Blaming the Unvaccinated during the Covid-19 Pandemic: The Roles of Political Ideology and Risk Perceptions in the USA

Supplementary Online Materials

Pretest

Participants and Procedure

We recruited 400 participants from Amazon Mechanical Turk (MTurk) to complete a study on C19 attitudes. 397 (M_{age} = 39.77, SD = 12.83, 45.6% identified as men) participants completed the survey and met inclusion criteria by passing the attention check questions embedded in the survey (sample item: "Please select neither"). This study was a preliminary test of our hypotheses specified in the main manuscript, and therefore the target sample size was based on a heuristic cut-off to obtain at least N = 80 to 100 in each cell for the proposed main effects (i.e., main effects of vaccination status). A power analysis based on G*Power suggested that the final sample size could, with 90% power, detect a small effect size r of .14 - .15.

We created four different characters that varied in their risk profiles. We manipulated each character's vaccination status such that they were either vaccinated or unvaccinated (see the end of this document for complete wording). Two of the characters were considered to be at high risk of getting seriously ill from contracting C19 (Mary, a 75-year-old retiree, and Richard, a sedentary 53-year-old with severe comorbidities) and two characters were in relatively lower risk groups (Mark, a healthy 38-year-old who works outdoors, and Katy, a fit 21-year-old undergraduate). Our low- and high-risk labels were guided by several sources available at the time of data collection [1-9].

We used a between-subjects design to test our hypotheses. Participants were randomly assigned to one of the eight scenarios (one of the four characters based on the character's risk profile and one of the two versions of being either vaccinated or unvaccinated). As we show in our subsequent analyses, we collapsed two high risk characters (Mary and Richard), and two low risk characters (Katy and Mark) into high and low risk categories, respectively.

Measures[1]

Scapegoating. After reading about the character, participants responded to a 6-item measure on scapegoating adapted from Rothschild et al. [10]. Participants indicated whether they thought the character "is responsible for overwhelmed healthcare systems", "is to be blamed for the effects of hospital staff shortages", "is at fault for C19 deaths and hospitalization", and "is guilty of severely jeopardizing his/her community's public health", "should be punished for prolonging the pandemic", and "is at fault for putting people's lives at risk.", (1 = *Not at all responsible*, 6 = *Very much responsible*[2]). We created a composite score by averaging these six items (α = .97).

Perception of Risk (if contracted C19). Participants rated each character's perceived likelihood of: 1) being hospitalized, 2) dying, and 3) non-recovery if the latter contracted C19. They responded using a slide bar, with 0 = *practically zero* and 100 = *almost certain*. We view the three items as indicators of the general perceived risk of C19 to the character. To simplify the subsequent reporting of the general relationship between conditions and risk estimation, we collapsed the three items into a single indicator of *perceived aggregate risk*. The three items had high internal consistency (α = .93). Our conclusions remained unchanged if we split the analysis for each sub-index of risk perception.

[1] Participants also evaluated additional assessments for exploratory purposes (e.g., perceived character morality, trust in science, and communal narcissism). We do not report the results due to their exploratory nature, but our data is available on OSF.

[2] Due to an error, some participants saw anchors that stated 1 = *not at all responsible* to 6 = *very much responsible,* which is not appropriate for the item 'is guilty of severely jeopardizing his/her community's public health. As we show below, we correct this issue in the next study by ensuring that all anchors that state: 1 = *not at all* to 6 = *very much*.

Results

Table 1 reports the basic descriptive statistics and *t* test results showing the difference in risk perceptions and scapegoating as a function of the character's vaccination status.

Table 1

Pretest: Descriptive Statistics and T Test Results

Mark – Low Risk

DV and Condition		*N*	*M*	*SD*	Cohen's *d*	*t*	*df*	*p*	95% CI
Scapegoating	Vax	42	**1.19**	.58	1.63	-8.05	97	<.0001	[-2.65, -1.6]
	No	57	**3.32**	1.64					
Risk of Hospitalization %	Vax	42	**13.02**	15.81	1.16	-5.67	96	<.0001	[-38.4, -18.48]
	No	56	**41.46**	29.45					
Risk of Death %	Vax	42	**8.21**	12.33	0.86	-4.23	97	<.0001	[-29.43, -10.63]
	No	57	**28.25**	28.79					
Risk of Non-recovery %	Vax	41	**12.12**	23.40	0.63	-3.09	96	.0030	[-28.03, -6.11]
	No	57	**29.19**	29.25					

Katy – Low Risk

DV and Condition		*N*	*M*	*SD*	Cohen's *d*	*t*	*df*	*p*	95% CI
Scapegoating	Vax	50	**1.56**	.97	1.32	-6.51	98	<.0001	[-2.21, -1.17]
	No	50	**3.25**	1.56					
Risk of Hospitalization %	Vax	50	**10.48**	14.01	1.01	-4.99	97	<.0001	[-34.53, -14.88]
	No	49	**35.18**	32.02					
Risk of Death %	Vax	50	**6.56**	14.01	0.64	-3.16	97	<.0001	[-22.05, -5.04]
	No	49	**20.10**	26.79					
Risk of Non-recovery %	Vax	50	**5.38**	11.50	0.67	-3.31	97	.0010	[-21.79, -5.45]
	No	49	**19.00**	26.67					

Richard – High Risk

DV and Condition		*N*	*M*	*SD*	Cohen's *d*	*t*	*df*	*p*	95% CI
Scapegoating	Vax	46	**1.59**	1.00	1.07	-5.31	98	<.0001	[-1.87, -.85]
	No	54	**2.95**	1.48					
Risk of Hospitalization %	Vax	46	**48.87**	26.13	0.40	-1.97	98	.0520	[-21.85, .08]
	No	54	**59.76**	28.68					
Risk of Death %	Vax	46	**31.83**	29.97	0.31	-1.51	98	.1340	[-20.83, 2.82]
	No	54	**40.83**	29.47					
Risk of Non-recovery %	Vax	46	**29.96**	29.71	0.28	-1.37	98	.1750	[-19.77, 3.65]
	No	54	**38.02**	29.16					

Mary – High Risk

DV and Condition		*N*	*M*	*SD*	Cohen's *d*	*t*	*df*	*p*	95% CI
Scapegoating	Vax	60	**1.19**	.56	1.59	-7.78	96	<.0001	[-2.10, -1.25]
	No	38	**2.86**	1.51					
Risk of Hospitalization %	Vax	60	**33.88**	25.97	0.92	-4.49	95	<.0001	[-38.08, -14.75]
	No	37	**60.30**	31.32					
Risk of Death %	Vax	60	**21.73**	24.86	0.78	-3.82	95	<.0001	[-33.48, -10.56]
	No	37	**43.76**	31.62					
Risk of Non-recovery %	Vax	60	**21.25**	25.68	0.69	-3.35	95	.0010	[-30.81, -7.88]
	No	37	**40.59**	30.55					

In addition, we examined the relationship between risk perceptions and scapegoating. We tested whether higher risk estimates would predict scapegoating, while controlling for the effect of vaccination status condition and character risk context, as well as all possible interaction terms. Results showed that risk perceptions incrementally predicted scapegoating beyond all the control variable, $b = 0.02$, $SE = 0.01$, 95% CI [0.01, 0.03], $t = 4.25$, $p < .0001$. Higher risk estimations are related to stronger endorsement of scapegoating.

