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Predictors of COVID-19 vaccine acceptance across time and countries: Results from a series of cross-sectional surveys

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ABSTRACT

Objective: Describe demographic, social, and psychological correlates of willingness to receive a COVID-19 vaccine.

Setting: Series of online surveys undertaken between March and October, 2020.

Participants: A total of 25 separate national samples (matched to country population by age and sex) in 12 different countries were recruited through online panel providers (N = 25,334).

Primary outcome measures: Reported willingness to receive a COVID-19 vaccination.

Results: Multivariate logistic regression analyses reveal sex (female OR = 0.59, 95%CI [0.55, 0.64]), trust in medical and scientific experts (OR = 1.27, [1.22, 1.33]), and worry about the COVID-19 virus (OR = 1.49, [1.43, 1.55]) as the strongest predictors of stated vaccine acceptance considering pooled data, and the most consistent predictors across countries. In a subset of UK samples we show that these effects are robust after controlling for attitudes towards vaccination in general.

Conclusions: Our results indicate that the burden of trust largely rests on the shoulders of the scientific and medical community, with implications for how future COVID-19 vaccination information should be communicated to maximize uptake.

Keywords: Vaccination, vaccine hesitancy, COVID-19, risk, trust.

ARTICLE SUMMARY

Strengths and limitation of this study

- To examine predictors of vaccine acceptance we collected data from a large number of participants in several different countries and at different time points.
- We examine range of demographic, risk and trust-related predictors using multivariate models.
- Samples were quota matched (age and gender) to country population, but not probability sampled.
- At the time of surveys no COVID-19 vaccine was publicly available, thus stated acceptance is hypothetical, and may change with provision of more information about current vaccines.

INTRODUCTION

COVID-19 has resulted in over a million deaths globally, illness for millions more, and unprecedented social and economic disruption[1,2]. Many governments have signaled that mass vaccination against the virus is the most straightforward—and possibly only—route to normality and stability[3,4]. While recent announcements of effective vaccines[5,6] are promising, the wider impact of vaccines on preventing the spread of disease is also dependent on the uptake within a given population. In order to achieve 'herd immunity', enough people in a population must be immune to prevent the spread of a disease among non-immune individuals. The proportion varies depending on a number of factors including how infectious the contagion is, its prevalence in a population, and the variation in individual susceptibility or exposure to infection[7]. Estimates for the level of immunity required for COVID-19 herd immunity have ranged from 50% to 80% of the population, acquired through either natural infection and recovery, or through vaccination[8,9].

Vaccine hesitancy—defined as a delay in acceptance or refusal of vaccines despite availability[10]—poses a challenge to achieving herd immunity. If a sufficient number of people in a population reject vaccination—and herd immunity is not achieved—the virus will continue to circulate among susceptible individuals, including those who are unable to be vaccinated for medical reasons. The WHO identified vaccine hesitancy as one of the top 10 threats to global health in 2019[11], and in the pressing context of COVID-19, understanding vaccine hesitancy has only grown in importance[12].

Public health researchers concerned with uptake of vaccination have understandably sought to uncover the drivers of vaccine hesitancy. By identifying antecedents of vaccine hesitancy, policy makers, public health officials, and professional communicators can target interventions to increase uptake of vaccines and ultimately reduce the burden of disease in a population[4]. However, strategies developed for campaigns targeting diseases with well-

established vaccines (e.g. MMR, pertussis) may not fully translate to a pandemic context where there is greater uncertainty, less information available, and where institutional trust plays a greater role—as was noted in the wake of the 2009 H1N1 influenza pandemic[13].

Recent evidence shows that acceptance of a COVID-19 vaccine is far from universal in many countries. Lazarus et al[14] conducted a series of surveys across 19 countries in June 2020, asking respondents how much they agreed with the following statement: 'If a COVID-19 vaccine is proven safe and effective and is available, I will take it'. The proportion of respondents who agreed ranged from 88.6% (China) to 55.8% (Russia). Examining possible predictors of vaccine acceptance, the authors report that men, older people, and those who express greater trust in the government were more likely to express willingness to receive a vaccine. The role of trust (in science, the government or the medical system) is a recurring theme in many other recent studies which have examined COVID-19 vaccine hesitancy in individual countries[15–20]. For example, Palamenghi et al[20] report that across two large random samples of the Italian population, trust in science was positively correlated (r = .37) with willingness to receive a COVID-19 vaccine. Frank and Arim[16] report that Canadians who are more trusting of local and national government bodies are more likely to express intentions to receive a vaccine if available, as are those who report high general social trust (i.e. believing that 'most people can be trusted').

Such results align with pre-COVID studies which have highlighted the role of trust in vaccination intentions and attitudes[13,21,22]. However, we note that recent studies examining COVID-19 vaccine intentions have typically only examined trust in one entity (e.g. government or hospitals); research to date has not considered the possible overlap between trust in the government, trust in science and medicine, and general social trust[23–25]. There is also a question over the extent to which vaccine acceptance is linked to mistrust in experts and authorities *regarding COVID-19 in particular*, or a more general lack of trust

in these actors. In order to target communications specifically designed to satisfy the information needs of those who distrust official authorities, it is important to identify the precise agents that they distrust (and, ideally, why).

Beyond trust, the perceived threat or risk posed by a given disease has also been shown to predict vaccination attitudes. Models of health behavior, such as the Health Belief Model[26] and Protection Motivation Theory[27], place the perceived risk or severity of a disease as a key driver of vaccination intentions (and other preventative health behaviors)[13,28]. Recent surveys in the US, Malaysia, and Israel have shown that perceived risk and worry regarding the COVID-19 virus is associated with vaccine acceptance[29–31]. Other factors, such as the perceived benefits and costs as well as efficacy of protective behaviors are also outlined in models of health behavior as predictors of engagement in a given health behavior. However, until recently, little information about the possible costs, distribution and efficacy of a COVID-19 vaccine was available, meaning that the public has not generally been able to assess the potential benefits of a vaccine outside of a purely hypothetical arena (although experimental work has examined the influence of these factors on willingness to receive a vaccine[32]).

There are also increasing concerns about the politicization of science and about politics becoming entangled with vaccine beliefs and attitudes specifically, particularly in the context of a pandemic where central government structures are deeply involved in all stages of the public health response[13,33]. Prior research[34] has shown that the rhetoric adopted by political elites on social media can fuel anti-vaccination attitudes amongst their followers and that ideologies can help explain anti-vaccination attitudes[30,35].

In the current study we present a more comprehensive international analysis of the role of key social, political, and psychological predictors of COVID-19 vaccine acceptance

across 12 countries, with multiple national surveys in some countries (total $N = 25{,}334$, see Table 1). All samples were recruited via online panel providers using quotas to ensure samples were matched to the general population in terms of age and gender (with the exception of France, see methods). Unlike previous studies, we examine reported trust in a range of actors, both in general and specifically relating to the COVID-19 pandemic. We also include several demographic factors (including political orientation), numeracy (known to play a role in risk perceptions[36], and vaccine attitudes in particular[37]), affective (worry) and cognitive (perceived likelihood of infection) aspects of perceived COVID-19 risk[38], broad measures of perceived efficacy, and, in a subset of samples, general attitudes towards vaccines.

METHODS

Participants and procedure

Between March and October 2020, we fielded 25 separate surveys across 12 countries. The majority of samples were recruited through an ISO certified international survey company Respondi (respondi.com). Participants in Australia were recruited through Dynata (dynata.com), and additional US and UK samples were recruited via Prolific (prolific.ac). Quota-based sampling ensured all samples were representative of the country population in terms of age and gender, and, in Prolific samples, ethnicity [39]. Participants who had previously completed a survey were prevented from completing further surveys, so all our samples represent different individuals. Participants who did not finish the survey were excluded. Demographic details for each sample are shown in Table 1. For completeness we include several samples in which vaccine acceptance was measured, but the survey did not always include all the predictor variables used in models presented below. Surveys which did not include all predictor variables are marked with a '*' in Table 1.

All participants were directed via a study link to the Qualtrics platform, and provided informed consent before completing the survey. This study was overseen by the University of Cambridge Psychology Research Ethics Committee (PRE.2020.034).

Materials

Participants reported their age and gender, level of education (ranging from *No formal education above age 16* to *PhD*), and political orientation (*Very liberal/left wing* to *Very conservative/right wing*). Numeracy was measured as a combined index of the 2-3 item adaptive form of the Berlin Numeracy Test [40] and an additional risk literacy item from Lipkus et al.[41].

Participants completed a widely used measure of general social trust (*Generally speaking, would you say most people can be trusted, or that you can't be too careful in dealing with people*?)[42] and a separate measure of prosociality (*To what extent do you think it's important to do things for the benefit of others and society even if they have some costs to you personally?*). Trust in experts and trust in government were each measured as the combined average of reported trust in three targets (experts: scientists, medical doctors and nurses, and scientific knowledge [Cronbach's αs .77-.86]; government: politicians, current government, civil servants [αs .73-.90]; all from *Cannot be trusted at all* to *Can be trusted a lot*). We also asked participants to report their trust in several actors with specific regard to the COVID-19 pandemic. Participants reported the extent to which they trust politicians in their country to 'deal effectively with the pandemic', and how much they separately trusted the country's national scientific and medical advisors, independent experts not connected with government, and the WHO to 'know the best measures to take in the face of the pandemic' (all from *Not at all* to *Very much*). Personal and government efficacy were captured by items asking participants the extent to which they felt that, respectively, their own actions, and the actions of their country 'to limit the spread of coronavirus can make a

difference' (*Not at all* to *Very much*). Perceived likelihood of infection was measured as an index of three related items (example: *I will probably get sick with the coronavirus/COVID-19*; αs .71-.89). Participants also reported their level of worry about the virus (from *Not at all worried* to *Very worried*). In a subset of UK samples, we also asked participants about their general attitude towards vaccination, using two items from Lewandowsky et al.'s [35] scale (example: *I believe that vaccines are a safe and reliable way to help avert the spread of preventable diseases* [*r*s .83-.87]).

Participants' vaccine acceptance was measured with the question: '*If a vaccine were to be available for the coronavirus/COVID-19 now, would you get vaccinated yourself?*' (*Yes/No)*. Participants were also asked *'If a vaccine were to be available for the coronavirus/COVID-19 now: Would you recommend vulnerable friends/family to get vaccinated?*' (*Yes/No).* Full item wording for all measures can be found in Table S1.

Surveys were translated from English to other languages by native speakers fluent in English. Multi-item scales (trust in science, trust in government and perceived likelihood of infection) were subjected to multi-group confirmatory factor analysis to establish measurement invariance[43]. All scales exhibited metric invariance based on a criterion of a reduction in CFI no greater than .02 when constraining item factor loadings to be equal across different countries (see Table S2). This more relaxed criterion (compared to the widely used $\Delta CFI < .01$[43]) was applied in light of the recommendations of Rutkowski and Svetina[44] for analyses with a large number of groups. Metric invariance indicates that effects of the construct in question (but necessarily not latent means) can be compared across groups.

RESULTS

Figure 1 shows the percentage of participants in each survey who responded that they would be willing to be vaccinated if a COVID-19 vaccine was available, or would recommend a vaccine to vulnerable others, given the options of 'Yes' or 'No' [1]. Across all samples, the percentage of respondents who stated they were willing to receive a vaccine ranged from 62.6% (Sweden, April) to 88.1% (Mexico, March), while the percentage of those who said they would recommend a vaccine to vulnerable others ranged from 67.5% (US, September) to 91.7% (UK, March). Descriptively, in every single sample the proportion of respondents stating a willingness to receive a vaccine was lower than the proportion who would recommend it to vulnerable others (M_{diff} = -5.79%, SD = 3.00). We also note a trend of decreasing stated acceptance over time: in nearly all countries with multiple samples, vaccine acceptance in any given survey was lower than previous surveys of the same population. For example between March and May, 2020, stated vaccine acceptance among respondents in Mexico dropped from 88.1% to 73.9% (a two-sample proportion test indicated that this difference was statistically significant, 95%CI [-18.4%, -9.9%], z = 6.51, $p < .001$) In the US, stated vaccine acceptance (among participants recruited through online panel provider Respondi) fell more than 12 percentage points, from 74.7% to 62.6%, between May and September, 2020 (95%CI [-16.7%, -7.5%], z = 5.09, $p < .001$).

[FIGURE 1 HERE]

[1] Based on respondents who answered the question. In the Italy sample a number of participants were not presented with these items due to a technical error (n = 80, 11%). In the remaining samples the average proportion of missing responses for vaccine intention and recommendation items was 1% (see supplementary Table S3 for description of missing data).

Table 1.

Sample demographics and percentage of participants willing to receive a COVID-19 vaccine or to recommend it to vulnerable friends/family.

Country	Source	Date	N	M_{Age} (SD)	Female (%)	Tertiary Educated (%)	Vaccine - acceptance (%)	Vaccine - recommend (%)
Australia	Dynata	20-Mar	700	46.3 (16.4)	51.0	43.4	82.9	88.7
China*	Respondi	09-Apr	700	43.2 (14.3)	48.9	73.1	85.8	87.4
Germany	Respondi	23-Mar	700	46.6 (16.0)	49.9	32.7	80.8	89.2
Spain	Respondi	22-Mar	700	46.6 (15.0)	51.1	58.1	83.6	89.8
Spain	Respondi	06-May	700	46.0 (15.0)	50.4	57.0	79.8	82.5
France*	BVA	03-Apr	3002	48.8 (16.5)	52.5	71.1	69.7	80.7
Italy	Respondi	22-Mar	700	46.9 (26.1)	50.4	41.3	85.3	88.2
Japan	Respondi	10-Apr	699	48.1 (16.4)	50.9	53.3	74.5	80.1
S. Korea	Respondi	09-Apr	700	45.3 (15.5)	49.0	70.5	85.6	88.4
Mexico	Respondi	21-Mar	693	38.4 (14.2)	50.5	66.4	88.1	90.3
Mexico	Respondi	06-May	700	38.7 (14.6)	51.0	75.8	73.9	75.6
Sweden	Respondi	28-Mar	700	48.4 (77.3)	49.1	40.3	66.3	77.2
Sweden	Respondi	17-Apr	700	45.3 (16.7)	48.9	40.2	63.4	73.7
UK	Prolific	19-Mar	703	45.6 (15.7)	50.9	53.9	80.4	91.7
UK	Prolific	07-May	5711	45.2 (23.1)	50.7	56.5	80.4	86.7
UK	Prolific	06-Jul	2513	44.8 (17.5)	52.5	58.5	78.9	85.3
UK	Prolific	18-Sep	6918	38.1 (15.0)	51.2	56.2	73.0	79.5
UK	Respondi	07-May	5011	45.6 (16.0)	52.0	43.4	78.9	84.2
UK*	Respondi	08-Jun	5000	45.9 (15.9)	53.2	39.7	79.0	83.2
UK	Respondi	06-Jul	2613	46.0 (24.4)	51.7	44.9	80.1	84.4
UK	Respondi	18-Sep	5518	45.7 (19.6)	51.6	42.6	75.7	79.9
UK	Respondi	29-Oct	4417	47.1 (23.4)	52.2	42.0	72.2	76.1
US	Prolific	19-Mar	702	45.1 (15.9)	50.6	66.8	75.7	85.7
US	Respondi	07-May	700	45.7 (26.5)	51.0	59.3	74.7	80.1

US*	Respondi	28-Sep	909	44.8 (15.6)	50.6	50.1	62.6	67.5

*Indicates survey that included vaccine acceptance items but not all model predictor variables (excluded from analyses below).

We fitted a logistic regression model to data from each sample to identify the correlates of COVID-19 vaccine intentions. Predictors included: demographic variables; an objective measure of numeracy, political ideology; general social trust; prosociality (willingness to 'do things for the benefit of others and society' even at personal cost); general trust in medical and scientific experts; general trust in government; specific trust in politicians to manage the pandemic; specific trust in (separately) national science advisors, independent scientists and the WHO to 'know the best measures to take in the face of the pandemic'; the perceived efficacy of their own and their country's actions to limit the spread of the virus; perceived likelihood of infection; and, worry about COVID-19 (for details on measures see Methods section and Table S1; descriptive statistics are reported in Tables S4 and S5, and bivariate correlations in Figure S1). Continuous measures (i.e. all except gender) were scaled and mean centered prior to analysis. Only complete observations we included. Multicollinearity analyses indicated no issues arising from correlated predictors (all variance inflation factor values < 4). To facilitate the interpretation of results we present odds ratios in a heat map format in Figure 2. A full model results including confidence intervals can be found in Tables S6 and S7. Results of models predicting vaccine recommendation responses are also presented in supplementary materials (Figure S2, Tables S8 and S9).

[FIGURE 2 HERE]

Considering the most consistent predictors of stated vaccine acceptance across samples, we find that in most samples individuals who report a higher level of general trust in experts (OR_{pooled} = 1.27, 95%CI [1.22, 1.33]), or who are more worried about the virus (OR_{pooled} = 1.49, [1.43, 1.55]), are more likely to say that they would accept a vaccine. In

Germany, Spain, Mexico, Sweden (March only), and nearly all UK samples, females are generally less likely to say that they would accept a COVID-19 vaccine if available (OR_{pooled} = 0.59, [0.55, 0.64])[2]. We also note that measures of efficacy, both at the personal (OR_{pooled} = 1.01, [0.97, 1.06]) and country level (OR_{pooled} = 1.01, [0.96, 1.07]), were not significantly associated with reported vaccine acceptance in most samples.

Our results reveal a great deal of heterogeneity in the relevance of predictors across countries, but also across time in countries where we conducted multiple surveys. For example, in the United States only a few consistent predictors emerged. Most notably, political conservatism was associated with a lower likelihood to accept a COVID-19 vaccine ($OR_{USA—Mar}$ = 0.73 [0.57, 0.93]; $OR_{USA—May}$ = 0.75, [0.57, 0.99]) whereas trust in experts ($OR_{USA—Mar}$ = 1.53 [1.16, 2.03]; $OR_{USA—May}$ = 1.38, [1.03, 1.84]) and personal worry about the virus ($OR_{USA—Mar}$ = 1.48 [1.17, 1.87]; $OR_{USA—May}$ = 1.27, [0.99 – 1.64]) were associated with increased vaccination intentions. In contrast, in the United Kingdom, additional factors such as the role of age, gender, and prosociality played a significant role. There was also variation over time. For example, although political ideology was not a significant predictor in the UK in May or July, conservatism was associated with lower vaccination intentions from September onwards (ORs 0.84-.88), which may be related to increased polarization. To illustrate the increasing strength of the association between political ideology and vaccine acceptance over time in the UK, in Figure 3 we plot the predicted likelihood of reported vaccine acceptance across the political spectrum (holding all other predictors constant).

[FIGURE 3 HERE]

[2] UK data was over represented in our pooled sample. As a robustness check we also fitted the model to the pooled sample with UK data removed and report that the effects of gender, trust in experts and worry remain significant (*p*s < .001; see Table S6).

In the UK, we also report a different pattern of effects when comparing between samples collected via different providers, even where these were collected on the same day (in May, July, and September), were matched on age and gender, and controlling for a range of other demographic variables. This underscores the caution that must be applied when studies generalize results from a single survey sample (particularly an online survey).

In terms of variance explained, the variables in our model explained approximately 10-30% of the variance in the likelihood of vaccine acceptance vs refusal, with the exception of samples recruited in Korea (4%) and Japan (8%).

Accounting for general vaccine attitudes

To examine the extent to which the effects in our model can be accounted for by a negative perception of vaccines in general, we conducted an additional set of analyses. In our three most recent UK surveys we included a two-item measure of general vaccine attitudes (adapted from Lewandowsky et al.[35]). A comparison of results from models with or without general vaccine attitudes as a predictor is shown as a heat map in Figure 4. Although attitudes toward vaccination increase the explained variance of our model (ΔR^2 4%-9%) and reveal strong significant effects such that more positive attitudes are associated with increased vaccination intentions (ORs 1.69-2.31; full results in Table S10), the relationships in the original model appear robust and are only minimally attenuated when accounting for generalized attitudes.

[FIGURE 4 HERE]

DISCUSSION

Understanding the psychological determinants of vaccine acceptance and hesitancy is crucial during a global pandemic. Across all countries surveyed, between March and September 2020, a substantial proportion of participants (up to 37% in some countries) said that they would *not* accept a hypothetical COVID-19 vaccine. People were slightly more likely to say that they would recommend it to vulnerable friends and family members. Considering who is more or less likely to report willingness to be vaccinated against COVID-19, being male, expressing general trust in those with scientific or medical expertise, and worrying about the virus are the most consistent correlates of vaccine acceptance across our samples. It is important to note that hesitancy about a COVID-19 vaccine is not purely attributable to people's attitudes to vaccines in general. Although (in the UK, where we studied it) negative attitudes towards vaccines in general are a significant and important predictor of COVID-19 vaccine refusal, there are clearly additional factors at play in determining public reactions to a COVID-19 vaccine. This broadly aligns with other research indicating that, for many people, there are concerns specifically around the rapid and novel development processes of COVID-19 vaccines and possible safety issues[29,45]. Our multivariate analyses show that the bulk of the burden of trust rests on science and medicine. Accounting for the other factors in our model, we find that trust in government (both generally and regarding COVID-19) and general social trust (i.e. trust in people) are *not* significantly associated with vaccine acceptance in most of our samples.

The fact that we saw only a weak link between stated vaccine acceptance and our measure of prosociality—along with the fact that higher numbers of people said that they'd recommend the vaccine to a vulnerable friend or relative than say they would accept it themselves—suggests that the prosocial nature of vaccines may not be recognized by many people. Recent experimental research has shown that emphasizing the societal benefits of

herd immunity (i.e., the need for those who do not see themselves as personally vulnerable to take the vaccine in order to provide protection for those who are) may assist uptake[46].

The higher reluctance from women to say that they would take a vaccine is in line with other work focusing on acceptance of a potential COVID-19 vaccine[14,15], and vaccination generally[22] but has not been adequately explained. Even when general vaccine beliefs are taken into account, however, the gender bias remains. Qualitative work should focus on investigating this further, in order to understand the root of women's concerns about the COVID-19 vaccine. We see very little effect of our measures of personal or governmental efficacy, but this may be related to the fact that a vaccine against COVID-19 was hypothetical at the time of the surveys and our measures did not directly ask about vaccination.

Another important finding highlighted by our repeated samples is that vaccine acceptance appears to be politicized in the US and is becoming so in the UK. Our US results agree with previous US research focusing on COVID-19 vaccine acceptance[32,47], which noted that political conservatives are less accepting of potential COVID-19 vaccines. Our UK results align with those of Maher et al, who, through network analysis, show a pattern of attitudinal alignment over time in a small UK sample, resulting in the emergence of a politically conservative faction expressing less trust in scientists, doctors, and vaccines[17]. Although international research has suggested that political conservatism is correlated with anti-vaccination attitudes globally[33], we did not find that ideology was associated with vaccine acceptance outside of the US and UK. However most other countries were only surveyed in earlier stages of the pandemic (i.e. prior to May, 2020) and we can therefore not say whether they might have followed a similar pattern to the UK as time went on.

It is possible that misinformation susceptibility[48,49] and conspiracy thinking[50] underlie the association between ideology and vaccine attitudes to some extent. For example, Motta et al.[51] find that far right-wing media outlets have disproportionally spread misinformation during the early stages of the pandemic. Susceptibility to misinformation around COVID-19 was also found in prior research to be associated with measures of vaccine hesitancy[49]. There is already a proliferation of conspiracy theories focused on specific COVID-19 vaccines[52,53]. It will be important to tackle these pro-actively through 'prebunking' methods to inoculate against misinformation[54,55].

Finally, we acknowledge that the heterogeneity in our results across time and countries highlights the role that (unmeasured) contextual, country-specific factors play in informing individuals' vaccination attitudes. As noted by the WHO SAGE working group on vaccine hesitancy, individual factors such as trust and risk perception intersect with contextual influences such as culture, media environments, and information from local leaders[10]. Lastly, our samples were not truly representative of the general population in each country: although they were quota-balanced on gender and age, the population that respond to an online questionnaire will differ from the general population on several significant characteristics. However, the rank ordering of countries on vaccine acceptance in our study is similar to that of Lazarus et al[10], which were based on a random stratified sampling approach using several online panel providers. This gives us some confidence in the generalizability of our results, and the fact that our samples were generally larger and included more trust-focused questions makes them useful for exploring these important predictors of vaccine attitudes.

In terms of practical considerations, our finding that trust in scientific and medical institutions is one of the strongest predictors of vaccine acceptance highlights the need to work proactively with others from outside of this sphere, such as community and religious

leaders[56] to open a two-way conversation with those who distrust the scientific and medical establishment. Due consideration must also be given to the accessibility[57], format[58,59], and transparency[60,61] of information provided to the public. Future research should continue to evaluate how to most effectively communicate evidence about vaccination, and should seek to more deeply understand the concerns and needs of those who express hesitancy regarding COVID-19 vaccination. As Bhopal[62], commenting on potential COVID-19 mass vaccination efforts, writes, "Open, honest, factual and sensitively conducted public dialogue is now urgent."

CONCLUSIONS

Countries around the world face a major evidence communication challenge when it comes to the COVID-19 vaccines that are about to become available. In order to reach a large enough proportion of the population in each country to achieve herd immunity, it is vital to increase in the number of people who are willing to take a vaccine. To achieve this, non-pharmaceutical interventions will need to be deployed[63], such as communicating trustworthy information about the vaccines via credible sources. In the current research, we have demonstrated across 12 national samples that people's level of worry about COVID-19 and their trust in experts and medical and scientific institutions are key determinants of potential vaccine acceptance. Future research should confirm these findings in experimental settings. We recommend that empirical studies should continue to be carried out alongside qualitative work with different communities to get a rounded understanding of people's concerns and misunderstandings. Only by knowing these can we adequately address them and provide people with the information they need to make a decision that will affect not just their own health, but that of their community as well.

FIGURE LEGENDS

Figure 1. COVID-19 vaccine acceptance across countries and time. Percentage of respondents who stated they were willing to receive or recommend a COVID-19 vaccine across surveys. UK and US samples using different panel providers are reported separately.

Figure 2. Predictors of vaccine acceptance. Heatmap of odds ratios in logistic regression model predicting stated vaccine acceptance. Columns represent individual samples and rows represent predictors in model. Grey values are non-significant, $p > .05$. Red shading indicates a lower likelihood of reported vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; R, Respondi; P, Prolific). Political orientation data was not collected in French sample, this sample is excluded from pooled data.

Figure 3. Political ideology and vaccine acceptance in the UK. Predicted likelihood that an individual will accept being vaccinated at varying levels of political ideology (1 = very liberal/left wing, 7 = very conservative/right wing) in UK samples over time.

Figure 4. Negative general attitudes towards vaccination do not fully account for relationships in the model. Results of logistic regression models predicting reported COVID-19 vaccine acceptance in UK samples, excluding (left panel) or including (right panel) general vaccine attitudes as a predictor. Odds ratios shown are based on scaled predictors (other than gender). Grey values are non-significant, $p > .05$. For space, samples are defined by a letter denoting participant source (R, Respondi; P, Prolific).

Author contributions

Survey instrument development: JRK, CRS, GR, SD, SvdL, ALJF. Study conceptualisation, design and theoretical framing: JRK, SvdL, ALJF. Data collection: JRK, CRS, GR, SD, US, CD, PA, ALJF. Statistical analyses and first draft: JRK, SvdL, ALJF. Manuscript editing, review and approval: JRK, CRS, GR, SD, US, CD, PA, ALJF, SvdL.

Data availability

The data and analysis code for this study are available at:

https://osf.io/vgez2/?view_only=8fe81f5fe3f345a99b06edeaba6bd9e1

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Competing interests

None declared.

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Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

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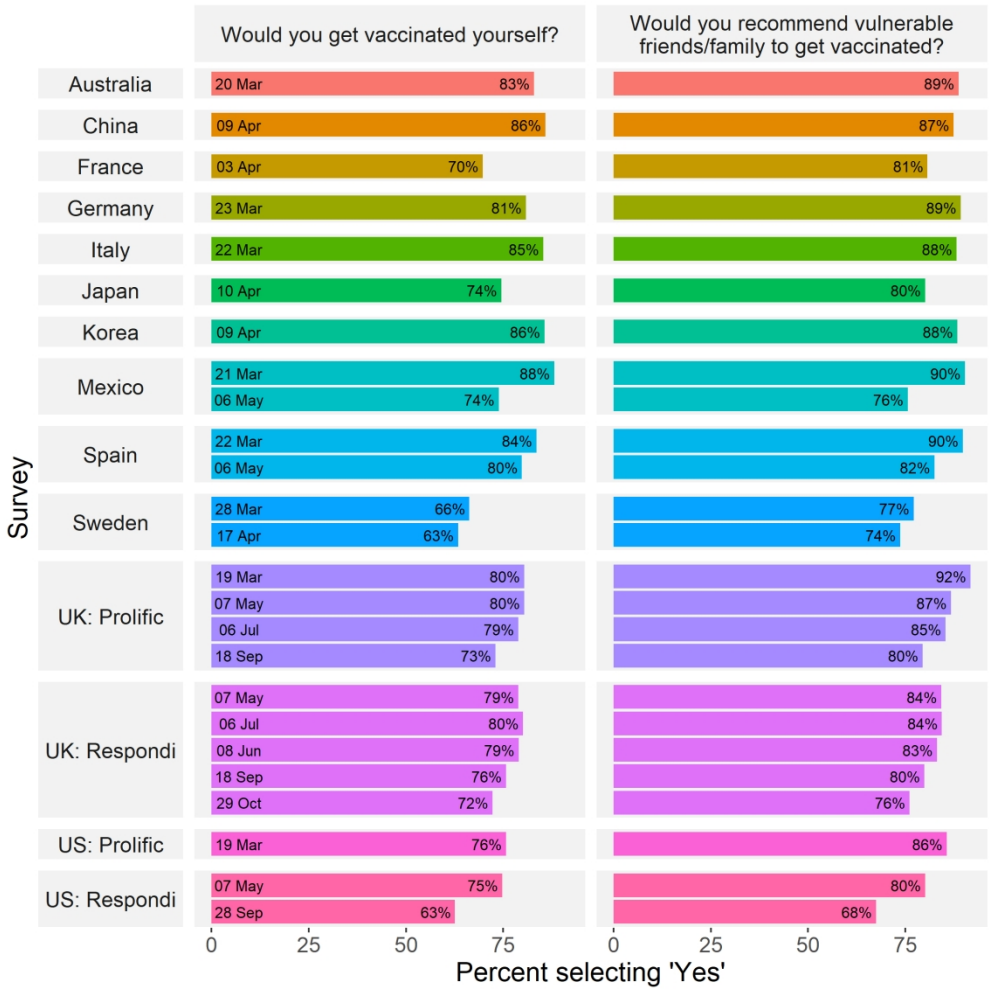

Figure 1. COVID-19 vaccine acceptance across countries and time. Percentage of respondents who stated they were willing to receive or recommend a COVID-19 vaccine across surveys. UK and US samples using different panel providers are reported separately

199x199mm (300 x 300 DPI)

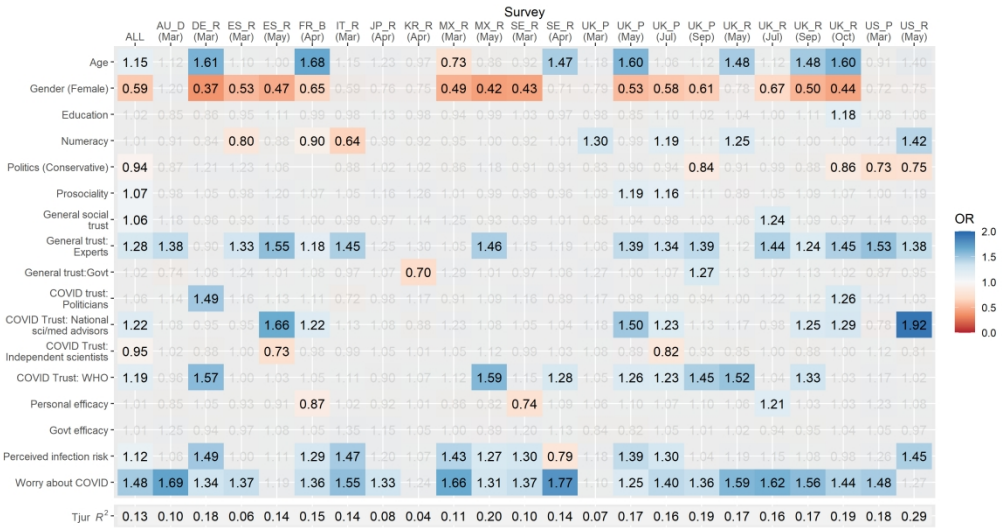

Figure 2. Predictors of vaccine acceptance. Heatmap of odds ratios in logistic regression model predicting stated vaccine acceptance. Columns represent individual samples and rows represent predictors in model. Grey values are non-significant, p > .05. Red shading indicates a lower likelihood of reported vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; R, Respondi; P, Prolific). Political orientation data was not collected in French sample, this sample is excluded from pooled data.

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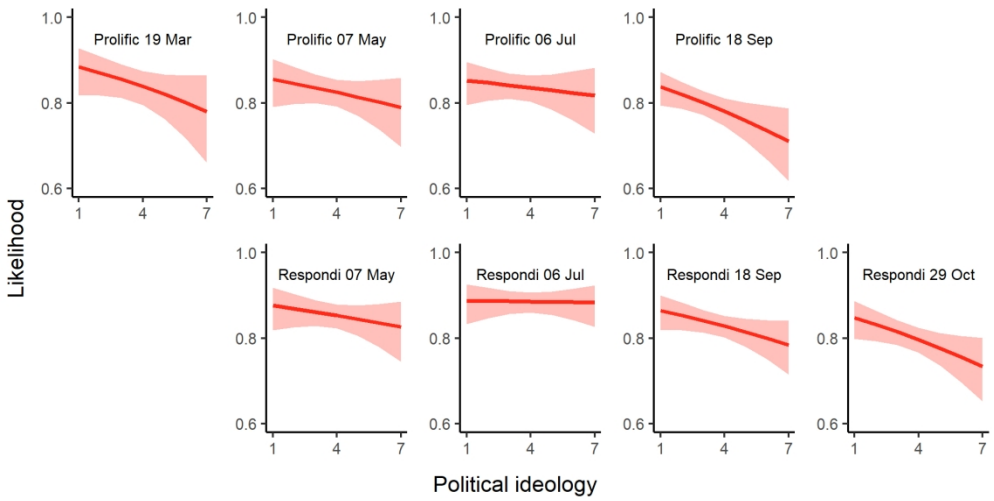

Figure 3. Political ideology and vaccine acceptance in the UK. Predicted likelihood that an individual will accept being vaccinated at varying levels of political ideology (1 = very liberal/left wing, 7 = very conservative/right wing) in UK samples over time.

177x88mm (300 x 300 DPI)

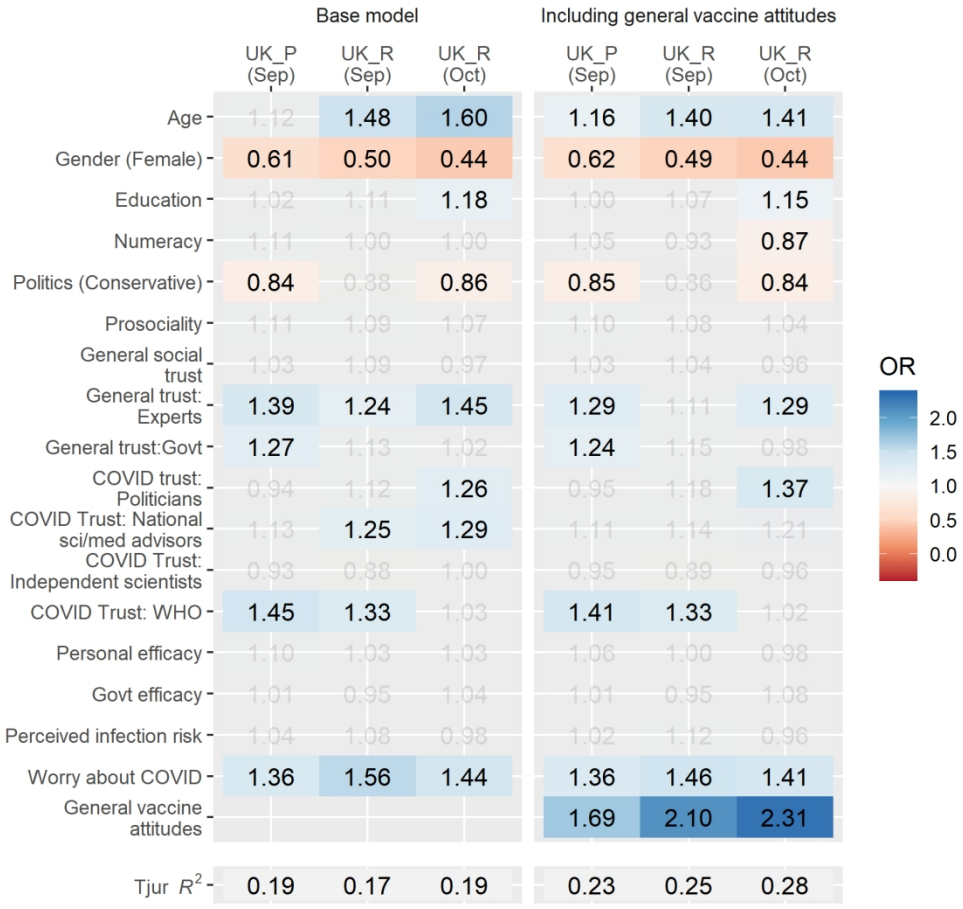

Figure 4. Negative general attitudes towards vaccination do not fully account for relationships in the model. Results of logistic regression models predicting reported COVID-19 vaccine acceptance in UK samples, excluding (left panel) or including (right panel) general vaccine attitudes as a predictor. Odds ratios shown are based on scaled predictors (other than gender). Grey values are non-significant, p > .05. For space, samples are defined by a letter denoting participant source (R, Respondi; P, Prolific).

159x149mm (300 x 300 DPI)

Predictors of COVID-19 vaccine acceptance across time and countries

Supplementary material

Table S1

Survey items and wording

Variable	Wording	Response
Gender	What is your gender?	0 =Male, 1= Female
Age	What is your age?	Age in years
Education	Please indicate your highest educational qualification	1 = No formal education above age 16, 2 = Professional or technical qualifications above age 16, 3 = School education up to age 18, 4 =Degree (Bachelors) or equivalent, 5 = Degree (Masters) or other postgraduate qualification, 6 = Doctorate [In France] 1 = No diploma, 2 =Primary school certificate, 3 = BEPC - Brevet des colleges, 4 = CAP / BEP, 5 = BAC / professional certificate / technical certificate, 6 = BAC +2 and above.
Numeracy (summed; range 1-5)	Adaptive Berlin Numeracy test (2-3items, see Cokely et al., 2012 for details). Which represents the highest risk of something happening?	Scores range 1-4 1 = '1 in 10' (correct), 2 = '1 in 1000', 3 = '1 in 100'
Politics	Where do you feel your political views lie on a spectrum of left wing (or liberal) to right wing (or conservative)?	1 = Very liberal/left, 7 = Very conservative/right
Prosociality	To what extent do you think it's important to do things for the benefit of others and society even if they have some costs to you personally?	1 = Not at all, 7 = Very much so
General social trust	Generally speaking, would you say most people can be trusted, or that you can't be too careful in dealing with people?	1 = Can't be too careful, 7 = Most people can be trusted

General trust: Experts (scale)	How much do you trust each of the following? - Medical doctors and nurses	1 = Cannot be trusted at all, 5 = Can be trusted a lot
	How much do you trust each of the following? - Scientists	1 = Cannot be trusted at all, 5 = Can be trusted a lot
	How much do you trust each of the following? - Scientific knowledge	1 = Cannot be trusted at all , 5 = Can be trusted a lot
General trust: Govt (scale)	How much do you trust each of the following? - Civil servants or public officials in the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
	How much do you trust each of the following? - The current government of the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
	How much do you trust each of the following? - Politicians in the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
COVID trust: Politicians	How much do you trust the country's politicians to deal effectively with the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: National sci/med advisors	How much do you trust the country's national scientific and medical advisors to know the best measures to take in the face of the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: Independent scientists	How much do you trust experts who are not connected with the government who are commenting on measures planned for the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: WHO	How much do you trust the World Health Organisation to know the best measures to take in the face of the pandemic?	1 = Not at all, 7 = Very much
Personal efficacy	To what extent do you feel that the personal actions you are taking to try to limit the spread of coronavirus make a difference?	1 = Not at all, 7 = Very much
Govt efficacy	To what extent do you feel the actions that your country is taking to limit the spread of coronavirus make a difference?	1 = Not at all, 7 = Very much
Perceived infection risk (scale)	How likely do you think it is that you will be directly and personally affected by the following	1= Not at all likely, 7 = Very likely

	in the next 6 months? - Catching the coronavirus/COVID-19	
	How likely do you think it is that your friends and family in the country you are currently living in will be directly affected by the following in the next 6 months? - Catching the coronavirus/COVID-19	1= Not at all likely, 7 = Very likely
	How much do you agree or disagree with the following statements? - I will probably get sick with the coronavirus/COVID-19.	1 = Strongly disagree, 5 = Strongly agree (rescaled)
Worry about COVID	How worried are you personally about the following issues at present? - Coronavirus/COVID-19	1 = Not at all worried, 7 = Very worried
Vaccine - acceptance	If a vaccine were to be available for the coronavirus/COVID-19 now: - Would you get vaccinated yourself?	0 = No, 1 = Yes
Vaccine – recommend to others	If a vaccine were to be available for the coronavirus/COVID-19 now: - Would you recommend vulnerable friends/family to get vaccinated?	0 = No, 1 = Yes
General vaccine attitudes	Please let us know how much you agree or disagree with the following statements about vaccines in general: - I believe that vaccines are a safe and reliable way to help avert the spread of preventable diseases	1 = Strongly disagree, 5 = Strongly agree
	Please let us know how much you agree or disagree with the following statements about vaccines in general: - Vaccinations are one of the most significant contributions to public health	1 = Strongly disagree, 5 = Strongly agree

Table S2

Results of measurement invariance analyses

Model	Constraints	*Df*	χ^2	$\Delta\chi^2$	ΔDf	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Trust in experts	Configural model	0	0	-	-	1	0	0	-	-	-
	Loadings	18	74.49	74.49***	18	0.998	0.039	0.017	0.002	0.039	0.017
	Intercepts	36	488.11	413.62***	18	0.981	0.079	0.035	0.017	0.039	0.018
	Means	45	983.43	495.32***	9	0.960	0.102	0.067	0.021	0.023	0.032
Trust in government	Configural model	0	0	-	-	1	0	0	-	-	-
	Loadings	18	447.63	447.63***	18	0.981	0.109	0.049	0.019	0.109	0.049
	Intercepts	36	1628.51	1180.88***	18	0.931	0.148	0.070	0.051	0.039	0.020
	Means	45	2318.57	690.06***	9	0.901	0.158	0.104	0.030	0.010	0.035
Perceived likelihood of infection	Configural model	0	0	-	-	1	0	0	-	-	-
	Loadings	18	124.79	124.79***	18	0.996	0.054	0.018	0.004	0.054	0.018
	Intercepts	36	826.98	702.19***	18	0.968	0.104	0.047	0.028	0.050	0.028
	Means	45	1036.54	209.56***	9	0.960	0.105	0.061	0.008	0.000	0.015

***$p < .001$, chi-square difference test

Table S3

Percentage of missing values for predictor and outcome variables across all samples.

