average, participants perceived a moderate degree of moral reproach from vaccinated people ($M = 4.81$, $SD = 1.44$) and were ambivalent in terms of openness to getting vaccinated ($M = 3.85$, $SD = 1.95$) and refusal to get vaccinated ($M = 4.10$, $SD = 2.00$), though scores on each variable notably displayed fairly high variance and ranged fully from 1 to 7.

We note that the analysis using our preregistered measurement strategy—which entailed treating all eight items for vaccine openness and refusal as comprising a single outcome variable (with refusal scale items reverse-scored) and accounting for transgender, non-binary, other-gender, and other-race participants—supported our hypothesis: Perceived moral reproach was a significant predictor of this variable, $b = -0.07$, $SE = 0.03$, $\beta = -0.06$, $p = .020$, over and above covariates. In this model, perceived moral reproach was the sixth strongest predictor of the 22 variables tested. Full results for this test are available in Supplemental Material.

3.1. Openness to getting vaccinated

First, we tested whether perceived moral reproach would predict openness to getting vaccinated. Results of an ordinary least squares (OLS) regression indicated that, contrary to our hypothesis, perceived moral reproach did not predict openness (see Table 2).

3.2. Refusal to get vaccinated

Next, we tested whether perceived moral reproach would predict refusal to get vaccinated. Results of an OLS regression indicated that, supporting our hypothesis, greater perceived moral reproach predicted stronger refusal to get vaccinated (see Table 3). Of the 18 predictors tested, perceived moral reproach was the fifth strongest.

4. Discussion

Our findings provide a new look at the psychology of vaccine hesitancy, showcasing a potential underpinning in moral cognition. First and foremost, perceived safety of COVID-19 vaccines was the strongest predictor of the extents to which participants were open to getting vaccinated and refused to get vaccinated. Nevertheless, moral sentiments explained additional, unique insight into COVID-19 vaccination intentions: Greater perceived moral reproach—the feeling of being judged as immoral for being unvaccinated—independently predicted stronger refusal to get vaccinated, over and above a wide range of other factors relevant to vaccination attitudes. Of the 18 predictors tested, perceived moral reproach was the fifth strongest. Notably, reproach was a stronger predictor of vaccine refusal than were other presumably key

Table 1
Intercorrelations for all main variables.

Variable	1	2	3	4	5	6	7	8	9	10
1. Moral Reproach	–									
2. Risk	-.02	–								
3. Underlying Conditions	-.15*	-.45*	–							
4. Safety	-.21*	.34*	-.20*	–						
5. Effectiveness	-.20*	.35*	-.19*	.77*	–					
6. Scientist Trust	-.16*	.37*	-.23*	.71*	.72*	–				
7. Medical Trust	-.19*	.26*	-.13*	.61*	.61*	.72*	–			
8. Social Media	.15*	.35*	-.32*	.20*	.18*	.25*	.20*	–		
9. Political Ideology	.19*	-.14*	-.07	-.20*	-.24*	-.25*	-.15*	.05	–	
10. Openness	-.15*	.45*	-.27*	.75*	.68*	.66*	.56*	.28*	-.27*	–
11. Refusal	.35*	-.16*	-.09*	-.51*	-.49*	-.42*	-.43*	.09*	.42*	-.65*

*p < .05.

Table 2
Factors predicting openness to getting vaccinated against COVID-19 ($R^2 = 0.65$).

Predictor	b	SE b	β	p
Perceived Safety of COVID-19 Vaccines	0.44	0.04	.42	<.001
Perceived Risk of COVID-19	0.16	0.03	.15	<.001
Perceived Effectiveness of COVID-19 Vaccines	0.16	0.04	.14	<.001
Political Ideology	−0.12	0.03	-.11	<.001
Trust in Medical Professionals	0.11	0.04	.09	.006
Trust in Scientists	0.08	0.05	.06	.092
Educational Attainment	0.08	0.03	.05	.024
Social Media Reliance for COVID-19 Information	0.06	0.03	.05	.032
Underlying Conditions Status	−0.16	0.11	-.04	.148
Ethnicity	−0.19	0.13	-.03	.161
Age	−0.01	0.00	-.03	.173
Race: Biracial/Multiracial	−0.35	0.28	-.03	.203
Rural-Urban Residence	0.02	0.02	.01	.463
Gender	−0.05	0.08	-.01	.533
Income	−0.02	0.04	-.01	.584
Race: Asian	−0.08	0.20	-.01	.703
Perceived Moral Reproach	**−0.01**	**0.03**	**-.01**	**.711**
Race: Black	0.03	0.13	.01	.814

Note. Predictors are ordered by absolute magnitude of standardized effect size (β), from largest to smallest predictor. perceived moral reproach is displayed in **boldface**.