Scapegoating

Next, we explored whether risk profiles (high/low risk category) and target vaccination status (vaccinated/unvaccinated) influence participants' endorsement of scapegoating. We

conducted a 2-way Analysis of Variance (ANOVA), with the two factors (i.e., vaccination status and risk category) as the independent variable and scapegoating as the dependent variable. We did not include the character category in the current model, because aside from high/low risk assignment, we did not vary conditions according to each character (i.e., we did not hypothesize the differences between Katy and Mark, two low-risk characters, and between the Mary and Richard, two high-risk characters).

We observed a significant main effect of vaccination status on scapegoating, $F(1, 393) = 196.38$, $p < .0001$, such that participants in the unvaccinated condition reported a higher scapegoating tendency ($M = 3.11$, $SD = 1.56$) than participants in the vaccinated condition ($M = 1.37$, $SD = 0.82$). Neither the main effect of risk category, $F(1, 393) = 2.57$, $p = .1100$, nor its interaction with vaccination condition, $F(1, 393) = 1.90$, $p = .1690$, was significant. In a separate model, we tested the effect of individual characters' risk profile and their interaction with vaccination status. Only the main effect of vaccination status was significant, $F(1, 389) = 196.92$, $p < .0001$. Individual risk profile, $F(3, 389) = 1.60$, $p = .1885$, as well as its interaction with vaccination status, $F(3, 389) = 1.59$, $p = .1912$, were non-significant.

Aggregate Perception of Risk

Due to a high internal consistency between the three perception of risk items ($\alpha = .93$), we collapsed[3] them into a single indicator. We observed a significant main effect of vaccination status on perception of risk, $F(1, 391) = 47.68$, $p < .0001$, such that participants in the unvaccinated condition reported a higher perception of risk ($M = 37.38$, $SD = 28.372$) than participants in the vaccinated condition ($M = 20.56$, $SD = 23.17$). The main effect of risk category was also significant, $F(1, 391) = 64.85$, $p < .0001$, such that participants in the high-

[3] Our results remained unchanged if we split the analysis for each sub-index of risk perception.

risk condition reported a higher perception of risk ($M = 38.14$, $SD = 27.47$) than participants in the low-risk condition ($M = 19.81$, $SD = 24.09$). The interaction between risk category and vaccination condition was non-significant, $F\ (1, 391) = 0.51$, $p = .4743$.

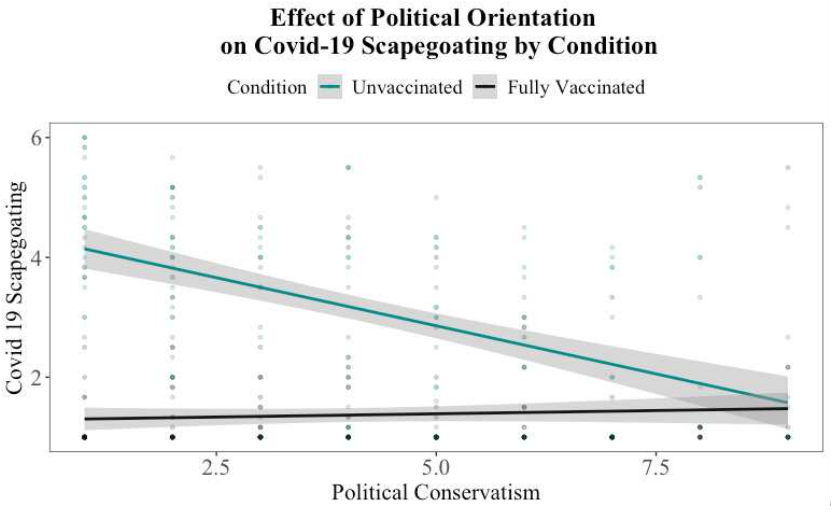
In a separate model, we tested the effect of individual risk profile and its interaction with vaccination status. The main effects of vaccination status, $F\ (1, 387) = 48.34$, $p < .0001$, and risk profile, $F\ (3, 387) = 23.64$, $p < .0001$, were significant such that the perception of risk was higher for high-risk than low-risk characters (all pairwise comparisons using LSD adjustment method were significant at ps $< .05$). The interaction between characters and vaccination status condition was not significant, $F\ (3, 387) = 1.56$, $p = .19986$.

Scapegoating and Perceptions of Risk as a Function of Political Orientation

Next, we examined whether participants' self-reported political orientation (termed *conservatism* because 1 = *very left-wing; liberal*, 9 = *very right-wing; conservative*) moderated the effects of vaccination status condition (1 = vaccinated, 0 = unvaccinated) on scapegoating and perception of risk using a multiple regression. The interaction term between political conservatism and vaccination status condition was significant, $b = 0.33$, $SE = 0.05$, 95% CI [0.241, 0.428], $p < .0001$. As shown in Figure 1, simple slope analyses indicated that political conservatism had a negative effect on scapegoating in the unvaccinated character condition, $b = -0.32$, $SE = 0.03$, $t = -9.30$, $p < .0001$, but had no effects when the character was fully vaccinated against C19, $b = 0.02$, $t = 0.69$, $p = .4911$. When we repeated the same analysis using risk perceptions as the main DVs, no interaction effect was found ($b = 1.33$, $SE = 1.10$, $p = .2260$).