Variable	AU_D (Mar)	CN_R (Apr)	DE_R (Mar)	ES_R (Mar)	ES_R (May)	FR_B (Apr)	IT_R (Mar)	JP_R (Apr)	KR_R (Apr)	MX_R (Mar)	MX_R (May)	SE_R (Apr)	SE_R (Mar)	UK_P (Jul)	UK_P (Mar)	UK_P (May)	UK_P (Sep)	UK_R (Jul)	UK_R (Jun)	UK_R (May)	UK_R (Oct)	UK_R (Sep)	US_P (Mar)	US_R (May)	US_R (Sep)
Age	5.4	0.6	3.6	2.0	1.6	0.0	20.6	2.3	0.4	7.9	0.9	1.3	4.4	0.0	0.0	0.2	0.0	1.4	1.2	1.2	0.9	1.4	0.0	0.9	0.0
Gender [Female]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1
Education	5.6	0.3	3.9	1.7	0.6	0.0	20.1	1.0	0.3	7.8	0.3	0.4	3.9	0.0	0.0	0.0	0.0	0.5	-	0.1	0.1	0.5	0.0	0.3	-
Numeracy	6.7	1.9	6.6	3.1	2.7	1.1	21.1	6.2	2.0	8.1	0.3	3.1	5.6	0.1	0.1	0.3	0.2	3.5	2.2	1.8	0.9	2.3	0.1	1.4	0.2
Politics [Conservative]	5.6	-	4.1	2.1	0.6	-	20.3	9.2	0.1	7.9	0.9	0.9	4.1	0.1	0.0	0.1	0.1	0.6	1.2	0.3	0.3	0.8	0.0	0.4	0.2
Prosociality	1.0	0.1	0.3	0.7	0.1	0.0	1.7	0.0	0.1	0.7	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.5	0.0	0.6	0.1	0.2	0.0	0.1	0.0
General social trust	0.0	0.0	0.1	0.3	0.3	0.0	0.4	0.0	0.1	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.0
General trust: Experts	0.0	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.1	0.4	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.3	0.1	0.4	0.0	0.0	0.0
General trust:Govt	0.1	-	0.3	0.0	0.1	0.0	0.9	0.1	0.1	0.3	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1
COVID trust: Politicians	3.4	-	1.7	1.3	0.0	0.0	10.0	0.4	0.1	4.8	0.3	0.1	2.3	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.2	0.0	0.1	0.0
COVID Trust: National sci/med advisors	3.4	-	1.7	1.3	0.1	0.0	10.0	0.3	0.0	4.8	0.3	0.1	2.3	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.0	0.3	-
COVID Trust: Independent scientists	3.4	-	1.7	1.6	0.1	0.0	10.1	0.3	0.0	4.8	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.1	-	0.2	0.0	0.1	0.1	0.3	-
COVID Trust: WHO	3.4	-	2.0	1.4	0.0	0.0	10.0	0.6	0.1	4.9	0.3	0.0	2.3	0.0	0.0	0.1	0.0	0.2	0.2	0.2	0.0	0.1	0.1	0.3	-
Personal efficacy	3.7	-	2.0	1.3	0.0	0.0	10.3	0.6	0.1	4.8	0.3	0.0	2.4	0.0	0.1	0.0	0.2	0.2	0.4	0.3	0.1	0.2	0.0	0.3	0.0
Govt efficacy	3.6	-	2.0	1.4	0.3	0.0	10.4	0.4	0.1	4.8	0.6	0.0	2.4	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.0	0.1	0.0	0.3	0.1
Perceived infection risk	1.4	0.3	1.0	0.9	0.0	0.0	3.0	0.0	0.0	1.7	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.1	0.4	0.2	0.2	0.0	0.1	0.4	0.0
Worry about COVID	1.0	0.0	0.6	0.6	0.0	0.0	2.4	0.1	0.3	1.4	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.0	0.1	0.1	0.1	0.0
Vaccine acceptance	4.0	0.1	1.9	1.4	0.1	0.0	11.4	0.1	0.1	5.8	0.3	0.4	2.4	0.1	0.0	0.0	0.0	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.0
Vaccine recommend	4.1	0.1	1.9	1.6	0.1	0.0	11.4	0.1	0.1	6.3	0.6	0.4	2.4	0.1	0.0	0.1	0.1	0.2	0.2	0.4	0.1	0.1	0.1	0.1	0.0
Vaccine attitudes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	0.2	0.3	-	-	-

'-' indicates variable not included in survey.

Table S4

Descriptive statistics for all samples (Mean (SD)), excluding US and UK samples (see Table S5)

	ALL	AU_D (Mar)	CN_R (Apr)	DE_R (Mar)	ES_R (Mar)	ES_R (May)	FR_B (Apr)	IT_R (Mar)	JP_R (Apr)	KR_R (Apr)	MX_R (Mar)	MX_R (May)	SE_R (Mar)	SE_R (Apr)
Age	45.27 (22.29)	46.30 (16.44)	43.21 (14.26)	46.61 (16.00)	46.64 (15.03)	46.00 (15.03)	48.79 (16.53)	46.95 (26.06)	48.08 (16.35)	45.34 (15.51)	38.39 (14.24)	38.68 (14.56)	48.41 (77.28)	45.31 (16.74)
Gender (Female)	0.51 (0.50)	0.51 (0.50)	0.49 (0.50)	0.50 (0.50)	0.51 (0.50)	0.50 (0.50)	0.48 (0.50)	0.50 (0.50)	0.51 (0.50)	0.49 (0.50)	0.50 (0.50)	0.51 (0.50)	0.49 (0.50)	0.49 (0.50)
Education	3.42 (1.13)	3.17 (1.12)	3.64 (0.88)	3.07 (1.19)	3.59 (1.08)	3.60 (1.07)	5.00[a] (1.12)	3.51 (1.23)	3.56 (0.81)	3.76 (0.79)	3.55 (0.94)	3.74 (0.88)	3.30 (1.06)	3.34 (1.01)
Numeracy	2.66 (1.11)	2.41 (1.06)	2.83 (1.25)	2.53 (1.12)	2.39 (1.03)	2.42 (0.97)	2.18 (0.70)	2.13 (0.71)	2.77 (1.25)	2.60 (1.06)	2.16 (0.90)	2.31 (0.95)	2.52 (1.23)	2.57 (1.21)
Politics (Conservative)	3.74 (1.41)	3.83 (1.30)	-	3.79 (1.19)	3.50 (1.43)	3.44 (1.50)	-	3.87 (1.45)	4.09 (1.09)	3.88 (1.20)	3.65 (1.31)	3.57 (1.33)	3.92 (1.59)	3.88 (1.61)
Prosociality	5.21 (1.36)	5.23 (1.36)	5.54 (1.19)	4.97 (1.42)	5.74 (1.21)	5.35 (1.34)	5.23 (1.41)	5.76 (1.38)	4.74 (1.42)	4.40 (1.31)	5.34 (1.61)	5.26 (1.53)	4.87 (1.43)	4.63 (1.48)
General social trust	3.66 (1.71)	3.95 (1.67)	4.96 (1.67)	3.61 (1.65)	3.47 (1.87)	3.29 (1.77)	2.98 (1.62)	3.70 (1.61)	3.85 (1.48)	3.97 (1.50)	2.81 (1.84)	2.94 (1.84)	3.73 (1.73)	3.85 (1.73)
General trust: Experts	3.97 (0.77)	3.97 (0.79)	4.26 (0.61)	3.90 (0.74)	4.19 (0.72)	4.09 (0.76)	3.76 (0.81)	4.02 (0.74)	3.51 (0.72)	3.74 (0.68)	4.05 (0.85)	4.10 (0.83)	3.90 (0.75)	3.85 (0.75)
General trust: Govt	2.64 (0.91)	2.96 (0.93)	-	3.14 (0.92)	2.75 (0.94)	2.54 (0.89)	2.48 (0.90)	2.89 (0.91)	2.46 (0.84)	2.65 (0.81)	2.28 (1.01)	2.35 (1.02)	3.04 (1.00)	3.00 (1.01)
COVID trust: Politicians	3.48 (1.87)	4.44 (1.75)	-	4.80 (1.65)	4.01 (1.88)	3.45 (1.91)	3.33 (1.78)	4.35 (1.74)	3.03 (1.60)	4.24 (1.63)	3.22 (1.99)	3.51 (1.96)	4.13 (1.78)	4.24 (1.83)
COVID Trust: National sci/med advisors	4.91 (1.60)	5.34 (1.41)	-	5.40 (1.43)	5.45 (1.39)	4.92 (1.65)	4.46 (1.73)	5.42 (1.40)	3.90 (1.51)	5.15 (1.37)	5.18 (1.69)	5.28 (1.60)	4.78 (1.67)	4.93 (1.66)
COVID Trust: Independent scientists	4.66 (1.55)	4.77 (1.49)	-	5.11 (1.38)	5.15 (1.39)	4.83 (1.55)	4.62 (1.52)	4.80 (1.45)	3.73 (1.51)	5.03 (1.26)	5.02 (1.68)	4.91 (1.65)	4.66 (1.52)	4.55 (1.48)
COVID Trust: WHO	4.84 (1.68)	5.19 (1.55)	-	5.16 (1.52)	5.46 (1.42)	4.88 (1.62)	4.80 (1.61)	5.25 (1.48)	3.12 (1.55)	3.96 (1.51)	5.80 (1.45)	5.58 (1.62)	5.05 (1.45)	4.81 (1.55)
Personal efficacy	5.22 (1.48)	5.14 (1.45)	-	5.24 (1.41)	5.31 (1.47)	5.14 (1.47)	5.20 (1.47)	5.31 (1.46)	4.26 (1.42)	5.42 (1.24)	5.36 (1.66)	5.56 (1.53)	5.20 (1.50)	5.26 (1.45)
Govt efficacy	3.86 (1.78)	4.48 (1.63)	-	4.68 (1.47)	4.21 (1.77)	4.11 (1.83)	4.22 (1.68)	4.60 (1.60)	3.21 (1.52)	5.08 (1.52)	3.82 (2.06)	4.39 (1.86)	4.30 (1.73)	4.41 (1.67)
Perceived infection risk	4.17 (1.32)	4.16 (1.40)	3.26 (1.37)	4.13 (1.34)	4.46 (1.23)	4.38 (1.26)	4.19 (1.24)	3.93 (1.30)	4.48 (1.20)	4.37 (1.22)	4.16 (1.47)	4.29 (1.43)	4.30 (1.37)	4.37 (1.29)
Worry about COVID	5.56 (1.52)	5.56 (1.51)	5.37 (1.57)	5.66 (1.49)	6.25 (1.17)	6.11 (1.26)	5.63 (1.43)	6.08 (1.27)	5.83 (1.28)	5.59 (1.29)	5.92 (1.46)	6.06 (1.35)	5.27 (1.55)	4.98 (1.66)
Vaccine – acceptance	0.76 (0.43)	0.83 (0.38)	0.86 (0.35)	0.81 (0.39)	0.84 (0.37)	0.80 (0.40)	0.70 (0.46)	0.85 (0.35)	0.74 (0.44)	0.86 (0.35)	0.88 (0.32)	0.74 (0.44)	0.66 (0.47)	0.63 (0.48)
Vaccine – recommend to vulnerable others	0.82 (0.38)	0.89 (0.32)	0.87 (0.33)	0.89 (0.31)	0.90 (0.30)	0.82 (0.38)	0.81 (0.40)	0.88 (0.32)	0.80 (0.40)	0.88 (0.32)	0.90 (0.30)	0.76 (0.43)	0.77 (0.42)	0.74 (0.44)
General vaccine attitudes	4.05 (1.11)	-	-	-	-	-	-	-	-	-	-	-	-	-

[a] Education item in France differed from other surveys – see Table S1.

Table S5

Descriptive statistics for all US and UK samples (Mean (SD))

	UK_P (Mar)	UK_P (May)	UK_P (Jul)	UK_P (Sep)	UK_R (May)	UK_R (Jun)	UK_R (Jul)	UK_R (Sep)	UK_R (Oct)	US_P (Mar)	US_R (May)	US_R (Sep)
Age	45.63 (15.69)	45.22 (23.08)	44.76 (17.55)	38.14 (15.01)	45.64 (15.99)	45.90 (15.87)	46.01 (24.36)	45.75 (19.58)	47.13 (23.44)	45.09 (15.90)	45.73 (26.53)	44.76 (15.60)
Gender (Female)	0.51 (0.50)	0.51 (0.50)	0.53 (0.50)	0.52 (0.50)	0.52 (0.50)	0.53 (0.50)	0.52 (0.50)	0.52 (0.50)	0.52 (0.50)	0.51 (0.50)	0.51 (0.50)	0.51 (0.50)
Education	3.45 (1.17)	3.50 (1.14)	3.58 (1.14)	3.54 (1.10)	3.17 (1.27)	-	3.20 (1.23)	3.15 (1.28)	3.10 (1.23)	3.87 (0.88)	3.70 (0.90)	-
Numeracy	3.22 (1.17)	3.23 (1.14)	3.04 (1.06)	3.24 (1.15)	2.64 (1.14)	2.74 (1.10)	2.61 (1.07)	2.60 (1.07)	2.78 (1.11)	3.14 (1.13)	2.76 (1.14)	2.58 (1.12)
Politics (Conservative)	3.69 (1.43)	3.67 (1.39)	3.58 (1.36)	3.37 (1.36)	3.90 (1.35)	3.89 (1.19)	3.90 (1.33)	3.84 (1.36)	3.83 (1.32)	3.22 (1.65)	3.92 (1.69)	4.07 (1.65)
Prosociality	5.50 (1.07)	5.36 (1.19)	5.32 (1.16)	5.42 (1.17)	5.12 (1.33)	5.25 (1.29)	5.03 (1.29)	5.08 (1.39)	5.38 (1.36)	5.43 (1.28)	5.05 (1.36)	5.02 (1.44)
General social trust	4.04 (1.59)	4.12 (1.55)	4.11 (1.55)	3.69 (1.56)	3.74 (1.71)	3.58 (1.70)	3.86 (1.59)	3.68 (1.68)	3.66 (1.64)	4.01 (1.68)	3.79 (1.73)	3.47 (1.84)
General trust: Experts	4.24 (0.66)	4.11 (0.63)	4.14 (0.66)	4.17 (0.68)	3.89 (0.79)	3.88 (0.81)	3.92 (0.76)	3.90 (0.78)	3.92 (0.77)	4.22 (0.73)	3.96 (0.77)	3.89 (0.83)
General trust: Govt	2.82 (0.85)	2.80 (0.82)	2.60 (0.82)	2.44 (0.81)	2.82 (0.87)	2.64 (0.87)	2.70 (0.88)	2.60 (0.90)	2.55 (0.86)	2.55 (0.79)	2.68 (0.83)	2.52 (0.88)
COVID trust: Politicians	3.81 (1.78)	3.80 (1.81)	3.16 (1.80)	2.57 (1.65)	4.00 (1.86)	3.38 (1.70)	3.60 (1.83)	3.23 (1.86)	3.04 (1.79)	3.06 (1.74)	3.11 (1.77)	2.93 (1.81)
COVID Trust: National sci/med advisors	5.27 (1.47)	5.13 (1.41)	5.12 (1.47)	4.88 (1.58)	4.94 (1.57)	4.58 (1.51)	4.88 (1.53)	4.66 (1.61)	4.60 (1.66)	5.46 (1.41)	5.15 (1.55)	-
COVID Trust: Independent scientists	4.88 (1.48)	4.59 (1.44)	4.74 (1.48)	4.77 (1.60)	4.46 (1.52)	-	4.54 (1.52)	4.40 (1.61)	4.28 (1.63)	5.16 (1.48)	4.72 (1.60)	-
COVID Trust: WHO	5.59 (1.40)	4.97 (1.55)	5.02 (1.62)	4.77 (1.70)	4.76 (1.69)	4.46 (1.69)	4.72 (1.66)	4.50 (1.69)	4.44 (1.71)	5.62 (1.55)	4.57 (1.90)	-
Personal efficacy	5.04 (1.39)	5.59 (1.26)	5.47 (1.35)	5.12 (1.48)	5.36 (1.48)	5.13 (1.45)	5.30 (1.45)	5.09 (1.52)	5.03 (1.52)	5.25 (1.45)	5.32 (1.47)	5.14 (1.57)
Govt efficacy	3.86 (1.75)	3.85 (1.70)	3.48 (1.72)	3.03 (1.62)	4.13 (1.74)	3.66 (1.61)	3.88 (1.75)	3.58 (1.73)	3.36 (1.70)	3.28 (1.80)	3.76 (1.76)	3.25 (1.86)
Perceived infection risk	4.89 (1.32)	4.26 (1.24)	3.96 (1.24)	4.26 (1.30)	4.14 (1.22)	3.94 (1.25)	3.86 (1.25)	4.13 (1.28)	4.27 (1.24)	3.98 (1.52)	3.91 (1.38)	4.11 (1.38)
Worry about COVID	5.80 (1.36)	5.72 (1.40)	5.28 (1.52)	5.36 (1.58)	5.60 (1.51)	5.34 (1.57)	5.30 (1.60)	5.39 (1.61)	5.39 (1.63)	5.49 (1.58)	5.58 (1.60)	5.43 (1.72)
Vaccine – acceptance	0.80 (0.40)	0.80 (0.40)	0.79 (0.41)	0.73 (0.44)	0.79 (0.41)	0.79 (0.41)	0.80 (0.40)	0.76 (0.43)	0.72 (0.45)	0.76 (0.43)	0.75 (0.44)	0.63 (0.48)
Vaccine – recommend to vulnerable others	0.92 (0.28)	0.87 (0.34)	0.85 (0.36)	0.80 (0.40)	0.84 (0.36)	0.83 (0.38)	0.84 (0.36)	0.80 (0.40)	0.76 (0.43)	0.86 (0.35)	0.80 (0.40)	0.68 (0.47)
General vaccine attitudes	-	-	-	4.21 (1.10)	-	-	-	3.90 (1.14)	4.05 (1.06)	-	-	-

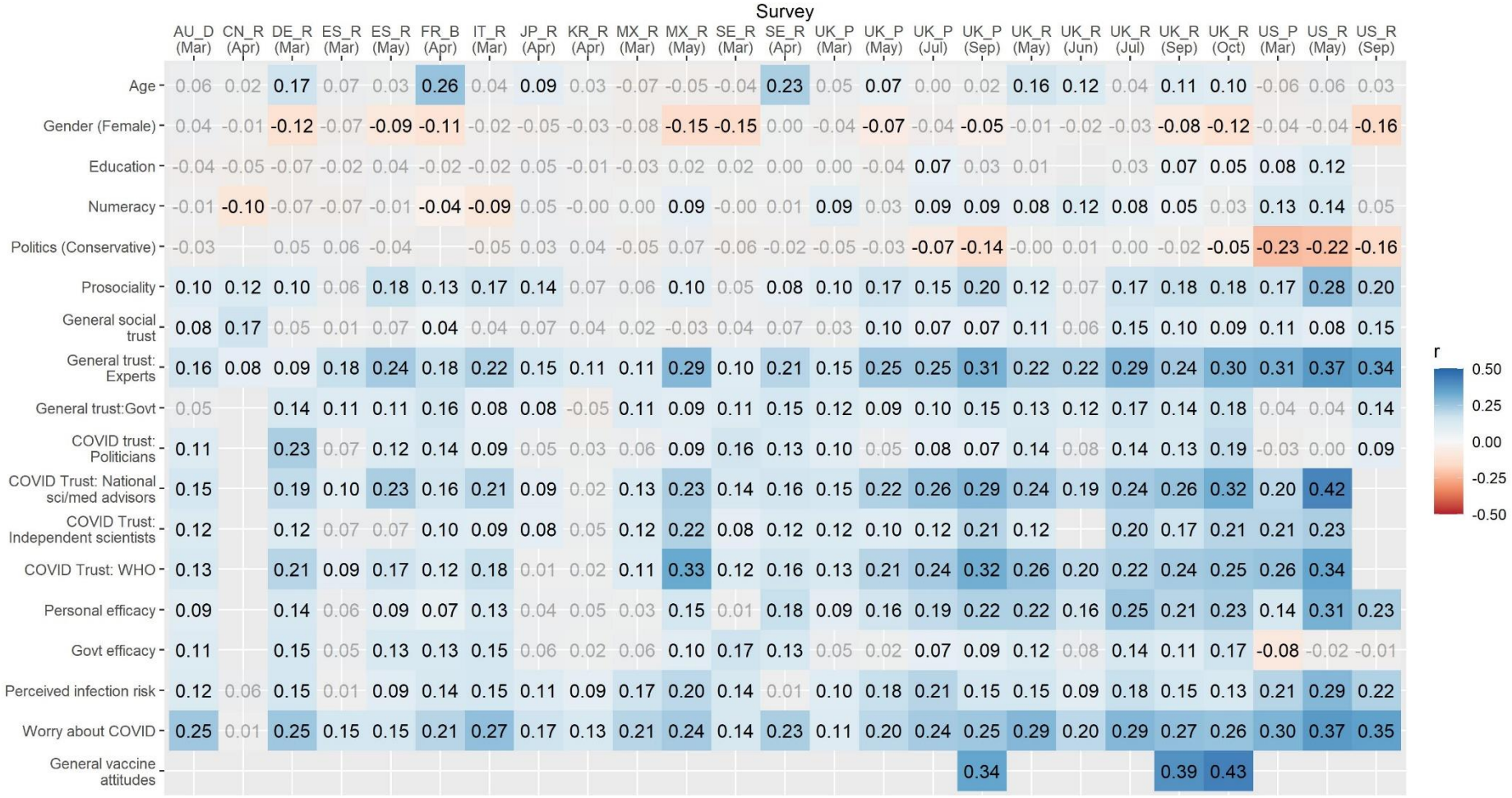

Figure S1. Point biserial correlations between predictors and vaccine acceptance across all samples. Greyed values are non-significant ($p > .05$). Blank spaces indicate predictors which were not included in a given survey

Table S6

Full logistic regression results from model predicting vaccine acceptance, excluding UK and US samples (shown in Table S7)

	ALL	**ALL (-UK)**	**AU_D (Mar)**	**DE_R (Mar)**	**ES_R (Mar)**	**ES_R (May)**	**FR_B (Apr)**	**IT_R (Mar)**	**JP_R (Apr)**	**KR_R (Apr)**	**MX_R (Mar)**	**MX_R (May)**	**SE_R (Mar)**	**SE_R (Apr)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	5.15 ***	5.00 ***	5.59 ***	9.38 ***	8.10 ***	7.35 ***	3.35 ***	11.73 ***	3.70 ***	7.89 ***	15.24 ***	5.43 ***	3.17 ***	2.20 ***
	[4.86 – 5.46]	(4.58 – 5.46)	[4.08 – 7.83]	[6.51 – 13.96]	[5.74 – 11.79]	[5.28 – 10.50]	[2.93 – 3.84]	[7.54 – 19.18]	[2.78 – 4.99]	[5.66 – 11.31]	[9.74 – 25.20]	[3.99 – 7.55]	[2.45 – 4.14]	[1.71 – 2.86]
Age	1.15 ***	1.00	1.12	1.61 ***	1.10	1.00	1.68 ***	1.15	1.23	0.97	0.73 *	0.86	0.92	1.47 ***
	[1.09 – 1.22]	(0.96 – 1.07)	[0.88 – 1.42]	[1.27 – 2.06]	[0.87 – 1.38]	[0.80 – 1.25]	[1.53 – 1.84]	[0.79 – 1.91]	[1.00 – 1.52]	[0.77 – 1.23]	[0.55 – 0.96]	[0.70 – 1.05]	[0.56 – 1.09]	[1.21 – 1.79]
Gender (Female)[a]	0.59 ***	0.61 ***	1.20	0.37 ***	0.53 **	0.47 ***	0.65 ***	0.59	0.76	0.75	0.49 *	0.42 ***	0.43 ***	0.71
	[0.55 – 0.64]	(0.55 – 0.69)	[0.76 – 1.88]	[0.23 – 0.59]	[0.33 – 0.83]	[0.30 – 0.72]	[0.54 – 0.77]	[0.34 – 1.03]	[0.50 – 1.13]	[0.48 – 1.19]	[0.27 – 0.87]	[0.28 – 0.62]	[0.30 – 0.62]	[0.49 – 1.03]
Education	1.02	1.00	0.85	0.86	0.95	1.11	0.99	0.98	1.13	0.98	0.94	0.99	1.03	0.97
	[0.98 – 1.06]	(0.93 – 1.07)	[0.67 – 1.07]	[0.68 – 1.08]	[0.77 – 1.18]	[0.90 – 1.36]	[0.91 – 1.09]	[0.74 – 1.30]	[0.93 – 1.39]	[0.78 – 1.23]	[0.70 – 1.25]	[0.81 – 1.20]	[0.86 – 1.23]	[0.81 – 1.16]
Numeracy	1.01	0.94 *	0.91	0.84	0.80 *	0.88	0.90 *	0.64 **	0.99	0.92	0.95	1.00	0.92	1.01
	[0.97 – 1.05]	(0.89 – 0.99)	[0.73 – 1.15]	[0.67 – 1.05]	[0.65 – 0.99]	[0.72 – 1.09]	[0.82 – 0.99]	[0.48 – 0.84]	[0.81 – 1.23]	[0.73 – 1.16]	[0.73 – 1.25]	[0.82 – 1.22]	[0.77 – 1.11]	[0.84 – 1.22]
Politics (Conservative)	0.94 **	0.95	0.87	1.21	1.23	1.06		0.88	1.02	1.02	0.86	1.18	0.91	0.91
	[0.90 – 0.98]	(0.90 – 1.00)	[0.68 – 1.11]	[0.96 – 1.52]	[0.98 – 1.55]	[0.84 – 1.33]		[0.66 – 1.18]	[0.84 – 1.25]	[0.80 – 1.30]	[0.65 – 1.14]	[0.97 – 1.44]	[0.76 – 1.10]	[0.75 – 1.10]
Prosociality	1.07 **	1.06 *	0.98	1.05	0.98	1.20	1.07	1.05	1.16	1.26	1.01	0.99	0.96	0.96
	[1.03 – 1.11]	(1.00 – 1.13)	[0.75 – 1.26]	[0.82 – 1.35]	[0.78 – 1.24]	[0.96 – 1.50]	[0.98 – 1.17]	[0.78 – 1.39]	[0.93 – 1.45]	[0.98 – 1.62]	[0.76 – 1.32]	[0.81 – 1.22]	[0.79 – 1.16]	[0.79 – 1.16]
General social trust	1.06 **	1.06	1.18	0.96	0.93	1.15	1.00	0.99	0.97	1.14	1.25	0.93	0.99	1.01
	[1.02 – 1.11]	(1.00 – 1.13)	[0.91 – 1.52]	[0.75 – 1.24]	[0.73 – 1.17]	[0.92 – 1.44]	[0.91 – 1.10]	[0.74 – 1.33]	[0.77 – 1.22]	[0.87 – 1.48]	[0.94 – 1.70]	[0.76 – 1.14]	[0.81 – 1.20]	[0.83 – 1.23]
General trust: Experts	1.28 ***	1.27 ***	1.38 *	0.90	1.33 *	1.55 ***	1.18 **	1.45 *	1.25	1.30	1.05	1.46 **	1.15	1.19
	[1.22 – 1.34]	(1.18 – 1.36)	[1.06 – 1.80]	[0.66 – 1.21]	[1.02 – 1.73]	[1.23 – 1.97]	[1.06 – 1.31]	[1.05 – 2.01]	[0.97 – 1.60]	[1.00 – 1.71]	[0.77 – 1.40]	[1.16 – 1.84]	[0.91 – 1.44]	[0.95 – 1.49]
General trust: Govt	1.02	0.93	0.74	1.06	1.24	1.01	1.08	0.97	1.07	0.70 *	1.29	1.01	0.97	1.06
	[0.96 – 1.07]	(0.86 – 1.01)	[0.54 – 1.00]	[0.77 – 1.47]	[0.91 – 1.70]	[0.76 – 1.34]	[0.94 – 1.23]	[0.67 – 1.39]	[0.81 – 1.40]	[0.52 – 0.93]	[0.90 – 1.89]	[0.78 – 1.31]	[0.75 – 1.26]	[0.79 – 1.42]
COVID trust: Politicians	1.06	1.04	1.14	1.49 *	1.16	1.13	1.11	0.72	0.98	1.17	0.91	1.09	1.16	0.89
	[1.00 – 1.13]	(0.95 – 1.13)	[0.78 – 1.66]	[1.02 – 2.20]	[0.83 – 1.63]	[0.81 – 1.57]	[0.97 – 1.27]	[0.45 – 1.12]	[0.67 – 1.41]	[0.86 – 1.58]	[0.61 – 1.36]	[0.80 – 1.47]	[0.85 – 1.59]	[0.64 – 1.23]
COVID Trust: National sci/med advisors	1.22 ***	1.23 ***	1.08	0.95	0.95	1.66 ***	1.22 **	1.13	1.08	0.88	1.23	1.08	1.05	1.04
	[1.16 – 1.29]	(1.13 – 1.34)	[0.76 – 1.52]	[0.64 – 1.42]	[0.69 – 1.31]	[1.24 – 2.24]	[1.08 – 1.39]	[0.72 – 1.78]	[0.79 – 1.48]	[0.63 – 1.24]	[0.89 – 1.70]	[0.82 – 1.42]	[0.79 – 1.41]	[0.77 – 1.41]
COVID Trust: Independent scientists	0.95 *	1.00	1.02	0.88	1.00	0.73 *	0.98	0.99	1.05	1.01	1.05	1.12	0.99	1.03
	[0.90 – 0.99]	(0.93 – 1.07)	[0.76 – 1.34]	[0.64 – 1.21]	[0.76 – 1.31]	[0.56 – 0.95]	[0.89 – 1.09]	[0.70 – 1.37]	[0.78 – 1.41]	[0.74 – 1.37]	[0.78 – 1.42]	[0.89 – 1.41]	[0.78 – 1.24]	[0.83 – 1.27]
COVID Trust: WHO	1.19 ***	1.10 **	0.96	1.57 **	1.00	1.03	1.05	1.11	0.90	1.07	1.12	1.59 ***	1.15	1.28 *
	[1.13 – 1.24]	(1.03 – 1.18)	[0.71 – 1.28]	[1.15 – 2.14]	[0.74 – 1.33]	[0.78 – 1.35]	[0.94 – 1.18]	[0.74 – 1.63]	[0.69 – 1.18]	[0.83 – 1.38]	[0.82 – 1.53]	[1.24 – 2.04]	[0.91 – 1.45]	[1.02 – 1.60]
Personal efficacy	1.01	0.93 *	0.85	1.05	0.93	0.91	0.87 **	1.02	0.92	1.01	0.86	0.82	0.74 **	1.09
	[0.97 – 1.06]	(0.87 – 0.99)	[0.64 – 1.12]	[0.81 – 1.35]	[0.71 – 1.21]	[0.71 – 1.16]	[0.79 – 0.96]	[0.73 – 1.43]	[0.72 – 1.18]	[0.75 – 1.36]	[0.62 – 1.17]	[0.64 – 1.05]	[0.60 – 0.92]	[0.90 – 1.33]
Govt efficacy	1.01	1.07	1.25	0.94	0.97	1.08	1.05	1.35	1.15	1.05	1.00	0.89	1.20	1.13
	[0.96 – 1.07]	(0.98 – 1.16)	[0.88 – 1.79]	[0.70 – 1.26]	[0.70 – 1.33]	[0.79 – 1.47]	[0.93 – 1.19]	[0.92 – 1.98]	[0.81 – 1.64]	[0.75 – 1.46]	[0.68 – 1.50]	[0.66 – 1.19]	[0.89 – 1.61]	[0.85 – 1.50]
Perceived infection risk	1.12 ***	1.13 ***	1.06	1.49 **	1.00	1.11	1.29 ***	1.47 **	1.20	1.07	1.43 *	1.27 *	1.30 **	0.79 *
	[1.07 – 1.16]	(1.07 – 1.20)	[0.82 – 1.37]	[1.16 – 1.92]	[0.80 – 1.25]	[0.89 – 1.38]	[1.18 – 1.42]	[1.11 – 1.96]	[0.97 – 1.48]	[0.83 – 1.38]	[1.06 – 1.92]	[1.02 – 1.57]	[1.07 – 1.58]	[0.65 – 0.97]
Worry about COVID	1.48 ***	1.52 ***	1.69 ***	1.34 *	1.37 *	1.19	1.36 ***	1.55 **	1.33 **	1.24	1.66 ***	1.31 *	1.37 **	1.77 ***
	[1.42 – 1.54]	(1.44 – 1.62)	[1.34 – 2.16]	[1.05 – 1.70]	[1.07 – 1.74]	[0.95 – 1.48]	[1.24 – 1.50]	[1.18 – 2.03]	[1.07 – 1.65]	[0.96 – 1.59]	[1.26 – 2.21]	[1.06 – 1.63]	[1.13 – 1.66]	[1.44 – 2.19]
Observations	19256	8418	644	641	669	666	2969	532	590	677	629	684	653	656
R^2 Tjur	0.126	0.102	0.096	0.183	0.061	0.137	0.151	0.142	0.077	0.04	0.115	0.196	0.102	0.137

Odd ratios [95CI] shown, all continuous measure were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; R, Respondi). [a]Gender is unstandardized. Political orientation data was not collected in France, this sample is excluded from pooled data.

*p < .05, **p < .01, *** p < .001

Table S7

Full logistic regression results from model predicting vaccine acceptance, UK and US samples

	UK_P (Mar)	**UK_P (May)**	**UK_P (Jul)**	**UK_P (Sep)**	**UK_R (May)**	**UK_R (Jul)**	**UK_R (Sep)**	**UK_R (Oct)**	**US_P (Mar)**	**US_R (May)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	5.20 ***	7.66 ***	6.20 ***	4.16 ***	5.62 ***	6.52 ***	5.55 ***	4.94 ***	4.66 ***	5.11 ***
	[3.87 – 7.11]	[5.86 – 10.18]	[4.91 – 7.93]	[3.48 – 4.99]	[4.38 – 7.33]	[5.11 – 8.43]	[4.56 – 6.79]	[4.07 – 6.03]	[3.46 – 6.38]	[3.71 – 7.21]
Age	1.18	1.60 ***	1.06	1.12	1.48 ***	1.12	1.48 ***	1.60 ***	0.91	1.40
	[0.96 – 1.46]	[1.23 – 2.10]	[0.90 – 1.28]	[0.99 – 1.28]	[1.22 – 1.79]	[0.95 – 1.41]	[1.26 – 1.75]	[1.31 – 1.95]	[0.74 – 1.12]	[0.96 – 2.07]
Gender (Female)	0.79	0.53 ***	0.58 ***	0.61 ***	0.78	0.67 *	0.50 ***	0.44 ***	0.72	0.75
	[0.52 – 1.20]	[0.37 – 0.75]	[0.43 – 0.79]	[0.48 – 0.78]	[0.56 – 1.09]	[0.48 – 0.93]	[0.39 – 0.65]	[0.34 – 0.57]	[0.48 – 1.09]	[0.49 – 1.15]
Education	0.98	0.85	1.10	1.02	1.04	1.00	1.11	1.18 *	1.08	1.06
	[0.80 – 1.21]	[0.71 – 1.00]	[0.95 – 1.29]	[0.91 – 1.15]	[0.88 – 1.24]	[0.85 – 1.18]	[0.98 – 1.26]	[1.04 – 1.34]	[0.88 – 1.32]	[0.86 – 1.31]
Numeracy	1.30 *	0.99	1.19 *	1.11	1.25 *	1.10	1.00	1.00	1.21	1.42 **
	[1.05 – 1.62]	[0.84 – 1.17]	[1.01 – 1.39]	[0.98 – 1.26]	[1.05 – 1.48]	[0.93 – 1.29]	[0.88 – 1.14]	[0.88 – 1.13]	[0.98 – 1.50]	[1.14 – 1.79]
Politics (Conservative)	0.83	0.90	0.94	0.84 *	0.91	0.99	0.88	0.86 *	0.73 *	0.75 *
	[0.66 – 1.05]	[0.74 – 1.09]	[0.79 – 1.13]	[0.74 – 0.97]	[0.76 – 1.10]	[0.83 – 1.19]	[0.77 – 1.01]	[0.74 – 0.98]	[0.57 – 0.93]	[0.57 – 0.99]
Prosociality	1.09	1.19 *	1.16 *	1.11	0.89	1.05	1.09	1.07	1.00	1.19
	[0.89 – 1.34]	[1.01 – 1.41]	[1.00 – 1.35]	[0.98 – 1.26]	[0.74 – 1.06]	[0.89 – 1.24]	[0.96 – 1.25]	[0.94 – 1.23]	[0.81 – 1.23]	[0.94 – 1.49]
General social trust	0.85	1.04	0.98	1.03	1.06	1.24 *	1.09	0.97	1.14	0.98
	[0.68 – 1.06]	[0.86 – 1.25]	[0.83 – 1.17]	[0.91 – 1.16]	[0.88 – 1.27]	[1.04 – 1.48]	[0.95 – 1.25]	[0.85 – 1.11]	[0.91 – 1.44]	[0.78 – 1.24]
General trust: Experts	1.06	1.39 **	1.34 ***	1.39 ***	1.12	1.44 ***	1.24 **	1.45 ***	1.53 **	1.38 *
	[0.83 – 1.34]	[1.13 – 1.70]	[1.13 – 1.60]	[1.21 – 1.61]	[0.91 – 1.38]	[1.19 – 1.73]	[1.06 – 1.44]	[1.24 – 1.69]	[1.16 – 2.03]	[1.03 – 1.84]
General trust:Govt	1.27	1.00	1.07	1.27 **	1.13	1.07	1.13	1.02	0.87	0.95
	[0.96 – 1.68]	[0.79 – 1.27]	[0.86 – 1.32]	[1.07 – 1.50]	[0.90 – 1.42]	[0.85 – 1.33]	[0.94 – 1.36]	[0.86 – 1.21]	[0.67 – 1.14]	[0.71 – 1.26]
COVID trust: Politicians	1.17	0.98	1.09	0.94	1.00	1.22	1.12	1.26 *	1.21	1.03
	[0.82 – 1.67]	[0.73 – 1.31]	[0.84 – 1.42]	[0.77 – 1.14]	[0.76 – 1.33]	[0.90 – 1.65]	[0.90 – 1.41]	[1.02 – 1.57]	[0.86 – 1.69]	[0.74 – 1.42]
COVID Trust: National sci/med advisors	1.18	1.50 ***	1.23 *	1.13	1.17	0.98	1.25 *	1.29 **	0.78	1.92 ***
	[0.88 – 1.59]	[1.18 – 1.89]	[1.00 – 1.51]	[0.97 – 1.33]	[0.92 – 1.49]	[0.77 – 1.25]	[1.04 – 1.50]	[1.07 – 1.56]	[0.57 – 1.04]	[1.39 – 2.69]
COVID Trust: Independent scientists	1.08	0.89	0.82 *	0.93	0.85	1.00	0.88	1.00	1.12	0.81
	[0.84 – 1.37]	[0.73 – 1.08]	[0.68 – 0.98]	[0.80 – 1.07]	[0.68 – 1.05]	[0.81 – 1.22]	[0.74 – 1.03]	[0.85 – 1.17]	[0.89 – 1.41]	[0.62 – 1.06]
COVID Trust: WHO	1.05	1.26 *	1.23 *	1.45 ***	1.52 ***	1.04	1.33 ***	1.03	1.17	1.02
	[0.80 – 1.35]	[1.04 – 1.53]	[1.02 – 1.49]	[1.25 – 1.69]	[1.23 – 1.88]	[0.83 – 1.29]	[1.12 – 1.58]	[0.87 – 1.23]	[0.90 – 1.51]	[0.76 – 1.37]
Personal efficacy	1.06	1.10	1.07	1.10	1.06	1.21 *	1.03	1.03	1.23	1.08
	[0.86 – 1.31]	[0.92 – 1.30]	[0.91 – 1.25]	[0.96 – 1.25]	[0.87 – 1.29]	[1.01 – 1.45]	[0.89 – 1.19]	[0.89 – 1.18]	[0.99 – 1.52]	[0.84 – 1.39]
Govt efficacy	0.84	0.82	1.05	1.01	1.02	0.94	0.95	1.04	1.05	0.97
	[0.62 – 1.13]	[0.63 – 1.05]	[0.83 – 1.33]	[0.84 – 1.21]	[0.80 – 1.31]	[0.72 – 1.24]	[0.77 – 1.16]	[0.86 – 1.27]	[0.77 – 1.43]	[0.71 – 1.33]
Perceived infection risk	1.18	1.39 ***	1.30 **	1.04	1.19	1.15	1.08	0.98	1.26	1.45 **
	[0.96 – 1.46]	[1.16 – 1.66]	[1.09 – 1.54]	[0.91 – 1.19]	[0.99 – 1.42]	[0.96 – 1.38]	[0.94 – 1.25]	[0.85 – 1.13]	[1.00 – 1.59]	[1.14 – 1.86]
Worry about COVID-19	1.10	1.25 *	1.40 ***	1.36 ***	1.59 ***	1.62 ***	1.56 ***	1.44 ***	1.48 **	1.27
	[0.88 – 1.36]	[1.04 – 1.48]	[1.18 – 1.65]	[1.19 – 1.57]	[1.34 – 1.89]	[1.35 – 1.95]	[1.35 – 1.80]	[1.24 – 1.66]	[1.17 – 1.87]	[0.99 – 1.64]
Observations	698	1144	1315	1847	1098	1254	1778	1704	694	683
R^2 Tjur	0.068	0.172	0.161	0.191	0.168	0.16	0.173	0.193	0.184	0.287

Odd ratios [95CI] shown, all continuous measure were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (R, Respondi; P, Prolific). [a]Gender is unstandardized

*p < .05, **p < .01, *** p < .001

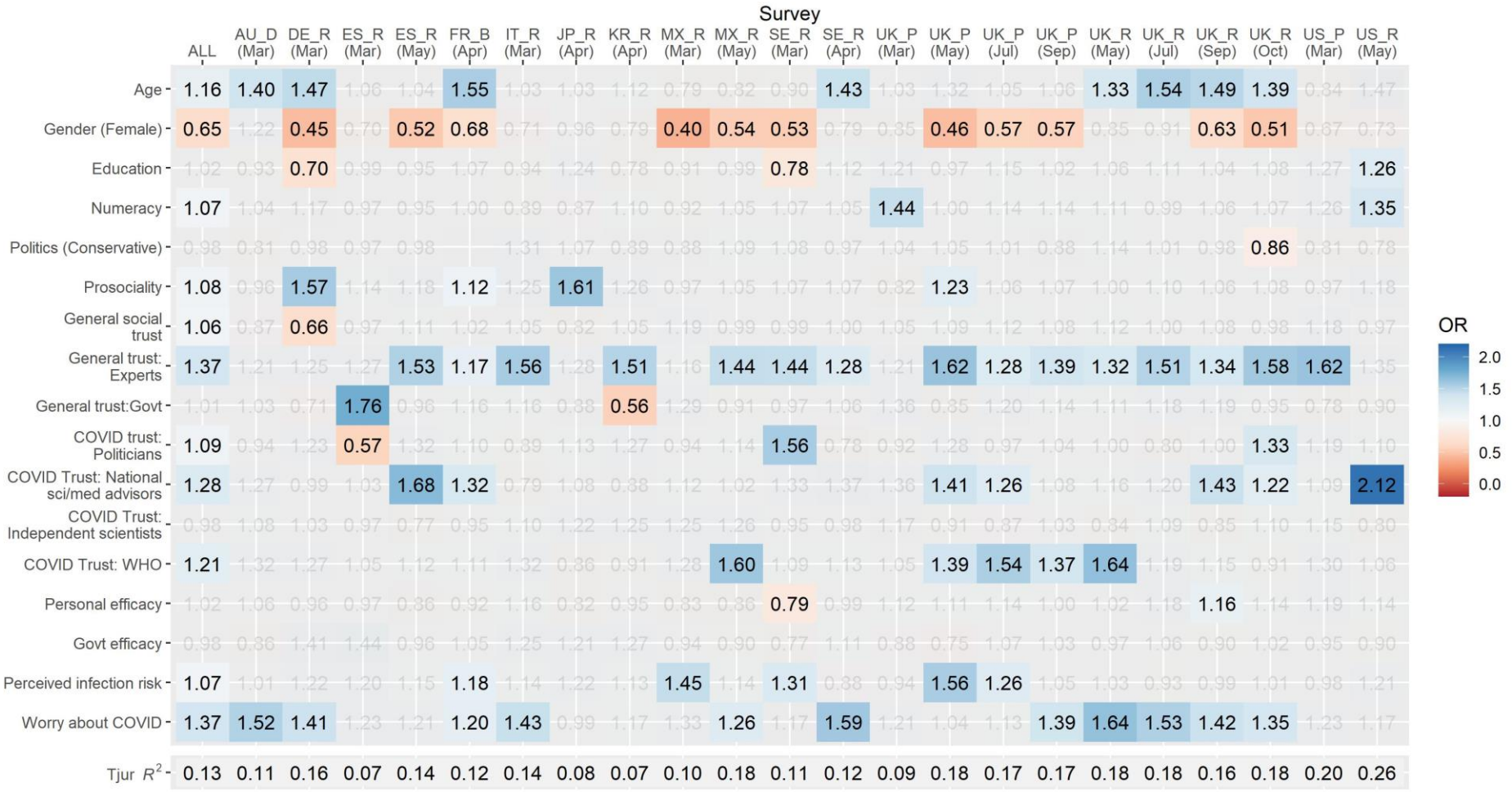

Figure S2. Heatmap of odds ratios in model predicting recommending vaccine to vulnerable friends/family. Columns represent individual samples and rows represent predictors in model. Grey values are non-significant, p > .05. Red shading indicates a lower likelihood of vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; R, Respondi; P, Prolific). Political orientation data was not collected in France, this sample is excluded from pooled data..