Table 3
Factors predicting refusal to get vaccinated against COVID-19 ($R^2 = 0.49$).

Predictor	b	SE b	β	p
Perceived Safety of COVID-19 Vaccines	−0.35	0.05	-.33	<.001
Political Ideology	0.27	0.03	.25	<.001
Trust in Medical Professionals	−0.22	0.05	-.16	<.001
Ethnicity	−0.77	0.16	-.13	<.001
Perceived Moral Reproach	**0.16**	**0.04**	**.12**	**< .001**
Perceived Effectiveness of COVID-19 Vaccines	−0.14	0.05	-.12	.004
Social Media Reliance for COVID-19 Information	0.14	0.04	.11	<.001
Underlying Conditions Status	−0.41	0.13	-.09	.002
Race: Black	0.43	0.15	.07	.005
Perceived Risk of COVID-19	−0.08	0.03	-.07	.017
Educational Attainment	0.09	0.04	.06	.031
Age	0.01	0.00	.05	.087
Income	−0.07	0.05	-.04	.124
Rural-Urban Residence	0.04	0.03	.04	.182
Trust in Scientists	0.05	0.06	.04	.365
Gender	−0.09	0.10	-.02	.393
Race: Biracial/Multiracial	−0.22	0.34	-.02	.513
Race: Asian	−0.08	0.24	-.01	.751

Note. Predictors are ordered by absolute magnitude of standardized effect size (β), from largest to smallest predictor. perceived moral reproach is displayed in **boldface**.

factors, including how much of a risk participants felt COVID-19 posed to them, whether participants had any underlying conditions making them more susceptible to a severe case of COVID-19, and how much participants trusted scientists.

Considering perceptions of moral reproach may help to guide efforts aimed at increasing COVID-19 vaccine uptake. As such efforts continue, it might be intuitive for agencies and advocates to moralize vaccine uptake in a way that condemns individuals who refuse vaccines. Yet our data suggest potential for moralized sentiments to backfire by imposing moral reproach, in turn making unvaccinated individuals even more fixed on refusing vaccination. A key aim for future research should involve identifying ways to defuse inhibitive defense mechanisms that can arise from upward moral comparison. Insights to be gained can be informative in promoting not only COVID-19 vaccinations but also myriad other health behaviors.

Our findings have important theoretical implications for questions surrounding morality and social comparison—with perceived moral reproach being a core type of upward moral comparison (Monin, 2007)—that can shed light on behavioral medicine. Namely, when does upward moral comparison *promote* behavior change (e.g., Zhang et al., 2017) and when might it *inhibit* it (as in the current research)? This matter remains unclear, limiting the ability to use theory to promote positive behavior change. On the one hand, engaging in upward moral comparison might promote behavior change by inducing cognitive dissonance and guilt, particularly for people with a strongly internalized moral identity (Rothgerber, 2014; Zhang et al., 2017); changing one's behavior to align with a moral norm may allow one to resolve these aversive states and restore moral self-image. On the other hand, experiencing moral condemnation may cause feelings of rejection and inferiority that motivate self-defensive responses, such as avoidance and externalization (Gausel and Leach, 2011). It can also lead people to derogate the source of moral condemnation (Minson and Monin, 2012), presumably lessening the attractiveness of the source's message and undermining behavior change. Research testing moderators of upward moral comparison effects—including individual-difference factors (e.g., moral identity, personality, self-efficacy) and features of the moral threat (e.g., personal relevance, social identity of the source, elevating vs. condemning tone)—would be valuable.