Figure 1

Pretest: Interaction between Political Orientation and Condition on C19 Scapegoating



Discussion

The results showed that people were more likely to scapegoat those who were unvaccinated (vs. vaccinated) for C19. This effect emerged for characters with four different risk profiles based on differences in age and comorbidities, suggesting that most people did not consider the different risk profiles of the individuals when assigning blame. Political ideology influenced participants' evaluations of scapegoating such that when evaluating vaccinated individuals, conservatism was not related to scapegoating, but when evaluating unvaccinated individuals, conservatism was negatively related to scapegoating. Finally, we observed that participants consistently over-estimated the chances that a character would be hospitalized, die, or never recover from C19 (the conservative estimation for high-risk groups was <10% for deaths and <20% for hospitalisations [1-9]), thus suggesting that the scapegoating of the unvaccinated is based on inflated perceptions of risks. Moreover, risk estimations were

consistently higher for the unvaccinated (vs. vaccinated) characters. The only exception was the participants' evaluation of C19 risks to Richard, a sedentary professional with severe comorbidities. We observed that Richard's vaccination status information did not influence the participants' estimation of the risks C19 poses to him. We did not find that political ideology influenced the relationship between vaccination status and risk estimation.

Our initial study had two major limitations, which we sought to rectify in Study 1. Our scapegoating assessment had a small imperfection in the response anchors, which could have swayed participants' answers to one of the six items. In addition, we asked people to compare only vaccinated against unvaccinated individuals. As noted in our main manuscript, even when the unvaccinated are at low risk, they may still pass the virus onto those who are not, thus burdening the healthcare systems indirectly. Therefore, in our next study, we asked participants to evaluate a person who was unvaccinated but recovered from the virus. Observing that people blame the unvaccinated even when they have recovered and are thus less likely to spread the virus than a regular unvaccinated person [11-13] would provide further evidence of scapegoating phenomenon (as opposed to a proportional explanation for prolonging the pandemic).

Study 1

We pre-registered this study here: https://aspredicted.org/RRZ_K8Z.

Participants and Procedure

We recruited 600 participants from MTurk and retained 570 (M_{age} = 40.22, *SD* = 12.65, 43% identified as men) who missed no more than one of two attention checks as specified in our pre-registration. We conducted a power simulation using the *r* package *simr* to determine the minimum number of participants needed to detect a medium-to-large (based on the average

effect size found in our Pretest) effect with at least 80% power at the within-subject level. The simulation suggested at least $N = 100$ to 150 participants. To estimate the (cross-level) interaction effect, where we expect the simple slope to be significant only in one condition (liberal participants) but not another (conservative participants), we extended our total sample size to 600 for a more conservative test of our hypothesis [14, 15].

Like in our Pretest, we created four characters with varying risk profiles (see the end of this document for exact wording). Two characters were in high-risk categories for getting seriously ill from contracting C19 (Mary, a 75-year-old retiree, and Richard, a sedentary 53-year-old with severe comorbidities), and two were in lower-risk categories (Mark, a healthy 38-year-old who works outdoors, and Katy, a healthy 21-year-old undergraduate). According to a recent age-stratified meta-analysis based on pre-vaccination data from 2020 and the information available at the time of data collection [1, 2, 16, 17], the characters' chances of hospitalization or death are highly varied (see Table 2). Chances of severe disease (pre-vaccination era, 2020) ranged from 4% and 17% (high-risk characters) to less than 1% (low-risk characters). Chances of fatal disease ranged from 5.5% and 0.4% (high-risk characters) to less than 0.02% (low-risk characters). It is important to note that these are averages across population-based age groups and do not consider other risk factors such as comorbidities. In the case of Mark and Katy (low-risk) and Mary (high-risk), individual risks would be much lower since they do not have any comorbidities. In the case of Richard (high-risk), his individual risk would be higher since he has multiple comorbidities. All of these risks would be substantially lower in January 2022 when the experiment was conducted, due both to vaccination and natural immunity. The CDC estimated that more than 40% of adults aged 18-49 had had a prior Covid-19 infection at this time, while slightly less than 70% had been vaccinated [18].

We manipulated three pieces of information for each vignette character. Specifically, each of the three characters was either: 1) fully vaccinated; 2) unvaccinated; or 3) unvaccinated but had fully recovered from a past infection of C19 (labeled *unvaccinated-recovered*). This led to a total of 12 scenarios. We used a within-subjects design; participants saw all four character cases presented in random order, but for each of the four characters, they only saw one of the three vaccination status conditions: vaccinated, unvaccinated, or unvaccinated-recovered.

Measures[4]

Scapegoating. Because participants were asked to evaluate four different characters, we sought to reduce the participation burden by administering only three items from our pretest and Rothschild and colleagues' scale of scapegoating [10]. Participants indicated whether they thought the character "*is to be blamed for the effects of hospital staff shortages*", "*is at fault for C19 deaths and hospitalization*", and "*is guilty of severely jeopardizing his/her community's public health*" (1 = *not at all*, 6 = *very much*). We created a composite score by averaging these items (α = .95).

Perception of Risk (if contracted C19). Participants rated each character's perceived likelihood of: 1) being hospitalized for severe illness, 2) dying, and 3) non-recovery if the latter contracted C19. They responded using a slide bar, with 0 = *practically zero* and 100 = *almost certain*. Like in our Pretest, we sought to simplify the subsequent reporting of the general relationship between conditions and risk estimation. Therefore, we collapsed the three items into a single indicator of *perceived aggregate risk*. The three items had high internal consistency (α

[4] We also collected exploratory data about mask comfort and trust in science. Questions were administered after the main study. Data is available on OSF.

= .93). Our conclusions remained unchanged if we split the analysis for each sub-index of risk perception.

Political Orientation. We diversified our measurement by asking participants to indicate their ideology (1 = *very liberal*; 9 = *very conservative*), and their voting decision in the 2020 Presidential Election as a proxy of political inclination. When conducting the analyses using 2020 voting, we dropped participants who did not vote, did not wish to disclose, or had voted for candidates other than Donald Trump or Joseph Biden ($N = 127$). For political orientation analyses, we only used participants who either voted for Biden ($N = 293$; Liberals) or Trump ($N = 150$; Conservatives), and we report results using the voting-based decision.[5]

Results

We first examined the relationship between risk estimations and scapegoating to explore whether it exists beyond vaccination statuses and character risk. To do so, we regressed scapegoating on risk perception, while controlling for vaccination statuses and character risks, as well as all their possible interaction terms. Results showed that in this model, risk perceptions significantly predicted scapegoating, $\gamma = 0.03$, $SE = 0.01$, 95% CI [0.02, 0.04], $t = 8.88$, $p < .0001$. In other words, higher risk estimations, regardless of vaccination statuses and inherent risks bear by the character, are related to stronger endorsement of scapegoating.