Table S8

Full logistic regression results from model predicting vaccine recommendation to vulnerable others, excluding UK and US samples (shown in Table S9)

	ALL	**AU_D (Mar)**	**DE_R (Mar)**	**ES_R (Mar)**	**ES_R (May)**	**FR_B (Apr)**	**IT_R (Mar)**	**JP_R (Apr)**	**KR_R (Apr)**	**MX_R (Mar)**	**MX_R (May)**	**SE_R (Mar)**	**SE_R (Apr)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	7.54 ***	10.40 ***	21.17 ***	13.42 ***	8.84 ***	6.45 ***	14.20 ***	4.88 ***	11.66 ***	22.92 ***	5.11 ***	5.38 ***	3.60 ***
	[7.06 – 8.06]	[7.01 – 16.08]	[13.08 –36.39]	[8.85 – 21.37]	[6.21 – 12.98]	[5.50 – 7.61]	[8.89 – 24.03]	[3.58 – 6.79]	[7.94 – 17.84]	[13.58 –41.94]	[3.78 – 7.06]	[3.99 – 7.42]	[2.73 – 4.83]
Age	1.16 ***	1.40 *	1.47 *	1.06	1.04	1.55 ***	1.03	1.03	1.12	0.79	0.82	0.90	1.43 **
	[1.09 – 1.23]	[1.05 – 1.88]	[1.08 – 2.00]	[0.80 – 1.40]	[0.83 – 1.32]	[1.39 – 1.73]	[0.77 – 1.70]	[0.81 – 1.29]	[0.86 – 1.48]	[0.58 – 1.07]	[0.67 – 1.01]	[0.63 – 1.07]	[1.15 – 1.78]
Gender (Female)[a]	0.65 ***	1.22	0.45 **	0.70	0.52 **	0.68 ***	0.71	0.96	0.79	0.40 **	0.54 **	0.53 **	0.79
	[0.60 – 0.71]	[0.71 – 2.10]	[0.25 – 0.80]	[0.39 – 1.21]	[0.32 – 0.81]	[0.56 – 0.84]	[0.38 – 1.29]	[0.62 – 1.50]	[0.47 – 1.32]	[0.20 – 0.77]	[0.36 – 0.80]	[0.35 – 0.81]	[0.53 – 1.18]
Education	1.02	0.93	0.70 *	0.99	0.95	1.07	0.94	1.24	0.78	0.91	0.99	0.78 *	1.12
	[0.97 – 1.06]	[0.70 – 1.23]	[0.52 – 0.92]	[0.76 – 1.28]	[0.76 – 1.18]	[0.97 – 1.18]	[0.69 – 1.28]	[0.99 – 1.55]	[0.59 – 1.02]	[0.65 – 1.24]	[0.82 – 1.21]	[0.64 – 0.96]	[0.92 – 1.36]
Numeracy	1.07 ***	1.04	1.17	0.97	0.95	1.00	0.89	0.87	1.10	0.92	1.05	1.07	1.05
	[1.03 – 1.12]	[0.79 – 1.40]	[0.88 – 1.58]	[0.75 – 1.27]	[0.76 – 1.19]	[0.91 – 1.11]	[0.65 – 1.23]	[0.70 – 1.10]	[0.84 – 1.45]	[0.68 – 1.25]	[0.85 – 1.29]	[0.87 – 1.33]	[0.86 – 1.28]
Politics (Conservative)	0.98	0.81	0.98	0.97	0.98		1.31	1.07	0.89	0.88	1.09	1.08	0.97
	[0.94 – 1.02]	[0.60 – 1.08]	[0.73 – 1.31]	[0.74 – 1.29]	[0.77 – 1.24]		[0.96 – 1.78]	[0.86 – 1.33]	[0.67 – 1.17]	[0.64 – 1.21]	[0.89 – 1.33]	[0.88 – 1.33]	[0.79 – 1.19]
Prosociality	1.08 ***	0.96	1.57 **	1.14	1.18	1.12 *	1.25	1.61 ***	1.26	0.97	1.05	1.07	1.07
	[1.03 – 1.13]	[0.70 – 1.31]	[1.14 – 2.17]	[0.87 – 1.49]	[0.94 – 1.49]	[1.01 – 1.23]	[0.93 – 1.67]	[1.26 – 2.07]	[0.95 – 1.66]	[0.72 – 1.31]	[0.86 – 1.29]	[0.86 – 1.31]	[0.88 – 1.32]
General social trust	1.06 **	0.87	0.66 *	0.97	1.11	1.02	1.05	0.82	1.05	1.19	0.99	0.99	1.00
	[1.01 – 1.11]	[0.62 – 1.19]	[0.47 – 0.92]	[0.72 – 1.31]	[0.87 – 1.41]	[0.92 – 1.14]	[0.76 – 1.44]	[0.63 – 1.07]	[0.78 – 1.42]	[0.87 – 1.67]	[0.81 – 1.22]	[0.79 – 1.24]	[0.81 – 1.24]
General trust: Experts	1.37 ***	1.21	1.25	1.27	1.53 ***	1.17 **	1.56 **	1.28	1.51 **	1.16	1.44 **	1.44 **	1.28 *
	[1.30 – 1.44]	[0.89 – 1.63]	[0.85 – 1.83]	[0.92 – 1.74]	[1.20 – 1.96]	[1.04 – 1.31]	[1.12 – 2.19]	[0.97 – 1.69]	[1.12 – 2.05]	[0.84 – 1.59]	[1.15 – 1.82]	[1.12 – 1.85]	[1.01 – 1.61]
General trust: Govt	1.01	1.03	0.71	1.76 **	0.96	1.16	1.16	0.88	0.56 ***	1.29	0.91	0.97	1.06
	[0.95 – 1.07]	[0.72 – 1.47]	[0.46 – 1.10]	[1.20 – 2.62]	[0.71 – 1.30]	[0.99 – 1.35]	[0.78 – 1.72]	[0.66 – 1.18]	[0.40 – 0.77]	[0.86 – 1.97]	[0.70 – 1.18]	[0.72 – 1.30]	[0.77 – 1.45]
COVID trust: Politicians	1.09 *	0.94	1.23	0.57 *	1.32	1.10	0.89	1.13	1.27	0.94	1.14	1.56 *	0.78
	[1.01 – 1.17]	[0.59 – 1.49]	[0.75 – 2.02]	[0.36 – 0.89]	[0.93 – 1.90]	[0.94 – 1.29]	[0.55 – 1.44]	[0.75 – 1.72]	[0.89 – 1.82]	[0.60 – 1.47]	[0.83 – 1.55]	[1.10 – 2.22]	[0.54 – 1.11]
COVID Trust: National sci/med advisors	1.28 ***	1.27	0.99	1.03	1.68 ***	1.32 ***	0.79	1.08	0.88	1.12	1.02	1.33	1.37
	[1.21 – 1.36]	[0.85 – 1.92]	[0.60 – 1.62]	[0.69 – 1.51]	[1.24 – 2.30]	[1.14 – 1.52]	[0.51 – 1.24]	[0.77 – 1.53]	[0.61 – 1.28]	[0.78 – 1.61]	[0.77 – 1.35]	[0.97 – 1.83]	[0.99 – 1.91]
COVID Trust: Independent scientists	0.98	1.08	1.03	0.97	0.77	0.95	1.10	1.22	1.25	1.25	1.26	0.95	0.98
	[0.93 – 1.04]	[0.76 – 1.53]	[0.69 – 1.51]	[0.68 – 1.36]	[0.58 – 1.02]	[0.85 – 1.07]	[0.78 – 1.54]	[0.88 – 1.70]	[0.89 – 1.74]	[0.89 – 1.74]	[0.99 – 1.58]	[0.73 – 1.22]	[0.77 – 1.23]
COVID Trust: WHO	1.21 ***	1.32	1.27	1.05	1.12	1.11	1.32	0.86	0.91	1.28	1.60 ***	1.09	1.13
	[1.14 – 1.27]	[0.93 – 1.85]	[0.85 – 1.89]	[0.74 – 1.47]	[0.84 – 1.49]	[0.98 – 1.26]	[0.89 – 1.92]	[0.63 – 1.15]	[0.66 – 1.23]	[0.92 – 1.78]	[1.25 – 2.05]	[0.84 – 1.41]	[0.88 – 1.45]
Personal efficacy	1.02	1.06	0.96	0.97	0.86	0.92	1.16	0.82	0.95	0.83	0.86	0.79 *	0.99
	[0.98 – 1.07]	[0.76 – 1.47]	[0.70 – 1.30]	[0.71 – 1.32]	[0.66 – 1.11]	[0.82 – 1.02]	[0.82 – 1.66]	[0.62 – 1.07]	[0.69 – 1.31]	[0.57 – 1.16]	[0.66 – 1.10]	[0.63 – 0.99]	[0.80 – 1.22]
Govt efficacy	0.98	0.86	1.41	1.44	0.96	1.05	1.25	1.21	1.27	0.94	0.90	0.77	1.11
	[0.92 – 1.05]	[0.55 – 1.33]	[0.97 – 2.06]	[0.96 – 2.20]	[0.69 – 1.33]	[0.91 – 1.21]	[0.82 – 1.91]	[0.81 – 1.81]	[0.87 – 1.85]	[0.61 – 1.47]	[0.67 – 1.21]	[0.56 – 1.06]	[0.81 – 1.51]
Perceived infection risk	1.07 **	1.01	1.22	1.20	1.15	1.18 **	1.14	1.22	1.13	1.45 *	1.14	1.31 *	0.88
	[1.02 – 1.12]	[0.74 – 1.37]	[0.89 – 1.69]	[0.91 – 1.58]	[0.91 – 1.45]	[1.06 – 1.31]	[0.83 – 1.56]	[0.96 – 1.55]	[0.84 – 1.50]	[1.04 – 2.01]	[0.91 – 1.41]	[1.05 – 1.63]	[0.71 – 1.08]
Worry about COVID-19	1.37 ***	1.52 **	1.41 *	1.23	1.21	1.20 ***	1.43 *	0.99	1.17	1.33	1.26 *	1.17	1.59 ***
	[1.31 – 1.43]	[1.15 – 2.03]	[1.05 – 1.91]	[0.92 – 1.64]	[0.96 – 1.52]	[1.08 – 1.34]	[1.09 – 1.89]	[0.78 – 1.25]	[0.88 – 1.53]	[0.98 – 1.81]	[1.01 – 1.57]	[0.95 – 1.45]	[1.28 – 1.98]
Observations	19248	643	641	669	667	2969	532	590	677	625	683	653	656
R^2 Tjur	0.129	0.109	0.162	0.069	0.136	0.118	0.142	0.076	0.073	0.104	0.184	0.113	0.123

Odd ratios [95CI] shown, all continuous measure were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (D, Dynata; R, Respondi; P, Prolific). [a]Gender is unstandardized. Political orientation data was not collected in France, this sample is excluded from pooled data. *p < .05, **p < .01, *** p < .001

Table S9

Full logistic regression results from model predicting vaccine recommendation to vulnerable others, UK and US samples

	UK_P (Mar) *OR*	**UK_P (May)** *OR*	**UK_P (Jul)** *OR*	**UK_P (Sep)** *OR*	**UK_R (May)** *OR*	**UK_R (Jul)** *OR*	**UK_R (Sep)** *OR*	**UK_R (Oct)** *OR*	**US_P (Mar)** *OR*	**US_R (May)** *OR*
(Intercept)	16.28 ***	15.62 ***	10.85 ***	6.58 ***	8.67 ***	8.43 ***	6.69 ***	5.76 ***	11.92 ***	8.08 ***
	[10.45 – 26.82]	[11.10 – 22.65]	[8.19 – 14.66]	[5.39 – 8.10]	[6.49 – 11.82]	[6.45 – 11.22]	[5.45 – 8.30]	[4.71 – 7.11]	[8.03 – 18.40]	[5.62 – 11.97]
Age	1.03	1.32	1.05	1.06	1.33 **	1.54 **	1.49 ***	1.39 **	0.84	1.47
	[0.76 – 1.39]	[0.98 – 1.81]	[0.86 – 1.30]	[0.93 – 1.22]	[1.07 – 1.65]	[1.16 – 2.05]	[1.26 – 1.78]	[1.13 – 1.71]	[0.64 – 1.09]	[0.97 – 2.23]
Gender (Female)	0.85	0.46 ***	0.57 **	0.57 ***	0.85	0.91	0.63 ***	0.51 ***	0.67	0.73
	[0.46 – 1.55]	[0.30 – 0.69]	[0.40 – 0.82]	[0.44 – 0.74]	[0.58 – 1.24]	[0.64 – 1.31]	[0.48 – 0.82]	[0.39 – 0.66]	[0.40 – 1.12]	[0.46 – 1.14]
Education	1.21	0.97	1.15	1.02	1.06	1.11	1.04	1.08	1.27	1.26 *
	[0.89 – 1.62]	[0.79 – 1.18]	[0.96 – 1.37]	[0.89 – 1.16]	[0.87 – 1.29]	[0.93 – 1.33]	[0.91 – 1.19]	[0.95 – 1.24]	[0.98 – 1.64]	[1.00 – 1.60]
Numeracy	1.44 *	1.00	1.14	1.14	1.11	0.99	1.06	1.07	1.26	1.35 *
	[1.05 – 2.02]	[0.82 – 1.22]	[0.95 – 1.37]	[1.00 – 1.31]	[0.92 – 1.35]	[0.83 – 1.19]	[0.93 – 1.22]	[0.94 – 1.22]	[0.96 – 1.66]	[1.06 – 1.73]
Politics (Conservative)	1.04	1.05	1.01	0.88	1.14	1.01	0.98	0.86 *	0.81	0.78
	[0.74 – 1.46]	[0.84 – 1.32]	[0.82 – 1.25]	[0.76 – 1.02]	[0.92 – 1.41]	[0.83 – 1.24]	[0.85 – 1.14]	[0.75 – 1.00]	[0.60 – 1.09]	[0.59 – 1.05]
Prosociality	0.82	1.23 *	1.06	1.07	1.00	1.10	1.06	1.08	0.97	1.18
	[0.60 – 1.09]	[1.01 – 1.50]	[0.89 – 1.25]	[0.94 – 1.23]	[0.82 – 1.22]	[0.91 – 1.32]	[0.92 – 1.22]	[0.94 – 1.24]	[0.75 – 1.25]	[0.92 – 1.50]
General social trust	1.05	1.09	1.12	1.08	1.12	1.00	1.08	0.98	1.18	0.97
	[0.77 – 1.43]	[0.87 – 1.36]	[0.92 – 1.37]	[0.94 – 1.23]	[0.91 – 1.39]	[0.82 – 1.22]	[0.93 – 1.24]	[0.86 – 1.13]	[0.89 – 1.58]	[0.76 – 1.25]
General trust: Experts	1.21	1.62 ***	1.28 *	1.39 ***	1.32 *	1.51 ***	1.34 ***	1.58 ***	1.62 **	1.35
	[0.87 – 1.69]	[1.28 – 2.05]	[1.05 – 1.55]	[1.19 – 1.62]	[1.05 – 1.66]	[1.24 – 1.85]	[1.15 – 1.57]	[1.35 – 1.86]	[1.17 – 2.27]	[0.99 – 1.84]
General trust:Govt	1.36	0.85	1.20	1.14	1.11	1.18	1.19	0.95	0.78	0.90
	[0.90 – 2.06]	[0.64 – 1.13]	[0.93 – 1.53]	[0.96 – 1.37]	[0.86 – 1.44]	[0.92 – 1.51]	[0.98 – 1.44]	[0.79 – 1.13]	[0.55 – 1.08]	[0.66 – 1.22]
COVID trust: Politicians	0.92	1.28	0.97	1.04	1.00	0.80	1.00	1.33 *	1.19	1.10
	[0.55 – 1.53]	[0.91 – 1.83]	[0.71 – 1.32]	[0.84 – 1.30]	[0.73 – 1.36]	[0.57 – 1.13]	[0.79 – 1.28]	[1.06 – 1.68]	[0.77 – 1.81]	[0.77 – 1.57]
COVID Trust: National sci/med advisors	1.36	1.41 *	1.26 *	1.08	1.16	1.20	1.43 ***	1.22 *	1.09	2.12 ***
	[0.90 – 2.07]	[1.07 – 1.85]	[1.00 – 1.58]	[0.91 – 1.29]	[0.88 – 1.52]	[0.91 – 1.58]	[1.17 – 1.74]	[1.00 – 1.49]	[0.75 – 1.55]	[1.50 – 3.02]
COVID Trust: Independent scientists	1.17	0.91	0.87	1.03	0.84	1.09	0.85	1.10	1.15	0.80
	[0.83 – 1.64]	[0.72 – 1.15]	[0.70 – 1.06]	[0.88 – 1.20]	[0.65 – 1.07]	[0.86 – 1.37]	[0.71 – 1.01]	[0.93 – 1.30]	[0.86 – 1.53]	[0.60 – 1.07]
COVID Trust: WHO	1.05	1.39 **	1.54 ***	1.37 ***	1.64 ***	1.19	1.15	0.91	1.30	1.06
	[0.73 – 1.51]	[1.11 – 1.75]	[1.25 – 1.90]	[1.16 – 1.60]	[1.29 – 2.09]	[0.94 – 1.51]	[0.95 – 1.37]	[0.75 – 1.10]	[0.96 – 1.75]	[0.76 – 1.47]
Personal efficacy	1.12	1.11	1.14	1.00	1.02	1.18	1.16 *	1.14	1.19	1.14
	[0.84 – 1.50]	[0.91 – 1.36]	[0.95 – 1.35]	[0.87 – 1.16]	[0.83 – 1.26]	[0.96 – 1.43]	[1.00 – 1.35]	[0.99 – 1.32]	[0.92 – 1.53]	[0.88 – 1.49]
Govt efficacy	0.88	0.75	1.07	1.03	0.97	1.06	0.90	1.02	0.95	0.90
	[0.57 – 1.36]	[0.56 – 1.01]	[0.81 – 1.42]	[0.85 – 1.26]	[0.74 – 1.28]	[0.78 – 1.46]	[0.72 – 1.12]	[0.83 – 1.25]	[0.66 – 1.39]	[0.64 – 1.27]
Perceived infection risk	0.94	1.56 ***	1.26 *	1.05	1.03	0.93	0.99	1.01	0.98	1.21
	[0.69 – 1.28]	[1.25 – 1.94]	[1.03 – 1.53]	[0.91 – 1.22]	[0.84 – 1.26]	[0.76 – 1.14]	[0.85 – 1.15]	[0.88 – 1.16]	[0.73 – 1.31]	[0.92 – 1.58]
Worry about COVID	1.21	1.04	1.13	1.39 ***	1.64 ***	1.53 ***	1.42 ***	1.35 ***	1.23	1.17
	[0.89 – 1.62]	[0.84 – 1.28]	[0.93 – 1.37]	[1.20 – 1.61]	[1.36 – 1.99]	[1.26 – 1.87]	[1.23 – 1.65]	[1.16 – 1.57]	[0.92 – 1.64]	[0.90 – 1.53]
Observations	698	1143	1315	1846	1097	1254	1778	1704	694	683
R^2 Tjur	0.086	0.181	0.169	0.167	0.183	0.183	0.159	0.182	0.2	0.265

Odd ratios [95CI] shown, all continuous measure were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (D, Dynata; R, Respondi; P, Prolific). [a]Gender is unstandardized. *p < .05, **p < .01, *** p < .001

Table S10

Result of logistic regression models predicting vaccine acceptance, including or excluding general vaccine attitudes.

	Base model			**Including general vaccine attitudes**		
	UK Prolific (Sep)	**UK Respondi (Sep)**	**UK Respondi (Oct)**	**UK Prolific (Sep)**	**UK Respondi (Sep)**	**UK Respondi (Oct)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	4.16 ***	5.55 ***	4.94 ***	4.29 ***	6.18 ***	5.40 ***
	[3.48 – 4.99]	[4.56 – 6.79]	[4.07 – 6.03]	[3.58 – 5.19]	[5.02 – 7.68]	[4.40 – 6.69]
Age	1.12	1.48 ***	1.60 ***	1.16 *	1.40 ***	1.41 **
	[0.99 – 1.28]	[1.26 – 1.75]	[1.31 – 1.95]	[1.02 – 1.32]	[1.18 – 1.66]	[1.14 – 1.74]
Gender (Female)	0.61 ***	0.50 ***	0.44 ***	0.62 ***	0.49 ***	0.44 ***
	[0.48 – 0.78]	[0.39 – 0.65]	[0.34 – 0.57]	[0.48 – 0.79]	[0.38 – 0.64]	[0.33 – 0.57]
Education	1.02	1.11	1.18 *	1.00	1.07	1.15 *
	[0.91 – 1.15]	[0.98 – 1.26]	[1.04 – 1.34]	[0.88 – 1.13]	[0.94 – 1.23]	[1.00 – 1.32]
Numeracy	1.11	1.00	1.00	1.05	0.93	0.87 *
	[0.98 – 1.26]	[0.88 – 1.14]	[0.88 – 1.13]	[0.93 – 1.19]	[0.82 – 1.06]	[0.76 – 1.00]
Politics (Conservative)	0.84 *	0.88	0.86 *	0.85 *	0.86	0.84 *
	[0.74 – 0.97]	[0.77 – 1.01]	[0.74 – 0.98]	[0.73 – 0.98]	[0.75 – 1.00]	[0.73 – 0.98]
Prosociality	1.11	1.09	1.07	1.10	1.08	1.04
	[0.98 – 1.26]	[0.96 – 1.25]	[0.94 – 1.23]	[0.96 – 1.25]	[0.94 – 1.24]	[0.90 – 1.20]
General social trust	1.03	1.09	0.97	1.03	1.04	0.96
	[0.91 – 1.16]	[0.95 – 1.25]	[0.85 – 1.11]	[0.90 – 1.16]	[0.90 – 1.20]	[0.84 – 1.11]
General trust: Experts	1.39 ***	1.24 **	1.45 ***	1.29 ***	1.11	1.29 **
	[1.21 – 1.61]	[1.06 – 1.44]	[1.24 – 1.69]	[1.11 – 1.50]	[0.95 – 1.31]	[1.09 – 1.52]
General trust: Govt	1.27 **	1.13	1.02	1.24 *	1.15	0.98
	[1.07 – 1.50]	[0.94 – 1.36]	[0.86 – 1.21]	[1.04 – 1.47]	[0.95 – 1.39]	[0.82 – 1.18]
COVID trust: Politicians	0.94	1.12	1.26 *	0.95	1.18	1.37 **
	[0.77 – 1.14]	[0.90 – 1.41]	[1.02 – 1.57]	[0.78 – 1.17]	[0.93 – 1.49]	[1.09 – 1.72]
COVID Trust: National sci/med advisors	1.13	1.25 *	1.29 **	1.11	1.14	1.21
	[0.97 – 1.33]	[1.04 – 1.50]	[1.07 – 1.56]	[0.94 – 1.31]	[0.94 – 1.38]	[0.98 – 1.48]
COVID Trust: Independent scientists	0.93	0.88	1.00	0.95	0.89	0.96
	[0.80 – 1.07]	[0.74 – 1.03]	[0.85 – 1.17]	[0.82 – 1.10]	[0.74 – 1.06]	[0.81 – 1.13]
COVID Trust: WHO	1.45 ***	1.33 ***	1.03	1.41 ***	1.33 **	1.02
	[1.25 – 1.69]	[1.12 – 1.58]	[0.87 – 1.23]	[1.21 – 1.65]	[1.11 – 1.59]	[0.85 – 1.24]
Personal efficacy	1.10	1.03	1.03	1.06	1.00	0.98
	[0.96 – 1.25]	[0.89 – 1.19]	[0.89 – 1.18]	[0.93 – 1.22]	[0.86 – 1.16]	[0.84 – 1.14]
Govt efficacy	1.01	0.95	1.04	1.01	0.95	1.08
	[0.84 – 1.21]	[0.77 – 1.16]	[0.86 – 1.27]	[0.84 – 1.22]	[0.77 – 1.18]	[0.88 – 1.33]
Perceived infection risk	1.04	1.08	0.98	1.02	1.12	0.96
	[0.91 – 1.19]	[0.94 – 1.25]	[0.85 – 1.13]	[0.89 – 1.17]	[0.96 – 1.30]	[0.83 – 1.11]
Worry about COVID	1.36 ***	1.56 ***	1.44 ***	1.36 ***	1.46 ***	1.41 ***
	[1.19 – 1.57]	[1.35 – 1.80]	[1.24 – 1.66]	[1.18 – 1.56]	[1.26 – 1.70]	[1.20 – 1.65]
General vaccine attitudes				1.69 ***	2.10 ***	2.31 ***
				[1.51 – 1.90]	[1.85 – 2.38]	[2.01 – 2.65]
Observations	1847	1778	1704	1841	1773	1700
R^2 Tjur	0.191	0.173	0.193	0.235	0.247	0.281

Odds ratios [95CI] based on standardized (scaled and mean centered) continuous variables except for gender which is unstandardized.

*p < .05, **p < .01, *** p < .001

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*
Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any pre-specified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	11
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	7
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	-
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8, Table S1
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7
Bias	9	Describe any efforts to address potential sources of bias	11
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	11
		(*b*) Describe any methods used to examine subgroups and interactions	11
		(*c*) Explain how missing data were addressed	10 (footnote), Table S3
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed	-

		Case-control study—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	12(footnote), Table S6
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	11 (Table 1), Tables S6,S7
		(b) Give reasons for non-participation at each stage	7
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	11 (Table 1), Tables S4, S5
		(b) Indicate number of participants with missing data for each variable of interest	10 (footnote), Table S3
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	-
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	-
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	-
		Cross-sectional study—Report numbers of outcome events or summary measures	11
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	12, Figure S1,
		(*b*) Report category boundaries when continuous variables were categorized	-
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.
Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Correlates of intended COVID-19 vaccine acceptance across time and countries: Results from a series of cross-sectional surveys

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ABSTRACT

Objective: Describe demographic, social, and psychological correlates of willingness to receive a COVID-19 vaccine.

Setting: Series of online surveys undertaken between March and October 2020.

Participants: A total of 25 separate national samples (matched to country population by age and sex) in 12 different countries were recruited through online panel providers (N = 25,334).

Primary outcome measures: Reported willingness to receive a COVID-19 vaccination.

Results: Reported willingness to receive a vaccine varied widely across samples, ranging from 63% to 88%. Multivariate logistic regression analyses reveal sex (female OR = 0.59, 95%CI [0.55, 0.64]), trust in medical and scientific experts (OR = 1.27, [1.22, 1.33]), and worry about the COVID-19 virus (OR = 1.49, [1.43, 1.55]) as the strongest correlates of stated vaccine acceptance considering pooled data, and the most consistent correlates across countries. In a subset of UK samples we show that these effects are robust after controlling for attitudes towards vaccination in general.

Conclusions: Our results indicate that the burden of trust largely rests on the shoulders of the scientific and medical community, with implications for how future COVID-19 vaccination information should be communicated to maximize uptake.

Keywords: Vaccination, vaccine hesitancy, COVID-19, risk, trust.

ARTICLE SUMMARY

Strengths and limitations of this study

- To examine predictors of vaccine acceptance we collected data from a large number of participants in several different countries and at different time points.
- We examine a range of demographic, risk and trust-related predictors using multivariate models.
- Samples were quota matched (age and gender) to country population, but not probability sampled.
- At the time of the surveys no COVID-19 vaccine was publicly available, thus stated acceptance is hypothetical, and may change with provision of more information about current vaccines.

INTRODUCTION

COVID-19 has resulted in over 2.5 million deaths globally, illness for millions more, and unprecedented social and economic disruption[1,2]. Many governments have signaled that mass vaccination against the virus is the most straightforward—and possibly only—route to normality and stability[3,4]. While recent announcements of effective vaccines[5,6] and their rollout to certain demographics in some countries is promising[7], the wider impact of vaccines on preventing the spread of disease is dependent on broad uptake within a given population. In order to achieve 'herd immunity', enough people in a population must be immune to prevent the spread of a disease among non-immune individuals. The proportion varies depending on a number of factors including how infectious the contagion is, its prevalence in a population, and the variation in individual susceptibility or exposure to infection[8]. Estimates for the level of immunity required for COVID-19 herd immunity have ranged from 50% to 80% of the population, acquired through either natural infection and recovery, or through vaccination[9,10]. It must be noted that, while there is evidence that currently available vaccines can reduce SARS-CoV-2 infections [11], there is only limited preliminary evidence that vaccination can reduce transmission of the virus at the time of writing [12]. Thus, the net impact of vaccination campaigns on the spread of the virus remains uncertain until more research is conducted [13].

Vaccine hesitancy—defined as a delay in acceptance or refusal of vaccines despite availability[14]—poses a challenge to achieving herd immunity. If a sufficient number of people in a population reject vaccination—and herd immunity is not achieved—the virus will continue to circulate among susceptible individuals, including those who are unable to be vaccinated for medical reasons. The WHO identified vaccine hesitancy as one of the top 10 threats to global health in 2019[15], and in the pressing context of COVID-19, understanding vaccine hesitancy has only grown in importance[16].

Public health researchers concerned with uptake of vaccination have understandably sought to uncover the drivers of vaccine hesitancy. By identifying antecedents of vaccine hesitancy, policy makers, public health officials, and professional communicators can target interventions to increase uptake of vaccines and ultimately reduce the burden of disease in a population[4]. However, strategies developed for campaigns targeting diseases with well-established vaccines (e.g. MMR, pertussis) may not fully translate to a pandemic context where there is greater uncertainty, less information available, and where institutional trust plays a greater role—as was noted in the wake of the 2009 H1N1 influenza pandemic[17].

Recent evidence shows that acceptance of a COVID-19 vaccine is far from universal in many countries. Lazarus et al[18] conducted a series of surveys across 19 countries in June 2020, asking respondents how much they agreed with the following statement: 'If a COVID-19 vaccine is proven safe and effective and is available, I will take it'. The proportion of respondents who agreed ranged from 88.6% (China) to 55.8% (Russia). Examining possible predictors of vaccine acceptance, the authors report that men, older people, and those who express greater trust in the government were more likely to express willingness to receive a vaccine. The role of trust (in science, the government or the medical system) is a recurring theme in many other recent studies which have examined COVID-19 vaccine hesitancy in individual countries[19–27]. For example, Palamenghi et al[24] report that across two large random samples of the Italian population, trust in science was positively correlated (r = .37) with willingness to receive a COVID-19 vaccine. Frank and Arim[20] report that Canadians who are more trusting of local and national government bodies are more likely to express intentions to receive a vaccine if available, as are those who report high general social trust (i.e. believing that 'most people can be trusted').

Such results align with pre-COVID studies which have highlighted the role of trust in vaccination intentions and attitudes[17,28,29]. However, we note that recent studies

examining COVID-19 vaccine intentions have typically only examined trust in one entity (e.g. government or hospitals); research to date has not considered the possible overlap between trust in the government, trust in science and medicine, and general social trust[30–32]. There is also a question over the extent to which vaccine acceptance is linked to mistrust in experts and authorities *regarding COVID-19 in particular*, or a more general lack of trust in these actors. In order to target communications specifically designed to satisfy the information needs of those who distrust official authorities, it is important to identify the precise agents that they distrust (and, ideally, why).

Beyond trust, the perceived threat or risk posed by a given disease has also been shown to predict vaccination attitudes. Models of health behavior, such as the Health Belief Model[33] and Protection Motivation Theory[34], place the perceived risk or severity of a disease as a key driver of vaccination intentions (and other preventative health behaviors)[17,35]. Recent surveys in the US, Malaysia, and Israel have shown that perceived risk and worry regarding the COVID-19 virus is associated with vaccine acceptance[36–38]. Other factors, such as the perceived benefits and costs as well as efficacy of protective behaviors are also outlined in models of health behavior as predictors of engagement in a given health behavior. However, until recently, little information about the possible costs, distribution and efficacy of a COVID-19 vaccine was available, meaning that the public has not generally been able to assess the potential benefits of a vaccine outside of a purely hypothetical arena (although experimental work has examined the influence of these factors on willingness to receive a vaccine[39]).

There are also increasing concerns about the politicization of science and about politics becoming entangled with vaccine beliefs and attitudes specifically, particularly in the context of a pandemic where central government structures are deeply involved in all stages of the public health response[17,40]. Prior research[41] has shown that the rhetoric adopted

by political elites on social media can fuel anti-vaccination attitudes amongst their followers and that ideologies can help explain anti-vaccination attitudes[37,42].

In the current study we present a more comprehensive international analysis of the role of key social, political, and psychological correlates of COVID-19 vaccine acceptance across 12 countries, with multiple national surveys in some countries (total $N = 25{,}334$, see Table 1). All samples were recruited via online panel providers using quotas to ensure samples were matched to the general population in terms of age and gender (with the exception of France, see methods). Unlike previous studies, we examine reported trust in a range of actors, both in general and specifically relating to the COVID-19 pandemic. We also include several demographic factors (including political orientation), numeracy (known to play a role in risk perceptions[43], and vaccine attitudes in particular[44]), affective (worry) and cognitive (perceived likelihood of infection) aspects of perceived COVID-19 risk[45], broad measures of perceived efficacy, and, in a subset of samples, general attitudes towards vaccines.

METHODS

Participants and procedure

Between March and October 2020, we fielded 25 separate surveys across 12 countries. The majority of samples were recruited through an ISO certified international survey company Respondi (respondi.com).Our initial US and UK samples were recruited via Prolific (prolific.ac). Although some later samples from these countries were recruited via Respondi, we continued to also recruit Prolific samples to allow comparisons with our earliest data points in the pandemic. As we did not have matching Prolific and Respondi samples at each time point, and results differed slightly between these providers, we report these samples separately for transparency. Quota-based sampling ensured all samples broadly. were representative of each country's population in terms of age and gender, and, in

Prolific samples, ethnicity [46]. Recruitment was managed by these external providers and exact response rates were not provided. However, Respondi provided a broad estimate of a 30% response rate across surveys (personal communication; Respondi, 2021). Participants who had previously completed a survey were prevented from completing further surveys, so all our samples represent different individuals. Participants who did not finish the survey were excluded. Demographic details for each sample are shown in Table 1. For completeness we include several samples in which vaccine acceptance was measured but the survey did not include all the independent variables used in the models presented below. Surveys which did not include all these variables are marked with a '*' in Table 1.

All participants were directed via a study link to the Qualtrics platform, and provided informed consent before completing the survey. This study was approved by the University of Cambridge Psychology Research Ethics Committee (PRE.2020.034).

It is important to note that the surveys were conducted at various timepoints as the pandemic unfolded in each country. Table 1 also reports the total number of COVID-19 deaths for each country at each survey timepoint, and the number of reported cases in the week prior to the survey (with the caveat that reporting practices vary between countries). We also provide the Stringency Index measure generated by the COVID-19 Government Response Tracker [47], which is a 0-100 index based on various restrictions put in place by governments to control the pandemic (e.g. closing schools, 'shelter in place' requirements). External data were sourced from the COVID-19 Government Response Tracker [47] and Ali et al. [48].

The information about potential vaccines also changed over the data collection period. In February 2020, the first major vaccine candidates, the Moderna and Oxford AstraZeneca vaccines, were announced [49,50]. In mid-2020 the launches of Phase III trials for several

vaccines were announced: Moderna and Pfizer BioNTech in July [51], and AstraZeneca in August [52]. Results of Phase III clinical trials and estimates of efficacy were not announced during the data collection period (ending in October, 2020). No vaccines were approved for use by local regulators at the time(s) the surveys were conducted in each country.

Materials

Participants reported their age and gender, level of education (ranging from *No formal education above age 16* to *PhD*), and political orientation (*Very liberal/left wing* to *Very conservative/right wing*). Numeracy was measured as a combined index of the 2-3 item adaptive form of the Berlin Numeracy Test [53] and an additional risk literacy item from Lipkus et al.[54].

Participants completed a widely used measure of general social trust (*Generally speaking, would you say most people can be trusted, or that you can't be too careful in dealing with people*?)[55] and a separate measure of prosociality (*To what extent do you think it's important to do things for the benefit of others and society even if they have some costs to you personally?*). Trust in experts and trust in government were each measured as the combined average of reported trust in three targets (experts: scientists, medical doctors and nurses, and scientific knowledge [Cronbach's αs .77-.86]; government: politicians, current government, civil servants [αs .73-.90]; all from *Cannot be trusted at all* to *Can be trusted a lot*). We also asked participants to report their trust in several actors with specific regard to the COVID-19 pandemic. Participants reported the extent to which they trust politicians in their country to 'deal effectively with the pandemic', and how much they separately trusted the country's national scientific and medical advisors, independent experts not connected with government, and the WHO to 'know the best measures to take in the face of the pandemic' (all from *Not at all* to *Very much*). Personal and government efficacy were captured by items asking participants the extent to which they felt that, respectively, their

own actions, and the actions of their country 'to limit the spread of coronavirus can make a difference' (*Not at all* to *Very much*). Perceived likelihood of infection was measured as an index of three related items (example: *I will probably get sick with the coronavirus/COVID-19*; αs .71-.89). Participants also reported their level of worry about the virus (from *Not at all worried* to *Very worried*). In a subset of UK samples, we also asked participants about their general attitude towards vaccination, using two items from Lewandowsky et al.'s [42] scale (example: *I believe that vaccines are a safe and reliable way to help avert the spread of preventable diseases* [*r*s .83-.87]).

Participants' vaccine acceptance was measured with the question: '*If a vaccine were to be available for the coronavirus/COVID-19 now, would you get vaccinated yourself?*' (*Yes/No)*. Participants were also asked *'If a vaccine were to be available for the coronavirus/COVID-19 now: Would you recommend vulnerable friends/family to get vaccinated?*' (*Yes/No)*. Full item wording for all measures can be found in Table S1.

Surveys were translated from English to other languages by native speakers fluent in English.

Analysis

To examine the correlates of vaccine acceptance we fitted a multivariate logistic regression model to the data from each survey. To allow for descriptive comparisons between countries and across time, we report model results separately for each country, time point, and (in the UK) panel provider. We also report results from the model fitted to the pooled data from all surveys, and a supplementary multi-level model adjusting for survey-level variables (total number of cases and days since first case in country at time of survey). All analyses were conducted in R (v4.0.5).

RESULTS

Figure 1 shows the percentage of participants in each survey who responded that they would be willing to be vaccinated if a COVID-19 vaccine was available, or would recommend a vaccine to vulnerable others, given the options of 'Yes' or 'No' [1]. Across all samples, the percentage of respondents who stated they were willing to receive a vaccine ranged from 62.6% (Sweden, April) to 88.1% (Mexico, March), while the percentage of those who said they would recommend a vaccine to vulnerable others ranged from 67.5% (US, September) to 91.7% (UK, March). Descriptively, in every single sample the proportion of respondents stating a willingness to receive a vaccine was lower than the proportion who would recommend it to vulnerable others (M_{diff} = -5.79%, SD = 3.00). We also note a trend of decreasing stated acceptance over time: in nearly all countries with multiple samples, vaccine acceptance in any given survey was lower than previous surveys of the same population. For example between March and May, 2020, stated vaccine acceptance among respondents in Mexico dropped from 88.1% to 73.9% (a Chi-Square test of independence indicated that this difference was statistically significant, $\chi^2 = 42.44$, $p < .001$) In the US, stated vaccine acceptance (among participants recruited through online panel provider Respondi) fell more than 12 percentage points, from 74.7% to 62.6%, between May and September, 2020 ($\chi^2 = 25.89$, $p < .001$).

[FIGURE 1 HERE]

[1] Based on respondents who answered the question. In the Italy sample a number of participants were not presented with these items due to a technical error (n = 80, 11%). In the remaining samples the average proportion of missing responses for vaccine intention and recommendation items was 1% (see supplementary Tables S2 and S3 for description of missing data and the age and gender distribution of those participants who answered the vaccine acceptance item). We acknowledge that in some cases estimates of vaccine acceptance may not be based on samples exactly matched to a country's population age and gender distribution due to this missing data, but note that age and gender are controlled for in the models below.

Table 1.
Survey demographics, percentage of participants willing to receive a COVID-19 vaccine or to recommend it to vulnerable friends/family, and country-level pandemic indicators.

Country	Source	Date	N	M_{Age} (SD)	Female (%)	Tertiary Educated (%)	Vaccine - acceptance (%)	Vaccine - Recommend (%)	Total deaths	Days since first case	Cases week prior	Stringency Index
Australia	Dynata	20-Mar	700	46.3 (16.4)	51.0	43.4	82.9	88.7	7	55	591	47.22
China*	Respondi	09-Apr	700	43.2 (14.3)	48.9	73.1	85.8	87.4	3335	144	276	56.94
Germany	Respondi	23-Mar	700	46.7 (15.9)	49.9	32.7	80.8	89.2	123	56	21784	76.85
Spain	Respondi	22-Mar	700	46.7 (15.0)	51.1	58.1	83.6	89.8	1772	51	20970	71.76
Spain	Respondi	06-May	700	46.0 (15.0)	50.4	57.0	79.8	82.5	25857	96	7408	81.94
France	BVA	03-Apr	3002	48.8 (16.5)	52.5	71.1	69.7	80.7	6496	98	30979	87.96
Italy	Respondi	22-Mar	700	45.9 (14.8)	50.4	41.3	85.3	88.2	5476	51	34391	91.67
Japan	Respondi	10-Apr	699	48.1 (16.4)	50.9	53.3	74.5	80.1	125	85	3096	45.37
S. Korea	Respondi	09-Apr	700	45.3 (15.5)	49.0	70.5	85.6	88.4	204	80	447	82.41
Mexico	Respondi	21-Mar	693	38.7 (14.0)	50.5	66.4	88.1	90.3	2	22	210	8.33
Mexico	Respondi	06-May	700	38.6 (14.2)	51.0	75.8	73.9	75.6	2704	68	9835	82.41
Sweden	Respondi	28-Mar	700	45.5 (16.0)	49.1	40.3	66.3	77.2	239	57	1795	50.93
Sweden	Respondi	17-Apr	700	45.5 (16.5)	48.9	40.2	63.4	73.7	1925	77	3690	64.81
UK	Prolific	19-Mar	703	45.6 (15.7)	50.9	53.9	80.4	91.7	162	48	4719	31.48
UK	Prolific	07-May	1157	44.7 (15.7)	50.7	56.5	80.4	86.7	30321	97	25582	79.63
UK	Prolific	06-Jul	1325	44.5 (15.6)	52.5	58.5	78.9	85.3	40643	157	2461	64.35
UK	Prolific	18-Sep	1869	38.2 (15.0)	51.2	56.2	73.0	79.5	41732	231	24259	65.74
UK	Respondi	07-May	1150	45.7 (15.9)	52.0	43.4	78.9	84.2	30321	97	25582	79.63
UK*	Respondi	08-Jun	500	45.9 (15.9)	53.2	39.7	79.0	83.2	38666	129	7742	73.15
UK	Respondi	06-Jul	1326	45.4 (16.6)	51.7	44.9	80.1	84.4	40643	157	2461	64.35
UK	Respondi	18-Sep	1855	45.5 (16.1)	51.6	42.6	75.7	79.9	41732	231	24259	65.74
UK	Respondi	29-Oct	1744	46.7 (16.0)	52.2	42.0	72.2	76.1	45955	272	154873	75.00
US	Prolific	19-Mar	702	45.1 (15.8)	50.6	66.8	75.7	85.7	264	58	12077	67.13
US	Respondi	07-May	700	45.0 (16.1)	51.0	59.3	74.7	80.1	78618	107	187115	72.69
US*	Respondi	28-Sep	909	44.8 (15.6)	50.6	50.1	62.6	67.5	205612	251	288759	62.50

*Indicates survey that included vaccine acceptance items but not all model predictor variables (excluded from analyses below).

We fitted a multivariate logistic regression model to data from each sample to identify the correlates of COVID-19 vaccine intentions. Independent variables included: demographic variables; an objective measure of numeracy, political ideology; general social trust; prosociality (perceived importance of doing 'things for the benefit of others and society' even at personal cost); general trust in medical and scientific experts; general trust in government; specific trust in politicians to manage the pandemic; specific trust in (separately) national science advisors, independent scientists and the WHO to 'know the best measures to take in the face of the pandemic'; the perceived efficacy of their own and their country's actions to limit the spread of the virus; perceived likelihood of infection; and, worry about COVID-19 (for details on measures see Methods section and Table S1; descriptive statistics are reported in Table S4, and bivariate correlations in Figure S1). Continuous measures (i.e. all except gender) were scaled and mean centered prior to analysis. Only complete observations were included. Multicollinearity analyses indicated no issues arising from correlated predictors (all variance inflation factor values < 4). To facilitate the interpretation of results we present odds ratios in a heat map format in Figure 2. Full model results including confidence intervals can be found in Table S5. Results of models investigating correlates of willingness to recommend a vaccine to vulnerable others are also presented in supplementary materials (Figure S2, Table S6). We fitted an additional multi-level model to the pooled data, adjusting for country, month, days since first case and number of cases reported in each country at each time point (Table S7). Fixed effects were essentially unchanged from those reported in the simpler pooled model. Due to the low number of groups, estimates of random effects were unreliable [56].