Investigating behavior change intentions as dualistic—with openness to change and resistance to change comprising distinct constructs—could be informative, and psychometrically grounded measurement is vital. We found strong psychometric evidence for separating these two constructs, and perceived moral reproach showed divergent associations with them. That perceived moral reproach predicted refusal to get vaccinated, but not openness to getting vaccinated, may elucidate nuanced patterns in the defensive nature of upward moral comparison. Upward moral comparison threatens one's moral self-image, putting one on the psychological defense (Monin, 2007). Our findings suggest that compared to downplaying one's *openness* to behavior change, amplifying one's *rejection* of behavior change may

afford a more direct and explicit way of denying one's moral failure and distancing oneself from a moral threat. Alternatively, rather than reflecting moral threat's relevance for rejection of vs. openness to behavior change distinctly, our divergent findings for openness and refusal may have resulted from these variables' scale items activating different types of cognitions. Whereas openness items involved specific temporal components and planning, refusal items lacked these aspects and instead tended to focus on (rejecting) persuasion from others. Potentially, because our measures of both refusal and reproach involved interpersonal judgments, this shared feature could explain why perceived reproach predicted refusal, but not openness. To clarify processes and provide solutions, further research should aim to conceptually replicate and disentangle the presently observed effects in other domains. Experimental tests would be particularly worthwhile, so as to demonstrate causality and to identify strategies for promoting positive behavior change by leveraging moral comparisons. For example, messages that enable people to self-affirm can be effective at defusing threats imposed by upward moral comparison (e.g., Monin et al., 2008) and thus might help to support behavior change in moralized domains.

Future research on moral comparison also may clarify mechanisms by conceptualizing judgments as functions of potential intergroup relations, as COVID-19 vaccination status may create a sense of social identity. Moral reproach may operate differently in a basic interpersonal context (e.g., one shopper at a grocery store condemning another shopper for using too many plastic bags) than in a context where it passes across salient social identity lines (e.g., a liberal condemning a conservative for opposing gay marriage). We suspect that moral reproach in intergroup contexts may fuel behavioral resistance, at least in part, as a result of perceived intergroup threat bolstering attachment to one's in-group (e.g., Branscombe et al., 1999; Greenaway and Cruwys, 2019; Wohl et al., 2010). To the extent that unvaccinated individuals see their unvaccinated status as a social identity, perceived moral reproach might promote refusal to get vaccinated by strengthening in-group identification and/or amplifying out-group bias. These processes would stem from efforts to regulate one's collective self as part of a group, rather than one's personal moral self-image as social comparison accounts theorize.

4.1. Strengths and limitations

Strengths of this research include its use of preregistration, highly powered design, extensive set of covariates, and integration of moral psychology with health behavior. One limitation is that our data were correlational, thus precluding strong causal inference. A second limitation is that all participants were from the U.S., which restricts cross-cultural generalizability. A third limitation is that study outcomes were assessed via self-report, thus capturing vaccine intentions but not actual vaccine uptake over time. A fourth limitation is that, although our study accounted for many covariates, there are surely additional predictors of COVID-19 vaccination intentions that we did not assess, which could present aims for future research. For example, perceptions of vaccine naturalness, beliefs about purity, and conspiracy ideation are plausible factors (e.g., Georgiou et al., 2020; Reich, 2016; Rossen et al., 2019). Even within predictors we did consider, greater nuance could be informative; our single-item assessment of political ideology, for instance, overlooked distinctions between social and economic beliefs that may divergently predict vaccination attitudes. A fifth limitation is that we did not ask participants about any specific vaccine (e.g., Moderna, Pfizer-BioNTech) but instead assessed attitudes toward COVID-19 vaccines in general; this ambiguity could have added noise to our data.

5. Conclusion

As unwillingness to get vaccinated against COVID-19 persists, consideration of moral psychology is critical. To receive or refuse a vaccine is not just a personal choice but an action with moral connotations. Unvaccinated people perceive a moderate degree of moral reproach from vaccinated others, and this perception of reproach may account partially for why many unvaccinated people refuse to get vaccinated. Intuitively, shaming people for eschewing a COVID-19 vaccine may seem like an effective strategy for creating prescriptive moral norms that motivate vaccine uptake. Yet people readily become defensive when they feel their moral self-image under threat. As efforts ensue to jab more arms with vaccinations, jabbing moralities may be a counterproductive sentiment.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi. org/10.1016/j.socscimed.2022.114699.

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