[5] This continuous scale was also significantly correlated with the binary voting-based decision ($r = .76$, $p < .0001$). Our results remained unchanged if we use the same 1-9 continuous measure. Specifically, the interaction between continuous political orientation and vaccination status of the character on scapegoating was significant, F (2, 1741.74) = 199.26, $p < .0001$. Simple slope analyses revealed that political conservatism had no effects on scapegoating of fully vaccinated character,, $\gamma = 0.02$, $SE = 0.01$, $t = 1.619$, $p = .1059$, but exhibit significant negative effects for the purely unvaccinated characters, $\gamma = -0.36$, $SE = 0.03$, $t = -14.13$, $p < .0001$, and those unvaccinated but recovered, $\gamma = -0.33$, $SE = 0.03$, $t = -12.87$, $p < .0001$. For perception of risk, a significant interaction also emerged, F (2, 1764.99) = 40.17, $p < .0001$. Simple slope analyses revealed that political conservatism had positive effects on perception on risk for fully vaccinated character, $\gamma = 0.87$, $SE = 0.31$, $t = 2.792$, $p = .0054$, but exhibit significant negative effects for the purely unvaccinated characters, $\gamma = -2.25$, $SE = 0.41$, $t = -5.48$, $p < .0001$, and those unvaccinated but recovered, $\gamma = -2.49$, $SE = 0.40$, $t = -6.32$, $p < .0001$.

Scapegoating

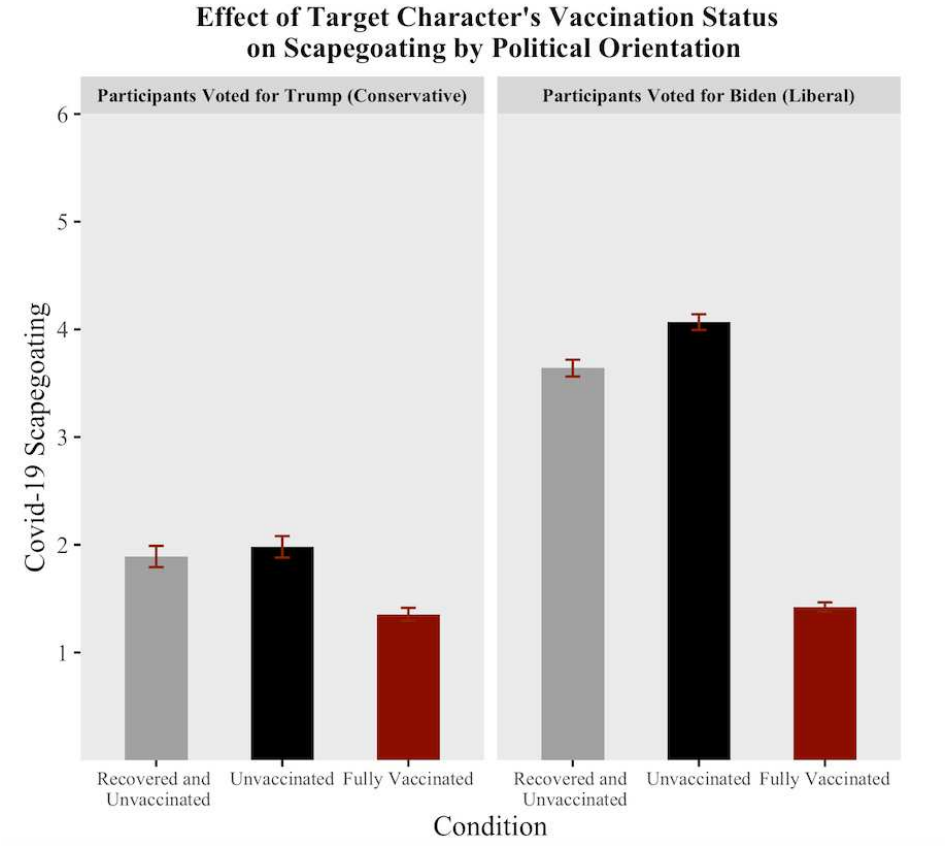
Following our pre-registered analysis plan, we tested our main hypothesis using a random-intercepts multilevel regression model with multiple decisions and character's vaccination status conditions nested within participants. We first tested the effects of three conditions (vaccinated, unvaccinated, vaccinated-recovered) on participants' scapegoating of characters. Results supported our hypothesis, such that participants were significantly less likely to blame vaccinated (M = 1.41, SD = 0.86) than unvaccinated characters (M = 3.28, SD = 1.73), γ = -1.85, SE = 0.06, 95% CI [-1.97, -1.73], t = -30.26, $p < .0001$, and unvaccinated-recovered (M = 2.95, SD = 1.70), γ = -1.52, SE = 0.06, 95% CI [-1.64, -1.41], t = -25.19, $p < .0001$. Although not hypothesized, we observed a significant difference in evaluations of unvaccinated characters; unvaccinated-recovered were less likely to be scapegoated than the purely unvaccinated, γ = -0.32, SE = 0.04, 95% CI [-0.39, -0.24], t = -7.90, $p < .0001$.

We tested whether political orientation moderated the effects of vaccination status condition on scapegoating. A significant interaction between political orientation and vaccination status of the character emerged, F (2, 1369.53) = 156.87, $p < .0001$ (see Figure 2). Simple effect analyses suggested that participants who voted for Trump (M = 1.35, SD = 0.84) and Biden (M = 1.42, SD = 0.85) did not differ on scapegoating of a fully vaccinated character, γ = 0.07, SE = 0.08, 95% CI [-0.09, 0.23], t = 0.845, p = .399. Yet, when it came to evaluating the purely unvaccinated characters, participants who voted for Trump (M = 1.98, SD = 1.40) were less likely to scapegoat the characters than those who voted for Biden (M = 4.07, SD = 1.45), γ = 2.07, SE = 0.14, 95% CI [1.79, 2.34], t = 14.75, $p < .0001$. The more interesting results emerged when assessing evaluations of two unvaccinated targets; participants who voted for Trump (M = 1.89, SD = 1.40) continued to show a lower level of scapegoating of unvaccinated-recovered

than those voted for Biden (M = 3.64, SD = 1.54), γ = 1.87, SE = 0.14, 95% CI [1.59, 2.15], t = 12.97, $p < .0001$.

Figure 2

Study 1: Interaction between Political Orientation and Vaccination Status Condition on C19 Scapegoating



Perception of Risk

We followed the same preregistered plan to analyse the effect of vaccination status condition on general perceptions of risk. Descriptive statistics showing each of the three kinds of risk estimations (hospitalisation due to severe illness, death, and non-recovery) by vaccination status and vignette character are presented in Table 2.

Table 2. Study 1 Descriptive Statistics: Scapegoating and Participant Estimates of C19 Risks by Character and Vaccination Condition (Vaccinated, Unvaccinated, Unvaccinated-Recovered).