[FIGURE 2 HERE]

Considering the most consistent correlates of stated vaccine acceptance across samples, we find that in most samples individuals who report a higher level of general trust in experts (OR_{pooled} = 1.28, 95%CI [1.22, 1.34]), or who are more worried about the virus (OR_{pooled} = 1.47 [1.41 – 1.53]), are more likely to say that they would accept a vaccine. In Germany, Spain, Mexico, Sweden (March only), and nearly all UK samples, females are generally less likely to say that they would accept a COVID-19 vaccine if available (OR_{pooled} = 0.59, [0.55, 0.64])[2]. We also note that measures of efficacy, both at the personal (OR_{pooled} = 1.00, [0.96 – 1.05]) and country level (OR_{pooled} = 1.01, [0.96, 1.08]), were not significantly associated with reported vaccine acceptance in most samples.

Our results reveal a great deal of heterogeneity in the relevance of correlates across countries, but also across time in countries where we conducted multiple surveys. For example, in the United States only a few consistent associations emerged. Most notably, political conservatism was associated with a lower likelihood to accept a COVID-19 vaccine in March ($OR_{USA—Mar}$ = 0.73 [0.57, 0.93]; $OR_{USA—May}$ = 0.77 [0.58 – 1.01]) whereas trust in experts ($OR_{USA—Mar}$ = 1.53 [1.16, 2.03]; $OR_{USA—May}$ = 1.36 [1.02 – 1.82]) and personal worry about the virus ($OR_{USA—Mar}$ = 1.47 [1.17, 1.87]; $OR_{USA—May}$ = 1.27, [0.99 – 1.64]) were associated with increased vaccination intentions. In contrast, in the United Kingdom, additional factors such as the role of age, gender, and prosociality played a significant role. There was also variation over time. For example, although political ideology was not a significant correlate in the UK in May or July 2020, conservatism was associated with lower vaccination intentions from September 2020 onwards (ORs 0.85-.88), which may be related to increased polarization. To illustrate the increasing strength of the association between political ideology and vaccine acceptance over time in the UK, in Figure 3 we plot the

[2] UK data was over represented in our pooled sample. As a robustness check we also fitted the model to the pooled sample with UK data removed and report that the effects of gender, trust in experts and worry remain significant (*p*s < .001; see Table S5).

predicted likelihood of reported vaccine acceptance across the political spectrum (holding all other variables constant).

[FIGURE 3 HERE]

In the UK, we also report a different pattern of effects when comparing between samples collected via different providers, even where these were collected on the same day (in May, July, and September), were matched on age and gender, and controlling for a range of other demographic variables. This underscores the caution that must be applied when studies generalize results from a single survey sample (particularly an online survey).

In terms of variance explained, the variables in our model explained approximately 10-30% of the variance in the likelihood of vaccine acceptance vs refusal, with the exception of samples recruited in South Korea (4%) and Japan (8%).

Accounting for general vaccine attitudes

To examine the extent to which the effects in our model can be accounted for by a negative perception of vaccines in general, we conducted an additional set of analyses. In our three most recent UK surveys we included a two-item measure of general vaccine attitudes (adapted from Lewandowsky et al.[42]). A comparison of results from models with or without general vaccine attitudes as an independent variable is shown as a heat map in Figure 4. Although attitudes toward vaccination increase the explained variance of our model (ΔR^2 4%-9%) and reveal strong significant effects such that more positive attitudes are associated with increased vaccination intentions (ORs 1.69-2.32; full results in Table S8), the relationships in the original model appear robust and are only minimally attenuated when accounting for generalized attitudes.

[FIGURE 4 HERE]

DISCUSSION

Understanding the psychological determinants of vaccine acceptance and hesitancy is crucial during a global pandemic. Across all countries surveyed, between March and September 2020, a substantial proportion of participants (up to 37% in some countries) said that they would *not* accept a hypothetical COVID-19 vaccine. People were slightly more likely to say that they would recommend it to vulnerable friends and family members. Considering who is more or less likely to report willingness to be vaccinated against COVID-19, being male, expressing general trust in those with scientific or medical expertise, and worrying about the virus are the most consistent correlates of vaccine acceptance across our samples. It is important to note that hesitancy about a COVID-19 vaccine is not purely attributable to people's attitudes to vaccines in general. Although (in the UK, where we studied it) negative attitudes towards vaccines in general are a significant and important correlate of COVID-19 vaccine refusal, there are clearly additional factors at play in determining public reactions to a COVID-19 vaccine. This broadly aligns with other research indicating that, for many people, there are concerns specifically around the rapid and novel development processes of COVID-19 vaccines and possible safety issues[36,57]. Our multivariate analyses show that the bulk of the burden of trust rests on science and medicine. This is in line with other recent studies specifically examining the association between trust in scientists and doctors, and COVID-19 vaccine hesitancy [26,27]. Accounting for the other factors in our model, we find that trust in government (both generally and regarding COVID-19) and general social trust (i.e. trust in people) are *not* significantly associated with vaccine acceptance in most of our samples. Since the period of data collection, more information about COVID-19 vaccines, including their safety and efficacy has become available. It

remains to be seen how this information has shifted vaccine intentions. As the public focus has shifted from vaccine development to the regulatory approval and rollout of vaccines[11] , it is possible that trust in government and regulators may play a greater role in individuals' vaccine decision making. However, further research is required to confirm this speculation.

The fact that we saw only a weak link between stated vaccine acceptance and our measure of prosociality—along with the fact that higher numbers of people said that they would recommend the vaccine to a vulnerable friend or relative than say they would accept it themselves—suggests that the prosocial nature of vaccines may not be recognized by many people. Recent experimental research has shown that emphasizing the societal benefits of herd immunity (i.e., the need for those who do not see themselves as personally vulnerable to take the vaccine in order to provide protection for those who are) may assist uptake[58]. However, such strategies depend on vaccines preventing *transmission* of the virus, rather than just symptoms. There is now preliminary evidence that this is the case for the Moderna and Pfizer BioNTech vaccines [12], but further studies are required to confirm these findings.

The greater reluctance from women to say that they would take a vaccine is in line with other work focusing on acceptance of a potential COVID-19 vaccine[18,19], and vaccination generally[29] but has not been adequately explained. Even when general vaccine beliefs are taken into account, however, the gender bias remains. Qualitative work should focus on investigating this further, in order to understand the root of women's concerns about the COVID-19 vaccine. We see very little effect of our measures of personal or governmental efficacy, but this may be related to the fact that a vaccine against COVID-19 was hypothetical at the time of the surveys and our measures did not directly ask about vaccination.

Another important finding highlighted by our repeated samples is that vaccine acceptance appears to be politicized in the US and is becoming so in the UK. Our US results agree with previous US research focusing on COVID-19 vaccine acceptance[39,59], which noted that political conservatives are less accepting of potential COVID-19 vaccines. Our UK results align with those of Maher et al, who, through network analysis, show a pattern of attitudinal alignment over time in a small UK sample, resulting in the emergence of a politically conservative faction expressing less trust in scientists, doctors, and vaccines[21]. Although international research has suggested that political conservatism is correlated with anti-vaccination attitudes globally[40], we did not find that ideology was associated with vaccine acceptance outside of the US and UK. However most other countries were only surveyed in earlier stages of the pandemic (i.e. prior to May, 2020) and we can therefore not say whether they might have followed a similar pattern to the UK as time went on.

It is possible that misinformation susceptibility[60,61] and conspiracy thinking[62] underlie the association between ideology and vaccine attitudes to some extent. For example, Motta et al[63] find that far right-wing media outlets have disproportionally spread misinformation during the early stages of the pandemic. Susceptibility to misinformation around COVID-19 was also found in prior research to be associated with measures of vaccine hesitancy[61]. There is already a proliferation of conspiracy theories focused on specific COVID-19 vaccines[64,65]. It will be important to tackle these pro-actively through 'prebunking' methods to inoculate against misinformation[66,67].

We must note that our surveys did not examine several sociodemographic factors that could explain additional variance in vaccination intentions; ethnic minority status, socio-economic status and underlying health conditions have all been shown to be associated with COVID-19 vaccine hesitancy in some contexts [68,69]. Future research should examine how these factors relate to vaccine confidence and intentions as vaccine campaigns progress.

Finally, we acknowledge that the heterogeneity in our results across time and countries highlights the role that (unmeasured) contextual, country-specific factors play in informing individuals' vaccination attitudes. As noted by the WHO SAGE working group on vaccine hesitancy, individual factors such as trust and risk perception intersect with contextual influences such as culture, media environments, and information from local leaders[14]. Our samples were not truly representative of the general population in each country: although they were quota-balanced on gender and age, the population that respond to an online questionnaire will differ from the general population on several significant characteristics. However, the rank ordering of countries on vaccine acceptance in our study is similar to that of Lazarus et al[18], which were based on a random stratified sampling approach using several online panel providers. This gives us some confidence in the generalizability of our results, and the fact that our samples were generally larger and included more trust-focused questions makes them useful for exploring these important correlates of vaccine attitudes.

In terms of practical considerations, our finding that trust in scientific and medical institutions is one of the strongest correlates of vaccine acceptance highlights the need to work proactively with others from outside of this sphere, such as community and religious leaders[70], to open a two-way conversation with those who distrust the scientific and medical establishment. Due consideration must also be given to the accessibility[71], format[72,73], and transparency[74,75] of information provided to the public. Future research should continue to evaluate how to most effectively communicate evidence about vaccination[76], and should seek to more deeply understand the concerns and needs of those who express hesitancy regarding COVID-19 vaccination. As Bhopal[77], commenting on potential COVID-19 mass vaccination efforts, writes, "Open, honest, factual and sensitively conducted public dialogue is now urgent."

CONCLUSIONS

Countries around the world face a major evidence communication challenge when it comes to the COVID-19 vaccines that are becoming available. In order to reach a large enough proportion of the population in each country to achieve herd immunity, it is vital to increase the number of people who are willing to take a vaccine. To achieve this, non-pharmaceutical interventions will need to be deployed[78], such as communicating trustworthy information about the vaccines via credible sources. In the current research, we have demonstrated across 12 national samples that people's level of worry about COVID-19 and their trust in experts and medical and scientific institutions are key determinants of potential vaccine acceptance. Future research should confirm these findings in experimental settings. We recommend that empirical studies should continue to be carried out alongside qualitative work with different communities to get a rounded understanding of people's concerns and misunderstandings. Only by knowing these can we adequately address them and provide people with the information they need to make a decision that will affect not just their own health, but that of their community as well.

FIGURE LEGENDS

Figure 1. COVID-19 vaccine acceptance across countries and time. Percentage of respondents who stated they were willing to receive or recommend a COVID-19 vaccine across surveys. UK and US samples using different panel providers are reported separately.

Figure 2. Correlates of vaccine acceptance. Heatmap of odds ratios in multivariate logistic regression model predicting stated vaccine acceptance. Columns represent individual samples and rows represent independent variables in model. Grey values are non-significant, $p > .05$. Red shading indicates a lower likelihood of reported vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). Political orientation data was not collected in the French sample; this sample is excluded from pooled data.

Figure 3. Political ideology and vaccine acceptance in the UK. Predicted likelihood that an individual will accept being vaccinated at varying levels of political ideology (1 = very liberal/left wing, 7 = very conservative/right wing) in UK samples over time.

Figure 4. Negative general attitudes towards vaccination do not fully account for relationships in the model. Results of multivariate logistic regression models investigating reported COVID-19 vaccine acceptance in UK samples, excluding (left panel) or including (right panel) general vaccine attitudes as an independent variable. Odds ratios shown are based on scaled variables (other than gender). Grey values are non-significant, $p > .05$. For space, samples are defined by a letter denoting participant source (P, Prolific; R, Respondi).

Author contributions

Survey instrument development: JRK, CRS, GR, SD, SvdL, ALJF. Study conceptualisation, design and theoretical framing: JRK, SvdL, ALJF. Data collection: JRK, CRS, GR, SD, US, CD, PA, ALJF. Statistical analyses and first draft: JRK, SvdL, ALJF. Manuscript editing, review and approval: JRK, CRS, GR, SD, US, CD, PA, ALJF, SvdL.

Data availability

The data and analysis code for this study are available at:

https://osf.io/vgez2/?view_only=8fe81f5fe3f345a99b06edeaba6bd9e1

Ethics approval

This study was approved by the University of Cambridge Psychology Research Ethics Committee (PRE.2020.034).

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Competing interests

None declared.

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Patient and Public Involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

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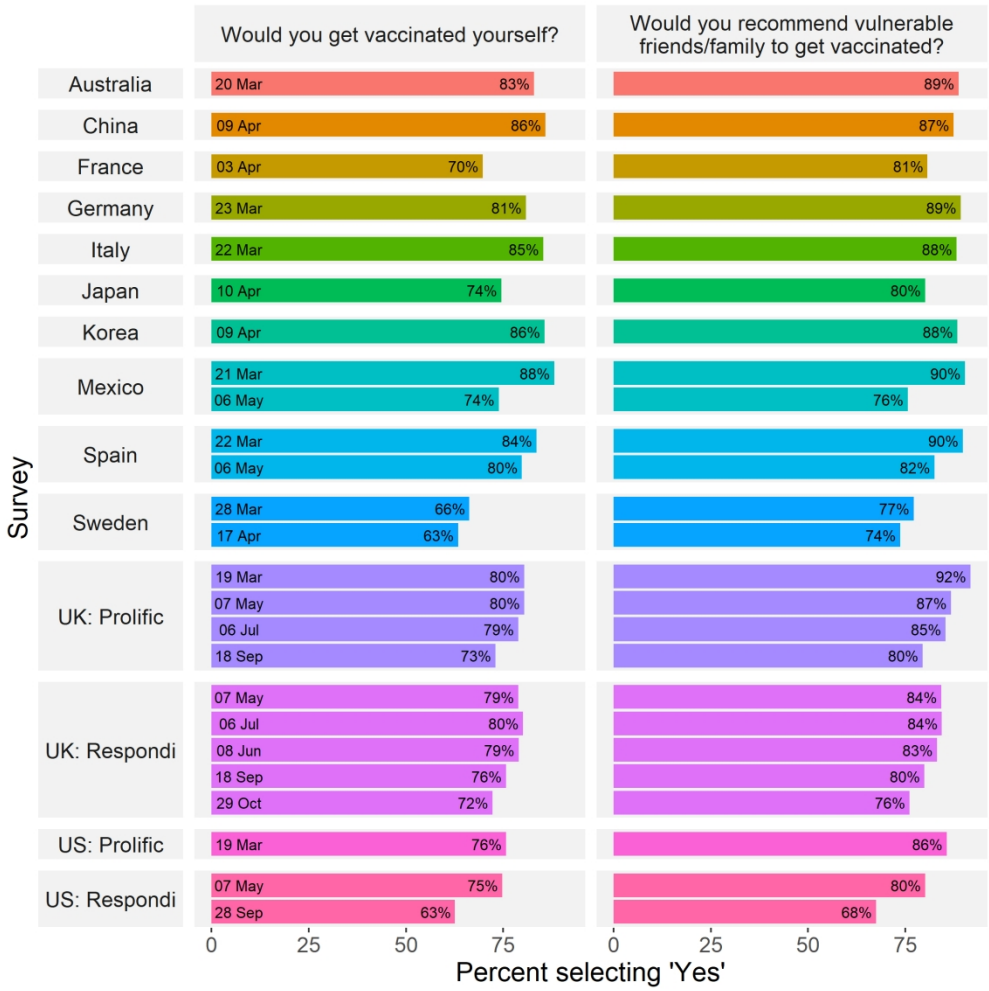

Figure 1. COVID-19 vaccine acceptance across countries and time. Percentage of respondents who stated they were willing to receive or recommend a COVID-19 vaccine across surveys. UK and US samples using different panel providers are reported separately

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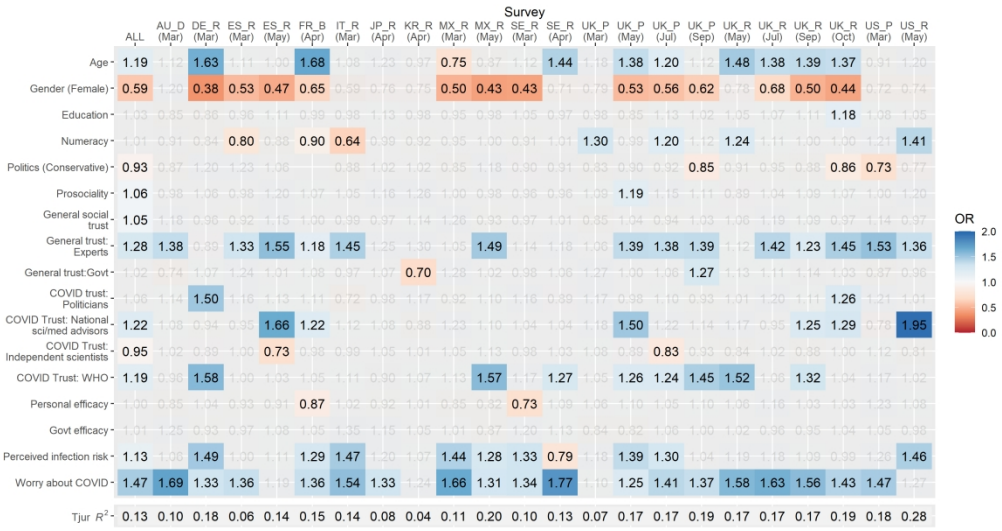

Figure 2. Correlates of vaccine acceptance. Heatmap of odds ratios in multivariate logistic regression model predicting stated vaccine acceptance. Columns represent individual samples and rows represent independent variables in model. Grey values are non-significant, p > .05. Red shading indicates a lower likelihood of reported vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). Political orientation data was not collected in the French sample; this sample is excluded from pooled data.

299x159mm (300 x 300 DPI)

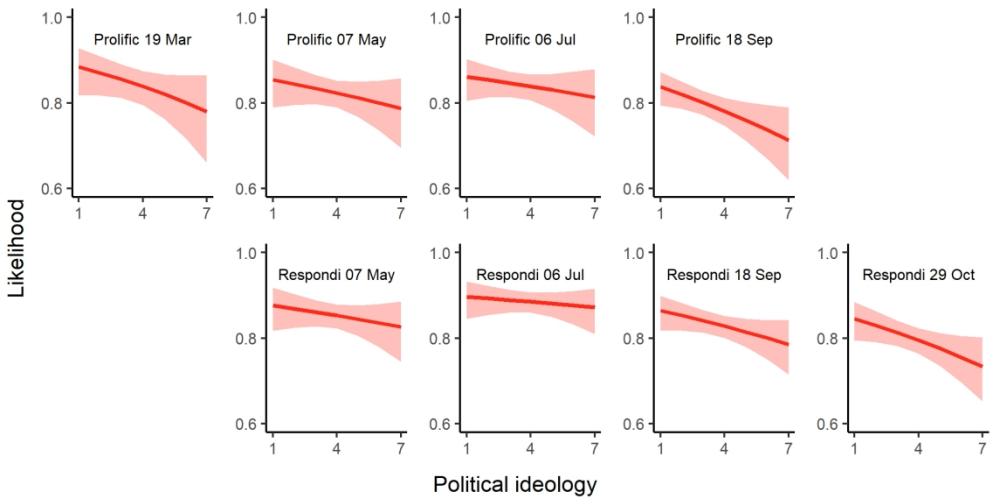

Figure 3. Political ideology and vaccine acceptance in the UK. Predicted likelihood that an individual will accept being vaccinated at varying levels of political ideology (1 = very liberal/left wing, 7 = very conservative/right wing) in UK samples over time.

177x88mm (300 x 300 DPI)

Figure 3. Political ideology and vaccine acceptance in the UK. Predicted likelihood that an individual will accept being vaccinated at varying levels of political ideology (1 = very liberal/left wing, 7 = very conservative/right wing) in UK samples over time.

159x149mm (300 x 300 DPI)

Correlates of intended COVID-19 vaccine acceptance across time and countries: Results from a series of cross-sectional surveys

Supplementary material

Table S1

Survey items and wording

Variable	Wording	Response
Gender	What is your gender?	0 =Male, 1= Female, 'Other' and 'Prefer not to say' (included in Prolific samples only) coded as missing.
Age	What is your age?	Age in years
Education	Please indicate your highest educational qualification	1 = No formal education above age 16, 2 = Professional or technical qualifications above age 16, 3 = School education up to age 18, 4 = Degree (Bachelors) or equivalent, 5 = Degree (Masters) or other postgraduate qualification, 6 = Doctorate [In France] 1 = No diploma, 2 =Primary school certificate, 3 = BEPC - Brevet des colleges, 4 = CAP / BEP, 5 = BAC / professional certificate / technical certificate, 6 = BAC +2 and above.
Numeracy (summed; range 1-5)	Adaptive Berlin Numeracy test (2-3items, see Cokely et al., 2012 for details). Which represents the highest risk of something happening?	Scores range 1-4 1 = '1 in 10' (correct), 2 = '1 in 1000', 3 = '1 in 100'
Politics	Where do you feel your political views lie on a spectrum of left wing (or liberal) to right wing (or conservative)?	1 = Very liberal/left, 7 = Very conservative/right
Prosociality	To what extent do you think it's important to do things for the benefit of others and society even if they have some costs to you personally?	1 = Not at all, 7 = Very much so

General social trust	Generally speaking, would you say most people can be trusted, or that you can't be too careful in dealing with people?	1 = Can't be too careful, 7 = Most people can be trusted
General trust: Experts (scale)	How much do you trust each of the following? - Medical doctors and nurses	1 = Cannot be trusted at all, 5 = Can be trusted a lot
	How much do you trust each of the following? - Scientists	1 = Cannot be trusted at all, 5 = Can be trusted a lot
	How much do you trust each of the following? - Scientific knowledge	1 = Cannot be trusted at all , 5 = Can be trusted a lot
General trust: Govt (scale)	How much do you trust each of the following? - Civil servants or public officials in the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
	How much do you trust each of the following? - The current government of the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
	How much do you trust each of the following? - Politicians in the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
COVID trust: Politicians	How much do you trust the country's politicians to deal effectively with the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: National sci/med advisors	How much do you trust the country's national scientific and medical advisors to know the best measures to take in the face of the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: Independent scientists	How much do you trust experts who are not connected with the government who are commenting on measures planned for the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: WHO	How much do you trust the World Health Organisation to know the best measures to take in the face of the pandemic?	1 = Not at all, 7 = Very much
Personal efficacy	To what extent do you feel that the personal actions you are taking to try to limit the spread of coronavirus make a difference?	1 = Not at all, 7 = Very much
Govt efficacy	To what extent do you feel the actions that your country is taking to limit the spread of coronavirus make a difference?	1 = Not at all, 7 = Very much

Perceived infection risk (scale)	How likely do you think it is that you will be directly and personally affected by the following in the next 6 months? - Catching the coronavirus/COVID-19	1= Not at all likely, 7 = Very likely
	How likely do you think it is that your friends and family in the country you are currently living in will be directly affected by the following in the next 6 months? - Catching the coronavirus/COVID-19	1= Not at all likely, 7 = Very likely
	How much do you agree or disagree with the following statements? - I will probably get sick with the coronavirus/COVID-19.	1 = Strongly disagree, 5 = Strongly agree (rescaled)
Worry about COVID	How worried are you personally about the following issues at present? - Coronavirus/COVID-19	1 = Not at all worried, 7 = Very worried
Vaccine - acceptance	If a vaccine were to be available for the coronavirus/COVID-19 now: - Would you get vaccinated yourself?	0 = No, 1 = Yes
Vaccine – recommend to others	If a vaccine were to be available for the coronavirus/COVID-19 now: - Would you recommend vulnerable friends/family to get vaccinated?	0 = No, 1 = Yes
General vaccine attitudes	Please let us know how much you agree or disagree with the following statements about vaccines in general: - I believe that vaccines are a safe and reliable way to help avert the spread of preventable diseases	1 = Strongly disagree, 5 = Strongly agree
	Please let us know how much you agree or disagree with the following statements about vaccines in general: - Vaccinations are one of the most significant contributions to public health	1 = Strongly disagree, 5 = Strongly agree

Table S2

Percentage of missing values for predictor and outcome variables across all samples.

Variable	AU_D (Mar)	CN_R (Apr)	DE_R (Mar)	ES_R (Mar)	ES_R (May)	FR_B (Apr)	IT_R (Mar)	JP_R (Apr)	KR_R (Apr)	MX_R (Mar)	MX_R (May)	SE_R (Apr)	SE_R (Mar)	UK_P (Jul)	UK_P (Mar)	UK_P (May)	UK_P (Sep)	UK_R (Jul)	UK_R (Jun)	UK_R (May)	UK_R (Oct)	UK_R (Sep)	US_P (Mar)	US_R (May)	US_R (Sep)
Age	5.4	0.6	3.9	2.1	1.6	0.0	20.9	2.3	0.4	8.8	1.1	1.7	4.6	0.1	0.0	0.3	0.1	1.8	1.2	1.5	1.0	1.7	0.1	1.3	0.0
Gender [Female]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1
Education	5.6	0.3	3.9	1.7	0.6	0.0	20.1	1.0	0.3	7.8	0.3	0.4	3.9	0.0	0.0	0.0	0.0	0.5	-	0.1	0.1	0.5	0.0	0.3	-
Numeracy	6.7	1.9	6.6	3.1	2.7	1.1	21.1	6.2	2.0	8.1	0.3	3.1	5.6	0.1	0.1	0.3	0.2	3.5	2.2	1.8	0.9	2.3	0.1	1.4	0.2
Politics [Conservative]	5.6	-	4.1	2.1	0.6	-	20.3	9.2	0.1	7.9	0.9	0.9	4.1	0.1	0.0	0.1	0.1	0.6	1.2	0.3	0.3	0.8	0.0	0.4	0.2
Prosociality	1.0	0.1	0.3	0.7	0.1	0.0	1.7	0.0	0.1	0.7	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.5	0.0	0.6	0.1	0.2	0.0	0.1	0.0
General social trust	0.0	0.0	0.1	0.3	0.3	0.0	0.4	0.0	0.1	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.0
General trust: Experts	0.0	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.1	0.4	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.3	0.1	0.4	0.0	0.0	0.0
General trust:Govt	0.1	-	0.3	0.0	0.1	0.0	0.9	0.1	0.1	0.3	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1
COVID trust: Politicians	3.4	-	1.7	1.3	0.0	0.0	10.0	0.4	0.1	4.8	0.3	0.1	2.3	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.2	0.0	0.1	0.0
COVID Trust: National sci/med advisors	3.4	-	1.7	1.3	0.1	0.0	10.0	0.3	0.0	4.8	0.3	0.1	2.3	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.0	0.3	-
COVID Trust: Independent scientists	3.4	-	1.7	1.6	0.1	0.0	10.1	0.3	0.0	4.8	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.1	-	0.2	0.0	0.1	0.1	0.3	-
COVID Trust: WHO	3.4	-	2.0	1.4	0.0	0.0	10.0	0.6	0.1	4.9	0.3	0.0	2.3	0.0	0.0	0.1	0.0	0.2	0.2	0.2	0.0	0.1	0.1	0.3	-
Personal efficacy	3.7	-	2.0	1.3	0.0	0.0	10.3	0.6	0.1	4.8	0.3	0.0	2.4	0.0	0.1	0.0	0.2	0.2	0.4	0.3	0.1	0.2	0.0	0.3	0.0
Govt efficacy	3.6	-	2.0	1.4	0.3	0.0	10.4	0.4	0.1	4.8	0.6	0.0	2.4	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.0	0.1	0.0	0.3	0.1
Perceived infection risk	1.4	0.3	1.0	0.9	0.0	0.0	3.0	0.0	0.0	1.7	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.1	0.4	0.2	0.2	0.0	0.1	0.4	0.0
Worry about COVID	1.0	0.0	0.6	0.6	0.0	0.0	2.4	0.1	0.3	1.4	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.0	0.1	0.1	0.1	0.0
Vaccine acceptance	4.0	0.1	1.9	1.4	0.1	0.0	11.4	0.1	0.1	5.8	0.3	0.4	2.4	0.1	0.0	0.0	0.0	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.0
Vaccine recommend	4.1	0.1	1.9	1.6	0.1	0.0	11.4	0.1	0.1	6.3	0.6	0.4	2.4	0.1	0.0	0.1	0.1	0.2	0.2	0.4	0.1	0.1	0.1	0.1	0.0
Vaccine attitudes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	0.2	0.3	-	-	-

'-' indicates variable not included in survey. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). Missing gender includes 'Other' and 'prefer" not to say' responses (total $n = 35$) and missing age includes values outside the range of 18-100 (total $n = 46$)

Table S3

Gender and age distribution of those participants who answered the vaccine acceptance item (% of each sample; continued on following page)

Gender	Age bracket	AU_D1	CN_R1	DE_R1	ES_R1	ES_R2	FR_B1	IT_R1	JP_R1	KR_R1	MX_R1	MX_R2	SE_R1	SE_R2
Male	18-24	6.0	5.7	5.2	4.5	4.7	1.2	4.8	4.9	5.6	9.8	9.9	5.3	5.7
	24-34	8.3	10.9	8.7	7.4	7.6	6.2	8.4	7.3	8.6	12.4	11.8	10.5	10.5
	35-44	8.6	9.3	8.6	10.4	10.6	7.6	9.4	8.7	9.6	10.0	10.7	9.2	9.0
	45-54	8.2	11.3	10.0	10.9	10.7	10.2	10.7	10.2	11.2	8.9	8.3	9.8	9.5
	55-64	7.6	8.2	10.5	9.0	8.9	8.6	8.6	8.2	10.2	5.8	5.4	8.6	8.8
	65+	9.2	5.7	7.7	7.0	7.2	13.8	6.8	9.7	6.0	3.2	3.0	8.1	7.8
	Missing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Female	18-24	5.7	5.4	5.2	4.5	4.7	8.5	4.8	5.0	5.3	8.9	10.0	5.0	5.5
	24-34	9.5	10.4	8.4	7.8	7.7	8.7	8.4	7.6	8.2	12.9	12.3	10.3	10.0
	35-44	10.1	8.9	8.4	10.9	10.7	8.4	10.5	9.2	9.2	12.1	11.3	8.9	8.5
	45-54	9.4	10.9	9.5	10.9	11.0	9.5	12.4	10.5	10.7	8.7	8.6	9.4	9.3
	55-64	7.9	7.9	9.9	9.3	8.9	6.7	7.6	8.6	9.7	5.4	5.7	8.4	8.3
	65+	9.5	5.4	7.7	7.5	7.3	10.7	7.7	10.2	5.9	2.0	2.9	6.6	7.2
Missing	18-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	24-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	35-44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	45-54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	55-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	65+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). ‘Missing’ gender includes responses ‘Other’ and ‘Prefer not to say’ - only included in Prolific samples.

Table S3 (continued)

Gender and age distribution of those participants who answered the vaccine acceptance item (% of each sample)

Gender	Age bracket	UK_P1	UK_P3	UK_P4	UK_P5	UK_R2	UK_R3	UK_R4	UK_R5	UK_R6	US_P1	US_R2	US_R3
Male	18-24	5.6	7.2	7.1	11.7	5.8	4.2	5.8	5.9	5.5	5.9	6.3	3.4
	24-34	10.0	8.8	9.4	15.1	8.7	8.0	8.8	8.9	7.8	10.1	9.6	12.5
	35-44	8.3	9.3	9.4	7.7	9.2	9.4	9.3	9.3	8.7	9.0	8.7	12.0
	45-54	8.5	8.6	8.5	6.4	9.2	9.6	9.2	9.2	10.2	9.0	8.7	5.7
	55-64	11.7	9.3	8.2	5.7	8.3	8.4	8.2	8.2	8.4	8.6	8.9	9.2
	65+	4.7	5.5	4.6	1.7	6.7	7.0	7.0	7.0	7.3	6.4	6.7	6.4
	Missing	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Female	18-24	5.6	5.1	6.1	10.9	6.3	7.0	6.3	6.2	5.7	4.9	6.6	5.3
	24-34	8.8	9.8	9.1	11.5	9.5	10.0	9.6	9.5	8.4	11.3	10.0	11.3
	35-44	9.3	9.9	8.9	8.8	10.0	10.2	10.0	9.9	9.5	7.6	9.2	9.2
	45-54	8.3	7.7	10.2	8.6	10.0	10.2	9.8	9.8	10.6	8.7	9.0	8.1
	55-64	12.9	13.1	11.8	8.8	8.9	8.8	8.6	8.7	9.5	11.7	9.3	10.3
	65+	6.1	5.1	6.3	2.7	7.2	7.0	7.5	7.5	8.4	6.6	7.0	6.3
Missing	18-24	0.0	0.1	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
	24-34	0.3	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	35-44	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	45-54	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	55-64	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	65+	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). 'Missing' gender includes responses 'Other' and 'Prefer not to say' - only included in Prolific samples.

Table S4

Descriptive statistics for all samples (Mean (SD)) (continued on following page)

	ALL	AU_D (Mar)	CN_R (Apr)	DE_R (Mar)	ES_R (Mar)	ES_R (May)	FR_B (Apr)	IT_R (Mar)	JP_R (Apr)	KR_R (Apr)	MX_R (Mar)	MX_R (May)	SE_R (Mar)	SE_R (Apr)
Age	45.06 (16.02)	46.30 (16.44)	43.21 (14.26)	46.71 (15.93)	46.68 (14.99)	46.00 (15.03)	48.79 (16.53)	45.91 (14.81)	48.08 (16.35)	45.34 (15.51)	38.69 (13.96)	38.61 (14.21)	45.49 (16.02)	45.49 (16.54)
Gender (Female)	0.51 (0.50)	0.51 (0.50)	0.49 (0.50)	0.50 (0.50)	0.51 (0.50)	0.50 (0.50)	0.48 (0.50)	0.50 (0.50)	0.51 (0.50)	0.49 (0.50)	0.50 (0.50)	0.51 (0.50)	0.49 (0.50)	0.49 (0.50)
Education	3.42 (1.13)	3.17 (1.12)	3.64 (0.88)	3.07 (1.19)	3.59 (1.08)	3.60 (1.07)	5.00[a] (1.12)	3.51 (1.23)	3.56 (0.81)	3.76 (0.79)	3.55 (0.94)	3.74 (0.88)	3.30 (1.06)	3.34 (1.01)
Numeracy	2.66 (1.11)	2.41 (1.06)	2.83 (1.25)	2.53 (1.12)	2.39 (1.03)	2.42 (0.97)	2.18 (0.70)	2.13 (0.71)	2.77 (1.25)	2.60 (1.06)	2.16 (0.90)	2.31 (0.95)	2.52 (1.23)	2.57 (1.21)
Politics (Conservative)	3.74 (1.41)	3.83 (1.30)	-	3.79 (1.19)	3.50 (1.43)	3.44 (1.50)	-	3.87 (1.45)	4.09 (1.09)	3.88 (1.20)	3.65 (1.31)	3.57 (1.33)	3.92 (1.59)	3.88 (1.61)
Prosociality	5.21 (1.36)	5.23 (1.36)	5.54 (1.19)	4.97 (1.42)	5.74 (1.21)	5.35 (1.34)	5.23 (1.41)	5.76 (1.38)	4.74 (1.42)	4.40 (1.31)	5.34 (1.61)	5.26 (1.53)	4.87 (1.43)	4.63 (1.48)
General social trust	3.66 (1.71)	3.95 (1.67)	4.96 (1.67)	3.61 (1.65)	3.47 (1.87)	3.29 (1.77)	2.98 (1.62)	3.70 (1.61)	3.85 (1.48)	3.97 (1.50)	2.81 (1.84)	2.94 (1.84)	3.73 (1.73)	3.85 (1.73)
General trust: Experts	3.97 (0.77)	3.97 (0.79)	4.26 (0.61)	3.90 (0.74)	4.19 (0.72)	4.09 (0.76)	3.76 (0.81)	4.02 (0.74)	3.51 (0.72)	3.74 (0.68)	4.05 (0.85)	4.10 (0.83)	3.90 (0.75)	3.85 (0.75)
General trust: Govt	2.64 (0.91)	2.96 (0.93)	-	3.14 (0.92)	2.75 (0.94)	2.54 (0.89)	2.48 (0.90)	2.89 (0.91)	2.46 (0.84)	2.65 (0.81)	2.28 (1.01)	2.35 (1.02)	3.04 (1.00)	3.00 (1.01)
COVID trust: Politicians	3.48 (1.87)	4.44 (1.75)	-	4.80 (1.65)	4.01 (1.88)	3.45 (1.91)	3.33 (1.78)	4.35 (1.74)	3.03 (1.60)	4.24 (1.63)	3.22 (1.99)	3.51 (1.96)	4.13 (1.78)	4.24 (1.83)
COVID Trust: National sci/med advisors	4.91 (1.60)	5.34 (1.41)	-	5.40 (1.43)	5.45 (1.39)	4.92 (1.65)	4.46 (1.73)	5.42 (1.40)	3.90 (1.51)	5.15 (1.37)	5.18 (1.69)	5.28 (1.60)	4.78 (1.67)	4.93 (1.66)
COVID Trust: Independent scientists	4.66 (1.55)	4.77 (1.49)	-	5.11 (1.38)	5.15 (1.39)	4.83 (1.55)	4.62 (1.52)	4.80 (1.45)	3.73 (1.51)	5.03 (1.26)	5.02 (1.68)	4.91 (1.65)	4.66 (1.52)	4.55 (1.48)
COVID Trust: WHO	4.84 (1.68)	5.19 (1.55)	-	5.16 (1.52)	5.46 (1.42)	4.88 (1.62)	4.80 (1.61)	5.25 (1.48)	3.12 (1.55)	3.96 (1.51)	5.80 (1.45)	5.58 (1.62)	5.05 (1.45)	4.81 (1.55)
Personal efficacy	5.22 (1.48)	5.14 (1.45)	-	5.24 (1.41)	5.31 (1.47)	5.14 (1.47)	5.20 (1.47)	5.31 (1.46)	4.26 (1.42)	5.42 (1.24)	5.36 (1.66)	5.56 (1.53)	5.20 (1.50)	5.26 (1.45)
Govt efficacy	3.86 (1.78)	4.48 (1.63)	-	4.68 (1.47)	4.21 (1.77)	4.11 (1.83)	4.22 (1.68)	4.60 (1.60)	3.21 (1.52)	5.08 (1.52)	3.82 (2.06)	4.39 (1.86)	4.30 (1.73)	4.41 (1.67)
Perceived infection risk	4.17 (1.32)	4.16 (1.40)	3.26 (1.37)	4.13 (1.34)	4.46 (1.23)	4.38 (1.26)	4.19 (1.24)	3.93 (1.30)	4.48 (1.20)	4.37 (1.22)	4.16 (1.47)	4.29 (1.43)	4.30 (1.37)	4.37 (1.29)
Worry about COVID	5.56 (1.52)	5.56 (1.51)	5.37 (1.57)	5.66 (1.49)	6.25 (1.17)	6.11 (1.26)	5.63 (1.43)	6.08 (1.27)	5.83 (1.28)	5.59 (1.29)	5.92 (1.46)	6.06 (1.35)	5.27 (1.55)	4.98 (1.66)
Vaccine – acceptance	0.76 (0.43)	0.83 (0.38)	0.86 (0.35)	0.81 (0.39)	0.84 (0.37)	0.80 (0.40)	0.70 (0.46)	0.85 (0.35)	0.74 (0.44)	0.86 (0.35)	0.88 (0.32)	0.74 (0.44)	0.66 (0.47)	0.63 (0.48)
Vaccine – recommend to vulnerable others	0.82 (0.38)	0.89 (0.32)	0.87 (0.33)	0.89 (0.31)	0.90 (0.30)	0.82 (0.38)	0.81 (0.40)	0.88 (0.32)	0.80 (0.40)	0.88 (0.32)	0.90 (0.30)	0.76 (0.43)	0.77 (0.42)	0.74 (0.44)
General vaccine attitudes	4.05 (1.11)	-	-	-	-	-	-	-	-	-	-	-	-	-

[a] Education item in France differed from other surveys – see Table S1.