		Estimates for All Conditions*	**Vaccinated Condition**		**Unvaccinated Condition**		**Unvaccinated and Recovered** .	
Character (Age, Risk Profile)	DV	**%**	***Mean***	*SD*	***Mean***	*SD*	***Mean***	*SD*
Katy (21, Low).	Scapegoating		**1.52**	0.98	**3.24**	1.70	**3.15**	1.79
	Hospitalisation	**< 1**	**13.71**	17.76	**28.40**	25.18	**23.69**	23.57
	Dying	**< 1**	**6.37**	12.01	**16.19**	22.19	**13.08**	18.85
	Non-recovery[+]	**NA**	**7.12**	13.84	**16.95**	22.23	**13.79**	18.65
Mark (38, Low).	Scapegoating		**1.21**	0.61	**3.04**	1.72	**2.68**	1.63
	Hospitalisation	**< 1**	**12.02**	14.87	**31.72**	25.2	**27.78**	23.22
	Dying	**< 1**	**6.73**	12.80	**18.39**	21.4	**15.81**	21.35
	Non-recovery	**NA**	**7.48**	14.30	**18.64**	22.27	**15.72**	21.20
Mary (75, High).	Scapegoating		**1.26**	0.66	**3.40**	1.73	**2.82**	1.68
	Hospitalisation	**15 – 20**	**32.06**	25.02	**57.68**	26.63	**42.15**	28.44
	Dying	**5.5**	**20.49**	22.75	**38.86**	27.66	**27.41**	25.88
	Non-recovery	**NA**	**19.79**	22.13	**36.10**	27.23	**27.58**	26.61
Richard (53, High).	Scapegoating		**1.67**	1.04	**3.43**	1.75	**3.15**	1.64
	Hospitalisation	**~ 5**	**38.75**	24.96	**64.39**	25.20	**45.99**	29.19
	Dying	**5 – 10**	**24.52**	24.19	**42.31**	28.89	**30.40**	28.49
	Non-recovery	**NA**	**23.26**	23.66	**41.82**	28.38	**29.75**	28.45

***** Age-stratified severe and fatal Covid-19 by character in the pre-vaccination era (2020). Estimate ranges are based on several sources available at the time of data collection [1-9]. These risks would be substantially lower in January 2022 when the experiment was conducted due both to vaccination and natural immunity. The CDC estimated that more than 40% of adults aged 18-49 had had a prior Covid-19 infection at this time while slightly less than 70% had been vaccinated [18].

[+] We do not estimate the chances that the character will never recover.

Again, we used a random-intercepts multilevel regression model with multiple decisions and character's vaccination status conditions nested within participants. For the purposes of investigating the underlying relationship between risk estimation and vaccination status, we used the aggregate risk perception (i.e., three risk-based items collapsed into one reliable indicator). Participants perceived lower aggregate risk for vaccinated (M = 17.75, SD = 20.09) than unvaccinated characters (M = 34.42, SD = 26.70), γ = -16.77, SE = 1.04, 95% CI [-18.81, -14.72], t = -16.09, $p < .0001$, and unvaccinated-recovered (M = 25.86 SD = 24.22), γ = -7.99, SE = 1.02, 95% CI [-9.98, -6.00], t = -7.87, $p < .0001$. Although not hypothesized, we found that the two unvaccinated conditions also differed significantly from each other, with participants perceiving a higher aggregate risk for purely unvaccinated characters than unvaccinated-recovered, γ = 8.48, SE = 1.00, 95% CI [6.52, 10.43], t = 8.51, $p < .0001$.

Similar to the results for scapegoating, we also found an interaction between political orientation and vaccination status of the character on perception of aggregate risk, F (2, 1381.79) = 33.19, $p < .0001$. Simple effect analyses suggested that participants who voted for Trump (M = 20.47, SD = 22.97) perceived higher risk for fully vaccinated characters than those voted for Biden (M = 15.71, SD = 18.00), γ = -4.56, SE = 1.79, 95% CI [-8.08, -1.05], t = -2.54, p = .0114. For purely unvaccinated characters, participants who voted for Trump (M = 26.08, SD = 26.78) perceived lower risk for the character than those who voted for Biden (M = 39.51, SD = 26.23), γ = 12.92, SE = 2.46, 95% CI [8.11, 17.73], t = 5.26, $p < .0001$. Finally, and more interestingly, participants who voted for Trump (M = 18.76, SD = 21.17) continued to show a lower level of perceived risk for the unvaccinated-recovered than those voted for Biden (M = 30.81, SD = 25.12), γ = 13.31, SE = 2.32, 95% CI [8.77, 17.85], t = 5.75, $p < .0001$.

Study 1 Exploratory Analysis: Interaction between the Character Risk, Political Ideology, and Character's Vaccination Status

Exploratory Analysis 1 (Not Preregistered)

As in our pre-test, we combined the two high risk characters into a high risk category and the two low risk characters into a low risk category. We then explored whether character risk interacted with participants' political orientation and character's vaccination status condition (i.e., three-way interaction) in affecting the perception of risk for the character. We found a significant three-way interaction, $F(2, 1528.87) = 3.13$, $p = .0441$. We summarized the estimated means in Table 3.

Our exploratory analyses suggested that regardless of a target's risk profile, participants who voted for Trump (vs. Biden) consistently viewed the unvaccinated-recovered character as less vulnerable to the virus (both *p*s < .0001). Moreover, for low-risk targets, participants who voted for Trump discounted vaccination status in making their risk assessment (i.e., they viewed everyone as similarly (in)vulnerable to C19 risk), as compared to participants who voted for Biden (*p*s in the range of < .0001 to .1630); participants who voted for Biden, however, tended to discount information pertaining to the character's at-risk factors (i.e., age or comorbidities) and focused primarily on vaccination status. In other words, they consistently rated the unvaccinated characters (recovered or not) as more vulnerable to C19 risk than the vaccinated.

Finally, when we repeated the same analysis with scapegoating as the dependent variable, we did not observe any significant three-way interaction, $F(2, 1536.52) = 0.09$, $p = .9129$. The only significant interaction in the model is between condition and political ideology, results reported earlier.

Table 3

Study 1: Estimated Means for The Three-Way Interaction Effect on Perceived Aggregate Risk

	High-Risk Character					
	Fully vaccinated		Unvaccinated		Unvaccinated-Recovered	
	Participants voted for Trump	Participants voted for Biden	Participants voted for Trump	Participants voted for Biden	Participants voted for Trump	Participants voted for Biden
M	31.05	23.15	40.97	49.96	22.65	41.91
SD	24.68	20.05	27.74	24.61	22.23	25.94
b	-7.90		8.99		19.25	
p	.0034		.0049		<.0001	

	Low-Risk Character					
	Fully vaccinated		Unvaccinated		Unvaccinated-Recovered	
	Participants voted for Trump	Participants voted for Biden	Participants voted for Trump	Participants voted for Biden	Participants voted for Trump	Participants voted for Biden
M	10.2	7.99	11.93	28.24	14.54	20.89
SD	15.4	11.28	16.09	23.11	19.2	19.67
b	-2.21		16.31		6.35	
p	.1630		<.0001		.0086	

Study 2

This study was pre-registered here: https://aspredicted.org/QS2_MCY.

Participants and Procedure

We recruited 200 US participants from Mechanical Turk and retained 193 after following our pre-registered criteria of correctly identifying an attention check question and indicating the topic of the vignette (M_{age} = 39.19, *SD* = 12.44, 47.4% identified as men). We assumed a small-to-medium effect size (e.g., *r* = .21, the average effect size of social psychological research, [19]). An a priori power analysis revealed a sample estimate of 180 needed to detect the assumed effect size with at least 80% power. We recruited 200 subjects with the goal of accounting for exclusions (based on our preregistered criteria).

Participants read about Steve, a 28-year-old landscaper who is healthy, fit, and works by himself outdoors. We used a between-subjects design, so the participants were assigned at random to one of the two conditions where Steve is either vaccinated (but does not plan on getting the booster) or unvaccinated (but recovered). In both cases, vaccination/recovery occurred at the same time (May of 2021). See the bottom of this document for complete information about the materials.

Measures[6]

Scapegoating. After reading the character description, participants first responded to a more complete 8-item measure on scapegoating adapted from Rothschild et al. [1]. Unlike in Study 2 which relied on three items, we used a complete scale as the participants only evaluated one character. We also added two items in addition to those noted in our Pretest. For example, we asked participants to indicate whether the character "Is responsible for prolonged masking mandates", and "Is to be blamed for lengthy restrictions" (1 = *Not at all*, 6

[6] We also collected exploratory data about mask comfort. Questions were administered after the main study.

= *Very much*). The reason why we added those two items was to broaden the scope of scapegoating and extend the generalizability of our findings. We created a composite score by averaging these items (α = .98).

Perception of Risk. We used the same three items as in Study 1, with a more precise prompt highlighting the Omicron variant: "If Steve contracts C19 Omicron right now, what is the likelihood he will:" be hospitalized, die, and never recover (0 = *practically zero* to 100 = *almost certain*). Because the items had high reliability (α = .89), we collapsed them into a single indicator of *aggregate risk perceptions* for analytical purposes only.

Political Orientation. We asked participants to report their political ideology (same as Study 1; we used 1 – 100 scale and voting history; $\%_{Biden}$ = 56.0, $\%_{Trump}$ = 22.8, $\%_{other}$ = 4.1, and $\%_{didn't\ vote}$ = 17.1).

C19 Status. In addition, we asked them to indicate whether they are vaccinated (Yes = 78.6%, No = 20.8%, Do not want to answer = 0.50%), and whether they had C19 (Yes = 33.7%, No = 65.3%, Do not want to answer = 1.0%).

Results

Table 4 shows that participants consistently scapegoated the unvaccinated target more than the vaccinated one and perceived him (Steve) as being at greater risk of getting seriously ill if he contracted Omicron variant.

Table 4

Study 2: Descriptive Statistics and* T *Test Results

Dependent Variable and Condition		*N*	*M*	*SD*	Cohen's *d*	*t*	*df*	*p*	95% CI
Scapegoating	Vax	99	**1.58**	1.06	1.12	-7.80	191	<.0001	[-1.93, -1.15]
	No	94	**3.13**	1.64					
Risk of Hospitalization* %	Vax	99	**16.59**	18.30	0.66	-4.63	191	<.0001	[-22.09, -8.78]
	No	94	**32.02**	27.36					
Risk of Death* %	Vax	98	**6.88**	14.76	0.54	-3.78	190	<.0002	[-17.40, -5.36]
	No	94	**18.26**	25.76					
Risk of Non-recovery* %	Vax	99	**8.21**	15.92	0.54	-3.75	191	<.0002	[-18.60, -5.66]
	No	94	**20.34**	27.70					

Note. Vax = vaccinated for C19 (without booster); No = unvaccinated for C19.
* According to data available in 2022, the chances that 28-year old fit and healthy man will get seriously ill or die if he contracts C19 are < 1%. See Study 1 for additional references.

As a robustness check, we examined whether the vaccination status condition predicts scapegoating even after controlling for plausible factors (C19 recovery status, personal vaccination status, gender, age, and ideology). We observed that it does; while controlling for all those factors, people are still more likely to scapegoat the unvaccinated individuals (M = 3.15, SD = 1.64) as compared to vaccinated individuals (M = 1.56, SD = 1.05), $F(1,183)$ = 70.29, p <.0001.

Regarding the relationship between risk perception estimates and scapegoating, we again regressed scapegoating on risk perceptions, while controlling for vaccination status condition and its interaction with risk perceptions. Results showed that risk perceptions significantly predicted scapegoating, b = 0.04, SE = 0.01, 95% CI [0.03, 0.05], t = 7.89, p < .0001.

Next, we examined the effect of the interaction between political ideology and condition on scapegoating. To test the generalizability of our findings, we conducted analyses using both continuous and binary or voting-based assessment of political ideology, and the patterns remained largely consistent. Specifically, we observed a significant interaction

between political conservatism and vaccination condition, and a simple effect analysis suggested that the tendency (i.e., effect) to scapegoat the unvaccinated (vs. vaccinated) was linearly decreased from being liberal (defined as -1 SD on ideological conservatism measure), to moderate (defined as within +1 and -1 SD on ideological conservatism measure), to conservatives (defined as +1 SD on ideological conservatism measure). We summarize the results in Table 5 and simple slopes in Table 6, and illustrate the effect in Figure 3.

Table 5

Study 2: Regression Model Results for Scapegoating

DV: ***Scapegoating***	***b***	***SE***	***t***	***p***	***95% CI***
Intercepts	4.39	0.27	15.98	<.0001	[3.85, 4.93]
Condition (A)	-2.53	0.38	-6.68	<.0001	[-3.28, -1.78]
Conservatism (B)	-0.30	0.06	-5.24	<.0001	[-0.41, -0.18]
A x B	0.23	0.08	2.99	.0032	[0.08, 0.38]

Notes. Model R^2 = .34, $F(3, 189) = 32.81$, $p < .0001$. Conservatism variable is continuous.