Table S4 (continued)

Descriptive statistics for all samples (Mean (SD))

	UK_P (Mar)	UK_P (May)	UK_P (Jul)	UK_P (Sep)	UK_R (May)	UK_R (Jun)	UK_R (Jul)	UK_R (Sep)	UK_R (Oct)	US_P (Mar)	US_R (May)	US_R (Sep)
Age	45.63 (15.69)	44.72 (15.66)	44.54 (15.65)	38.18 (14.98)	45.72 (15.94)	45.90 (15.87)	45.42 (16.60)	45.47 (16.09)	46.74 (16.04)	45.14 (15.84)	45.03 (16.09)	44.76 (15.60)
Gender (Female)	0.51 (0.50)	0.51 (0.50)	0.53 (0.50)	0.52 (0.50)	0.52 (0.50)	0.53 (0.50)	0.52 (0.50)	0.52 (0.50)	0.52 (0.50)	0.51 (0.50)	0.51 (0.50)	0.51 (0.50)
Education	3.45 (1.17)	3.50 (1.14)	3.58 (1.14)	3.54 (1.10)	3.17 (1.27)	-	3.20 (1.23)	3.15 (1.28)	3.10 (1.23)	3.87 (0.88)	3.70 (0.90)	-
Numeracy	3.22 (1.17)	3.23 (1.14)	3.04 (1.06)	3.24 (1.15)	2.64 (1.14)	2.74 (1.10)	2.61 (1.07)	2.60 (1.07)	2.78 (1.11)	3.14 (1.13)	2.76 (1.14)	2.58 (1.12)
Politics (Conservative)	3.69 (1.43)	3.67 (1.39)	3.58 (1.36)	3.37 (1.36)	3.90 (1.35)	3.89 (1.19)	3.90 (1.33)	3.84 (1.36)	3.83 (1.32)	3.22 (1.65)	3.92 (1.69)	4.07 (1.65)
Prosociality	5.50 (1.07)	5.36 (1.19)	5.32 (1.16)	5.42 (1.17)	5.12 (1.33)	5.25 (1.29)	5.03 (1.29)	5.08 (1.39)	5.38 (1.36)	5.43 (1.28)	5.05 (1.36)	5.02 (1.44)
General social trust	4.04 (1.59)	4.12 (1.55)	4.11 (1.55)	3.69 (1.56)	3.74 (1.71)	3.58 (1.70)	3.86 (1.59)	3.68 (1.68)	3.66 (1.64)	4.01 (1.68)	3.79 (1.73)	3.47 (1.84)
General trust: Experts	4.24 (0.66)	4.11 (0.63)	4.14 (0.66)	4.17 (0.68)	3.89 (0.79)	3.88 (0.81)	3.92 (0.76)	3.90 (0.78)	3.92 (0.77)	4.22 (0.73)	3.96 (0.77)	3.89 (0.83)
General trust: Govt	2.82 (0.85)	2.80 (0.82)	2.60 (0.82)	2.44 (0.81)	2.82 (0.87)	2.64 (0.87)	2.70 (0.88)	2.60 (0.90)	2.55 (0.86)	2.55 (0.79)	2.68 (0.83)	2.52 (0.88)
COVID trust: Politicians	3.81 (1.78)	3.80 (1.81)	3.16 (1.80)	2.57 (1.65)	4.00 (1.86)	3.38 (1.70)	3.60 (1.83)	3.23 (1.86)	3.04 (1.79)	3.06 (1.74)	3.11 (1.77)	2.93 (1.81)
COVID Trust: National sci/med advisors	5.27 (1.47)	5.13 (1.41)	5.12 (1.47)	4.88 (1.58)	4.94 (1.57)	4.58 (1.51)	4.88 (1.53)	4.66 (1.61)	4.60 (1.66)	5.46 (1.41)	5.15 (1.55)	-
COVID Trust: Independent scientists	4.88 (1.48)	4.59 (1.44)	4.74 (1.48)	4.77 (1.60)	4.46 (1.52)	-	4.54 (1.52)	4.40 (1.61)	4.28 (1.63)	5.16 (1.48)	4.72 (1.60)	-
COVID Trust: WHO	5.59 (1.40)	4.97 (1.55)	5.02 (1.62)	4.77 (1.70)	4.76 (1.69)	4.46 (1.69)	4.72 (1.66)	4.50 (1.69)	4.44 (1.71)	5.62 (1.55)	4.57 (1.90)	-
Personal efficacy	5.04 (1.39)	5.59 (1.26)	5.47 (1.35)	5.12 (1.48)	5.36 (1.48)	5.13 (1.45)	5.30 (1.45)	5.09 (1.52)	5.03 (1.52)	5.25 (1.45)	5.32 (1.47)	5.14 (1.57)
Govt efficacy	3.86 (1.75)	3.85 (1.70)	3.48 (1.72)	3.03 (1.62)	4.13 (1.74)	3.66 (1.61)	3.88 (1.75)	3.58 (1.73)	3.36 (1.70)	3.28 (1.80)	3.76 (1.76)	3.25 (1.86)
Perceived infection risk	4.89 (1.32)	4.26 (1.24)	3.96 (1.24)	4.26 (1.30)	4.14 (1.22)	3.94 (1.25)	3.86 (1.25)	4.13 (1.28)	4.27 (1.24)	3.98 (1.52)	3.91 (1.38)	4.11 (1.38)
Worry about COVID	5.80 (1.36)	5.72 (1.40)	5.28 (1.52)	5.36 (1.58)	5.60 (1.51)	5.34 (1.57)	5.30 (1.60)	5.39 (1.61)	5.39 (1.63)	5.49 (1.58)	5.58 (1.60)	5.43 (1.72)
Vaccine – acceptance	0.80 (0.40)	0.80 (0.40)	0.79 (0.41)	0.73 (0.44)	0.79 (0.41)	0.79 (0.41)	0.80 (0.40)	0.76 (0.43)	0.72 (0.45)	0.76 (0.43)	0.75 (0.44)	0.63 (0.48)
Vaccine – recommend to vulnerable others	0.92 (0.28)	0.87 (0.34)	0.85 (0.36)	0.80 (0.40)	0.84 (0.36)	0.83 (0.38)	0.84 (0.36)	0.80 (0.40)	0.76 (0.43)	0.86 (0.35)	0.80 (0.40)	0.68 (0.47)
General vaccine attitudes	-	-	-	4.21 (1.10)	-	-	-	3.90 (1.14)	4.05 (1.06)	-	-	-

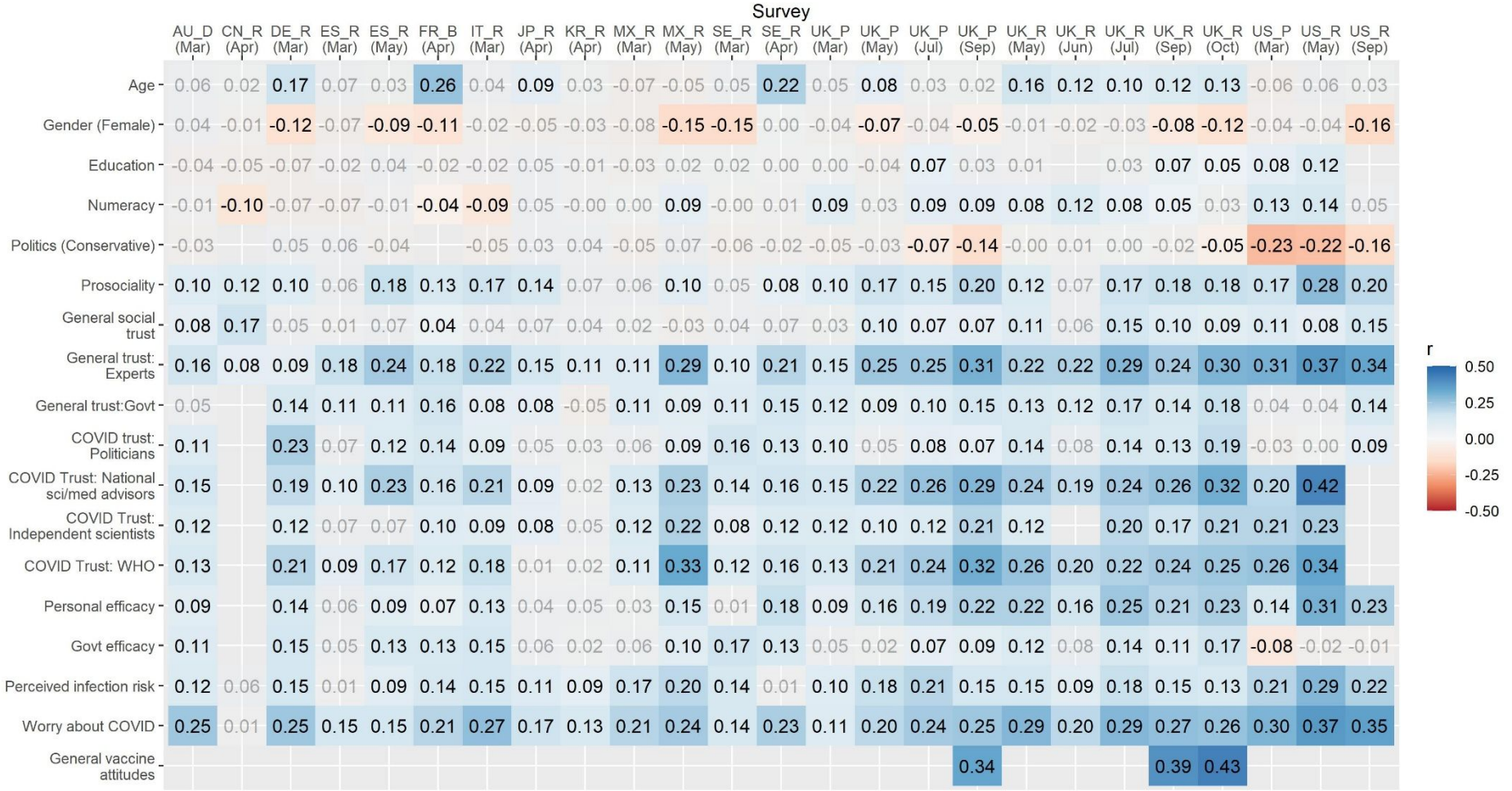

Figure S1. Point biserial correlations between predictors and vaccine acceptance across all samples. Greyed values are non-significant ($p > .05$). Blank spaces indicate predictors which were not included in a given survey

Table S5

Full logistic regression results from model predicting vaccine acceptance (continued on following page)

	ALL	**ALL (-UK)**	**AU_D (Mar)**	**DE_R (Mar)**	**ES_R (Mar)**	**ES_R (May)**	**FR_B (Apr)**	**IT_R (Mar)**	**JP_R (Apr)**	**KR_R (Apr)**	**MX_R (Mar)**	**MX_R (May)**	**SE_R (Mar)**	**SE_R (Apr)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	5.22 ***	5.05 ***	5.59 ***	9.30 ***	8.06 ***	7.35 ***	3.35 ***	11.64 ***	3.70 ***	7.89 ***	14.91 ***	5.36 ***	3.17 ***	2.22 ***
	[4.92 – 5.53]	[4.63 – 5.53]	[4.08 – 7.83]	[6.46 – 13.85]	[5.71 – 11.73]	[5.28 – 10.50]	[2.93 – 3.84]	[7.49 – 19.01]	[2.78 – 4.99]	[5.66 – 11.31]	[9.54 – 24.65]	[3.94 – 7.44]	[2.45 – 4.15]	[1.72 – 2.88]
Age	1.19 ***	1.08 **	1.12	1.63 ***	1.11	1	1.68 ***	1.08	1.23	0.97	0.75 *	0.87	1.12	1.44 ***
	[1.14 – 1.23]	[1.02 – 1.15]	[0.88 – 1.42]	[1.29 – 2.09]	[0.88 – 1.40]	[0.80 – 1.25]	[1.53 – 1.84]	[0.80 – 1.44]	[1.00 – 1.52]	[0.77 – 1.23]	[0.57 – 0.98]	[0.71 – 1.06]	[0.93 – 1.34]	[1.19 – 1.76]
Gender (Female)[a]	0.59 ***	0.61 ***	1.2	0.38 ***	0.53 **	0.47 ***	0.65 ***	0.59	0.76	0.75	0.50 *	0.43 ***	0.43 ***	0.71
	[0.55 – 0.64]	[0.55 – 0.69]	[0.76 – 1.88]	[0.23 – 0.60]	[0.33 – 0.84]	[0.30 – 0.72]	[0.54 – 0.77]	[0.34 – 1.03]	[0.50 – 1.13]	[0.48 – 1.19]	[0.28 – 0.88]	[0.28 – 0.64]	[0.30 – 0.63]	[0.49 – 1.03]
Education	1.03	1	0.85	0.86	0.96	1.11	0.99	0.98	1.13	0.98	0.95	0.98	1.05	0.97
	[0.99 – 1.08]	[0.94 – 1.07]	[0.67 – 1.07]	[0.68 – 1.08]	[0.77 – 1.19]	[0.90 – 1.36]	[0.91 – 1.09]	[0.74 – 1.31]	[0.93 – 1.39]	[0.78 – 1.23]	[0.71 – 1.26]	[0.81 – 1.19]	[0.88 – 1.25]	[0.81 – 1.16]
Numeracy	1.01	0.94 *	0.91	0.84	0.80 *	0.88	0.90 *	0.64 **	0.99	0.92	0.95	1	0.91	1.01
	[0.97 – 1.05]	[0.89 – 0.99]	[0.73 – 1.15]	[0.67 – 1.05]	[0.65 – 0.98]	[0.72 – 1.09]	[0.82 – 0.99]	[0.48 – 0.84]	[0.81 – 1.23]	[0.73 – 1.16]	[0.73 – 1.26]	[0.82 – 1.22]	[0.76 – 1.10]	[0.84 – 1.21]
Politics (Conservative)	0.93 ***	0.94 *	0.87	1.2	1.23	1.06		0.88	1.02	1.02	0.85	1.18	0.9	0.91
	[0.89 – 0.97]	[0.89 – 0.99]	[0.68 – 1.11]	[0.96 – 1.52]	[0.98 – 1.55]	[0.84 – 1.33]		[0.66 – 1.18]	[0.84 – 1.25]	[0.80 – 1.30]	[0.64 – 1.13]	[0.96 – 1.44]	[0.74 – 1.08]	[0.75 – 1.10]
Prosociality	1.06 **	1.05	0.98	1.06	0.98	1.2	1.07	1.05	1.16	1.26	1	0.98	0.96	0.96
	[1.02 – 1.10]	[0.99 – 1.12]	[0.75 – 1.26]	[0.82 – 1.36]	[0.78 – 1.23]	[0.96 – 1.50]	[0.98 – 1.17]	[0.78 – 1.40]	[0.93 – 1.45]	[0.98 – 1.62]	[0.76 – 1.31]	[0.80 – 1.20]	[0.79 – 1.15]	[0.79 – 1.16]
General social trust	1.05 *	1.05	1.18	0.96	0.92	1.15	1	0.99	0.97	1.14	1.26	0.93	0.97	1.01
	[1.01 – 1.10]	[0.99 – 1.11]	[0.91 – 1.52]	[0.75 – 1.24]	[0.73 – 1.16]	[0.92 – 1.44]	[0.91 – 1.10]	[0.74 – 1.34]	[0.77 – 1.22]	[0.87 – 1.48]	[0.95 – 1.70]	[0.76 – 1.14]	[0.80 – 1.19]	[0.83 – 1.24]
General trust: Experts	1.28 ***	1.26 ***	1.38 *	0.89	1.33 *	1.55 ***	1.18 **	1.45 *	1.25	1.3	1.05	1.49 ***	1.14	1.18
	[1.22 – 1.34]	[1.18 – 1.36]	[1.06 – 1.80]	[0.66 – 1.20]	[1.03 – 1.74]	[1.23 – 1.97]	[1.06 – 1.31]	[1.04 – 2.01]	[0.97 – 1.60]	[1.00 – 1.71]	[0.78 – 1.41]	[1.18 – 1.88]	[0.91 – 1.44]	[0.95 – 1.48]
General trust: Govt	1.02	0.94	0.74	1.07	1.24	1.01	1.08	0.97	1.07	0.70 *	1.28	1.02	0.98	1.06
	[0.97 – 1.08]	[0.87 – 1.01]	[0.54 – 1.00]	[0.77 – 1.48]	[0.91 – 1.69]	[0.76 – 1.34]	[0.94 – 1.23]	[0.68 – 1.39]	[0.81 – 1.40]	[0.52 – 0.93]	[0.88 – 1.87]	[0.78 – 1.32]	[0.75 – 1.27]	[0.79 – 1.42]
COVID trust: Politicians	1.06	1.03	1.14	1.50 *	1.16	1.13	1.11	0.72	0.98	1.17	0.92	1.1	1.16	0.89
	[0.99 – 1.13]	[0.94 – 1.13]	[0.78 – 1.66]	[1.02 – 2.21]	[0.83 – 1.63]	[0.81 – 1.57]	[0.97 – 1.27]	[0.45 – 1.12]	[0.67 – 1.41]	[0.86 – 1.58]	[0.61 – 1.37]	[0.81 – 1.48]	[0.85 – 1.58]	[0.64 – 1.23]
COVID Trust: National sci/med advisors	1.22 ***	1.22 ***	1.08	0.94	0.95	1.66 ***	1.22 **	1.12	1.08	0.88	1.23	1.1	1.04	1.04
	[1.15 – 1.29]	[1.12 – 1.33]	[0.76 – 1.52]	[0.63 – 1.41]	[0.69 – 1.31]	[1.24 – 2.24]	[1.08 – 1.39]	[0.72 – 1.77]	[0.79 – 1.48]	[0.63 – 1.24]	[0.89 – 1.70]	[0.83 – 1.44]	[0.77 – 1.39]	[0.77 – 1.41]
COVID Trust: Independent scientists	0.95 *	1	1.02	0.89	1	0.73 *	0.98	0.99	1.05	1.01	1.05	1.13	0.98	1.03
	[0.91 – 1.00]	[0.93 – 1.07]	[0.76 – 1.34]	[0.65 – 1.22]	[0.76 – 1.32]	[0.56 – 0.95]	[0.89 – 1.09]	[0.70 – 1.37]	[0.78 – 1.41]	[0.74 – 1.37]	[0.77 – 1.41]	[0.89 – 1.42]	[0.78 – 1.23]	[0.83 – 1.27]
COVID Trust: WHO	1.19 ***	1.11 **	0.96	1.58 **	1	1.03	1.05	1.11	0.9	1.07	1.13	1.57 ***	1.17	1.27 *
	[1.14 – 1.25]	[1.04 – 1.19]	[0.71 – 1.28]	[1.16 – 2.15]	[0.74 – 1.33]	[0.78 – 1.35]	[0.94 – 1.18]	[0.74 – 1.63]	[0.69 – 1.18]	[0.83 – 1.38]	[0.83 – 1.54]	[1.22 – 2.01]	[0.92 – 1.48]	[1.01 – 1.60]
Personal efficacy	1	0.92 *	0.85	1.04	0.93	0.91	0.87 **	1.02	0.92	1.01	0.85	0.82	0.73 **	1.09
	[0.96 – 1.05]	[0.86 – 0.98]	[0.64 – 1.12]	[0.80 – 1.34]	[0.71 – 1.21]	[0.71 – 1.16]	[0.79 – 0.96]	[0.73 – 1.44]	[0.72 – 1.18]	[0.75 – 1.36]	[0.61 – 1.16]	[0.64 – 1.05]	[0.59 – 0.90]	[0.90 – 1.32]
Govt efficacy	1.01	1.07	1.25	0.93	0.97	1.08	1.05	1.35	1.15	1.05	1.01	0.87	1.2	1.13
	[0.96 – 1.08]	[0.99 – 1.16]	[0.88 – 1.79]	[0.69 – 1.25]	[0.70 – 1.33]	[0.79 – 1.47]	[0.93 – 1.19]	[0.92 – 1.98]	[0.81 – 1.64]	[0.75 – 1.46]	[0.68 – 1.51]	[0.65 – 1.17]	[0.90 – 1.61]	[0.85 – 1.50]
Perceived infection risk	1.13 ***	1.14 ***	1.06	1.49 **	1	1.11	1.29 ***	1.47 **	1.2	1.07	1.44 *	1.28 *	1.33 **	0.79 *
	[1.08 – 1.17]	[1.08 – 1.21]	[0.82 – 1.37]	[1.16 – 1.92]	[0.80 – 1.25]	[0.89 – 1.38]	[1.18 – 1.42]	[1.11 – 1.95]	[0.97 – 1.48]	[0.83 – 1.38]	[1.07 – 1.94]	[1.03 – 1.59]	[1.09 – 1.62]	[0.65 – 0.97]
Worry about COVID	1.47 ***	1.51 ***	1.69 ***	1.33 *	1.36 *	1.19	1.36 ***	1.54 **	1.33 **	1.24	1.66 ***	1.31 *	1.34 **	1.77 ***
	[1.41 – 1.53]	[1.42 – 1.60]	[1.34 – 2.16]	[1.05 – 1.69]	[1.07 – 1.73]	[0.95 – 1.48]	[1.24 – 1.50]	[1.18 – 2.03]	[1.07 – 1.65]	[0.96 – 1.59]	[1.26 – 2.21]	[1.05 – 1.62]	[1.10 – 1.63]	[1.44 – 2.19]
Observations	19216	8398	644	639	668	666	2969	530	590	677	624	682	652	653
R^2 Tjur	0.128	0.101	0.096	0.184	0.061	0.137	0.151	0.141	0.077	0.04	0.115	0.197	0.102	0.132

Odds ratios [95CI] shown, all continuous measures were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P Prolific; R, Respondi). [a]Gender is unstandardized. Political orientation data was not collected in France; this sample is excluded from pooled data.

*p < .05, **p < .01, *** p < .001

Table S5 (continued)

Full logistic regression results from model predicting vaccine acceptance

	UK_P (Mar) *OR*	**UK_P (May)** *OR*	**UK_P (Jul)** *OR*	**UK_P (Sep)** *OR*	**UK_R (May)** *OR*	**UK_R (Jul)** *OR*	**UK_R (Sep)** *OR*	**UK_R (Oct)** *OR*	**US_P (Mar)** *OR*	**US_R (May)** *OR*
(Intercept)	5.20 ***	7.58 ***	6.42 ***	4.14 ***	5.62 ***	6.68 ***	5.56 ***	4.91 ***	4.66 ***	5.12 ***
	[3.87 – 7.11]	[5.81 – 10.07]	[5.06 – 8.23]	[3.47 – 4.98]	[4.37 – 7.33]	[5.22 – 8.68]	[4.57 – 6.81]	[4.05 – 6.00]	[3.46 – 6.38]	[3.71 – 7.21]
Age	1.18	1.38 ***	1.20 *	1.12	1.48 ***	1.38 ***	1.39 ***	1.37 ***	0.91	1.2
	[0.96 – 1.46]	[1.15 – 1.65]	[1.02 – 1.42]	[0.99 – 1.27]	[1.23 – 1.80]	[1.16 – 1.65]	[1.21 – 1.59]	[1.20 – 1.58]	[0.74 – 1.13]	[0.95 – 1.52]
Gender (Female)	0.79	0.53 ***	0.56 ***	0.62 ***	0.78	0.68 *	0.50 ***	0.44 ***	0.72	0.74
	[0.52 – 1.20]	[0.37 – 0.75]	[0.41 – 0.76]	[0.49 – 0.79]	[0.55 – 1.08]	[0.49 – 0.94]	[0.38 – 0.64]	[0.34 – 0.57]	[0.48 – 1.09]	[0.48 – 1.13]
Education	0.98	0.85	1.13	1.02	1.05	1.07	1.11	1.18 *	1.08	1.05
	[0.80 – 1.21]	[0.71 – 1.00]	[0.97 – 1.32]	[0.91 – 1.15]	[0.88 – 1.24]	[0.91 – 1.26]	[0.98 – 1.27]	[1.04 – 1.34]	[0.88 – 1.32]	[0.85 – 1.30]
Numeracy	1.30 *	0.99	1.20 *	1.12	1.24 *	1.11	1	1	1.21	1.41 **
	[1.05 – 1.62]	[0.84 – 1.17]	[1.02 – 1.41]	[0.99 – 1.26]	[1.05 – 1.48]	[0.95 – 1.32]	[0.88 – 1.14]	[0.88 – 1.13]	[0.98 – 1.50]	[1.13 – 1.78]
Politics (Conservative)	0.83	0.9	0.92	0.85 *	0.91	0.95	0.88	0.86 *	0.73 *	0.77
	[0.66 – 1.05]	[0.74 – 1.09]	[0.77 – 1.11]	[0.74 – 0.97]	[0.76 – 1.10]	[0.79 – 1.13]	[0.77 – 1.01]	[0.75 – 0.99]	[0.57 – 0.93]	[0.58 – 1.01]
Prosociality	1.09	1.19 *	1.15	1.11	0.89	1.04	1.09	1.07	1	1.2
	[0.89 – 1.34]	[1.01 – 1.41]	[0.99 – 1.34]	[0.98 – 1.26]	[0.74 – 1.06]	[0.88 – 1.23]	[0.96 – 1.25]	[0.94 – 1.23]	[0.81 – 1.23]	[0.96 – 1.51]
General social trust	0.85	1.04	0.94	1.03	1.06	1.19	1.09	0.97	1.14	0.97
	[0.68 – 1.06]	[0.86 – 1.25]	[0.79 – 1.12]	[0.91 – 1.17]	[0.88 – 1.27]	[1.00 – 1.43]	[0.96 – 1.25]	[0.85 – 1.11]	[0.90 – 1.44]	[0.77 – 1.23]
General trust: Experts	1.06	1.39 **	1.38 ***	1.39 ***	1.12	1.42 ***	1.23 **	1.45 ***	1.53 **	1.36 *
	[0.83 – 1.34]	[1.13 – 1.70]	[1.16 – 1.65]	[1.20 – 1.60]	[0.91 – 1.38]	[1.17 – 1.71]	[1.06 – 1.44]	[1.24 – 1.70]	[1.16 – 2.03]	[1.02 – 1.82]
General trust:Govt	1.27	1	1.06	1.27 **	1.13	1.11	1.14	1.03	0.87	0.96
	[0.96 – 1.68]	[0.79 – 1.27]	[0.86 – 1.31]	[1.08 – 1.51]	[0.90 – 1.43]	[0.88 – 1.38]	[0.95 – 1.37]	[0.86 – 1.22]	[0.67 – 1.13]	[0.72 – 1.28]
COVID trust: Politicians	1.17	0.98	1.1	0.93	1.01	1.2	1.11	1.26 *	1.21	1.01
	[0.82 – 1.67]	[0.73 – 1.31]	[0.85 – 1.44]	[0.76 – 1.14]	[0.76 – 1.33]	[0.89 – 1.62]	[0.88 – 1.39]	[1.01 – 1.56]	[0.86 – 1.69]	[0.73 – 1.40]
COVID Trust: National sci/med advisors	1.18	1.50 ***	1.22	1.14	1.17	0.95	1.25 *	1.29 **	0.78	1.95 ***
	[0.88 – 1.59]	[1.18 – 1.89]	[0.99 – 1.50]	[0.97 – 1.34]	[0.92 – 1.50]	[0.74 – 1.22]	[1.04 – 1.50]	[1.07 – 1.56]	[0.57 – 1.04]	[1.41 – 2.73]
COVID Trust: Independent scientists	1.08	0.89	0.83 *	0.93	0.84	1.02	0.88	1	1.12	0.81
	[0.84 – 1.37]	[0.73 – 1.08]	[0.69 – 0.99]	[0.80 – 1.07]	[0.68 – 1.04]	[0.83 – 1.25]	[0.74 – 1.04]	[0.85 – 1.17]	[0.89 – 1.41]	[0.62 – 1.06]
COVID Trust: WHO	1.05	1.26 *	1.24 *	1.45 ***	1.52 ***	1.06	1.32 **	1.04	1.17	1.02
	[0.80 – 1.35]	[1.04 – 1.53]	[1.03 – 1.50]	[1.25 – 1.68]	[1.22 – 1.88]	[0.85 – 1.32]	[1.11 – 1.57]	[0.87 – 1.24]	[0.90 – 1.51]	[0.76 – 1.37]
Personal efficacy	1.06	1.1	1.05	1.1	1.06	1.16	1.03	1.03	1.23	1.08
	[0.86 – 1.31]	[0.92 – 1.30]	[0.89 – 1.23]	[0.96 – 1.25]	[0.87 – 1.29]	[0.96 – 1.39]	[0.89 – 1.18]	[0.89 – 1.18]	[0.99 – 1.52]	[0.84 – 1.38]
Govt efficacy	0.84	0.82	1.06	1	1.02	0.96	0.95	1.04	1.05	0.98
	[0.62 – 1.13]	[0.63 – 1.05]	[0.83 – 1.34]	[0.84 – 1.20]	[0.79 – 1.30]	[0.73 – 1.27]	[0.77 – 1.17]	[0.86 – 1.27]	[0.77 – 1.43]	[0.72 – 1.34]
Perceived infection risk	1.18	1.39 ***	1.30 **	1.04	1.19	1.18	1.09	0.99	1.26	1.46 **
	[0.96 – 1.46]	[1.16 – 1.66]	[1.09 – 1.54]	[0.90 – 1.18]	[1.00 – 1.42]	[0.98 – 1.41]	[0.94 – 1.26]	[0.86 – 1.13]	[1.00 – 1.59]	[1.14 – 1.86]
Worry about COVID-19	1.1	1.25 *	1.41 ***	1.37 ***	1.58 ***	1.63 ***	1.56 ***	1.43 ***	1.47 **	1.27
	[0.88 – 1.36]	[1.04 – 1.48]	[1.19 – 1.66]	[1.19 – 1.57]	[1.33 – 1.88]	[1.36 – 1.96]	[1.36 – 1.80]	[1.23 – 1.65]	[1.17 – 1.87]	[0.99 – 1.64]
Observations	698	1143	1314	1845	1095	1249	1772	1702	693	680
R^2 Tjur	0.068	0.172	0.165	0.192	0.168	0.169	0.174	0.192	0.184	0.283

Odds ratios [95CI] shown, all continuous measures were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (R, Respondi; P, Prolific). [a]Gender is unstandardized

*p < .05, **p < .01, *** p < .001

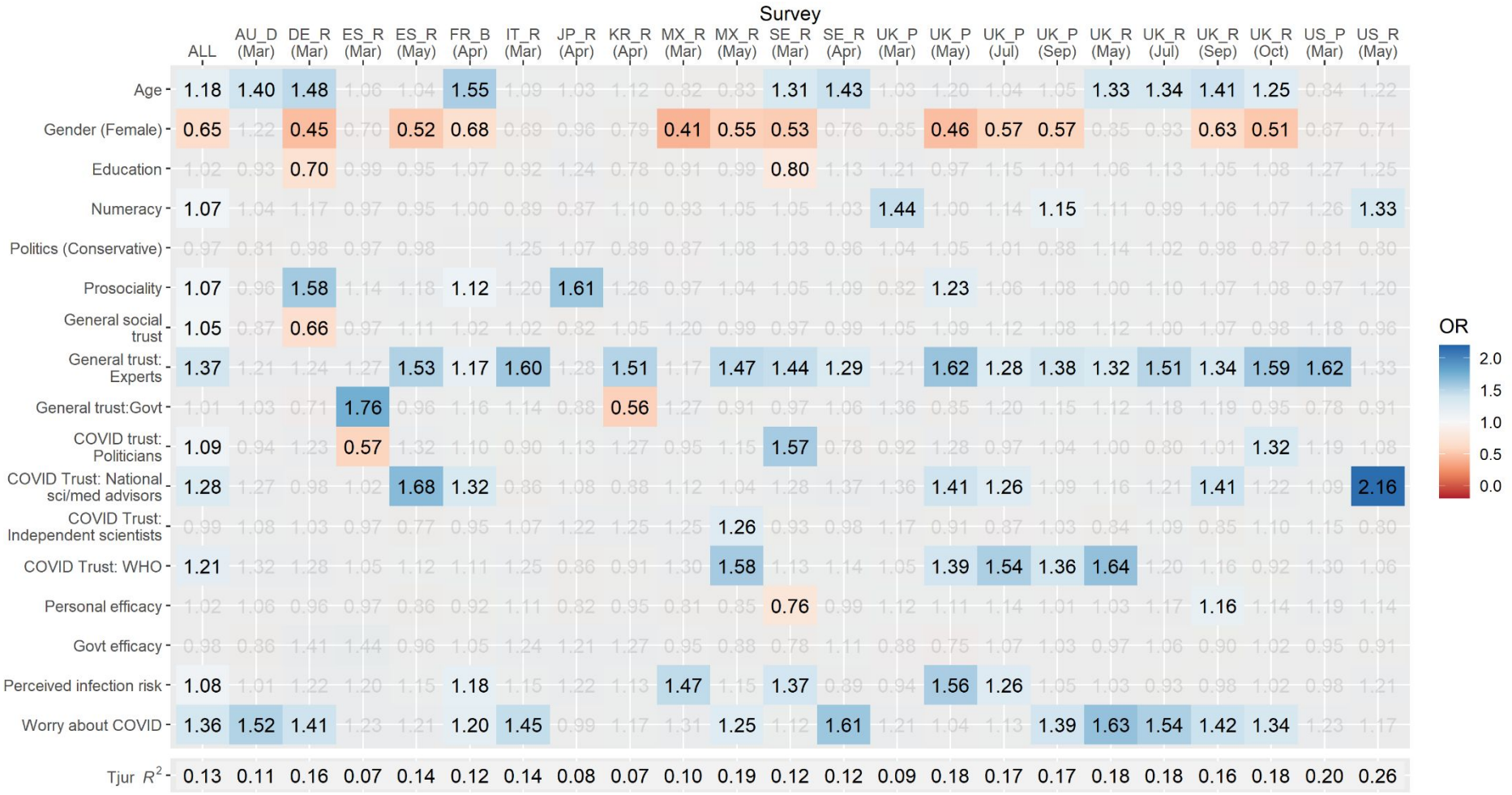

Figure S2. Heatmap of odds ratios in model predicting recommending vaccine to vulnerable friends/family. Columns represent individual samples and rows represent predictors in model. Grey values are non-significant, $p > .05$. Red shading indicates a lower likelihood of vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; R, Respondi). Political orientation data was not collected in France, this sample is excluded from pooled data.

Table S6

Full logistic regression results from model predicting vaccine recommendation to vulnerable friends or family (continued on following page)

	ALL *OR*	**AU_D (Mar)** *OR*	**DE_R (Mar)** *OR*	**ES_R (Mar)** *OR*	**ES_R (May)** *OR*	**FR_B (Apr)** *OR*	**IT_R (Mar)** *OR*	**JP_R (Apr)** *OR*	**KR_R (Apr)** *OR*	**MX_R (Mar)** *OR*	**MX_R (May)** *OR*	**SE_R (Mar)** *OR*	**SE_R (Apr)** *OR*
(Intercept)	7.64 *** [7.15 – 8.17]	10.40 *** [7.01 – 16.08]	21.06 *** [13.01 – 36.22]	13.37 *** [8.82 – 21.29]	8.84 *** [6.21 – 12.98]	6.45 *** [5.50 – 7.61]	14.40 *** [8.98 – 24.48]	4.88 *** [3.58 – 6.79]	11.66 *** [7.94 – 17.84]	22.54 *** [13.36 – 41.23]	5.04 *** [3.72 – 6.96]	5.49 *** [4.05 – 7.60]	3.72 *** [2.80 – 5.01]
Age	1.18 *** [1.13 – 1.24]	1.40 * [1.05 – 1.88]	1.48 * [1.09 – 2.02]	1.06 [0.80 – 1.41]	1.04 [0.83 – 1.32]	1.55 *** [1.39 – 1.73]	1.09 [0.79 – 1.51]	1.03 [0.81 – 1.29]	1.12 [0.86 – 1.48]	0.82 [0.60 – 1.11]	0.83 [0.68 – 1.02]	1.31 * [1.06 – 1.63]	1.43 ** [1.15 – 1.78]
Gender (Female)[a]	0.65 *** [0.59 – 0.70]	1.22 [0.71 – 2.10]	0.45 ** [0.25 – 0.81]	0.7 [0.40 – 1.21]	0.52 ** [0.32 – 0.81]	0.68 *** [0.56 – 0.84]	0.69 [0.37 – 1.26]	0.96 [0.62 – 1.50]	0.79 [0.47 – 1.32]	0.41 ** [0.20 – 0.77]	0.55 ** [0.36 – 0.82]	0.53 ** [0.35 – 0.81]	0.76 [0.50 – 1.13]
Education	1.02 [0.98 – 1.07]	0.93 [0.70 – 1.23]	0.70 * [0.52 – 0.93]	0.99 [0.76 – 1.29]	0.95 [0.76 – 1.18]	1.07 [0.97 – 1.18]	0.92 [0.67 – 1.26]	1.24 [0.99 – 1.55]	0.78 [0.59 – 1.02]	0.91 [0.65 – 1.25]	0.99 [0.81 – 1.21]	0.80 * [0.65 – 0.98]	1.13 [0.93 – 1.37]
Numeracy	1.07 *** [1.03 – 1.12]	1.04 [0.79 – 1.40]	1.17 [0.88 – 1.58]	0.97 [0.75 – 1.27]	0.95 [0.76 – 1.19]	1 [0.91 – 1.11]	0.89 [0.65 – 1.23]	0.87 [0.70 – 1.10]	1.1 [0.84 – 1.45]	0.93 [0.69 – 1.27]	1.05 [0.86 – 1.29]	1.05 [0.85 – 1.30]	1.03 [0.85 – 1.27]
Politics (Conservative)	0.97 [0.93 – 1.01]	0.81 [0.60 – 1.08]	0.98 [0.73 – 1.31]	0.97 [0.74 – 1.29]	0.98 [0.77 – 1.24]		1.25 [0.91 – 1.72]	1.07 [0.86 – 1.33]	0.89 [0.67 – 1.17]	0.87 [0.64 – 1.20]	1.08 [0.89 – 1.32]	1.03 [0.84 – 1.27]	0.96 [0.78 – 1.19]
Prosociality	1.07 ** [1.03 – 1.12]	0.96 [0.70 – 1.31]	1.58 ** [1.14 – 2.19]	1.14 [0.87 – 1.49]	1.18 [0.94 – 1.49]	1.12 * [1.01 – 1.23]	1.2 [0.88 – 1.62]	1.61 *** [1.26 – 2.07]	1.26 [0.95 – 1.66]	0.97 [0.72 – 1.31]	1.04 [0.84 – 1.27]	1.05 [0.85 – 1.30]	1.09 [0.89 – 1.34]
General social trust	1.05 * [1.00 – 1.10]	0.87 [0.62 – 1.19]	0.66 * [0.47 – 0.92]	0.97 [0.71 – 1.31]	1.11 [0.87 – 1.41]	1.02 [0.92 – 1.14]	1.02 [0.74 – 1.41]	0.82 [0.63 – 1.07]	1.05 [0.78 – 1.42]	1.2 [0.88 – 1.68]	0.99 [0.81 – 1.22]	0.97 [0.77 – 1.22]	0.99 [0.80 – 1.23]
General trust: Experts	1.37 *** [1.31 – 1.44]	1.21 [0.89 – 1.63]	1.24 [0.85 – 1.83]	1.27 [0.93 – 1.74]	1.53 *** [1.20 – 1.96]	1.17 ** [1.04 – 1.31]	1.60 ** [1.14 – 2.25]	1.28 [0.97 – 1.69]	1.51 ** [1.12 – 2.05]	1.17 [0.85 – 1.60]	1.47 ** [1.17 – 1.86]	1.44 ** [1.12 – 1.85]	1.29 * [1.02 – 1.63]
General trust: Govt	1.01 [0.96 – 1.08]	1.03 [0.72 – 1.47]	0.71 [0.46 – 1.10]	1.76 ** [1.20 – 2.62]	0.96 [0.71 – 1.30]	1.16 [0.99 – 1.35]	1.14 [0.77 – 1.70]	0.88 [0.66 – 1.18]	0.56 *** [0.40 – 0.77]	1.27 [0.84 – 1.95]	0.91 [0.70 – 1.19]	0.97 [0.73 – 1.30]	1.06 [0.78 – 1.46]
COVID trust: Politicians	1.09 * [1.01 – 1.17]	0.94 [0.59 – 1.49]	1.23 [0.75 – 2.02]	0.57 * [0.36 – 0.89]	1.32 [0.93 – 1.90]	1.1 [0.94 – 1.29]	0.9 [0.55 – 1.45]	1.13 [0.75 – 1.72]	1.27 [0.89 – 1.82]	0.95 [0.61 – 1.49]	1.15 [0.84 – 1.56]	1.57 * [1.11 – 2.23]	0.78 [0.54 – 1.10]
COVID Trust: National sci/med advisors	1.28 *** [1.21 – 1.36]	1.27 [0.85 – 1.92]	0.98 [0.59 – 1.60]	1.02 [0.69 – 1.51]	1.68 *** [1.24 – 2.30]	1.32 *** [1.14 – 1.52]	0.86 [0.54 – 1.37]	1.08 [0.77 – 1.53]	0.88 [0.61 – 1.28]	1.12 [0.78 – 1.61]	1.04 [0.78 – 1.37]	1.28 [0.93 – 1.75]	1.37 [0.99 – 1.91]
COVID Trust: Independent scientists	0.99 [0.94 – 1.04]	1.08 [0.76 – 1.53]	1.03 [0.70 – 1.52]	0.97 [0.68 – 1.36]	0.77 [0.58 – 1.02]	0.95 [0.85 – 1.07]	1.07 [0.75 – 1.50]	1.22 [0.88 – 1.70]	1.25 [0.89 – 1.74]	1.25 [0.89 – 1.74]	1.26 * [1.00 – 1.59]	0.93 [0.72 – 1.21]	0.98 [0.77 – 1.24]
COVID Trust: WHO	1.21 *** [1.15 – 1.28]	1.32 [0.93 – 1.85]	1.28 [0.86 – 1.90]	1.05 [0.74 – 1.47]	1.12 [0.84 – 1.49]	1.11 [0.98 – 1.26]	1.25 [0.83 – 1.86]	0.86 [0.63 – 1.15]	0.91 [0.66 – 1.23]	1.3 [0.93 – 1.81]	1.58 *** [1.23 – 2.02]	1.13 [0.87 – 1.47]	1.14 [0.89 – 1.46]
Personal efficacy	1.02 [0.97 – 1.06]	1.06 [0.76 – 1.47]	0.96 [0.70 – 1.30]	0.97 [0.71 – 1.32]	0.86 [0.66 – 1.11]	0.92 [0.82 – 1.02]	1.11 [0.77 – 1.59]	0.82 [0.62 – 1.07]	0.95 [0.69 – 1.31]	0.81 [0.56 – 1.15]	0.85 [0.66 – 1.10]	0.76 * [0.60 – 0.96]	0.99 [0.80 – 1.22]
Govt efficacy	0.98 [0.92 – 1.05]	0.86 [0.55 – 1.33]	1.41 [0.97 – 2.05]	1.44 [0.96 – 2.20]	0.96 [0.69 – 1.33]	1.05 [0.91 – 1.21]	1.24 [0.81 – 1.89]	1.21 [0.81 – 1.81]	1.27 [0.87 – 1.85]	0.95 [0.61 – 1.48]	0.88 [0.65 – 1.19]	0.78 [0.56 – 1.07]	1.11 [0.82 – 1.52]
Perceived infection risk	1.08 *** [1.03 – 1.13]	1.01 [0.74 – 1.37]	1.22 [0.89 – 1.68]	1.2 [0.91 – 1.58]	1.15 [0.91 – 1.45]	1.18 ** [1.06 – 1.31]	1.15 [0.83 – 1.58]	1.22 [0.96 – 1.55]	1.13 [0.84 – 1.50]	1.47 * [1.06 – 2.04]	1.15 [0.92 – 1.43]	1.37 ** [1.10 – 1.71]	0.89 [0.72 – 1.10]
Worry about COVID-19	1.36 *** [1.30 – 1.42]	1.52 ** [1.15 – 2.03]	1.41 * [1.05 – 1.90]	1.23 [0.92 – 1.64]	1.21 [0.96 – 1.52]	1.20 *** [1.08 – 1.34]	1.45 ** [1.09 – 1.92]	0.99 [0.78 – 1.25]	1.17 [0.88 – 1.53]	1.31 [0.96 – 1.79]	1.25 * [1.01 – 1.56]	1.12 [0.90 – 1.38]	1.61 *** [1.29 – 2.00]
Observations	19208	643	639	668	667	2969	530	590	677	620	681	652	653
R^2 Tjur	0.131	0.109	0.162	0.069	0.136	0.118	0.137	0.076	0.073	0.105	0.186	0.121	0.124

Odds ratios [95CI] shown, all continuous measures were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (D, Dynata; P, Prolific; R, Respondi). [a]Gender is unstandardized. Political orientation data was not collected in France; this sample is excluded from pooled data. *p < .05, **p < .01, *** p < .001

Table S6 (continued)

Full logistic regression results from model predicting vaccine recommendation to vulnerable others

	UK_P (Mar) *OR*	**UK_P (May)** *OR*	**UK_P (Jul)** *OR*	**UK_P (Sep)** *OR*	**UK_R (May)** *OR*	**UK_R (Jul)** *OR*	**UK_R (Sep)** *OR*	**UK_R (Oct)** *OR*	**US_P (Mar)** *OR*	**US_R (May)** *OR*
(Intercept)	16.28 ***	15.53 ***	10.84 ***	6.56 ***	8.65 ***	8.29 ***	6.65 ***	5.75 ***	11.91 ***	8.09 ***
	[10.45 – 26.82]	[11.04 – 22.50]	[8.18 – 14.64]	[5.37 – 8.08]	[6.48 – 11.80]	[6.34 – 11.02]	[5.41 – 8.25]	[4.70 – 7.10]	[8.02 – 18.38]	[5.64 – 11.97]
Age	1.03	1.20	1.04	1.05	1.33 **	1.34 **	1.41 ***	1.25 **	0.84	1.22
	[0.76 – 1.39]	[0.97 – 1.49]	[0.86 – 1.26]	[0.92 – 1.21]	[1.08 – 1.65]	[1.10 – 1.64]	[1.22 – 1.63]	[1.08 – 1.44]	[0.64 – 1.10]	[0.94 – 1.58]
Gender (Female)	0.85	0.46 ***	0.57 **	0.57 ***	0.85	0.93	0.63 ***	0.51 ***	0.67	0.71
	[0.46 – 1.55]	[0.30 – 0.69]	[0.40 – 0.82]	[0.44 – 0.74]	[0.58 – 1.24]	[0.65 – 1.33]	[0.48 – 0.82]	[0.39 – 0.66]	[0.40 – 1.11]	[0.45 – 1.12]
Education	1.21	0.97	1.15	1.01	1.06	1.13	1.05	1.08	1.27	1.25
	[0.89 – 1.62]	[0.79 – 1.18]	[0.96 – 1.37]	[0.89 – 1.15]	[0.88 – 1.29]	[0.94 – 1.35]	[0.91 – 1.20]	[0.94 – 1.23]	[0.98 – 1.64]	[0.99 – 1.58]
Numeracy	1.44 *	1.00	1.14	1.15 *	1.11	0.99	1.06	1.07	1.26	1.33 *
	[1.05 – 2.02]	[0.82 – 1.22]	[0.95 – 1.37]	[1.00 – 1.32]	[0.92 – 1.35]	[0.83 – 1.19]	[0.93 – 1.22]	[0.94 – 1.22]	[0.96 – 1.66]	[1.04 – 1.72]
Politics (Conservative)	1.04	1.05	1.01	0.88	1.14	1.02	0.98	0.87	0.81	0.80
	[0.74 – 1.46]	[0.84 – 1.32]	[0.82 – 1.25]	[0.76 – 1.03]	[0.92 – 1.41]	[0.83 – 1.24]	[0.85 – 1.14]	[0.75 – 1.00]	[0.60 – 1.09]	[0.60 – 1.08]
Prosociality	0.82	1.23 *	1.06	1.08	1.00	1.1	1.07	1.08	0.97	1.20
	[0.60 – 1.09]	[1.01 – 1.50]	[0.89 – 1.25]	[0.94 – 1.23]	[0.82 – 1.22]	[0.91 – 1.33]	[0.93 – 1.23]	[0.94 – 1.24]	[0.75 – 1.25]	[0.94 – 1.53]
General social trust	1.05	1.09	1.12	1.08	1.12	1.00	1.07	0.98	1.18	0.96
	[0.77 – 1.43]	[0.87 – 1.36]	[0.92 – 1.37]	[0.95 – 1.24]	[0.91 – 1.39]	[0.81 – 1.21]	[0.93 – 1.24]	[0.85 – 1.13]	[0.89 – 1.57]	[0.75 – 1.24]
General trust: Experts	1.21	1.62 ***	1.28 *	1.38 ***	1.32 *	1.51 ***	1.34 ***	1.59 ***	1.62 **	1.33
	[0.87 – 1.69]	[1.28 – 2.05]	[1.05 – 1.55]	[1.19 – 1.61]	[1.05 – 1.66]	[1.23 – 1.84]	[1.14 – 1.57]	[1.35 – 1.87]	[1.17 – 2.27]	[0.98 – 1.81]
General trust:Govt	1.36	0.85	1.2	1.15	1.12	1.18	1.19	0.95	0.78	0.91
	[0.90 – 2.06]	[0.64 – 1.13]	[0.93 – 1.53]	[0.96 – 1.38]	[0.86 – 1.44]	[0.92 – 1.51]	[0.98 – 1.44]	[0.80 – 1.14]	[0.55 – 1.08]	[0.67 – 1.24]
COVID trust: Politicians	0.92	1.28	0.97	1.04	1.00	0.80	1.01	1.32 *	1.19	1.08
	[0.55 – 1.53]	[0.91 – 1.83]	[0.71 – 1.32]	[0.83 – 1.30]	[0.73 – 1.37]	[0.57 – 1.13]	[0.79 – 1.28]	[1.05 – 1.66]	[0.77 – 1.81]	[0.75 – 1.54]
COVID Trust: National sci/med advisors	1.36	1.41 *	1.26 *	1.09	1.16	1.21	1.41 ***	1.22	1.09	2.16 ***
	[0.90 – 2.07]	[1.07 – 1.85]	[1.00 – 1.58]	[0.91 – 1.30]	[0.88 – 1.52]	[0.91 – 1.59]	[1.16 – 1.72]	[1.00 – 1.48]	[0.76 – 1.55]	[1.53 – 3.08]
COVID Trust: Independent scientists	1.17	0.91	0.87	1.03	0.84	1.09	0.85	1.10	1.15	0.80
	[0.83 – 1.64]	[0.72 – 1.15]	[0.70 – 1.06]	[0.88 – 1.20]	[0.65 – 1.07]	[0.86 – 1.37]	[0.71 – 1.01]	[0.93 – 1.30]	[0.86 – 1.53]	[0.59 – 1.06]
COVID Trust: WHO	1.05	1.39 **	1.54 ***	1.36 ***	1.64 ***	1.2	1.16	0.92	1.30	1.06
	[0.73 – 1.51]	[1.11 – 1.75]	[1.25 – 1.90]	[1.16 – 1.60]	[1.29 – 2.09]	[0.94 – 1.53]	[0.96 – 1.39]	[0.76 – 1.11]	[0.96 – 1.75]	[0.76 – 1.47]
Personal efficacy	1.12	1.11	1.14	1.01	1.03	1.17	1.16 *	1.14	1.19	1.14
	[0.84 – 1.50]	[0.91 – 1.36]	[0.95 – 1.35]	[0.87 – 1.16]	[0.83 – 1.27]	[0.96 – 1.43]	[1.00 – 1.35]	[0.99 – 1.32]	[0.92 – 1.53]	[0.87 – 1.48]
Govt efficacy	0.88	0.75	1.07	1.03	0.97	1.06	0.9	1.02	0.95	0.91
	[0.57 – 1.36]	[0.56 – 1.01]	[0.81 – 1.42]	[0.85 – 1.25]	[0.74 – 1.28]	[0.78 – 1.46]	[0.72 – 1.12]	[0.83 – 1.25]	[0.66 – 1.39]	[0.65 – 1.29]
Perceived infection risk	0.94	1.56 ***	1.26 *	1.05	1.03	0.93	0.98	1.02	0.98	1.21
	[0.69 – 1.28]	[1.25 – 1.94]	[1.03 – 1.53]	[0.91 – 1.21]	[0.84 – 1.27]	[0.75 – 1.14]	[0.84 – 1.14]	[0.88 – 1.17]	[0.73 – 1.31]	[0.92 – 1.58]
Worry about COVID	1.21	1.04	1.13	1.39 ***	1.63 ***	1.54 ***	1.42 ***	1.34 ***	1.23	1.17
	[0.89 – 1.62]	[0.84 – 1.28]	[0.93 – 1.37]	[1.20 – 1.62]	[1.35 – 1.98]	[1.26 – 1.89]	[1.23 – 1.65]	[1.15 – 1.55]	[0.92 – 1.64]	[0.89 – 1.53]
Observations	698	1142	1314	1844	1094	1249	1772	1702	693	680
R^2 Tjur	0.086	0.181	0.169	0.167	0.183	0.185	0.160	0.182	0.200	0.261

Odds ratios [95CI] shown, all continuous measures were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (D, Dynata; P, Prolific; R, Respondi). [a]Gender is unstandardized. *p < .05, **p < .01, *** p < .001

Table S7

Results of multi-level model (samples nested by country, month) adjusting for survey-level variables.