Table 6

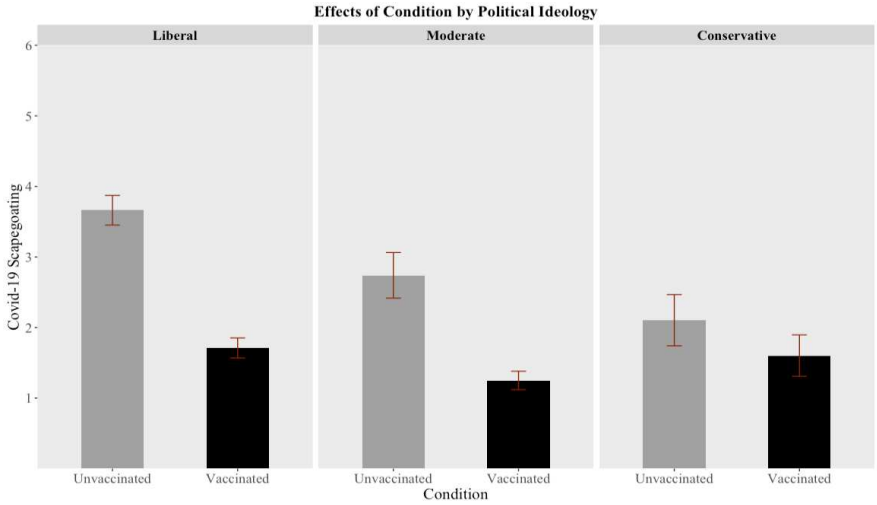
Study 2: Simple Effect Analysis for Scapegoating

Political Ideology Subgroups		***N***	***M***	***SD***	***b***	***t***	***df***	***p***	**95% CI**
Liberal	Vax	12	**2.21**	0.87	-2.18	-4.13	26	<.0001	[-3.27, -1.10]
(-1 SD)	No	16	**4.39**	0.62					
Moderate	Vax	66	**1.47**	0.19	-1.63	-7.51	124	<.0001	[-2.06, -1.20]
(Mean)	No	62	**3.10**	0.39					
Conservative	Vax	21	**1.60**	0.58	-0.50	0.46	37	.2841	[-1.44, 0.43]
(+1 SD)	No	18	**2.10**	0.71					

Notes. *B* represents the mean difference (effect) between vaccinated (coded as "1") and unvaccinated (coded as "0") conditions. Conservatism variable is continuous.

Figure 3

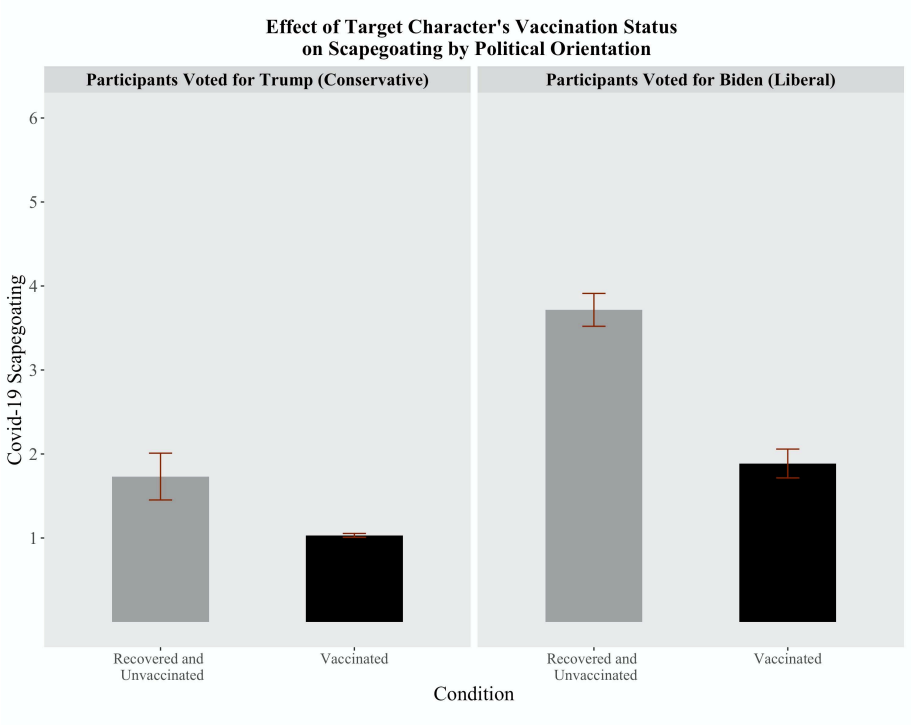
Study 2: Interaction between Continuous Political Orientation and Vaccination Status Condition (Vaccinated/Not Boosted vs. Unvaccinated/Recovered) on Scapegoating



We also tested whether political orientation as a binary, voting-based variable moderated the effects of vaccination status condition on scapegoating. A significant interaction between binary political orientation and vaccination status of the character emerged, F (1, 148) = 6.554, p = .0115 (Figure 4). Simple effect analyses suggested that participants who voted for Trump (M = 1.03, SD = 0.11) and Biden (M = 1.89, SD = 1.26) differ on scapegoating of a fully vaccinated character, b = 0.86, SE = 0.26, 95% CI [0.34, 1.37], t = 3.30, p = .0015. Yet, when it came to evaluating the unvaccinated characters, the effects become larger, such that participants who voted for Biden (M = 3.72, SD = 1.44) were much more likely to scapegoat the characters than those who voted for Trump (M = 1.73, SD = 1.25), b = 1.98, SE = 0.36, 95% CI [1.26, 2.71], t = 5.46, p < .0001.

Figure 4

Study 2: Interaction between Binary Political Orientation and Vaccination Status Condition (Unvaccinated/Recovered vs. Vaccinated/Not Boosted) on Scapegoating



Next, we examined the joint impact on aggregate risk perception. As shown in Table 7, only the effect of the vaccination status condition was significant. Since the interaction approached significance, we examined the simple effect/slopes of the interaction, reported in Table 8.

Table 7

Study 2: Regression Model Results for Aggregate Risk Perception

DV: ***Risk Perception***	***b***	***SE***	***t***	***p***	***95% CI***
Intercepts	30.36	4.24	7.17	.0000	[22.00, 38.71]
Condition (A)	-22.63	5.84	-3.88	.0001	[-34.15, -11.12]
Conservatism (B)	-1.59	0.87	-1.84	.0677	[-3.31, 0.12]
A x B	2.26	1.19	1.90	.0592	[-0.03, 4.60]

Notes. Model $R^2 = .12$, $F(3, 189) = 8.22$, $p < .0001$

Table 8

Study 2: Simple Slopes Analysis for Aggregate Risk Perception

Political Ideology Subgroups		***N***	***M***	***SD***	***b***	***t***	***df***	***p***	**95% CI**
Liberal	Vax	12	**10.11**	8.06	-32.29	-3.43	26	.0020	[-51.64, -12.94]
(-1 SD)	No	16	**42.40**	31.70					
Moderate	Vax	66	**9.19**	12.33	-8.69	-3.25	124	.0015	[-13.98, -3.40]
(Mean)	No	62	**17.88**	17.50					
Conservative	Vax	21	**15.21**	22.01	-10.49	-1.28	37	.2074	[-27.07, 6.08]
(+1 SD)	No	18	**25.70**	13.40					

Notes. *b* represents the mean difference (effect) between the vaccinated (“1”) and unvaccinated (“0”) conditions.

Materials

Pretest Materials

Participants were assigned at random into one of the eight conditions, where one of the four characters was either vaccinated (A) or unvaccinated (B).

Mark is a 38-year-old civil engineer. He spends most of his work time outside supervising the construction site for the new port in his city. In general, he is fit and healthy; he runs marathons, hikes, and prepares his own food.

A. He also decided to get the Covid-19 shot. He is up to date on his Covid-19 shots, he is vaccinated against all other illnesses, and his children are up to date on their regular vaccinations.
B. When it comes to the Covid-19 vaccine, he decided not to take it. He is vaccinated against all other illnesses and his children are up to date on their regular vaccinations. However, he does not want the Covid-19 vaccine.

Katy (21) is a third-year college student. She spends most of her time with other students going to parties, studying, and working at her part-time job. In general, she is healthy and has no major illnesses.

A. Katy received three doses of the Covid-19 vaccine.
B. Katy decided NOT to get the Covid-19 vaccine.

Mary is a 75-year-old retiree. She spends most of her time involved with her church and doing volunteer work around her community.

A. She has recently received her booster shot against Covid-19.
B. She decided not to get the Covid-19 vaccine.

Richard is a 53-year-old accountant. He does not live a healthy lifestyle; He spends most of his time in his office and frequently eats in fast food places close to his work. He has obesity, hypertension, and Type II diabetes.

A. Richard is up to date on his Covid-19 vaccinations (i.e., he had a booster shot).
B. Richard decided not to get the Covid-19 vaccine.

Scapegoating (Rothschild et al., 2012)

Indicate the extent to which you believe that [the character]:
1 (not at all) to 6 (very much)

1. Is responsible for overwhelmed healthcare systems.
2. Is to blame for the effects of hospital staff shortages.
3. Is at fault for Covid-19 deaths and hospitalizations.
4. Is guilty of severely jeopardizing his community's public health.
5. Should be punished for prolonging the pandemic.
6. Is at fault for putting people's lives at risk.

Risk Estimates
If [the character] contracts Covid-19, what is the likelihood that [they] will:

Slider scale with the following labels: 0 = practically zero; 50/50; 100 = almost certain

1. Be hospitalized
2. Die
3. Never recover

Study 1 Materials

Participants read all four cases, but the three conditions were assigned at random. A = vaccinated, B = unvaccinated-recovered, C = unvaccinated.

Mary is a 75-year-old retiree. She spends most of her time involved with her church and doing volunteer work around her community.

A. She has recently received her booster shot against Covid-19.
B. She decided not to get the Covid-19 vaccine. She had Covid-19 back in January, 2021 (before vaccines were available) and she recovered fully.
C. She decided not to get the Covid-19 vaccine.

Richard is a 53-year-old accountant. He does not live a healthy lifestyle; He spends most of his time in his office and frequently eats in fast food places close to his work. He has obesity, hypertension, and Type II diabetes.

A. Richard is up to date on his Covid-19 vaccinations (i.e., he had a booster shot).
B. Richard decided not to get the Covid-19 vaccine. He already had Covid-19 back in January of 2021 (before vaccines were available to him), and he recovered fully.
C. Richard is unvaccinated.

Mark is a 38-year-old civil engineer. He spends most of his work time outside supervising the construction site for the new port in his city. In general, he is fit and healthy; he runs marathons, hikes, and prepares his own food.

A. When it comes to the Covid-19 vaccine, he decided not to take it. He contracted Covid-19 early in the pandemic (January, 2021 before vaccines were available to him) and he recovered fully.
B. Mark received three doses of the Covid-19 vaccine.
C. When it comes to the Covid-19 vaccine, he decided not to take it.

Katy (21) is a third-year college student. She spends most of her time with other students going to parties, studying, and working at her part-time job. In general, she is healthy and has no major illnesses.

A. Katy received three doses of the Covid-19 vaccine.
B. Katy decided NOT to get the Covid-19 vaccine. She already had Covid-19 in January 2021 (before vaccines were available to her age group) and she recovered fully.
C. Katy decided NOT to get the Covid-19 vaccine.

Scapegoating
Indicate the extent to which you believe that [the character]:
1 (not at all) to 6 (very much)

1. Is to blame for the effects of hospital staff shortages.
2. Is at fault for Covid-19 deaths and hospitalizations.
3. Is guilty of severely jeopardizing his community's public health.

Risk Estimates
If [the character] contracts Covid-19, what is the likelihood that [they] will:
Slider scale with the following labels: 0 = practically zero; 50/50; 100 = almost certain

1. Be hospitalized
2. Die
3. Never recover

Study 2 Materials

Participants were assigned at random to one of the two conditions (A or B).

Steve is a 28-year-old landscaper. In general, he is fit, healthy, and enjoys spending as much time outdoors as he can. He spends most of his work time outside by himself.

A. He received two doses of the Covid-19 vaccine in May of 2021 when he was eligible to get it (he does not plan on getting a booster).
B. He contracted Covid-19 in May of 2021 (around the time when he was eligible to receive his vaccine). He did not seek medical attention, and he recovered fully.

Scapegoating (adapted from Rothschild et al., 2012).
Indicate the extent to which you believe that [the character]:
1 (not at all) to 6 (very much)

1. Is responsible for overwhelmed healthcare systems.
2. Is to blame for the effects of hospital staff shortages.
3. Is at fault for Covid-19 deaths and hospitalizations.
4. Is guilty of severely jeopardizing his community's public health.
5. Should be punished for prolonging the pandemic.
6. Is at fault for putting people's lives at risk.
7. Is responsible for prolonged masking mandates.
8. Is to be blamed for lengthy restrictions.

Risk Estimation

If Steve contracts Covid-19 Omicron right now, what is the likelihood he will:

Slider scale with the following labels: 0 = practically zero; 50/50; 100 = almost certain

1. Be hospitalized
2. Die
3. Never recover

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