	OR	*CI*
(Intercept)	5.33 ***	4.16 – 6.84
Age	1.20 ***	1.15 – 1.25
Gender (Female)	0.58 ***	0.54 – 0.63
Education	1.02	0.98 – 1.07
Numeracy	1.02	0.98 – 1.06
Politics (Conservative)	0.93 ***	0.89 – 0.97
Prosociality	1.06 **	1.02 – 1.10
General social trust	1.04	1.00 – 1.08
General trust: Experts	1.30 ***	1.24 – 1.36
General trust: Govt	1.05	0.99 – 1.11
COVID trust: Politicians	1.05	0.99 – 1.13
COVID Trust: National sci/med advisors	1.19 ***	1.13 – 1.26
COVID Trust: Independent scientists	0.94 *	0.90 – 0.99
COVID Trust: WHO	1.23 ***	1.17 – 1.29
Personal efficacy	1.00	0.96 – 1.05
Govt efficacy	1.00	0.94 – 1.06
Perceived infection risk	1.16 ***	1.11 – 1.20
Worry about COVID	1.44 ***	1.38 – 1.50
Days since first case	0.93	0.70 – 1.22
Total confirmed cases	1.02	0.83 – 1.26
Random Effects		
σ^2	3.29	
$\tau_{00\ month:country}$	0.09	
$\tau_{00\ country}$	0.04	
Intraclass correlation coefficient	0.04	
N_{month}	6	
$N_{country}$	10	
Observations	19216	
Marginal R^2 / Conditional R^2	0.184 / 0.216	

Odds ratios [95CI] based on standardized (scaled and mean centered) continuous variables, except for gender which is unstandardized. *p < .05, ***p < .001.

Table S8

Result of logistic regression models predicting vaccine acceptance, including or excluding general vaccine attitudes.

	Base model			Including general vaccine attitudes		
	UK Prolific (Sep)	**UK Respondi (Sep)**	**UK Respondi (Oct)**	**UK Prolific (Sep)**	**UK Respondi (Sep)**	**UK Respondi (Oct)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	4.14 ***	5.56 ***	4.91 ***	4.28 ***	6.17 ***	5.40 ***
	[3.47 – 4.98]	[4.57 – 6.81]	[4.05 – 6.00]	[3.57 – 5.17]	[5.02 – 7.67]	[4.39 – 6.69]
Age	1.12	1.39 ***	1.37 ***	1.15 *	1.32 ***	1.25 **
	[0.99 – 1.27]	[1.21 – 1.59]	[1.20 – 1.58]	[1.01 – 1.31]	[1.15 – 1.52]	[1.08 – 1.45]
Gender (Female)	0.62 ***	0.50 ***	0.44 ***	0.63 ***	0.49 ***	0.43 ***
	[0.49 – 0.79]	[0.38 – 0.64]	[0.34 – 0.57]	[0.49 – 0.80]	[0.37 – 0.64]	[0.33 – 0.57]
Education	1.02	1.11	1.18 *	1.00	1.08	1.14
	[0.91 – 1.15]	[0.98 – 1.27]	[1.04 – 1.34]	[0.88 – 1.13]	[0.94 – 1.23]	[1.00 – 1.31]
Numeracy	1.12	1.00	1.00	1.06	0.93	0.87 *
	[0.99 – 1.26]	[0.88 – 1.14]	[0.88 – 1.13]	[0.93 – 1.20]	[0.82 – 1.07]	[0.76 – 0.99]
Politics (Conservative)	0.85 *	0.88	0.86 *	0.85 *	0.87	0.85 *
	[0.74 – 0.97]	[0.77 – 1.01]	[0.75 – 0.99]	[0.74 – 0.98]	[0.75 – 1.01]	[0.73 – 0.98]
Prosociality	1.11	1.09	1.07	1.10	1.08	1.04
	[0.98 – 1.26]	[0.96 – 1.25]	[0.94 – 1.23]	[0.96 – 1.25]	[0.94 – 1.24]	[0.90 – 1.20]
General social trust	1.03	1.09	0.97	1.03	1.04	0.96
	[0.91 – 1.17]	[0.96 – 1.25]	[0.85 – 1.11]	[0.91 – 1.17]	[0.90 – 1.20]	[0.83 – 1.11]
General trust: Experts	1.39 ***	1.23 **	1.45 ***	1.28 **	1.11	1.29 **
	[1.20 – 1.60]	[1.06 – 1.44]	[1.24 – 1.70]	[1.11 – 1.49]	[0.95 – 1.31]	[1.09 – 1.53]
General trust: Govt	1.27 **	1.14	1.03	1.24 *	1.16	0.99
	[1.08 – 1.51]	[0.95 – 1.37]	[0.86 – 1.22]	[1.05 – 1.48]	[0.96 – 1.40]	[0.82 – 1.19]
COVID trust: Politicians	0.93	1.11	1.26 *	0.95	1.17	1.35 *
	[0.76 – 1.14]	[0.88 – 1.39]	[1.01 – 1.56]	[0.77 – 1.17]	[0.92 – 1.48]	[1.07 – 1.70]
COVID Trust: National sci/med advisors	1.14	1.25 *	1.29 **	1.12	1.14	1.20
	[0.97 – 1.34]	[1.04 – 1.50]	[1.07 – 1.56]	[0.94 – 1.32]	[0.94 – 1.38]	[0.98 – 1.47]
COVID Trust: Independent scientists	0.93	0.88	1.00	0.95	0.90	0.95
	[0.80 – 1.07]	[0.74 – 1.04]	[0.85 – 1.17]	[0.82 – 1.11]	[0.75 – 1.07]	[0.80 – 1.13]
COVID Trust: WHO	1.45 ***	1.32 **	1.04	1.41 ***	1.33 **	1.03
	[1.25 – 1.68]	[1.11 – 1.57]	[0.87 – 1.24]	[1.21 – 1.64]	[1.11 – 1.59]	[0.85 – 1.25]
Personal efficacy	1.10	1.03	1.03	1.06	1.00	0.98
	[0.96 – 1.25]	[0.89 – 1.18]	[0.89 – 1.18]	[0.93 – 1.22]	[0.86 – 1.16]	[0.84 – 1.14]
Govt efficacy	1.00	0.95	1.04	1.01	0.95	1.08
	[0.84 – 1.20]	[0.77 – 1.17]	[0.86 – 1.27]	[0.84 – 1.22]	[0.77 – 1.18]	[0.88 – 1.33]
Perceived infection risk	1.04	1.09	0.99	1.02	1.12	0.97
	[0.90 – 1.18]	[0.94 – 1.26]	[0.86 – 1.13]	[0.88 – 1.17]	[0.96 – 1.31]	[0.83 – 1.12]
Worry about COVID	1.37 ***	1.56 ***	1.43 ***	1.36 ***	1.47 ***	1.39 ***
	[1.19 – 1.57]	[1.36 – 1.80]	[1.23 – 1.65]	[1.18 – 1.57]	[1.26 – 1.70]	[1.19 – 1.63]
General vaccine attitudes				1.69 ***	2.08 ***	2.32 ***
				[1.51 – 1.89]	[1.84 – 2.37]	[2.02 – 2.66]
Observations	1845	1772	1702	1839	1767	1698
R^2 Tjur	0.192	0.174	0.192	0.235	0.247	0.281

Odds ratios [95CI] based on standardized (scaled and mean centered) continuous variables except for gender which is unstandardized.

*p < .05, **p < .01, *** p < .001

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*
Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any pre-specified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	11
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	7
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	-
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8, Table S1
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7
Bias	9	Describe any efforts to address potential sources of bias	11
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	11
		(*b*) Describe any methods used to examine subgroups and interactions	11
		(*c*) Explain how missing data were addressed	10 (footnote), Table S3
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed	-

		Case-control study—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	12(footnote), Table S6
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	11 (Table 1), Tables S6,S7
		(b) Give reasons for non-participation at each stage	7
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	11 (Table 1), Tables S4, S5
		(b) Indicate number of participants with missing data for each variable of interest	10 (footnote), Table S3
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	-
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	-
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	-
		Cross-sectional study—Report numbers of outcome events or summary measures	11
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	12, Figure S1,
		(*b*) Report category boundaries when continuous variables were categorized	-
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.
Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Correlates of intended COVID-19 vaccine acceptance across time and countries: Results from a series of cross-sectional surveys

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ABSTRACT

Objective: Describe demographic, social, and psychological correlates of willingness to receive a COVID-19 vaccine.

Setting: Series of online surveys undertaken between March and October 2020.

Participants: A total of 25 separate national samples (matched to country population by age and sex) in 12 different countries were recruited through online panel providers (N = 25,334).

Primary outcome measures: Reported willingness to receive a COVID-19 vaccination.

Results: Reported willingness to receive a vaccine varied widely across samples, ranging from 63% to 88%. Multivariate logistic regression analyses reveal sex (female OR = 0.59, 95%CI [0.55, 0.64]), trust in medical and scientific experts (OR = 1.27, [1.22, 1.33]), and worry about the COVID-19 virus (OR = 1.49, [1.43, 1.55]) as the strongest correlates of stated vaccine acceptance considering pooled data, and the most consistent correlates across countries. In a subset of UK samples we show that these effects are robust after controlling for attitudes towards vaccination in general.

Conclusions: Our results indicate that the burden of trust largely rests on the shoulders of the scientific and medical community, with implications for how future COVID-19 vaccination information should be communicated to maximize uptake.

Keywords: Vaccination, vaccine hesitancy, COVID-19, risk, trust.

ARTICLE SUMMARY

Strengths and limitations of this study

- To examine predictors of vaccine acceptance we collected data from a large number of participants in several different countries and at different time points.
- We examine a range of demographic, risk and trust-related predictors using multivariate models.
- Samples were quota matched (age and gender) to country population, but not probability sampled.
- At the time of the surveys no COVID-19 vaccine was publicly available, thus stated acceptance is hypothetical, and may change with provision of more information about current vaccines.

INTRODUCTION

COVID-19 has resulted in over 2.5 million deaths globally, illness for millions more, and unprecedented social and economic disruption[1,2]. Many governments have signaled that mass vaccination against the virus is the most straightforward—and possibly only—route to normality and stability[3,4]. While recent announcements of effective vaccines[5,6] and their rollout to certain demographics in some countries is promising[7], the wider impact of vaccines on preventing the spread of disease is dependent on broad uptake within a given population. In order to achieve 'herd immunity', enough people in a population must be immune to prevent the spread of a disease among non-immune individuals. The proportion varies depending on a number of factors including how infectious the contagion is, its prevalence in a population, and the variation in individual susceptibility or exposure to infection[8]. Estimates for the level of immunity required for COVID-19 herd immunity have ranged from 50% to 80% of the population, acquired through either natural infection and recovery, or through vaccination[9,10]. It must be noted that, while there is evidence that currently available vaccines can reduce SARS-CoV-2 infections [11], there is only limited preliminary evidence that vaccination can reduce transmission of the virus at the time of writing [12]. Thus, the net impact of vaccination campaigns on the spread of the virus remains uncertain until more research is conducted [13].

Vaccine hesitancy—defined as a delay in acceptance or refusal of vaccines despite availability[14]—poses a challenge to achieving herd immunity. If a sufficient number of people in a population reject vaccination—and herd immunity is not achieved—the virus will continue to circulate among susceptible individuals, including those who are unable to be vaccinated for medical reasons. The WHO identified vaccine hesitancy as one of the top 10 threats to global health in 2019[15], and in the pressing context of COVID-19, understanding vaccine hesitancy has only grown in importance[16].

Public health researchers concerned with uptake of vaccination have understandably sought to uncover the drivers of vaccine hesitancy. By identifying antecedents of vaccine hesitancy, policy makers, public health officials, and professional communicators can target interventions to increase uptake of vaccines and ultimately reduce the burden of disease in a population[4]. However, strategies developed for campaigns targeting diseases with well-established vaccines (e.g. MMR, pertussis) may not fully translate to a pandemic context where there is greater uncertainty, less information available, and where institutional trust plays a greater role—as was noted in the wake of the 2009 H1N1 influenza pandemic[17].

Recent evidence shows that acceptance of a COVID-19 vaccine is far from universal in many countries. Lazarus et al[18] conducted a series of surveys across 19 countries in June 2020, asking respondents how much they agreed with the following statement: 'If a COVID-19 vaccine is proven safe and effective and is available, I will take it'. The proportion of respondents who agreed ranged from 88.6% (China) to 55.8% (Russia). Examining possible predictors of vaccine acceptance, the authors report that men, older people, and those who express greater trust in the government were more likely to express willingness to receive a vaccine. The role of trust (in science, the government or the medical system) is a recurring theme in many other recent studies which have examined COVID-19 vaccine hesitancy in individual countries[19–27]. For example, Palamenghi et al[24] report that across two large random samples of the Italian population, trust in science was positively correlated (r = .37) with willingness to receive a COVID-19 vaccine. Frank and Arim[20] report that Canadians who are more trusting of local and national government bodies are more likely to express intentions to receive a vaccine if available, as are those who report high general social trust (i.e. believing that 'most people can be trusted').

Such results align with pre-COVID studies which have highlighted the role of trust in vaccination intentions and attitudes[17,28,29]. However, we note that recent studies

examining COVID-19 vaccine intentions have typically only examined trust in one entity (e.g. government or hospitals); research to date has not considered the possible overlap between trust in the government, trust in science and medicine, and general social trust[30–32]. There is also a question over the extent to which vaccine acceptance is linked to mistrust in experts and authorities *regarding COVID-19 in particular*, or a more general lack of trust in these actors. In order to target communications specifically designed to satisfy the information needs of those who distrust official authorities, it is important to identify the precise agents that they distrust (and, ideally, why).

Beyond trust, the perceived threat or risk posed by a given disease has also been shown to predict vaccination attitudes. Models of health behavior, such as the Health Belief Model[33] and Protection Motivation Theory[34], place the perceived risk or severity of a disease as a key driver of vaccination intentions (and other preventative health behaviors)[17,35]. Recent surveys in the US, Malaysia, and Israel have shown that perceived risk and worry regarding the COVID-19 virus is associated with vaccine acceptance[36–38]. Other factors, such as the perceived benefits and costs as well as efficacy of protective behaviors are also outlined in models of health behavior as predictors of engagement in a given health behavior. However, until recently, little information about the possible costs, distribution and efficacy of a COVID-19 vaccine was available, meaning that the public has not generally been able to assess the potential benefits of a vaccine outside of a purely hypothetical arena (although experimental work has examined the influence of these factors on willingness to receive a vaccine[39]).

There are also increasing concerns about the politicization of science and about politics becoming entangled with vaccine beliefs and attitudes specifically, particularly in the context of a pandemic where central government structures are deeply involved in all stages of the public health response[17,40]. Prior research[41] has shown that the rhetoric adopted

by political elites on social media can fuel anti-vaccination attitudes amongst their followers and that ideologies can help explain anti-vaccination attitudes[37,42].

In the current study we present a more comprehensive international analysis of the role of key social, political, and psychological correlates of COVID-19 vaccine acceptance across 12 countries, with multiple national surveys in some countries (total $N = 25{,}334$, see Table 1). All samples were recruited via online panel providers using quotas to ensure samples were matched to the general population in terms of age and gender (with the exception of France, see methods). Unlike previous studies, we examine reported trust in a range of actors, both in general and specifically relating to the COVID-19 pandemic. We also include several demographic factors (including political orientation), numeracy (known to play a role in risk perceptions[43], and vaccine attitudes in particular[44]), affective (worry) and cognitive (perceived likelihood of infection) aspects of perceived COVID-19 risk[45], broad measures of perceived efficacy, and, in a subset of samples, general attitudes towards vaccines.

METHODS

Participants and procedure

Between March and October 2020, we fielded 25 separate surveys across 12 countries. The majority of samples were recruited through an ISO certified international survey company Respondi (respondi.com).Our initial US and UK samples were recruited via Prolific (prolific.ac). Although some later samples from these countries were recruited via Respondi, we continued to also recruit Prolific samples to allow comparisons with our earliest data points in the pandemic. As we did not have matching Prolific and Respondi samples at each time point, and results differed slightly between these providers, we report these samples separately for transparency. Recruitment was managed by these external providers and exact response rates were not provided. However, Respondi provided a broad

estimate of a 30% response rate across surveys (personal communication; Respondi, 2021). Non-response bias was mitigated by quota-based sampling, which ensured all samples were representative of each country's population in terms of age and gender (using interlocking quotas based on national census data), and, in Prolific samples, ethnicity [46]. We also control for socio-demographic factors such as education level and political orientation in analyses below. Participants who had previously completed a survey were prevented from completing further surveys, so all our samples represent different individuals. Participants who did not finish the survey were excluded. Demographic details for each sample are shown in Table 1. For completeness we include several samples in which vaccine acceptance was measured but the survey did not include all the independent variables used in the models presented below. Surveys which did not include all these variables are marked with a '*' in Table 1.

All participants were directed via a study link to the Qualtrics platform, and provided informed consent before completing the survey. This study was approved by the University of Cambridge Psychology Research Ethics Committee (PRE.2020.034).

It is important to note that the surveys were conducted at various timepoints as the pandemic unfolded in each country. Table 1 also reports the total number of COVID-19 deaths for each country at each survey timepoint, and the number of reported cases in the week prior to the survey (with the caveat that reporting practices vary between countries). We also provide the Stringency Index measure generated by the COVID-19 Government Response Tracker [47], which is a 0-100 index based on various restrictions put in place by governments to control the pandemic (e.g. closing schools, 'shelter in place' requirements). External data were sourced from the COVID-19 Government Response Tracker [47] and Ali et al. [48].

The information about potential vaccines also changed over the data collection period. In February 2020, the first major vaccine candidates, the Moderna and Oxford AstraZeneca vaccines, were announced [49,50]. In mid-2020 the launches of Phase III trials for several vaccines were announced: Moderna and Pfizer BioNTech in July [51], and AstraZeneca in August [52]. Results of Phase III clinical trials and estimates of efficacy were not announced during the data collection period (ending in October, 2020). No vaccines were approved for use by local regulators at the time(s) the surveys were conducted in each country.

Materials

Participants reported their age and gender, level of education (ranging from *No formal education above age 16* to *PhD*), and political orientation (*Very liberal/left wing* to *Very conservative/right wing*). Numeracy was measured as a combined index of the 2-3 item adaptive form of the Berlin Numeracy Test [53] and an additional risk literacy item from Lipkus et al.[54].

Participants completed a widely used measure of general social trust (*Generally speaking, would you say most people can be trusted, or that you can't be too careful in dealing with people*?)[55] and a separate measure of prosociality (*To what extent do you think it's important to do things for the benefit of others and society even if they have some costs to you personally?*). Trust in experts and trust in government were each measured as the combined average of reported trust in three targets (experts: scientists, medical doctors and nurses, and scientific knowledge [Cronbach's αs .77-.86]; government: politicians, current government, civil servants [αs .73-.90]; all from *Cannot be trusted at all* to *Can be trusted a lot*). We also asked participants to report their trust in several actors with specific regard to the COVID-19 pandemic. Participants reported the extent to which they trust politicians in their country to 'deal effectively with the pandemic', and how much they separately trusted the country's national scientific and medical advisors, independent experts not connected

with government, and the WHO to 'know the best measures to take in the face of the pandemic' (all from *Not at all* to *Very much*). Personal and government efficacy were captured by items asking participants the extent to which they felt that, respectively, their own actions, and the actions of their country 'to limit the spread of coronavirus can make a difference' (*Not at all* to *Very much*). Perceived likelihood of infection was measured as an index of three related items (example: *I will probably get sick with the coronavirus/COVID-19*; αs .71-.89). Participants also reported their level of worry about the virus (from *Not at all worried* to *Very worried*). In a subset of UK samples, we also asked participants about their general attitude towards vaccination, using two items from Lewandowsky et al.'s [42] scale (example: *I believe that vaccines are a safe and reliable way to help avert the spread of preventable diseases* [*r*s .83-.87]).

Participants' vaccine acceptance was measured with the question: '*If a vaccine were to be available for the coronavirus/COVID-19 now, would you get vaccinated yourself?*' (*Yes/No)*. Participants were also asked *'If a vaccine were to be available for the coronavirus/COVID-19 now: Would you recommend vulnerable friends/family to get vaccinated?*' (*Yes/No)*. Full item wording for all measures can be found in Table S1.

Surveys were translated from English to other languages by native speakers fluent in English.

Analysis

To examine the correlates of vaccine acceptance we fitted a multivariate logistic regression model to the data from each survey. To allow for descriptive comparisons between countries and across time, we report model results separately for each country, time point, and (in the UK) panel provider. We also report results from the model fitted to the pooled data from all surveys, and a supplementary multi-level model adjusting for survey-level

variables (total number of cases and days since first case in country at time of survey). All analyses were conducted in R (v4.0.5).

RESULTS

Figure 1 shows the percentage of participants in each survey who responded that they would be willing to be vaccinated if a COVID-19 vaccine was available, or would recommend a vaccine to vulnerable others, given the options of 'Yes' or 'No' [1]. Across all samples, the percentage of respondents who stated they were willing to receive a vaccine ranged from 62.6% (Sweden, April) to 88.1% (Mexico, March), while the percentage of those who said they would recommend a vaccine to vulnerable others ranged from 67.5% (US, September) to 91.7% (UK, March). Descriptively, in every single sample the proportion of respondents stating a willingness to receive a vaccine was lower than the proportion who would recommend it to vulnerable others (M_{diff} = -5.79%, SD = 3.00). We also note a trend of decreasing stated acceptance over time: in nearly all countries with multiple samples, vaccine acceptance in any given survey was lower than previous surveys of the same population. For example between March and May, 2020, stated vaccine acceptance among respondents in Mexico dropped from 88.1% to 73.9% (a Chi-Square test of independence indicated that this difference was statistically significant, $\chi^2 = 42.44$, $p < .001$) In the US, stated vaccine acceptance (among participants recruited through online panel provider Respondi) fell more than 12 percentage points, from 74.7% to 62.6%, between May and September, 2020 ($\chi^2 = 25.89$, $p < .001$).

[1] Based on respondents who answered the question. In the Italy sample a number of participants were not presented with these items due to a technical error (n = 80, 11%). In the remaining samples the average proportion of missing responses for vaccine intention and recommendation items was 1% (see supplementary Tables S2 and S3 for description of missing data and the age and gender distribution of those participants who answered the vaccine acceptance item). We acknowledge that in some cases estimates of vaccine acceptance may not be based on samples exactly matched to a country's population age and gender distribution due to this missing data, but note that age and gender are controlled for in the models below.

1 [FIGURE 1 HERE]

Table 1.

Survey demographics, percentage of participants willing to receive a COVID-19 vaccine or to recommend it to vulnerable friends/family, and country-level pandemic indicators.

Country	Source	Date	N	M_{Age} (SD)	Female (%)	Tertiary Educated (%)	Vaccine - acceptance (%)	Vaccine - Recommend (%)	Total deaths	Days since first case	Cases week prior	Stringency Index
Australia	Dynata	20-Mar	700	46.3 (16.4)	51.0	43.4	82.9	88.7	7	55	591	47.22
China*	Respondi	09-Apr	700	43.2 (14.3)	48.9	73.1	85.8	87.4	3335	144	276	56.94
Germany	Respondi	23-Mar	700	46.7 (15.9)	49.9	32.7	80.8	89.2	123	56	21784	76.85
Spain	Respondi	22-Mar	700	46.7 (15.0)	51.1	58.1	83.6	89.8	1772	51	20970	71.76
Spain	Respondi	06-May	700	46.0 (15.0)	50.4	57.0	79.8	82.5	25857	96	7408	81.94
France	BVA	03-Apr	3002	48.8 (16.5)	52.5	71.1	69.7	80.7	6496	98	30979	87.96
Italy	Respondi	22-Mar	700	45.9 (14.8)	50.4	41.3	85.3	88.2	5476	51	34391	91.67
Japan	Respondi	10-Apr	699	48.1 (16.4)	50.9	53.3	74.5	80.1	125	85	3096	45.37
S. Korea	Respondi	09-Apr	700	45.3 (15.5)	49.0	70.5	85.6	88.4	204	80	447	82.41
Mexico	Respondi	21-Mar	693	38.7 (14.0)	50.5	66.4	88.1	90.3	2	22	210	8.33
Mexico	Respondi	06-May	700	38.6 (14.2)	51.0	75.8	73.9	75.6	2704	68	9835	82.41
Sweden	Respondi	28-Mar	700	45.5 (16.0)	49.1	40.3	66.3	77.2	239	57	1795	50.93
Sweden	Respondi	17-Apr	700	45.5 (16.5)	48.9	40.2	63.4	73.7	1925	77	3690	64.81
UK	Prolific	19-Mar	703	45.6 (15.7)	50.9	53.9	80.4	91.7	162	48	4719	31.48
UK	Prolific	07-May	1157	44.7 (15.7)	50.7	56.5	80.4	86.7	30321	97	25582	79.63
UK	Prolific	06-Jul	1325	44.5 (15.6)	52.5	58.5	78.9	85.3	40643	157	2461	64.35
UK	Prolific	18-Sep	1869	38.2 (15.0)	51.2	56.2	73.0	79.5	41732	231	24259	65.74
UK	Respondi	07-May	1150	45.7 (15.9)	52.0	43.4	78.9	84.2	30321	97	25582	79.63
UK*	Respondi	08-Jun	500	45.9 (15.9)	53.2	39.7	79.0	83.2	38666	129	7742	73.15
UK	Respondi	06-Jul	1326	45.4 (16.6)	51.7	44.9	80.1	84.4	40643	157	2461	64.35
UK	Respondi	18-Sep	1855	45.5 (16.1)	51.6	42.6	75.7	79.9	41732	231	24259	65.74
UK	Respondi	29-Oct	1744	46.7 (16.0)	52.2	42.0	72.2	76.1	45955	272	154873	75.00
US	Prolific	19-Mar	702	45.1 (15.8)	50.6	66.8	75.7	85.7	264	58	12077	67.13
US	Respondi	07-May	700	45.0 (16.1)	51.0	59.3	74.7	80.1	78618	107	187115	72.69
US*	Respondi	28-Sep	909	44.8 (15.6)	50.6	50.1	62.6	67.5	205612	251	288759	62.50

*Indicates survey that included vaccine acceptance items but not all model predictor variables (excluded from analyses below).

We fitted a multivariate logistic regression model to data from each sample to identify the correlates of COVID-19 vaccine intentions. Independent variables included: demographic variables; an objective measure of numeracy, political ideology; general social trust; prosociality (perceived importance of doing 'things for the benefit of others and society' even at personal cost); general trust in medical and scientific experts; general trust in government; specific trust in politicians to manage the pandemic; specific trust in (separately) national science advisors, independent scientists and the WHO to 'know the best measures to take in the face of the pandemic'; the perceived efficacy of their own and their country's actions to limit the spread of the virus; perceived likelihood of infection; and, worry about COVID-19 (for details on measures see Methods section and Table S1; descriptive statistics are reported in Table S4, and bivariate correlations in Figure S1). Continuous measures (i.e. all except gender) were scaled and mean centered prior to analysis. Only complete observations were included. Multicollinearity analyses indicated no issues arising from correlated predictors (all variance inflation factor values < 4). To facilitate the interpretation of results we present odds ratios in a heat map format in Figure 2. Full model results including confidence intervals can be found in Table S5. Results of models investigating correlates of willingness to recommend a vaccine to vulnerable others are also presented in supplementary materials (Figure S2, Table S6). We fitted an additional multi-level model to the pooled data, adjusting for country, month, days since first case, level of government intervention, total reported deaths, and number of cases reported in each country at each time point (Table S7). Fixed effects were essentially unchanged from those reported in the simpler pooled model. Due to the low number of groups, estimates of random effects were unreliable [56].

[FIGURE 2 HERE]

Considering the most consistent correlates of stated vaccine acceptance across samples, we find that in most samples individuals who report a higher level of general trust in experts (OR_{pooled} = 1.28, 95%CI [1.22, 1.34]), or who are more worried about the virus (OR_{pooled} = 1.47 [1.41 – 1.53]), are more likely to say that they would accept a vaccine. In Germany, Spain, Mexico, Sweden (March only), and nearly all UK samples, females are generally less likely to say that they would accept a COVID-19 vaccine if available (OR_{pooled} = 0.59, [0.55, 0.64])[2]. We also note that measures of efficacy, both at the personal (OR_{pooled} = 1.00, [0.96 – 1.05]) and country level (OR_{pooled} = 1.01, [0.96, 1.08]), were not significantly associated with reported vaccine acceptance in most samples.

Our results reveal a great deal of heterogeneity in the relevance of correlates across countries, but also across time in countries where we conducted multiple surveys. For example, in the United States only a few consistent associations emerged. Most notably, political conservatism was associated with a lower likelihood to accept a COVID-19 vaccine in March ($OR_{USA—Mar}$ = 0.73 [0.57, 0.93]; $OR_{USA—May}$ = 0.77 [0.58 – 1.01]) whereas trust in experts ($OR_{USA—Mar}$ = 1.53 [1.16, 2.03]; $OR_{USA—May}$ = 1.36 [1.02 – 1.82]) and personal worry about the virus ($OR_{USA—Mar}$ = 1.47 [1.17, 1.87]; $OR_{USA—May}$ = 1.27, [0.99 – 1.64]) were associated with increased vaccination intentions. In contrast, in the United Kingdom, additional factors such as the role of age, gender, and prosociality played a significant role. There was also variation over time. For example, although political ideology was not a significant correlate in the UK in May or July 2020, conservatism was associated with lower vaccination intentions from September 2020 onwards (ORs 0.85-.88), which may be related to increased polarization. To illustrate the increasing strength of the association between political ideology and vaccine acceptance over time in the UK, in Figure 3 we plot the

[2] UK data was over represented in our pooled sample. As a robustness check we also fitted the model to the pooled sample with UK data removed and report that the effects of gender, trust in experts and worry remain significant (*p*s < .001; see Table S5).

predicted likelihood of reported vaccine acceptance across the political spectrum (holding all other variables constant).

[FIGURE 3 HERE]

In the UK, we also report a different pattern of effects when comparing between samples collected via different providers, even where these were collected on the same day (in May, July, and September), were matched on age and gender, and controlling for a range of other demographic variables. This underscores the caution that must be applied when studies generalize results from a single survey sample (particularly an online survey).

In terms of variance explained, the variables in our model explained approximately 10-30% of the variance in the likelihood of vaccine acceptance vs refusal, with the exception of samples recruited in South Korea (4%) and Japan (8%).

Accounting for general vaccine attitudes

To examine the extent to which the effects in our model can be accounted for by a negative perception of vaccines in general, we conducted an additional set of analyses. In our three most recent UK surveys we included a two-item measure of general vaccine attitudes (adapted from Lewandowsky et al.[42]). A comparison of results from models with or without general vaccine attitudes as an independent variable is shown as a heat map in Figure 4. Although attitudes toward vaccination increase the explained variance of our model (ΔR^2 4%-9%) and reveal strong significant effects such that more positive attitudes are associated with increased vaccination intentions (ORs 1.69-2.32; full results in Table S8), the relationships in the original model appear robust and are only minimally attenuated when accounting for generalized attitudes.

[FIGURE 4 HERE]

DISCUSSION

Understanding the psychological determinants of vaccine acceptance and hesitancy is crucial during a global pandemic. Across all countries surveyed, between March and September 2020, a substantial proportion of participants (up to 37% in some countries) said that they would *not* accept a hypothetical COVID-19 vaccine. People were slightly more likely to say that they would recommend it to vulnerable friends and family members. Considering who is more or less likely to report willingness to be vaccinated against COVID-19, being male, expressing general trust in those with scientific or medical expertise, and worrying about the virus are the most consistent correlates of vaccine acceptance across our samples. It is important to note that hesitancy about a COVID-19 vaccine is not purely attributable to people's attitudes to vaccines in general. Although (in the UK, where we studied it) negative attitudes towards vaccines in general are a significant and important correlate of COVID-19 vaccine refusal, there are clearly additional factors at play in determining public reactions to a COVID-19 vaccine. This broadly aligns with other research indicating that, for many people, there are concerns specifically around the rapid and novel development processes of COVID-19 vaccines and possible safety issues[36,57]. Our multivariate analyses show that the bulk of the burden of trust rests on science and medicine. This is in line with other recent studies specifically examining the association between trust in scientists and doctors, and COVID-19 vaccine hesitancy [26,27]. Accounting for the other factors in our model, we find that trust in government (both generally and regarding COVID-19) and general social trust (i.e. trust in people) are *not* significantly associated with vaccine acceptance in most of our samples. Since the period of data collection, more information about COVID-19 vaccines, including their safety and efficacy has become available. It

remains to be seen how this information has shifted vaccine intentions. As the public focus has shifted from vaccine development to the regulatory approval and rollout of vaccines[11] , it is possible that trust in government and regulators may play a greater role in individuals' vaccine decision making. However, further research is required to confirm this speculation.

The fact that we saw only a weak link between stated vaccine acceptance and our measure of prosociality—along with the fact that higher numbers of people said that they would recommend the vaccine to a vulnerable friend or relative than say they would accept it themselves—suggests that the prosocial nature of vaccines may not be recognized by many people. Recent experimental research has shown that emphasizing the societal benefits of herd immunity (i.e., the need for those who do not see themselves as personally vulnerable to take the vaccine in order to provide protection for those who are) may assist uptake[58]. However, such strategies depend on vaccines preventing *transmission* of the virus, rather than just symptoms. There is now preliminary evidence that this is the case for the Moderna and Pfizer BioNTech vaccines [12], but further studies are required to confirm these findings.

The greater reluctance from women to say that they would take a vaccine is in line with other work focusing on acceptance of a potential COVID-19 vaccine[18,19], and vaccination generally[29] but has not been adequately explained. Even when general vaccine beliefs are taken into account, however, the gender bias remains. Qualitative work should focus on investigating this further, in order to understand the root of women's concerns about the COVID-19 vaccine. We see very little effect of our measures of personal or governmental efficacy, but this may be related to the fact that a vaccine against COVID-19 was hypothetical at the time of the surveys and our measures did not directly ask about vaccination.

Another important finding highlighted by our repeated samples is that vaccine acceptance appears to be politicized in the US and is becoming so in the UK. Our US results agree with previous US research focusing on COVID-19 vaccine acceptance[39,59], which noted that political conservatives are less accepting of potential COVID-19 vaccines. Our UK results align with those of Maher et al, who, through network analysis, show a pattern of attitudinal alignment over time in a small UK sample, resulting in the emergence of a politically conservative faction expressing less trust in scientists, doctors, and vaccines[21]. Although international research has suggested that political conservatism is correlated with anti-vaccination attitudes globally[40], we did not find that ideology was associated with vaccine acceptance outside of the US and UK. However most other countries were only surveyed in earlier stages of the pandemic (i.e. prior to May, 2020) and we can therefore not say whether they might have followed a similar pattern to the UK as time went on.

It is possible that misinformation susceptibility[60,61] and conspiracy thinking[62] underlie the association between ideology and vaccine attitudes to some extent. For example, Motta et al[63] find that far right-wing media outlets have disproportionally spread misinformation during the early stages of the pandemic. Susceptibility to misinformation around COVID-19 was also found in prior research to be associated with measures of vaccine hesitancy[61]. There is already a proliferation of conspiracy theories focused on specific COVID-19 vaccines[64,65]. It will be important to tackle these pro-actively through 'prebunking' methods to inoculate against misinformation[66,67].

We must note that our surveys did not examine several sociodemographic factors that could explain additional variance in vaccination intentions; ethnic minority status, socio-economic status and underlying health conditions have all been shown to be associated with COVID-19 vaccine hesitancy in some contexts [68,69]. Future research should examine how these factors relate to vaccine confidence and intentions as vaccine campaigns progress.

Finally, we acknowledge that the heterogeneity in our results across time and countries highlights the role that (unmeasured) contextual, country-specific factors play in informing individuals' vaccination attitudes. As noted by the WHO SAGE working group on vaccine hesitancy, individual factors such as trust and risk perception intersect with contextual influences such as culture, media environments, and information from local leaders[14]. Our samples were not truly representative of the general population in each country: although they were quota-balanced on gender and age, the population that respond to an online questionnaire will differ from the general population on several significant characteristics. However, the rank ordering of countries on vaccine acceptance in our study is similar to that of Lazarus et al[18], which were based on a random stratified sampling approach using several online panel providers. This gives us some confidence in the generalizability of our results, and the fact that our samples were generally larger and included more trust-focused questions makes them useful for exploring these important correlates of vaccine attitudes.

In terms of practical considerations, our finding that trust in scientific and medical institutions is one of the strongest correlates of vaccine acceptance highlights the need to work proactively with others from outside of this sphere, such as community and religious leaders[70], to open a two-way conversation with those who distrust the scientific and medical establishment. Due consideration must also be given to the accessibility[71], format[72,73], and transparency[74,75] of information provided to the public. Future research should continue to evaluate how to most effectively communicate evidence about vaccination[76], and should seek to more deeply understand the concerns and needs of those who express hesitancy regarding COVID-19 vaccination. As Bhopal[77], commenting on potential COVID-19 mass vaccination efforts, writes, "Open, honest, factual and sensitively conducted public dialogue is now urgent."

CONCLUSIONS

Countries around the world face a major evidence communication challenge when it comes to the COVID-19 vaccines that are becoming available. In order to reach a large enough proportion of the population in each country to achieve herd immunity, it is vital to increase the number of people who are willing to take a vaccine. To achieve this, non-pharmaceutical interventions will need to be deployed[78], such as communicating trustworthy information about the vaccines via credible sources. In the current research, we have demonstrated across 12 national samples that people's level of worry about COVID-19 and their trust in experts and medical and scientific institutions are key determinants of potential vaccine acceptance. Future research should confirm these findings in experimental settings. We recommend that empirical studies should continue to be carried out alongside qualitative work with different communities to get a rounded understanding of people's concerns and misunderstandings. Only by knowing these can we adequately address them and provide people with the information they need to make a decision that will affect not just their own health, but that of their community as well.

FIGURE LEGENDS

Figure 1. COVID-19 vaccine acceptance across countries and time. Percentage of respondents who stated they were willing to receive or recommend a COVID-19 vaccine across surveys. UK and US samples using different panel providers are reported separately.

Figure 2. Correlates of vaccine acceptance. Heatmap of odds ratios in multivariate logistic regression model predicting stated vaccine acceptance. Columns represent individual samples and rows represent independent variables in model. Grey values are non-significant, $p > .05$. Red shading indicates a lower likelihood of reported vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). Political orientation data was not collected in the French sample; this sample is excluded from pooled data.

Figure 3. Political ideology and vaccine acceptance in the UK. Predicted likelihood that an individual will accept being vaccinated at varying levels of political ideology (1 = very liberal/left wing, 7 = very conservative/right wing) in UK samples over time.

Figure 4. Negative general attitudes towards vaccination do not fully account for relationships in the model. Results of multivariate logistic regression models investigating reported COVID-19 vaccine acceptance in UK samples, excluding (left panel) or including (right panel) general vaccine attitudes as an independent variable. Odds ratios shown are based on scaled variables (other than gender). Grey values are non-significant, $p > .05$. For space, samples are defined by a letter denoting participant source (P, Prolific; R, Respondi).

Author contributions

Survey instrument development: JRK, CRS, GR, SD, SvdL, ALJF. Study conceptualisation, design and theoretical framing: JRK, SvdL, ALJF. Data collection: JRK, CRS, GR, SD, US, CD, PA, ALJF. Statistical analyses and first draft: JRK, SvdL, ALJF. Manuscript editing, review and approval: JRK, CRS, GR, SD, US, CD, PA, ALJF, SvdL.

Data availability

The data and analysis code for this study are available at:

https://osf.io/vgez2/?view_only=8fe81f5fe3f345a99b06edeaba6bd9e1

Ethics approval

This study was approved by the University of Cambridge Psychology Research Ethics Committee (PRE.2020.034).

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Competing interests

None declared.

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Patient and Public Involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

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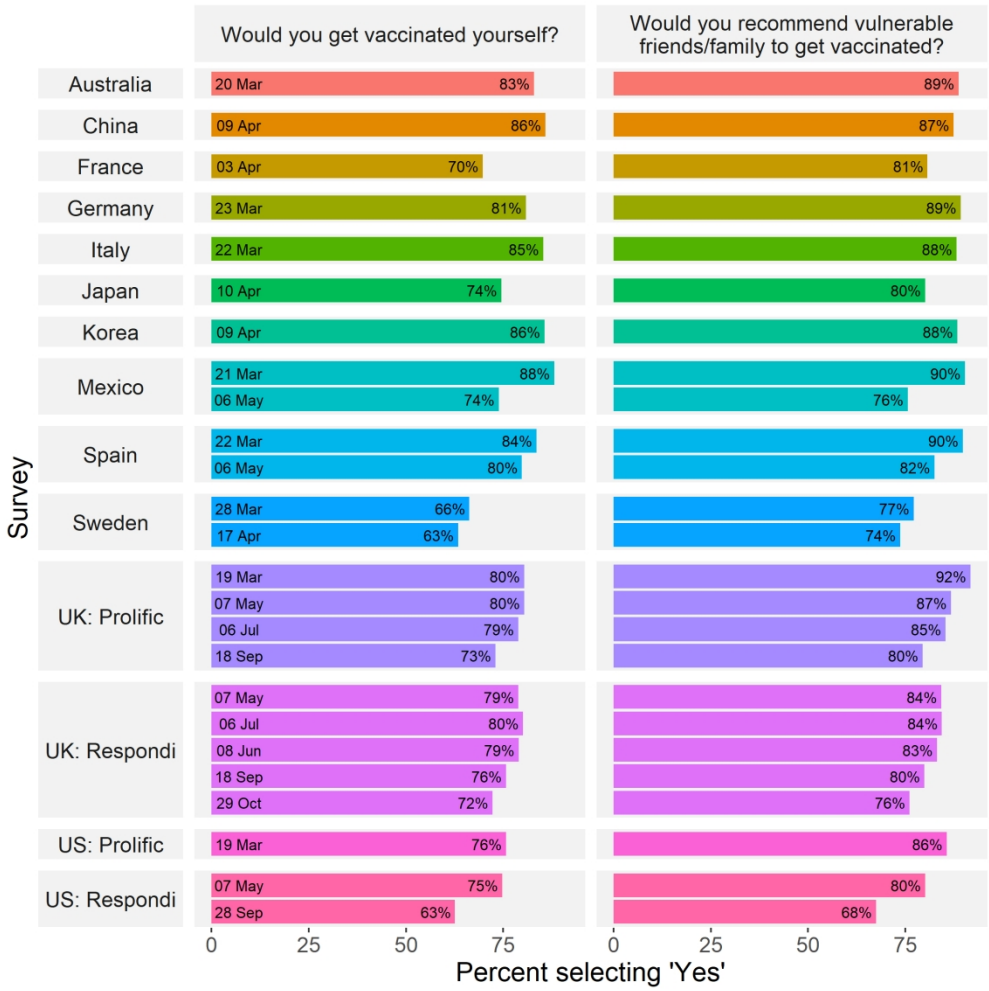

Figure 1. COVID-19 vaccine acceptance across countries and time. Percentage of respondents who stated they were willing to receive or recommend a COVID-19 vaccine across surveys. UK and US samples using different panel providers are reported separately

199x199mm (300 x 300 DPI)

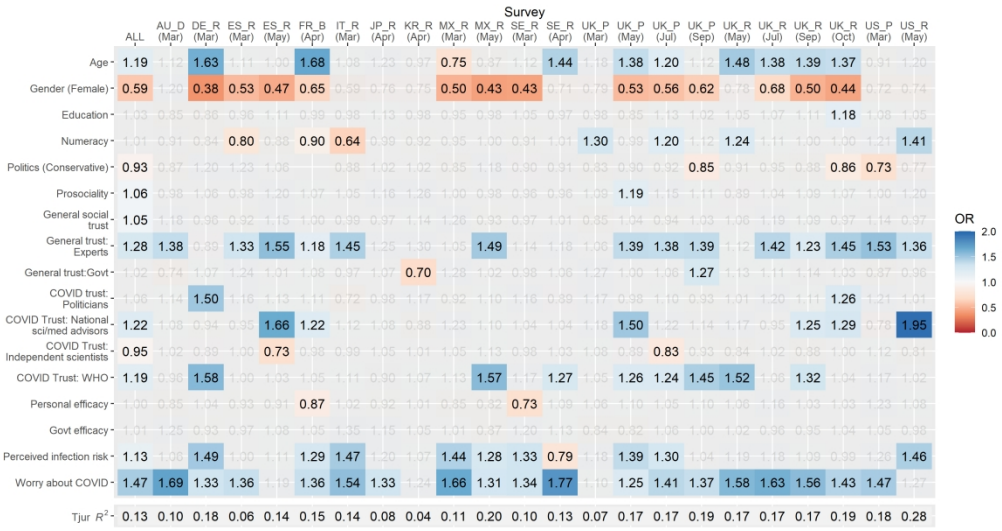

Figure 2. Correlates of vaccine acceptance. Heatmap of odds ratios in multivariate logistic regression model predicting stated vaccine acceptance. Columns represent individual samples and rows represent independent variables in model. Grey values are non-significant, p > .05. Red shading indicates a lower likelihood of reported vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). Political orientation data was not collected in the French sample; this sample is excluded from pooled data.

299x159mm (300 x 300 DPI)

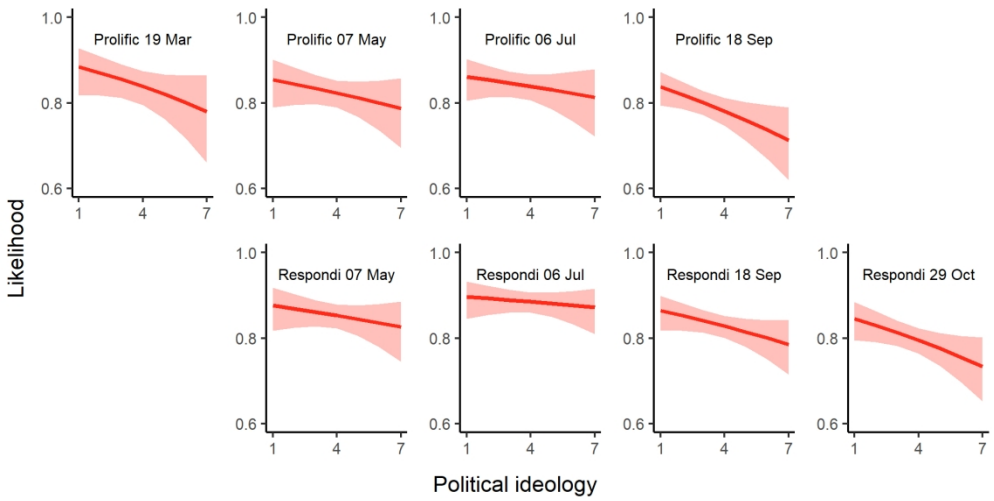

Figure 3. Political ideology and vaccine acceptance in the UK. Predicted likelihood that an individual will accept being vaccinated at varying levels of political ideology (1 = very liberal/left wing, 7 = very conservative/right wing) in UK samples over time.

177x88mm (300 x 300 DPI)

Figure 3. Political ideology and vaccine acceptance in the UK. Predicted likelihood that an individual will accept being vaccinated at varying levels of political ideology (1 = very liberal/left wing, 7 = very conservative/right wing) in UK samples over time.

159x149mm (300 x 300 DPI)

Correlates of intended COVID-19 vaccine acceptance across time and countries: Results from a series of cross-sectional surveys

Supplementary material

Table S1

Survey items and wording

Variable	Wording	Response
Gender	What is your gender?	0 =Male, 1= Female, 'Other' and 'Prefer not to say' (included in Prolific samples only) coded as missing.
Age	What is your age?	Age in years
Education	Please indicate your highest educational qualification	1 = No formal education above age 16, 2 = Professional or technical qualifications above age 16, 3 = School education up to age 18, 4 = Degree (Bachelors) or equivalent, 5 = Degree (Masters) or other postgraduate qualification, 6 = Doctorate [In France] 1 = No diploma, 2 =Primary school certificate, 3 = BEPC - Brevet des colleges, 4 = CAP / BEP, 5 = BAC / professional certificate / technical certificate, 6 = BAC +2 and above.
Numeracy (summed; range 1-5)	Adaptive Berlin Numeracy test (2-3items, see Cokely et al., 2012 for details). Which represents the highest risk of something happening?	Scores range 1-4 1 = '1 in 10' (correct), 2 = '1 in 1000', 3 = '1 in 100'
Politics	Where do you feel your political views lie on a spectrum of left wing (or liberal) to right wing (or conservative)?	1 = Very liberal/left, 7 = Very conservative/right
Prosociality	To what extent do you think it's important to do things for the benefit of others and society even if they have some costs to you personally?	1 = Not at all, 7 = Very much so

General social trust	Generally speaking, would you say most people can be trusted, or that you can't be too careful in dealing with people?	1 = Can't be too careful, 7 = Most people can be trusted
General trust: Experts (scale)	How much do you trust each of the following? - Medical doctors and nurses	1 = Cannot be trusted at all, 5 = Can be trusted a lot
	How much do you trust each of the following? - Scientists	1 = Cannot be trusted at all, 5 = Can be trusted a lot
	How much do you trust each of the following? - Scientific knowledge	1 = Cannot be trusted at all , 5 = Can be trusted a lot
General trust: Govt (scale)	How much do you trust each of the following? - Civil servants or public officials in the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
	How much do you trust each of the following? - The current government of the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
	How much do you trust each of the following? - Politicians in the country you are living in	1 = Cannot be trusted at all , 5 = Can be trusted a lot
COVID trust: Politicians	How much do you trust the country's politicians to deal effectively with the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: National sci/med advisors	How much do you trust the country's national scientific and medical advisors to know the best measures to take in the face of the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: Independent scientists	How much do you trust experts who are not connected with the government who are commenting on measures planned for the pandemic?	1 = Not at all, 7 = Very much
COVID Trust: WHO	How much do you trust the World Health Organisation to know the best measures to take in the face of the pandemic?	1 = Not at all, 7 = Very much
Personal efficacy	To what extent do you feel that the personal actions you are taking to try to limit the spread of coronavirus make a difference?	1 = Not at all, 7 = Very much
Govt efficacy	To what extent do you feel the actions that your country is taking to limit the spread of coronavirus make a difference?	1 = Not at all, 7 = Very much

Perceived infection risk (scale)	How likely do you think it is that you will be directly and personally affected by the following in the next 6 months? - Catching the coronavirus/COVID-19	1= Not at all likely, 7 = Very likely
	How likely do you think it is that your friends and family in the country you are currently living in will be directly affected by the following in the next 6 months? - Catching the coronavirus/COVID-19	1= Not at all likely, 7 = Very likely
	How much do you agree or disagree with the following statements? - I will probably get sick with the coronavirus/COVID-19.	1 = Strongly disagree, 5 = Strongly agree (rescaled)
Worry about COVID	How worried are you personally about the following issues at present? - Coronavirus/COVID-19	1 = Not at all worried, 7 = Very worried
Vaccine - acceptance	If a vaccine were to be available for the coronavirus/COVID-19 now: - Would you get vaccinated yourself?	0 = No, 1 = Yes
Vaccine – recommend to others	If a vaccine were to be available for the coronavirus/COVID-19 now: - Would you recommend vulnerable friends/family to get vaccinated?	0 = No, 1 = Yes
General vaccine attitudes	Please let us know how much you agree or disagree with the following statements about vaccines in general: - I believe that vaccines are a safe and reliable way to help avert the spread of preventable diseases	1 = Strongly disagree, 5 = Strongly agree
	Please let us know how much you agree or disagree with the following statements about vaccines in general: - Vaccinations are one of the most significant contributions to public health	1 = Strongly disagree, 5 = Strongly agree

Table S2

Percentage of missing values for predictor and outcome variables across all samples.

Variable	AU_D (Mar)	CN_R (Apr)	DE_R (Mar)	ES_R (Mar)	ES_R (May)	FR_B (Apr)	IT_R (Mar)	JP_R (Apr)	KR_R (Apr)	MX_R (Mar)	MX_R (May)	SE_R (Apr)	SE_R (Mar)	UK_P (Jul)	UK_P (Mar)	UK_P (May)	UK_P (Sep)	UK_R (Jul)	UK_R (Jun)	UK_R (May)	UK_R (Oct)	UK_R (Sep)	US_P (Mar)	US_R (May)	US_R (Sep)
Age	5.4	0.6	3.9	2.1	1.6	0.0	20.9	2.3	0.4	8.8	1.1	1.7	4.6	0.1	0.0	0.3	0.1	1.8	1.2	1.5	1.0	1.7	0.1	1.3	0.0
Gender [Female]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1
Education	5.6	0.3	3.9	1.7	0.6	0.0	20.1	1.0	0.3	7.8	0.3	0.4	3.9	0.0	0.0	0.0	0.0	0.5	-	0.1	0.1	0.5	0.0	0.3	-
Numeracy	6.7	1.9	6.6	3.1	2.7	1.1	21.1	6.2	2.0	8.1	0.3	3.1	5.6	0.1	0.1	0.3	0.2	3.5	2.2	1.8	0.9	2.3	0.1	1.4	0.2
Politics [Conservative]	5.6	-	4.1	2.1	0.6	-	20.3	9.2	0.1	7.9	0.9	0.9	4.1	0.1	0.0	0.1	0.1	0.6	1.2	0.3	0.3	0.8	0.0	0.4	0.2
Prosociality	1.0	0.1	0.3	0.7	0.1	0.0	1.7	0.0	0.1	0.7	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.5	0.0	0.6	0.1	0.2	0.0	0.1	0.0
General social trust	0.0	0.0	0.1	0.3	0.3	0.0	0.4	0.0	0.1	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.0
General trust: Experts	0.0	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.1	0.4	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.3	0.1	0.4	0.0	0.0	0.0
General trust:Govt	0.1	-	0.3	0.0	0.1	0.0	0.9	0.1	0.1	0.3	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1
COVID trust: Politicians	3.4	-	1.7	1.3	0.0	0.0	10.0	0.4	0.1	4.8	0.3	0.1	2.3	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.2	0.0	0.1	0.0
COVID Trust: National sci/med advisors	3.4	-	1.7	1.3	0.1	0.0	10.0	0.3	0.0	4.8	0.3	0.1	2.3	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.0	0.3	-
COVID Trust: Independent scientists	3.4	-	1.7	1.6	0.1	0.0	10.1	0.3	0.0	4.8	0.3	0.0	2.3	0.0	0.0	0.0	0.0	0.1	-	0.2	0.0	0.1	0.1	0.3	-
COVID Trust: WHO	3.4	-	2.0	1.4	0.0	0.0	10.0	0.6	0.1	4.9	0.3	0.0	2.3	0.0	0.0	0.1	0.0	0.2	0.2	0.2	0.0	0.1	0.1	0.3	-
Personal efficacy	3.7	-	2.0	1.3	0.0	0.0	10.3	0.6	0.1	4.8	0.3	0.0	2.4	0.0	0.1	0.0	0.2	0.2	0.4	0.3	0.1	0.2	0.0	0.3	0.0
Govt efficacy	3.6	-	2.0	1.4	0.3	0.0	10.4	0.4	0.1	4.8	0.6	0.0	2.4	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.0	0.1	0.0	0.3	0.1
Perceived infection risk	1.4	0.3	1.0	0.9	0.0	0.0	3.0	0.0	0.0	1.7	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.1	0.4	0.2	0.2	0.0	0.1	0.4	0.0
Worry about COVID	1.0	0.0	0.6	0.6	0.0	0.0	2.4	0.1	0.3	1.4	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.0	0.1	0.1	0.1	0.0
Vaccine acceptance	4.0	0.1	1.9	1.4	0.1	0.0	11.4	0.1	0.1	5.8	0.3	0.4	2.4	0.1	0.0	0.0	0.0	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.0
Vaccine recommend	4.1	0.1	1.9	1.6	0.1	0.0	11.4	0.1	0.1	6.3	0.6	0.4	2.4	0.1	0.0	0.1	0.1	0.2	0.2	0.4	0.1	0.1	0.1	0.1	0.0
Vaccine attitudes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	0.2	0.3	-	-	-

'-' indicates variable not included in survey. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). Missing gender includes 'Other' and 'prefer" not to say' responses (total $n = 35$) and missing age includes values outside the range of 18-100 (total $n = 46$)

Table S3

Gender and age distribution of those participants who answered the vaccine acceptance item (% of each sample; continued on following page)

Gender	Age bracket	AU_D1	CN_R1	DE_R1	ES_R1	ES_R2	FR_B1	IT_R1	JP_R1	KR_R1	MX_R1	MX_R2	SE_R1	SE_R2
Male	18-24	6.0	5.7	5.2	4.5	4.7	1.2	4.8	4.9	5.6	9.8	9.9	5.3	5.7
	24-34	8.3	10.9	8.7	7.4	7.6	6.2	8.4	7.3	8.6	12.4	11.8	10.5	10.5
	35-44	8.6	9.3	8.6	10.4	10.6	7.6	9.4	8.7	9.6	10.0	10.7	9.2	9.0
	45-54	8.2	11.3	10.0	10.9	10.7	10.2	10.7	10.2	11.2	8.9	8.3	9.8	9.5
	55-64	7.6	8.2	10.5	9.0	8.9	8.6	8.6	8.2	10.2	5.8	5.4	8.6	8.8
	65+	9.2	5.7	7.7	7.0	7.2	13.8	6.8	9.7	6.0	3.2	3.0	8.1	7.8
	Missing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Female	18-24	5.7	5.4	5.2	4.5	4.7	8.5	4.8	5.0	5.3	8.9	10.0	5.0	5.5
	24-34	9.5	10.4	8.4	7.8	7.7	8.7	8.4	7.6	8.2	12.9	12.3	10.3	10.0
	35-44	10.1	8.9	8.4	10.9	10.7	8.4	10.5	9.2	9.2	12.1	11.3	8.9	8.5
	45-54	9.4	10.9	9.5	10.9	11.0	9.5	12.4	10.5	10.7	8.7	8.6	9.4	9.3
	55-64	7.9	7.9	9.9	9.3	8.9	6.7	7.6	8.6	9.7	5.4	5.7	8.4	8.3
	65+	9.5	5.4	7.7	7.5	7.3	10.7	7.7	10.2	5.9	2.0	2.9	6.6	7.2
Missing	18-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	24-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	35-44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	45-54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	55-64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	65+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). ‘Missing’ gender includes responses ‘Other’ and ‘Prefer not to say’ - only included in Prolific samples.

Table S3 (continued)

Gender and age distribution of those participants who answered the vaccine acceptance item (% of each sample)

Gender	Age bracket	UK_P1	UK_P3	UK_P4	UK_P5	UK_R2	UK_R3	UK_R4	UK_R5	UK_R6	US_P1	US_R2	US_R3
Male	18-24	5.6	7.2	7.1	11.7	5.8	4.2	5.8	5.9	5.5	5.9	6.3	3.4
	24-34	10.0	8.8	9.4	15.1	8.7	8.0	8.8	8.9	7.8	10.1	9.6	12.5
	35-44	8.3	9.3	9.4	7.7	9.2	9.4	9.3	9.3	8.7	9.0	8.7	12.0
	45-54	8.5	8.6	8.5	6.4	9.2	9.6	9.2	9.2	10.2	9.0	8.7	5.7
	55-64	11.7	9.3	8.2	5.7	8.3	8.4	8.2	8.2	8.4	8.6	8.9	9.2
	65+	4.7	5.5	4.6	1.7	6.7	7.0	7.0	7.0	7.3	6.4	6.7	6.4
	Missing	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Female	18-24	5.6	5.1	6.1	10.9	6.3	7.0	6.3	6.2	5.7	4.9	6.6	5.3
	24-34	8.8	9.8	9.1	11.5	9.5	10.0	9.6	9.5	8.4	11.3	10.0	11.3
	35-44	9.3	9.9	8.9	8.8	10.0	10.2	10.0	9.9	9.5	7.6	9.2	9.2
	45-54	8.3	7.7	10.2	8.6	10.0	10.2	9.8	9.8	10.6	8.7	9.0	8.1
	55-64	12.9	13.1	11.8	8.8	8.9	8.8	8.6	8.7	9.5	11.7	9.3	10.3
	65+	6.1	5.1	6.3	2.7	7.2	7.0	7.5	7.5	8.4	6.6	7.0	6.3
Missing	18-24	0.0	0.1	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
	24-34	0.3	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	35-44	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	45-54	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	55-64	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	65+	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P, Prolific; R, Respondi). 'Missing' gender includes responses 'Other' and 'Prefer not to say' - only included in Prolific samples.

Table S4

Descriptive statistics for all samples (Mean (SD)) (continued on following page)

	ALL	AU_D (Mar)	CN_R (Apr)	DE_R (Mar)	ES_R (Mar)	ES_R (May)	FR_B (Apr)	IT_R (Mar)	JP_R (Apr)	KR_R (Apr)	MX_R (Mar)	MX_R (May)	SE_R (Mar)	SE_R (Apr)
Age	45.06 (16.02)	46.30 (16.44)	43.21 (14.26)	46.71 (15.93)	46.68 (14.99)	46.00 (15.03)	48.79 (16.53)	45.91 (14.81)	48.08 (16.35)	45.34 (15.51)	38.69 (13.96)	38.61 (14.21)	45.49 (16.02)	45.49 (16.54)
Gender (Female)	0.51 (0.50)	0.51 (0.50)	0.49 (0.50)	0.50 (0.50)	0.51 (0.50)	0.50 (0.50)	0.48 (0.50)	0.50 (0.50)	0.51 (0.50)	0.49 (0.50)	0.50 (0.50)	0.51 (0.50)	0.49 (0.50)	0.49 (0.50)
Education	3.42 (1.13)	3.17 (1.12)	3.64 (0.88)	3.07 (1.19)	3.59 (1.08)	3.60 (1.07)	5.00[a] (1.12)	3.51 (1.23)	3.56 (0.81)	3.76 (0.79)	3.55 (0.94)	3.74 (0.88)	3.30 (1.06)	3.34 (1.01)
Numeracy	2.66 (1.11)	2.41 (1.06)	2.83 (1.25)	2.53 (1.12)	2.39 (1.03)	2.42 (0.97)	2.18 (0.70)	2.13 (0.71)	2.77 (1.25)	2.60 (1.06)	2.16 (0.90)	2.31 (0.95)	2.52 (1.23)	2.57 (1.21)
Politics (Conservative)	3.74 (1.41)	3.83 (1.30)	-	3.79 (1.19)	3.50 (1.43)	3.44 (1.50)	-	3.87 (1.45)	4.09 (1.09)	3.88 (1.20)	3.65 (1.31)	3.57 (1.33)	3.92 (1.59)	3.88 (1.61)
Prosociality	5.21 (1.36)	5.23 (1.36)	5.54 (1.19)	4.97 (1.42)	5.74 (1.21)	5.35 (1.34)	5.23 (1.41)	5.76 (1.38)	4.74 (1.42)	4.40 (1.31)	5.34 (1.61)	5.26 (1.53)	4.87 (1.43)	4.63 (1.48)
General social trust	3.66 (1.71)	3.95 (1.67)	4.96 (1.67)	3.61 (1.65)	3.47 (1.87)	3.29 (1.77)	2.98 (1.62)	3.70 (1.61)	3.85 (1.48)	3.97 (1.50)	2.81 (1.84)	2.94 (1.84)	3.73 (1.73)	3.85 (1.73)
General trust: Experts	3.97 (0.77)	3.97 (0.79)	4.26 (0.61)	3.90 (0.74)	4.19 (0.72)	4.09 (0.76)	3.76 (0.81)	4.02 (0.74)	3.51 (0.72)	3.74 (0.68)	4.05 (0.85)	4.10 (0.83)	3.90 (0.75)	3.85 (0.75)
General trust: Govt	2.64 (0.91)	2.96 (0.93)	-	3.14 (0.92)	2.75 (0.94)	2.54 (0.89)	2.48 (0.90)	2.89 (0.91)	2.46 (0.84)	2.65 (0.81)	2.28 (1.01)	2.35 (1.02)	3.04 (1.00)	3.00 (1.01)
COVID trust: Politicians	3.48 (1.87)	4.44 (1.75)	-	4.80 (1.65)	4.01 (1.88)	3.45 (1.91)	3.33 (1.78)	4.35 (1.74)	3.03 (1.60)	4.24 (1.63)	3.22 (1.99)	3.51 (1.96)	4.13 (1.78)	4.24 (1.83)
COVID Trust: National sci/med advisors	4.91 (1.60)	5.34 (1.41)	-	5.40 (1.43)	5.45 (1.39)	4.92 (1.65)	4.46 (1.73)	5.42 (1.40)	3.90 (1.51)	5.15 (1.37)	5.18 (1.69)	5.28 (1.60)	4.78 (1.67)	4.93 (1.66)
COVID Trust: Independent scientists	4.66 (1.55)	4.77 (1.49)	-	5.11 (1.38)	5.15 (1.39)	4.83 (1.55)	4.62 (1.52)	4.80 (1.45)	3.73 (1.51)	5.03 (1.26)	5.02 (1.68)	4.91 (1.65)	4.66 (1.52)	4.55 (1.48)
COVID Trust: WHO	4.84 (1.68)	5.19 (1.55)	-	5.16 (1.52)	5.46 (1.42)	4.88 (1.62)	4.80 (1.61)	5.25 (1.48)	3.12 (1.55)	3.96 (1.51)	5.80 (1.45)	5.58 (1.62)	5.05 (1.45)	4.81 (1.55)
Personal efficacy	5.22 (1.48)	5.14 (1.45)	-	5.24 (1.41)	5.31 (1.47)	5.14 (1.47)	5.20 (1.47)	5.31 (1.46)	4.26 (1.42)	5.42 (1.24)	5.36 (1.66)	5.56 (1.53)	5.20 (1.50)	5.26 (1.45)
Govt efficacy	3.86 (1.78)	4.48 (1.63)	-	4.68 (1.47)	4.21 (1.77)	4.11 (1.83)	4.22 (1.68)	4.60 (1.60)	3.21 (1.52)	5.08 (1.52)	3.82 (2.06)	4.39 (1.86)	4.30 (1.73)	4.41 (1.67)
Perceived infection risk	4.17 (1.32)	4.16 (1.40)	3.26 (1.37)	4.13 (1.34)	4.46 (1.23)	4.38 (1.26)	4.19 (1.24)	3.93 (1.30)	4.48 (1.20)	4.37 (1.22)	4.16 (1.47)	4.29 (1.43)	4.30 (1.37)	4.37 (1.29)
Worry about COVID	5.56 (1.52)	5.56 (1.51)	5.37 (1.57)	5.66 (1.49)	6.25 (1.17)	6.11 (1.26)	5.63 (1.43)	6.08 (1.27)	5.83 (1.28)	5.59 (1.29)	5.92 (1.46)	6.06 (1.35)	5.27 (1.55)	4.98 (1.66)
Vaccine – acceptance	0.76 (0.43)	0.83 (0.38)	0.86 (0.35)	0.81 (0.39)	0.84 (0.37)	0.80 (0.40)	0.70 (0.46)	0.85 (0.35)	0.74 (0.44)	0.86 (0.35)	0.88 (0.32)	0.74 (0.44)	0.66 (0.47)	0.63 (0.48)
Vaccine – recommend to vulnerable others	0.82 (0.38)	0.89 (0.32)	0.87 (0.33)	0.89 (0.31)	0.90 (0.30)	0.82 (0.38)	0.81 (0.40)	0.88 (0.32)	0.80 (0.40)	0.88 (0.32)	0.90 (0.30)	0.76 (0.43)	0.77 (0.42)	0.74 (0.44)
General vaccine attitudes	4.05 (1.11)	-	-	-	-	-	-	-	-	-	-	-	-	-

[a] Education item in France differed from other surveys – see Table S1.

Table S4 (continued)

Descriptive statistics for all samples (Mean (SD))

	UK_P (Mar)	UK_P (May)	UK_P (Jul)	UK_P (Sep)	UK_R (May)	UK_R (Jun)	UK_R (Jul)	UK_R (Sep)	UK_R (Oct)	US_P (Mar)	US_R (May)	US_R (Sep)
Age	45.63 (15.69)	44.72 (15.66)	44.54 (15.65)	38.18 (14.98)	45.72 (15.94)	45.90 (15.87)	45.42 (16.60)	45.47 (16.09)	46.74 (16.04)	45.14 (15.84)	45.03 (16.09)	44.76 (15.60)
Gender (Female)	0.51 (0.50)	0.51 (0.50)	0.53 (0.50)	0.52 (0.50)	0.52 (0.50)	0.53 (0.50)	0.52 (0.50)	0.52 (0.50)	0.52 (0.50)	0.51 (0.50)	0.51 (0.50)	0.51 (0.50)
Education	3.45 (1.17)	3.50 (1.14)	3.58 (1.14)	3.54 (1.10)	3.17 (1.27)	-	3.20 (1.23)	3.15 (1.28)	3.10 (1.23)	3.87 (0.88)	3.70 (0.90)	-
Numeracy	3.22 (1.17)	3.23 (1.14)	3.04 (1.06)	3.24 (1.15)	2.64 (1.14)	2.74 (1.10)	2.61 (1.07)	2.60 (1.07)	2.78 (1.11)	3.14 (1.13)	2.76 (1.14)	2.58 (1.12)
Politics (Conservative)	3.69 (1.43)	3.67 (1.39)	3.58 (1.36)	3.37 (1.36)	3.90 (1.35)	3.89 (1.19)	3.90 (1.33)	3.84 (1.36)	3.83 (1.32)	3.22 (1.65)	3.92 (1.69)	4.07 (1.65)
Prosociality	5.50 (1.07)	5.36 (1.19)	5.32 (1.16)	5.42 (1.17)	5.12 (1.33)	5.25 (1.29)	5.03 (1.29)	5.08 (1.39)	5.38 (1.36)	5.43 (1.28)	5.05 (1.36)	5.02 (1.44)
General social trust	4.04 (1.59)	4.12 (1.55)	4.11 (1.55)	3.69 (1.56)	3.74 (1.71)	3.58 (1.70)	3.86 (1.59)	3.68 (1.68)	3.66 (1.64)	4.01 (1.68)	3.79 (1.73)	3.47 (1.84)
General trust: Experts	4.24 (0.66)	4.11 (0.63)	4.14 (0.66)	4.17 (0.68)	3.89 (0.79)	3.88 (0.81)	3.92 (0.76)	3.90 (0.78)	3.92 (0.77)	4.22 (0.73)	3.96 (0.77)	3.89 (0.83)
General trust: Govt	2.82 (0.85)	2.80 (0.82)	2.60 (0.82)	2.44 (0.81)	2.82 (0.87)	2.64 (0.87)	2.70 (0.88)	2.60 (0.90)	2.55 (0.86)	2.55 (0.79)	2.68 (0.83)	2.52 (0.88)
COVID trust: Politicians	3.81 (1.78)	3.80 (1.81)	3.16 (1.80)	2.57 (1.65)	4.00 (1.86)	3.38 (1.70)	3.60 (1.83)	3.23 (1.86)	3.04 (1.79)	3.06 (1.74)	3.11 (1.77)	2.93 (1.81)
COVID Trust: National sci/med advisors	5.27 (1.47)	5.13 (1.41)	5.12 (1.47)	4.88 (1.58)	4.94 (1.57)	4.58 (1.51)	4.88 (1.53)	4.66 (1.61)	4.60 (1.66)	5.46 (1.41)	5.15 (1.55)	-
COVID Trust: Independent scientists	4.88 (1.48)	4.59 (1.44)	4.74 (1.48)	4.77 (1.60)	4.46 (1.52)	-	4.54 (1.52)	4.40 (1.61)	4.28 (1.63)	5.16 (1.48)	4.72 (1.60)	-
COVID Trust: WHO	5.59 (1.40)	4.97 (1.55)	5.02 (1.62)	4.77 (1.70)	4.76 (1.69)	4.46 (1.69)	4.72 (1.66)	4.50 (1.69)	4.44 (1.71)	5.62 (1.55)	4.57 (1.90)	-
Personal efficacy	5.04 (1.39)	5.59 (1.26)	5.47 (1.35)	5.12 (1.48)	5.36 (1.48)	5.13 (1.45)	5.30 (1.45)	5.09 (1.52)	5.03 (1.52)	5.25 (1.45)	5.32 (1.47)	5.14 (1.57)
Govt efficacy	3.86 (1.75)	3.85 (1.70)	3.48 (1.72)	3.03 (1.62)	4.13 (1.74)	3.66 (1.61)	3.88 (1.75)	3.58 (1.73)	3.36 (1.70)	3.28 (1.80)	3.76 (1.76)	3.25 (1.86)
Perceived infection risk	4.89 (1.32)	4.26 (1.24)	3.96 (1.24)	4.26 (1.30)	4.14 (1.22)	3.94 (1.25)	3.86 (1.25)	4.13 (1.28)	4.27 (1.24)	3.98 (1.52)	3.91 (1.38)	4.11 (1.38)
Worry about COVID	5.80 (1.36)	5.72 (1.40)	5.28 (1.52)	5.36 (1.58)	5.60 (1.51)	5.34 (1.57)	5.30 (1.60)	5.39 (1.61)	5.39 (1.63)	5.49 (1.58)	5.58 (1.60)	5.43 (1.72)
Vaccine – acceptance	0.80 (0.40)	0.80 (0.40)	0.79 (0.41)	0.73 (0.44)	0.79 (0.41)	0.79 (0.41)	0.80 (0.40)	0.76 (0.43)	0.72 (0.45)	0.76 (0.43)	0.75 (0.44)	0.63 (0.48)
Vaccine – recommend to vulnerable others	0.92 (0.28)	0.87 (0.34)	0.85 (0.36)	0.80 (0.40)	0.84 (0.36)	0.83 (0.38)	0.84 (0.36)	0.80 (0.40)	0.76 (0.43)	0.86 (0.35)	0.80 (0.40)	0.68 (0.47)
General vaccine attitudes	-	-	-	4.21 (1.10)	-	-	-	3.90 (1.14)	4.05 (1.06)	-	-	-

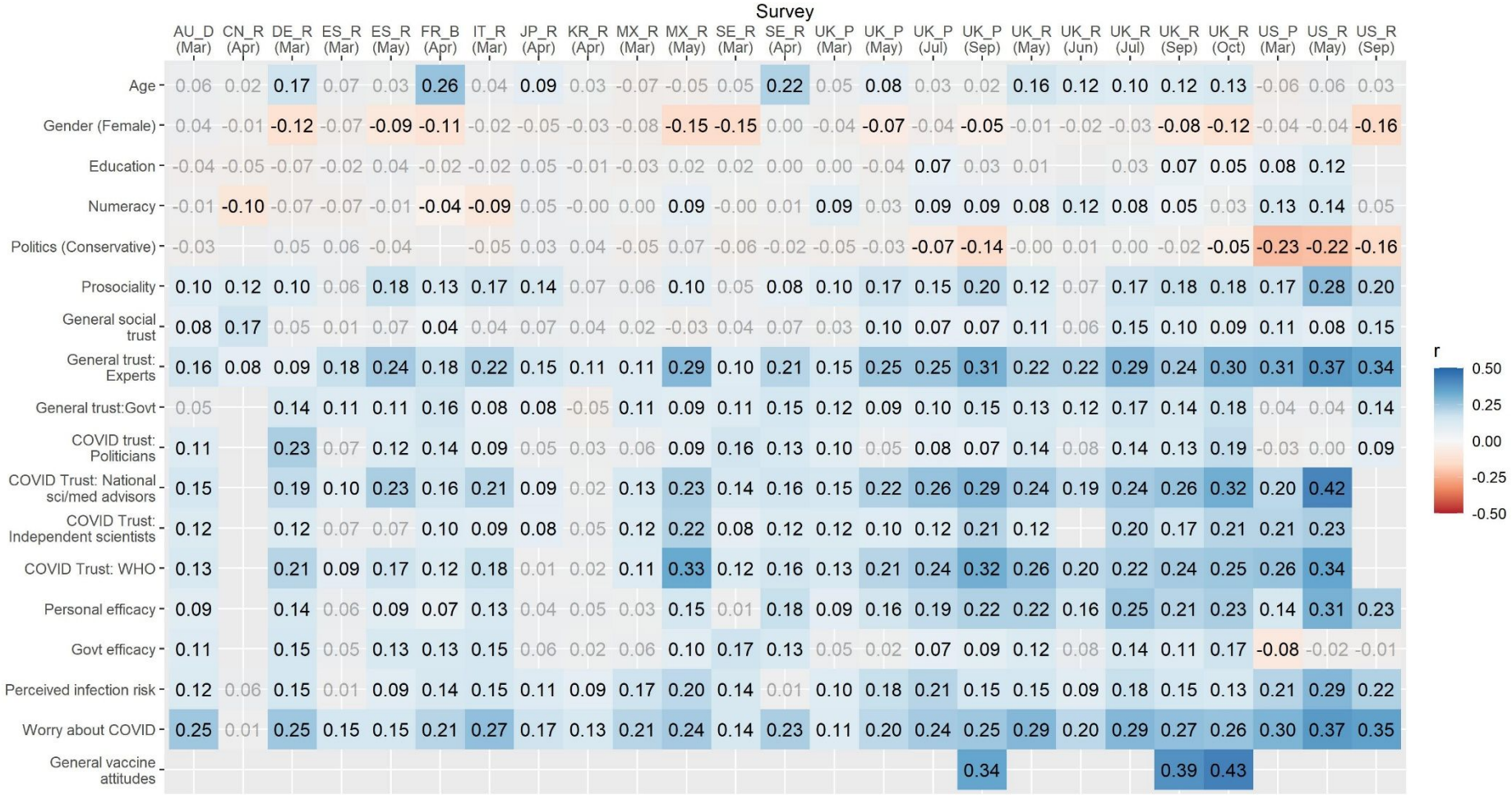

Figure S1. Point biserial correlations between predictors and vaccine acceptance across all samples. Greyed values are non-significant ($p > .05$). Blank spaces indicate predictors which were not included in a given survey

Table S5

Full logistic regression results from model predicting vaccine acceptance (continued on following page)

	ALL	**ALL (-UK)**	**AU_D (Mar)**	**DE_R (Mar)**	**ES_R (Mar)**	**ES_R (May)**	**FR_B (Apr)**	**IT_R (Mar)**	**JP_R (Apr)**	**KR_R (Apr)**	**MX_R (Mar)**	**MX_R (May)**	**SE_R (Mar)**	**SE_R (Apr)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	5.22 ***	5.05 ***	5.59 ***	9.30 ***	8.06 ***	7.35 ***	3.35 ***	11.64 ***	3.70 ***	7.89 ***	14.91 ***	5.36 ***	3.17 ***	2.22 ***
	[4.92 – 5.53]	[4.63 – 5.53]	[4.08 – 7.83]	[6.46 – 13.85]	[5.71 – 11.73]	[5.28 – 10.50]	[2.93 – 3.84]	[7.49 – 19.01]	[2.78 – 4.99]	[5.66 – 11.31]	[9.54 – 24.65]	[3.94 – 7.44]	[2.45 – 4.15]	[1.72 – 2.88]
Age	1.19 ***	1.08 **	1.12	1.63 ***	1.11	1	1.68 ***	1.08	1.23	0.97	0.75 *	0.87	1.12	1.44 ***
	[1.14 – 1.23]	[1.02 – 1.15]	[0.88 – 1.42]	[1.29 – 2.09]	[0.88 – 1.40]	[0.80 – 1.25]	[1.53 – 1.84]	[0.80 – 1.44]	[1.00 – 1.52]	[0.77 – 1.23]	[0.57 – 0.98]	[0.71 – 1.06]	[0.93 – 1.34]	[1.19 – 1.76]
Gender (Female)[a]	0.59 ***	0.61 ***	1.2	0.38 ***	0.53 **	0.47 ***	0.65 ***	0.59	0.76	0.75	0.50 *	0.43 ***	0.43 ***	0.71
	[0.55 – 0.64]	[0.55 – 0.69]	[0.76 – 1.88]	[0.23 – 0.60]	[0.33 – 0.84]	[0.30 – 0.72]	[0.54 – 0.77]	[0.34 – 1.03]	[0.50 – 1.13]	[0.48 – 1.19]	[0.28 – 0.88]	[0.28 – 0.64]	[0.30 – 0.63]	[0.49 – 1.03]
Education	1.03	1	0.85	0.86	0.96	1.11	0.99	0.98	1.13	0.98	0.95	0.98	1.05	0.97
	[0.99 – 1.08]	[0.94 – 1.07]	[0.67 – 1.07]	[0.68 – 1.08]	[0.77 – 1.19]	[0.90 – 1.36]	[0.91 – 1.09]	[0.74 – 1.31]	[0.93 – 1.39]	[0.78 – 1.23]	[0.71 – 1.26]	[0.81 – 1.19]	[0.88 – 1.25]	[0.81 – 1.16]
Numeracy	1.01	0.94 *	0.91	0.84	0.80 *	0.88	0.90 *	0.64 **	0.99	0.92	0.95	1	0.91	1.01
	[0.97 – 1.05]	[0.89 – 0.99]	[0.73 – 1.15]	[0.67 – 1.05]	[0.65 – 0.98]	[0.72 – 1.09]	[0.82 – 0.99]	[0.48 – 0.84]	[0.81 – 1.23]	[0.73 – 1.16]	[0.73 – 1.26]	[0.82 – 1.22]	[0.76 – 1.10]	[0.84 – 1.21]
Politics (Conservative)	0.93 ***	0.94 *	0.87	1.2	1.23	1.06		0.88	1.02	1.02	0.85	1.18	0.9	0.91
	[0.89 – 0.97]	[0.89 – 0.99]	[0.68 – 1.11]	[0.96 – 1.52]	[0.98 – 1.55]	[0.84 – 1.33]		[0.66 – 1.18]	[0.84 – 1.25]	[0.80 – 1.30]	[0.64 – 1.13]	[0.96 – 1.44]	[0.74 – 1.08]	[0.75 – 1.10]
Prosociality	1.06 **	1.05	0.98	1.06	0.98	1.2	1.07	1.05	1.16	1.26	1	0.98	0.96	0.96
	[1.02 – 1.10]	[0.99 – 1.12]	[0.75 – 1.26]	[0.82 – 1.36]	[0.78 – 1.23]	[0.96 – 1.50]	[0.98 – 1.17]	[0.78 – 1.40]	[0.93 – 1.45]	[0.98 – 1.62]	[0.76 – 1.31]	[0.80 – 1.20]	[0.79 – 1.15]	[0.79 – 1.16]
General social trust	1.05 *	1.05	1.18	0.96	0.92	1.15	1	0.99	0.97	1.14	1.26	0.93	0.97	1.01
	[1.01 – 1.10]	[0.99 – 1.11]	[0.91 – 1.52]	[0.75 – 1.24]	[0.73 – 1.16]	[0.92 – 1.44]	[0.91 – 1.10]	[0.74 – 1.34]	[0.77 – 1.22]	[0.87 – 1.48]	[0.95 – 1.70]	[0.76 – 1.14]	[0.80 – 1.19]	[0.83 – 1.24]
General trust: Experts	1.28 ***	1.26 ***	1.38 *	0.89	1.33 *	1.55 ***	1.18 **	1.45 *	1.25	1.3	1.05	1.49 ***	1.14	1.18
	[1.22 – 1.34]	[1.18 – 1.36]	[1.06 – 1.80]	[0.66 – 1.20]	[1.03 – 1.74]	[1.23 – 1.97]	[1.06 – 1.31]	[1.04 – 2.01]	[0.97 – 1.60]	[1.00 – 1.71]	[0.78 – 1.41]	[1.18 – 1.88]	[0.91 – 1.44]	[0.95 – 1.48]
General trust: Govt	1.02	0.94	0.74	1.07	1.24	1.01	1.08	0.97	1.07	0.70 *	1.28	1.02	0.98	1.06
	[0.97 – 1.08]	[0.87 – 1.01]	[0.54 – 1.00]	[0.77 – 1.48]	[0.91 – 1.69]	[0.76 – 1.34]	[0.94 – 1.23]	[0.68 – 1.39]	[0.81 – 1.40]	[0.52 – 0.93]	[0.88 – 1.87]	[0.78 – 1.32]	[0.75 – 1.27]	[0.79 – 1.42]
COVID trust: Politicians	1.06	1.03	1.14	1.50 *	1.16	1.13	1.11	0.72	0.98	1.17	0.92	1.1	1.16	0.89
	[0.99 – 1.13]	[0.94 – 1.13]	[0.78 – 1.66]	[1.02 – 2.21]	[0.83 – 1.63]	[0.81 – 1.57]	[0.97 – 1.27]	[0.45 – 1.12]	[0.67 – 1.41]	[0.86 – 1.58]	[0.61 – 1.37]	[0.81 – 1.48]	[0.85 – 1.58]	[0.64 – 1.23]
COVID Trust: National sci/med advisors	1.22 ***	1.22 ***	1.08	0.94	0.95	1.66 ***	1.22 **	1.12	1.08	0.88	1.23	1.1	1.04	1.04
	[1.15 – 1.29]	[1.12 – 1.33]	[0.76 – 1.52]	[0.63 – 1.41]	[0.69 – 1.31]	[1.24 – 2.24]	[1.08 – 1.39]	[0.72 – 1.77]	[0.79 – 1.48]	[0.63 – 1.24]	[0.89 – 1.70]	[0.83 – 1.44]	[0.77 – 1.39]	[0.77 – 1.41]
COVID Trust: Independent scientists	0.95 *	1	1.02	0.89	1	0.73 *	0.98	0.99	1.05	1.01	1.05	1.13	0.98	1.03
	[0.91 – 1.00]	[0.93 – 1.07]	[0.76 – 1.34]	[0.65 – 1.22]	[0.76 – 1.32]	[0.56 – 0.95]	[0.89 – 1.09]	[0.70 – 1.37]	[0.78 – 1.41]	[0.74 – 1.37]	[0.77 – 1.41]	[0.89 – 1.42]	[0.78 – 1.23]	[0.83 – 1.27]
COVID Trust: WHO	1.19 ***	1.11 **	0.96	1.58 **	1	1.03	1.05	1.11	0.9	1.07	1.13	1.57 ***	1.17	1.27 *
	[1.14 – 1.25]	[1.04 – 1.19]	[0.71 – 1.28]	[1.16 – 2.15]	[0.74 – 1.33]	[0.78 – 1.35]	[0.94 – 1.18]	[0.74 – 1.63]	[0.69 – 1.18]	[0.83 – 1.38]	[0.83 – 1.54]	[1.22 – 2.01]	[0.92 – 1.48]	[1.01 – 1.60]
Personal efficacy	1	0.92 *	0.85	1.04	0.93	0.91	0.87 **	1.02	0.92	1.01	0.85	0.82	0.73 **	1.09
	[0.96 – 1.05]	[0.86 – 0.98]	[0.64 – 1.12]	[0.80 – 1.34]	[0.71 – 1.21]	[0.71 – 1.16]	[0.79 – 0.96]	[0.73 – 1.44]	[0.72 – 1.18]	[0.75 – 1.36]	[0.61 – 1.16]	[0.64 – 1.05]	[0.59 – 0.90]	[0.90 – 1.32]
Govt efficacy	1.01	1.07	1.25	0.93	0.97	1.08	1.05	1.35	1.15	1.05	1.01	0.87	1.2	1.13
	[0.96 – 1.08]	[0.99 – 1.16]	[0.88 – 1.79]	[0.69 – 1.25]	[0.70 – 1.33]	[0.79 – 1.47]	[0.93 – 1.19]	[0.92 – 1.98]	[0.81 – 1.64]	[0.75 – 1.46]	[0.68 – 1.51]	[0.65 – 1.17]	[0.90 – 1.61]	[0.85 – 1.50]
Perceived infection risk	1.13 ***	1.14 ***	1.06	1.49 **	1	1.11	1.29 ***	1.47 **	1.2	1.07	1.44 *	1.28 *	1.33 **	0.79 *
	[1.08 – 1.17]	[1.08 – 1.21]	[0.82 – 1.37]	[1.16 – 1.92]	[0.80 – 1.25]	[0.89 – 1.38]	[1.18 – 1.42]	[1.11 – 1.95]	[0.97 – 1.48]	[0.83 – 1.38]	[1.07 – 1.94]	[1.03 – 1.59]	[1.09 – 1.62]	[0.65 – 0.97]
Worry about COVID	1.47 ***	1.51 ***	1.69 ***	1.33 *	1.36 *	1.19	1.36 ***	1.54 **	1.33 **	1.24	1.66 ***	1.31 *	1.34 **	1.77 ***
	[1.41 – 1.53]	[1.42 – 1.60]	[1.34 – 2.16]	[1.05 – 1.69]	[1.07 – 1.73]	[0.95 – 1.48]	[1.24 – 1.50]	[1.18 – 2.03]	[1.07 – 1.65]	[0.96 – 1.59]	[1.26 – 2.21]	[1.05 – 1.62]	[1.10 – 1.63]	[1.44 – 2.19]
Observations	19216	8398	644	639	668	666	2969	530	590	677	624	682	652	653
R^2 Tjur	0.128	0.101	0.096	0.184	0.061	0.137	0.151	0.141	0.077	0.04	0.115	0.197	0.102	0.132

Odds ratios [95CI] shown, all continuous measures were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; P Prolific; R, Respondi). [a]Gender is unstandardized. Political orientation data was not collected in France; this sample is excluded from pooled data.

*p < .05, **p < .01, *** p < .001

Table S5 (continued)

Full logistic regression results from model predicting vaccine acceptance

	UK_P (Mar)	**UK_P (May)**	**UK_P (Jul)**	**UK_P (Sep)**	**UK_R (May)**	**UK_R (Jul)**	**UK_R (Sep)**	**UK_R (Oct)**	**US_P (Mar)**	**US_R (May)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	5.20 ***	7.58 ***	6.42 ***	4.14 ***	5.62 ***	6.68 ***	5.56 ***	4.91 ***	4.66 ***	5.12 ***
	[3.87 – 7.11]	[5.81 – 10.07]	[5.06 – 8.23]	[3.47 – 4.98]	[4.37 – 7.33]	[5.22 – 8.68]	[4.57 – 6.81]	[4.05 – 6.00]	[3.46 – 6.38]	[3.71 – 7.21]
Age	1.18	1.38 ***	1.20 *	1.12	1.48 ***	1.38 ***	1.39 ***	1.37 ***	0.91	1.2
	[0.96 – 1.46]	[1.15 – 1.65]	[1.02 – 1.42]	[0.99 – 1.27]	[1.23 – 1.80]	[1.16 – 1.65]	[1.21 – 1.59]	[1.20 – 1.58]	[0.74 – 1.13]	[0.95 – 1.52]
Gender (Female)	0.79	0.53 ***	0.56 ***	0.62 ***	0.78	0.68 *	0.50 ***	0.44 ***	0.72	0.74
	[0.52 – 1.20]	[0.37 – 0.75]	[0.41 – 0.76]	[0.49 – 0.79]	[0.55 – 1.08]	[0.49 – 0.94]	[0.38 – 0.64]	[0.34 – 0.57]	[0.48 – 1.09]	[0.48 – 1.13]
Education	0.98	0.85	1.13	1.02	1.05	1.07	1.11	1.18 *	1.08	1.05
	[0.80 – 1.21]	[0.71 – 1.00]	[0.97 – 1.32]	[0.91 – 1.15]	[0.88 – 1.24]	[0.91 – 1.26]	[0.98 – 1.27]	[1.04 – 1.34]	[0.88 – 1.32]	[0.85 – 1.30]
Numeracy	1.30 *	0.99	1.20 *	1.12	1.24 *	1.11	1	1	1.21	1.41 **
	[1.05 – 1.62]	[0.84 – 1.17]	[1.02 – 1.41]	[0.99 – 1.26]	[1.05 – 1.48]	[0.95 – 1.32]	[0.88 – 1.14]	[0.88 – 1.13]	[0.98 – 1.50]	[1.13 – 1.78]
Politics (Conservative)	0.83	0.9	0.92	0.85 *	0.91	0.95	0.88	0.86 *	0.73 *	0.77
	[0.66 – 1.05]	[0.74 – 1.09]	[0.77 – 1.11]	[0.74 – 0.97]	[0.76 – 1.10]	[0.79 – 1.13]	[0.77 – 1.01]	[0.75 – 0.99]	[0.57 – 0.93]	[0.58 – 1.01]
Prosociality	1.09	1.19 *	1.15	1.11	0.89	1.04	1.09	1.07	1	1.2
	[0.89 – 1.34]	[1.01 – 1.41]	[0.99 – 1.34]	[0.98 – 1.26]	[0.74 – 1.06]	[0.88 – 1.23]	[0.96 – 1.25]	[0.94 – 1.23]	[0.81 – 1.23]	[0.96 – 1.51]
General social trust	0.85	1.04	0.94	1.03	1.06	1.19	1.09	0.97	1.14	0.97
	[0.68 – 1.06]	[0.86 – 1.25]	[0.79 – 1.12]	[0.91 – 1.17]	[0.88 – 1.27]	[1.00 – 1.43]	[0.96 – 1.25]	[0.85 – 1.11]	[0.90 – 1.44]	[0.77 – 1.23]
General trust: Experts	1.06	1.39 **	1.38 ***	1.39 ***	1.12	1.42 ***	1.23 **	1.45 ***	1.53 **	1.36 *
	[0.83 – 1.34]	[1.13 – 1.70]	[1.16 – 1.65]	[1.20 – 1.60]	[0.91 – 1.38]	[1.17 – 1.71]	[1.06 – 1.44]	[1.24 – 1.70]	[1.16 – 2.03]	[1.02 – 1.82]
General trust:Govt	1.27	1	1.06	1.27 **	1.13	1.11	1.14	1.03	0.87	0.96
	[0.96 – 1.68]	[0.79 – 1.27]	[0.86 – 1.31]	[1.08 – 1.51]	[0.90 – 1.43]	[0.88 – 1.38]	[0.95 – 1.37]	[0.86 – 1.22]	[0.67 – 1.13]	[0.72 – 1.28]
COVID trust: Politicians	1.17	0.98	1.1	0.93	1.01	1.2	1.11	1.26 *	1.21	1.01
	[0.82 – 1.67]	[0.73 – 1.31]	[0.85 – 1.44]	[0.76 – 1.14]	[0.76 – 1.33]	[0.89 – 1.62]	[0.88 – 1.39]	[1.01 – 1.56]	[0.86 – 1.69]	[0.73 – 1.40]
COVID Trust: National sci/med advisors	1.18	1.50 ***	1.22	1.14	1.17	0.95	1.25 *	1.29 **	0.78	1.95 ***
	[0.88 – 1.59]	[1.18 – 1.89]	[0.99 – 1.50]	[0.97 – 1.34]	[0.92 – 1.50]	[0.74 – 1.22]	[1.04 – 1.50]	[1.07 – 1.56]	[0.57 – 1.04]	[1.41 – 2.73]
COVID Trust: Independent scientists	1.08	0.89	0.83 *	0.93	0.84	1.02	0.88	1	1.12	0.81
	[0.84 – 1.37]	[0.73 – 1.08]	[0.69 – 0.99]	[0.80 – 1.07]	[0.68 – 1.04]	[0.83 – 1.25]	[0.74 – 1.04]	[0.85 – 1.17]	[0.89 – 1.41]	[0.62 – 1.06]
COVID Trust: WHO	1.05	1.26 *	1.24 *	1.45 ***	1.52 ***	1.06	1.32 **	1.04	1.17	1.02
	[0.80 – 1.35]	[1.04 – 1.53]	[1.03 – 1.50]	[1.25 – 1.68]	[1.22 – 1.88]	[0.85 – 1.32]	[1.11 – 1.57]	[0.87 – 1.24]	[0.90 – 1.51]	[0.76 – 1.37]
Personal efficacy	1.06	1.1	1.05	1.1	1.06	1.16	1.03	1.03	1.23	1.08
	[0.86 – 1.31]	[0.92 – 1.30]	[0.89 – 1.23]	[0.96 – 1.25]	[0.87 – 1.29]	[0.96 – 1.39]	[0.89 – 1.18]	[0.89 – 1.18]	[0.99 – 1.52]	[0.84 – 1.38]
Govt efficacy	0.84	0.82	1.06	1	1.02	0.96	0.95	1.04	1.05	0.98
	[0.62 – 1.13]	[0.63 – 1.05]	[0.83 – 1.34]	[0.84 – 1.20]	[0.79 – 1.30]	[0.73 – 1.27]	[0.77 – 1.17]	[0.86 – 1.27]	[0.77 – 1.43]	[0.72 – 1.34]
Perceived infection risk	1.18	1.39 ***	1.30 **	1.04	1.19	1.18	1.09	0.99	1.26	1.46 **
	[0.96 – 1.46]	[1.16 – 1.66]	[1.09 – 1.54]	[0.90 – 1.18]	[1.00 – 1.42]	[0.98 – 1.41]	[0.94 – 1.26]	[0.86 – 1.13]	[1.00 – 1.59]	[1.14 – 1.86]
Worry about COVID-19	1.1	1.25 *	1.41 ***	1.37 ***	1.58 ***	1.63 ***	1.56 ***	1.43 ***	1.47 **	1.27
	[0.88 – 1.36]	[1.04 – 1.48]	[1.19 – 1.66]	[1.19 – 1.57]	[1.33 – 1.88]	[1.36 – 1.96]	[1.36 – 1.80]	[1.23 – 1.65]	[1.17 – 1.87]	[0.99 – 1.64]
Observations	698	1143	1314	1845	1095	1249	1772	1702	693	680
R^2 Tjur	0.068	0.172	0.165	0.192	0.168	0.169	0.174	0.192	0.184	0.283

Odds ratios [95CI] shown, all continuous measures were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (R, Respondi; P, Prolific). [a]Gender is unstandardized

*p < .05, **p < .01, *** p < .001

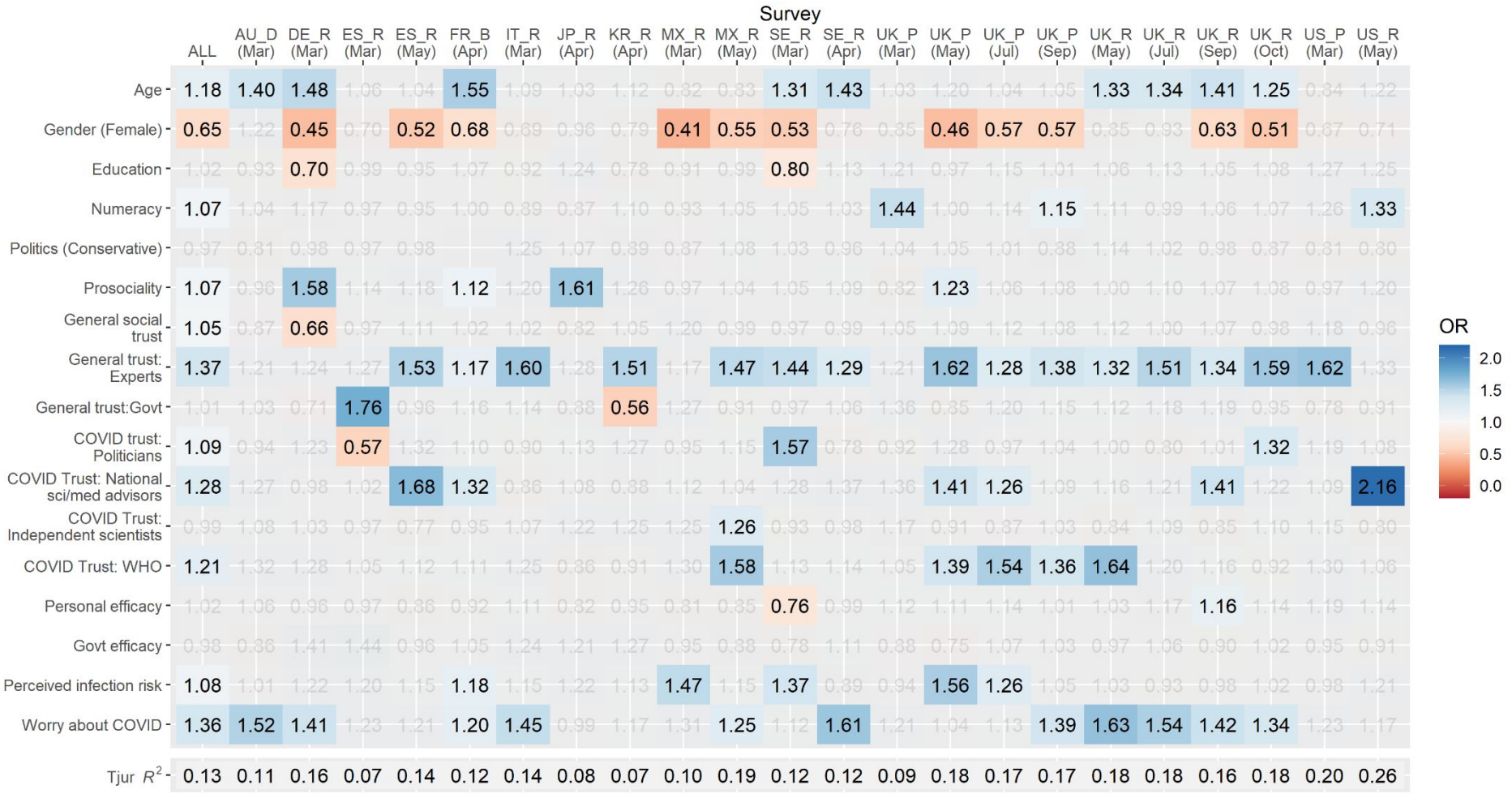

Figure S2. Heatmap of odds ratios in model predicting recommending vaccine to vulnerable friends/family. Columns represent individual samples and rows represent predictors in model. Grey values are non-significant, p > .05. Red shading indicates a lower likelihood of vaccine acceptance and blue shading a higher likelihood. For space, samples are defined by their two character ISO country code and a letter denoting participant source (B, BVA; D, Dynata; R, Respondi). Political orientation data was not collected in France, this sample is excluded from pooled data.

Table S6

Full logistic regression results from model predicting vaccine recommendation to vulnerable friends or family (continued on following page)

	ALL	**AU_D (Mar)**	**DE_R (Mar)**	**ES_R (Mar)**	**ES_R (May)**	**FR_B (Apr)**	**IT_R (Mar)**	**JP_R (Apr)**	**KR_R (Apr)**	**MX_R (Mar)**	**MX_R (May)**	**SE_R (Mar)**	**SE_R (Apr)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	7.64 *** [7.15 – 8.17]	10.40 *** [7.01 – 16.08]	21.06 *** [13.01 – 36.22]	13.37 *** [8.82 – 21.29]	8.84 *** [6.21 – 12.98]	6.45 *** [5.50 – 7.61]	14.40 *** [8.98 – 24.48]	4.88 *** [3.58 – 6.79]	11.66 *** [7.94 – 17.84]	22.54 *** [13.36 – 41.23]	5.04 *** [3.72 – 6.96]	5.49 *** [4.05 – 7.60]	3.72 *** [2.80 – 5.01]
Age	1.18 *** [1.13 – 1.24]	1.40 * [1.05 – 1.88]	1.48 * [1.09 – 2.02]	1.06 [0.80 – 1.41]	1.04 [0.83 – 1.32]	1.55 *** [1.39 – 1.73]	1.09 [0.79 – 1.51]	1.03 [0.81 – 1.29]	1.12 [0.86 – 1.48]	0.82 [0.60 – 1.11]	0.83 [0.68 – 1.02]	1.31 * [1.06 – 1.63]	1.43 ** [1.15 – 1.78]
Gender (Female)[a]	0.65 *** [0.59 – 0.70]	1.22 [0.71 – 2.10]	0.45 ** [0.25 – 0.81]	0.7 [0.40 – 1.21]	0.52 ** [0.32 – 0.81]	0.68 *** [0.56 – 0.84]	0.69 [0.37 – 1.26]	0.96 [0.62 – 1.50]	0.79 [0.47 – 1.32]	0.41 ** [0.20 – 0.77]	0.55 ** [0.36 – 0.82]	0.53 ** [0.35 – 0.81]	0.76 [0.50 – 1.13]
Education	1.02 [0.98 – 1.07]	0.93 [0.70 – 1.23]	0.70 * [0.52 – 0.93]	0.99 [0.76 – 1.29]	0.95 [0.76 – 1.18]	1.07 [0.97 – 1.18]	0.92 [0.67 – 1.26]	1.24 [0.99 – 1.55]	0.78 [0.59 – 1.02]	0.91 [0.65 – 1.25]	0.99 [0.81 – 1.21]	0.80 * [0.65 – 0.98]	1.13 [0.93 – 1.37]
Numeracy	1.07 *** [1.03 – 1.12]	1.04 [0.79 – 1.40]	1.17 [0.88 – 1.58]	0.97 [0.75 – 1.27]	0.95 [0.76 – 1.19]	1 [0.91 – 1.11]	0.89 [0.65 – 1.23]	0.87 [0.70 – 1.10]	1.1 [0.84 – 1.45]	0.93 [0.69 – 1.27]	1.05 [0.86 – 1.29]	1.05 [0.85 – 1.30]	1.03 [0.85 – 1.27]
Politics (Conservative)	0.97 [0.93 – 1.01]	0.81 [0.60 – 1.08]	0.98 [0.73 – 1.31]	0.97 [0.74 – 1.29]	0.98 [0.77 – 1.24]		1.25 [0.91 – 1.72]	1.07 [0.86 – 1.33]	0.89 [0.67 – 1.17]	0.87 [0.64 – 1.20]	1.08 [0.89 – 1.32]	1.03 [0.84 – 1.27]	0.96 [0.78 – 1.19]
Prosociality	1.07 ** [1.03 – 1.12]	0.96 [0.70 – 1.31]	1.58 ** [1.14 – 2.19]	1.14 [0.87 – 1.49]	1.18 [0.94 – 1.49]	1.12 * [1.01 – 1.23]	1.2 [0.88 – 1.62]	1.61 *** [1.26 – 2.07]	1.26 [0.95 – 1.66]	0.97 [0.72 – 1.31]	1.04 [0.84 – 1.27]	1.05 [0.85 – 1.30]	1.09 [0.89 – 1.34]
General social trust	1.05 * [1.00 – 1.10]	0.87 [0.62 – 1.19]	0.66 * [0.47 – 0.92]	0.97 [0.71 – 1.31]	1.11 [0.87 – 1.41]	1.02 [0.92 – 1.14]	1.02 [0.74 – 1.41]	0.82 [0.63 – 1.07]	1.05 [0.78 – 1.42]	1.2 [0.88 – 1.68]	0.99 [0.81 – 1.22]	0.97 [0.77 – 1.22]	0.99 [0.80 – 1.23]
General trust: Experts	1.37 *** [1.31 – 1.44]	1.21 [0.89 – 1.63]	1.24 [0.85 – 1.83]	1.27 [0.93 – 1.74]	1.53 *** [1.20 – 1.96]	1.17 ** [1.04 – 1.31]	1.60 ** [1.14 – 2.25]	1.28 [0.97 – 1.69]	1.51 ** [1.12 – 2.05]	1.17 [0.85 – 1.60]	1.47 ** [1.17 – 1.86]	1.44 ** [1.12 – 1.85]	1.29 * [1.02 – 1.63]
General trust: Govt	1.01 [0.96 – 1.08]	1.03 [0.72 – 1.47]	0.71 [0.46 – 1.10]	1.76 ** [1.20 – 2.62]	0.96 [0.71 – 1.30]	1.16 [0.99 – 1.35]	1.14 [0.77 – 1.70]	0.88 [0.66 – 1.18]	0.56 *** [0.40 – 0.77]	1.27 [0.84 – 1.95]	0.91 [0.70 – 1.19]	0.97 [0.73 – 1.30]	1.06 [0.78 – 1.46]
COVID trust: Politicians	1.09 * [1.01 – 1.17]	0.94 [0.59 – 1.49]	1.23 [0.75 – 2.02]	0.57 * [0.36 – 0.89]	1.32 [0.93 – 1.90]	1.1 [0.94 – 1.29]	0.9 [0.55 – 1.45]	1.13 [0.75 – 1.72]	1.27 [0.89 – 1.82]	0.95 [0.61 – 1.49]	1.15 [0.84 – 1.56]	1.57 * [1.11 – 2.23]	0.78 [0.54 – 1.10]
COVID Trust: National sci/med advisors	1.28 *** [1.21 – 1.36]	1.27 [0.85 – 1.92]	0.98 [0.59 – 1.60]	1.02 [0.69 – 1.51]	1.68 *** [1.24 – 2.30]	1.32 *** [1.14 – 1.52]	0.86 [0.54 – 1.37]	1.08 [0.77 – 1.53]	0.88 [0.61 – 1.28]	1.12 [0.78 – 1.61]	1.04 [0.78 – 1.37]	1.28 [0.93 – 1.75]	1.37 [0.99 – 1.91]
COVID Trust: Independent scientists	0.99 [0.94 – 1.04]	1.08 [0.76 – 1.53]	1.03 [0.70 – 1.52]	0.97 [0.68 – 1.36]	0.77 [0.58 – 1.02]	0.95 [0.85 – 1.07]	1.07 [0.75 – 1.50]	1.22 [0.88 – 1.70]	1.25 [0.89 – 1.74]	1.25 [0.89 – 1.74]	1.26 * [1.00 – 1.59]	0.93 [0.72 – 1.21]	0.98 [0.77 – 1.24]
COVID Trust: WHO	1.21 *** [1.15 – 1.28]	1.32 [0.93 – 1.85]	1.28 [0.86 – 1.90]	1.05 [0.74 – 1.47]	1.12 [0.84 – 1.49]	1.11 [0.98 – 1.26]	1.25 [0.83 – 1.86]	0.86 [0.63 – 1.15]	0.91 [0.66 – 1.23]	1.3 [0.93 – 1.81]	1.58 *** [1.23 – 2.02]	1.13 [0.87 – 1.47]	1.14 [0.89 – 1.46]
Personal efficacy	1.02 [0.97 – 1.06]	1.06 [0.76 – 1.47]	0.96 [0.70 – 1.30]	0.97 [0.71 – 1.32]	0.86 [0.66 – 1.11]	0.92 [0.82 – 1.02]	1.11 [0.77 – 1.59]	0.82 [0.62 – 1.07]	0.95 [0.69 – 1.31]	0.81 [0.56 – 1.15]	0.85 [0.66 – 1.10]	0.76 * [0.60 – 0.96]	0.99 [0.80 – 1.22]
Govt efficacy	0.98 [0.92 – 1.05]	0.86 [0.55 – 1.33]	1.41 [0.97 – 2.05]	1.44 [0.96 – 2.20]	0.96 [0.69 – 1.33]	1.05 [0.91 – 1.21]	1.24 [0.81 – 1.89]	1.21 [0.81 – 1.81]	1.27 [0.87 – 1.85]	0.95 [0.61 – 1.48]	0.88 [0.65 – 1.19]	0.78 [0.56 – 1.07]	1.11 [0.82 – 1.52]
Perceived infection risk	1.08 *** [1.03 – 1.13]	1.01 [0.74 – 1.37]	1.22 [0.89 – 1.68]	1.2 [0.91 – 1.58]	1.15 [0.91 – 1.45]	1.18 ** [1.06 – 1.31]	1.15 [0.83 – 1.58]	1.22 [0.96 – 1.55]	1.13 [0.84 – 1.50]	1.47 * [1.06 – 2.04]	1.15 [0.92 – 1.43]	1.37 ** [1.10 – 1.71]	0.89 [0.72 – 1.10]
Worry about COVID-19	1.36 *** [1.30 – 1.42]	1.52 ** [1.15 – 2.03]	1.41 * [1.05 – 1.90]	1.23 [0.92 – 1.64]	1.21 [0.96 – 1.52]	1.20 *** [1.08 – 1.34]	1.45 ** [1.09 – 1.92]	0.99 [0.78 – 1.25]	1.17 [0.88 – 1.53]	1.31 [0.96 – 1.79]	1.25 * [1.01 – 1.56]	1.12 [0.90 – 1.38]	1.61 *** [1.29 – 2.00]
Observations	19208	643	639	668	667	2969	530	590	677	620	681	652	653
R^2 Tjur	0.131	0.109	0.162	0.069	0.136	0.118	0.137	0.076	0.073	0.105	0.186	0.121	0.124

Odds ratios [95CI] shown, all continuous measures were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (D, Dynata; P, Prolific; R, Respondi). [a]Gender is unstandardized. Political orientation data was not collected in France; this sample is excluded from pooled data. *p < .05, **p < .01, *** p < .001

Table S6 (continued)

Full logistic regression results from model predicting vaccine recommendation to vulnerable others

	UK_P (Mar) *OR*	**UK_P (May)** *OR*	**UK_P (Jul)** *OR*	**UK_P (Sep)** *OR*	**UK_R (May)** *OR*	**UK_R (Jul)** *OR*	**UK_R (Sep)** *OR*	**UK_R (Oct)** *OR*	**US_P (Mar)** *OR*	**US_R (May)** *OR*
(Intercept)	16.28 ***	15.53 ***	10.84 ***	6.56 ***	8.65 ***	8.29 ***	6.65 ***	5.75 ***	11.91 ***	8.09 ***
	[10.45 – 26.82]	[11.04 – 22.50]	[8.18 – 14.64]	[5.37 – 8.08]	[6.48 – 11.80]	[6.34 – 11.02]	[5.41 – 8.25]	[4.70 – 7.10]	[8.02 – 18.38]	[5.64 – 11.97]
Age	1.03	1.20	1.04	1.05	1.33 **	1.34 **	1.41 ***	1.25 **	0.84	1.22
	[0.76 – 1.39]	[0.97 – 1.49]	[0.86 – 1.26]	[0.92 – 1.21]	[1.08 – 1.65]	[1.10 – 1.64]	[1.22 – 1.63]	[1.08 – 1.44]	[0.64 – 1.10]	[0.94 – 1.58]
Gender (Female)	0.85	0.46 ***	0.57 **	0.57 ***	0.85	0.93	0.63 ***	0.51 ***	0.67	0.71
	[0.46 – 1.55]	[0.30 – 0.69]	[0.40 – 0.82]	[0.44 – 0.74]	[0.58 – 1.24]	[0.65 – 1.33]	[0.48 – 0.82]	[0.39 – 0.66]	[0.40 – 1.11]	[0.45 – 1.12]
Education	1.21	0.97	1.15	1.01	1.06	1.13	1.05	1.08	1.27	1.25
	[0.89 – 1.62]	[0.79 – 1.18]	[0.96 – 1.37]	[0.89 – 1.15]	[0.88 – 1.29]	[0.94 – 1.35]	[0.91 – 1.20]	[0.94 – 1.23]	[0.98 – 1.64]	[0.99 – 1.58]
Numeracy	1.44 *	1.00	1.14	1.15 *	1.11	0.99	1.06	1.07	1.26	1.33 *
	[1.05 – 2.02]	[0.82 – 1.22]	[0.95 – 1.37]	[1.00 – 1.32]	[0.92 – 1.35]	[0.83 – 1.19]	[0.93 – 1.22]	[0.94 – 1.22]	[0.96 – 1.66]	[1.04 – 1.72]
Politics (Conservative)	1.04	1.05	1.01	0.88	1.14	1.02	0.98	0.87	0.81	0.80
	[0.74 – 1.46]	[0.84 – 1.32]	[0.82 – 1.25]	[0.76 – 1.03]	[0.92 – 1.41]	[0.83 – 1.24]	[0.85 – 1.14]	[0.75 – 1.00]	[0.60 – 1.09]	[0.60 – 1.08]
Prosociality	0.82	1.23 *	1.06	1.08	1.00	1.1	1.07	1.08	0.97	1.20
	[0.60 – 1.09]	[1.01 – 1.50]	[0.89 – 1.25]	[0.94 – 1.23]	[0.82 – 1.22]	[0.91 – 1.33]	[0.93 – 1.23]	[0.94 – 1.24]	[0.75 – 1.25]	[0.94 – 1.53]
General social trust	1.05	1.09	1.12	1.08	1.12	1.00	1.07	0.98	1.18	0.96
	[0.77 – 1.43]	[0.87 – 1.36]	[0.92 – 1.37]	[0.95 – 1.24]	[0.91 – 1.39]	[0.81 – 1.21]	[0.93 – 1.24]	[0.85 – 1.13]	[0.89 – 1.57]	[0.75 – 1.24]
General trust: Experts	1.21	1.62 ***	1.28 *	1.38 ***	1.32 *	1.51 ***	1.34 ***	1.59 ***	1.62 **	1.33
	[0.87 – 1.69]	[1.28 – 2.05]	[1.05 – 1.55]	[1.19 – 1.61]	[1.05 – 1.66]	[1.23 – 1.84]	[1.14 – 1.57]	[1.35 – 1.87]	[1.17 – 2.27]	[0.98 – 1.81]
General trust:Govt	1.36	0.85	1.2	1.15	1.12	1.18	1.19	0.95	0.78	0.91
	[0.90 – 2.06]	[0.64 – 1.13]	[0.93 – 1.53]	[0.96 – 1.38]	[0.86 – 1.44]	[0.92 – 1.51]	[0.98 – 1.44]	[0.80 – 1.14]	[0.55 – 1.08]	[0.67 – 1.24]
COVID trust: Politicians	0.92	1.28	0.97	1.04	1.00	0.80	1.01	1.32 *	1.19	1.08
	[0.55 – 1.53]	[0.91 – 1.83]	[0.71 – 1.32]	[0.83 – 1.30]	[0.73 – 1.37]	[0.57 – 1.13]	[0.79 – 1.28]	[1.05 – 1.66]	[0.77 – 1.81]	[0.75 – 1.54]
COVID Trust: National sci/med advisors	1.36	1.41 *	1.26 *	1.09	1.16	1.21	1.41 ***	1.22	1.09	2.16 ***
	[0.90 – 2.07]	[1.07 – 1.85]	[1.00 – 1.58]	[0.91 – 1.30]	[0.88 – 1.52]	[0.91 – 1.59]	[1.16 – 1.72]	[1.00 – 1.48]	[0.76 – 1.55]	[1.53 – 3.08]
COVID Trust: Independent scientists	1.17	0.91	0.87	1.03	0.84	1.09	0.85	1.10	1.15	0.80
	[0.83 – 1.64]	[0.72 – 1.15]	[0.70 – 1.06]	[0.88 – 1.20]	[0.65 – 1.07]	[0.86 – 1.37]	[0.71 – 1.01]	[0.93 – 1.30]	[0.86 – 1.53]	[0.59 – 1.06]
COVID Trust: WHO	1.05	1.39 **	1.54 ***	1.36 ***	1.64 ***	1.2	1.16	0.92	1.30	1.06
	[0.73 – 1.51]	[1.11 – 1.75]	[1.25 – 1.90]	[1.16 – 1.60]	[1.29 – 2.09]	[0.94 – 1.53]	[0.96 – 1.39]	[0.76 – 1.11]	[0.96 – 1.75]	[0.76 – 1.47]
Personal efficacy	1.12	1.11	1.14	1.01	1.03	1.17	1.16 *	1.14	1.19	1.14
	[0.84 – 1.50]	[0.91 – 1.36]	[0.95 – 1.35]	[0.87 – 1.16]	[0.83 – 1.27]	[0.96 – 1.43]	[1.00 – 1.35]	[0.99 – 1.32]	[0.92 – 1.53]	[0.87 – 1.48]
Govt efficacy	0.88	0.75	1.07	1.03	0.97	1.06	0.9	1.02	0.95	0.91
	[0.57 – 1.36]	[0.56 – 1.01]	[0.81 – 1.42]	[0.85 – 1.25]	[0.74 – 1.28]	[0.78 – 1.46]	[0.72 – 1.12]	[0.83 – 1.25]	[0.66 – 1.39]	[0.65 – 1.29]
Perceived infection risk	0.94	1.56 ***	1.26 *	1.05	1.03	0.93	0.98	1.02	0.98	1.21
	[0.69 – 1.28]	[1.25 – 1.94]	[1.03 – 1.53]	[0.91 – 1.21]	[0.84 – 1.27]	[0.75 – 1.14]	[0.84 – 1.14]	[0.88 – 1.17]	[0.73 – 1.31]	[0.92 – 1.58]
Worry about COVID	1.21	1.04	1.13	1.39 ***	1.63 ***	1.54 ***	1.42 ***	1.34 ***	1.23	1.17
	[0.89 – 1.62]	[0.84 – 1.28]	[0.93 – 1.37]	[1.20 – 1.62]	[1.35 – 1.98]	[1.26 – 1.89]	[1.23 – 1.65]	[1.15 – 1.55]	[0.92 – 1.64]	[0.89 – 1.53]
Observations	698	1142	1314	1844	1094	1249	1772	1702	693	680
R^2 Tjur	0.086	0.181	0.169	0.167	0.183	0.185	0.160	0.182	0.200	0.261

Odds ratios [95CI] shown, all continuous measures were standardized (scaled and mean-centered) prior to analysis. For space, samples are defined by their two character ISO country code and a letter denoting participant source (D, Dynata; P, Prolific; R, Respondi). [a]Gender is unstandardized. *p < .05, **p < .01, *** p < .001

Table S7

Results of multi-level model (samples nested by country and month) adjusting for survey-level variables.

	OR	*CI*
(Intercept)	6.59 ***	4.00 – 10.84
Age	1.20 ***	1.15 – 1.25
Gender (Female)	0.58 ***	0.54 – 0.63
Education	1.02	0.98 – 1.07
Numeracy	1.02	0.98 – 1.05
Politics (Conservative)	0.93 ***	0.89 – 0.97
Prosociality	1.06 **	1.02 – 1.10
General social trust	1.04	1.00 – 1.08
General trust: Experts	1.30 ***	1.24 – 1.36
General trust: Govt	1.05	1.00 – 1.11
COVID trust: Politicians	1.06	0.99 – 1.13
COVID Trust: National sci/med advisors	1.19 ***	1.13 – 1.26
COVID Trust: Independent scientists	0.94 *	0.90 – 0.99
COVID Trust: WHO	1.23 ***	1.17 – 1.29
Personal efficacy	1.01	0.96 – 1.05
Govt efficacy	1.00	0.94 – 1.06
Perceived infection risk	1.15 ***	1.11 – 1.20
Worry about COVID	1.44 ***	1.38 – 1.50
Days since first case[a]	0.91	0.62 – 1.35
Total confirmed cases[a]	0.46 ***	0.30 – 0.70
Total confirmed deaths[a]	3.07 ***	1.78 – 5.29
Government intervention (Stringency Index)[a]	0.93	0.83 – 1.05
Random effects		
σ^2	3.29	
$\tau_{00\ Country}$	0.18	
$\tau_{00\ Month}$	0.24	
Intraclass Correlation Coefficient	0.11	
$N_{Country}$	10	
N_{Month}	6	
Observations	19216	
Marginal R^2 / Conditional R^2	0.218 / 0.306	

Odds ratios [95CI] based on standardized (scaled and mean centered) continuous variables, except for gender which is unstandardized. [a] Denotes variables measured at the level of country and month of survey; due to the small number of countries and timepoints included in the model these estimates are biased and should be treated with caution (see Bryan & Jenkins, 2016; https://doi.org/10.1093/esr/jcv059). *p < .05, **p < .01, ***p < .001.

Table S8

Result of logistic regression models predicting vaccine acceptance, including or excluding general vaccine attitudes.

	Base model			Including general vaccine attitudes		
	UK Prolific (Sep)	**UK Respondi (Sep)**	**UK Respondi (Oct)**	**UK Prolific (Sep)**	**UK Respondi (Sep)**	**UK Respondi (Oct)**
	OR	*OR*	*OR*	*OR*	*OR*	*OR*
(Intercept)	4.14 ***	5.56 ***	4.91 ***	4.28 ***	6.17 ***	5.40 ***
	[3.47 – 4.98]	[4.57 – 6.81]	[4.05 – 6.00]	[3.57 – 5.17]	[5.02 – 7.67]	[4.39 – 6.69]
Age	1.12	1.39 ***	1.37 ***	1.15 *	1.32 ***	1.25 **
	[0.99 – 1.27]	[1.21 – 1.59]	[1.20 – 1.58]	[1.01 – 1.31]	[1.15 – 1.52]	[1.08 – 1.45]
Gender (Female)	0.62 ***	0.50 ***	0.44 ***	0.63 ***	0.49 ***	0.43 ***
	[0.49 – 0.79]	[0.38 – 0.64]	[0.34 – 0.57]	[0.49 – 0.80]	[0.37 – 0.64]	[0.33 – 0.57]
Education	1.02	1.11	1.18 *	1.00	1.08	1.14
	[0.91 – 1.15]	[0.98 – 1.27]	[1.04 – 1.34]	[0.88 – 1.13]	[0.94 – 1.23]	[1.00 – 1.31]
Numeracy	1.12	1.00	1.00	1.06	0.93	0.87 *
	[0.99 – 1.26]	[0.88 – 1.14]	[0.88 – 1.13]	[0.93 – 1.20]	[0.82 – 1.07]	[0.76 – 0.99]
Politics (Conservative)	0.85 *	0.88	0.86 *	0.85 *	0.87	0.85 *
	[0.74 – 0.97]	[0.77 – 1.01]	[0.75 – 0.99]	[0.74 – 0.98]	[0.75 – 1.01]	[0.73 – 0.98]
Prosociality	1.11	1.09	1.07	1.10	1.08	1.04
	[0.98 – 1.26]	[0.96 – 1.25]	[0.94 – 1.23]	[0.96 – 1.25]	[0.94 – 1.24]	[0.90 – 1.20]
General social trust	1.03	1.09	0.97	1.03	1.04	0.96
	[0.91 – 1.17]	[0.96 – 1.25]	[0.85 – 1.11]	[0.91 – 1.17]	[0.90 – 1.20]	[0.83 – 1.11]
General trust: Experts	1.39 ***	1.23 **	1.45 ***	1.28 **	1.11	1.29 **
	[1.20 – 1.60]	[1.06 – 1.44]	[1.24 – 1.70]	[1.11 – 1.49]	[0.95 – 1.31]	[1.09 – 1.53]
General trust: Govt	1.27 **	1.14	1.03	1.24 *	1.16	0.99
	[1.08 – 1.51]	[0.95 – 1.37]	[0.86 – 1.22]	[1.05 – 1.48]	[0.96 – 1.40]	[0.82 – 1.19]
COVID trust: Politicians	0.93	1.11	1.26 *	0.95	1.17	1.35 *
	[0.76 – 1.14]	[0.88 – 1.39]	[1.01 – 1.56]	[0.77 – 1.17]	[0.92 – 1.48]	[1.07 – 1.70]
COVID Trust: National sci/med advisors	1.14	1.25 *	1.29 **	1.12	1.14	1.20
	[0.97 – 1.34]	[1.04 – 1.50]	[1.07 – 1.56]	[0.94 – 1.32]	[0.94 – 1.38]	[0.98 – 1.47]
COVID Trust: Independent scientists	0.93	0.88	1.00	0.95	0.90	0.95
	[0.80 – 1.07]	[0.74 – 1.04]	[0.85 – 1.17]	[0.82 – 1.11]	[0.75 – 1.07]	[0.80 – 1.13]
COVID Trust: WHO	1.45 ***	1.32 **	1.04	1.41 ***	1.33 **	1.03
	[1.25 – 1.68]	[1.11 – 1.57]	[0.87 – 1.24]	[1.21 – 1.64]	[1.11 – 1.59]	[0.85 – 1.25]
Personal efficacy	1.10	1.03	1.03	1.06	1.00	0.98
	[0.96 – 1.25]	[0.89 – 1.18]	[0.89 – 1.18]	[0.93 – 1.22]	[0.86 – 1.16]	[0.84 – 1.14]
Govt efficacy	1.00	0.95	1.04	1.01	0.95	1.08
	[0.84 – 1.20]	[0.77 – 1.17]	[0.86 – 1.27]	[0.84 – 1.22]	[0.77 – 1.18]	[0.88 – 1.33]
Perceived infection risk	1.04	1.09	0.99	1.02	1.12	0.97
	[0.90 – 1.18]	[0.94 – 1.26]	[0.86 – 1.13]	[0.88 – 1.17]	[0.96 – 1.31]	[0.83 – 1.12]
Worry about COVID	1.37 ***	1.56 ***	1.43 ***	1.36 ***	1.47 ***	1.39 ***
	[1.19 – 1.57]	[1.36 – 1.80]	[1.23 – 1.65]	[1.18 – 1.57]	[1.26 – 1.70]	[1.19 – 1.63]
General vaccine attitudes				1.69 ***	2.08 ***	2.32 ***
				[1.51 – 1.89]	[1.84 – 2.37]	[2.02 – 2.66]
Observations	1845	1772	1702	1839	1767	1698
R^2 Tjur	0.192	0.174	0.192	0.235	0.247	0.281

Odds ratios [95CI] based on standardized (scaled and mean centered) continuous variables except for gender which is unstandardized.

*p < .05, **p < .01, *** p < .001

STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*

Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any pre-specified hypotheses	6
Methods			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	11
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	7
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	-
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8, Table S1
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7
Bias	9	Describe any efforts to address potential sources of bias	11
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	11
		(*b*) Describe any methods used to examine subgroups and interactions	11
		(*c*) Explain how missing data were addressed	10 (footnote), Table S3
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed	-

		Case-control study—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	12(footnote), Table S6
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	11 (Table 1), Tables S6,S7
		(b) Give reasons for non-participation at each stage	7
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	11 (Table 1), Tables S4, S5
		(b) Indicate number of participants with missing data for each variable of interest	10 (footnote), Table S3
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	-
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	-
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	-
		Cross-sectional study—Report numbers of outcome events or summary measures	11
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	12, Figure S1,
		(*b*) Report category boundaries when continuous variables were categorized	-
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15
Generalisability	21	Discuss the generalisability (external validity) of the study results	16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.