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EMPIRICAL ARTICLE

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Health worries, sociopolitical attitudes, or both? Prospective predictors of COVID-19 vaccine uptake in the Czech Republic

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Abstract

We examined the effects of health worries and sociopolitical attitudes on subsequent COVID-19 vaccine uptake. To avoid the potential bias of cross-sectional research, we analyzed whether these variables were able to predict the vaccine uptake prospectively, that is, when measured at the beginning of the nationwide vaccination campaign. The source of data was a longitudinal quota panel of 863 (T1 March 2021) and 641 (T2 May 2022) adult citizens of the Czech Republic. Besides health worries, the survey covered distrust in politicians, submission to political authorities, and trust in people. Results showed that the likelihood of getting vaccinated against COVID-19 at T2 was higher for participants who were more worried about the impact of COVID-19 on their health and less distrustful of politicians at T1. Furthermore, a general trust in people at T1 predicted a more likely vaccine uptake at T2, while political submission had no effect. These results corroborate the roles of both health concerns and sociopolitical attitudes in COVID-19 vaccine uptake.

KEYWORDS
COVID-19, health worries, political attitudes, submission, the Czech Republic, trust, vaccine uptake

1 | INTRODUCTION

Vaccination has been proven to be among the key strategies used by countries around the world to control the COVID-19 pandemic. A strong global consensus that "a COVID-19 vaccine is likely the most effective approach to sustainably controlling the COVID-19 pandemic" has been reached since the early phase of human trials (Koirala et al., 2020). Nevertheless, it soon became clear that vaccination was not just a medical issue; whether or not people got vaccinated against the disease was also a matter of psychological factors. Not surprisingly, a number of studies have shown that people worried about the possible consequences of COVID-19 on their health were more willing to get vaccinated compared to people who were not concerned and considered COVID-19 harmless (Allington et al., 2023; Bendau et al., 2021; Gerretsen et al., 2021; Troiano & Nardi, 2021). However, COVID-19 vaccination also has public health, national, and political dimensions. By getting vaccinated, people contribute to collective immunity and reduce the risk of spreading the disease to others. At the same time, the prompt to get vaccinated is typically issued by politicians such as the head of government and the Minister of Health. Our study investigates to what degree different aspects of one's relation to political authorities and society contribute to the likelihood of getting vaccinated.

Besides health worries related to COVID-19, we focus on three social psychological attitudes: distrust of politicians, submission to political authorities, and trust in people. Distrust of politicians refers to the belief that politicians and politics are principally dishonest. Previous research has suggested the association between COVID-19 vaccine hesitancy, distrust of the government or the state, and conspiracy suspicions (Allington et al., 2023; Murphy et al., 2021; Viskupič et al., 2022). Therefore, we expect that people who distrust politicians are less likely to get vaccinated. Another aspect of one's relation to political authorities is the level of submission, which is traditionally understood as a component of right-wing authoritarianism or parochialism. Studies on the association between COVID-19 vaccine hesitancy and right-wing authoritarianism have brought rather unclear results, which might be given by the possibility that only some aspects of authoritarianism, such as submission, are positively related to vaccine acceptance (Bilewicz & Soral, 2022; Murphy et al., 2021). Thus, our study supposes that a greater submission predicts a greater tendency to get vaccinated. Finally, we consider generalized trust in people, understood as the belief in trustworthiness, honesty, and fraternity with other members of society. Previous findings have been inconsistent, suggesting a lacking association between COVID-19 vaccine uptake and interpersonal trust (Viskupič et al., 2022), but also a relation between COVID-19 vaccine hesitancy and being self-interested and suspicious of others (Murphy et al., 2021). Assuming that getting vaccinated is also an expression of social responsibility, we expect that vaccine uptake is positively predicted by trust in people.

A large number of previous studies on COVID-19 vaccine acceptance or hesitancy are limited by their cross-sectional designs. Findings from these studies can be biased due to a common-method bias that typically results in an overestimation of the effects discovered. Additionally, many studies rely on the assessment of participants' *intentions* to get vaccinated, not actual vaccine uptake, which can further alter the effects. That is why we used a prospective approach to investigate how COVID-19 health worries, distrust of politicians, submission, and trust in people, measured at the beginning of the nationwide vaccination campaign, prospectively predicted actual COVID-19 vaccine uptake reported more than 1 year later. We controlled for the effects of age, gender, and education, which were associated with COVID-19 vaccine uptake in previous studies (Allington et al., 2023), and the effects of municipality size, as vaccines could have been less accessible and at the same time viewed as less necessary in smaller municipalities.

2 | METHOD

2.1 | Participants and procedure

The data source is a longitudinal study of Czech citizens' attitudes and behaviors during the COVID-19 pandemic. The sample was recruited from the adult population of the Czech Republic by a professional company using quota

sampling (quotas based on gender, education, size of municipality, and geographic regions). The questionnaires were administered using CAWI methodology in consecutive waves. Predictor variables were measured during the third wave of the pandemic, approximately 1 year after its onset in the Czech Republic, in March 2021 (T1) in a sample of 863 participants (49% females; age 19–70, *M* = 43.50, *SD* = 13.48). Fourteen months later, in May 2022 (T2), 641 respondents from the first wave also answered a question on their vaccine uptake (for details, see Table S1).

The nationwide vaccination campaign against COVID-19 was at its very beginning in March 2021. The vaccines were only available to healthcare workers, teachers, and citizens over 70 years of age or chronically ill. In our sample, only 4% were vaccinated at T1. In contrast, quality vaccines were available for free to the entire adult population in May 2022 (T2), and everyone who wanted could have been vaccinated by then.

2.2 | Measures

2.2.1 | Control variables (T1)

Four control variables were used: age, gender, the highest level of education (three categories: 33% lower than high school with the final exam, 40% high school with the final exam, and 27% university), and municipality size (three categories: 39% a small municipality, 37% a town, and 25% a city).

2.2.2 | COVID-19 health worries (T1)

Worries were measured using four items created for this study: "How worried are you that you or those you love will get sick with COVID-19 and suffer?" (from 1 = *I am not worried at all* to 5 = *I am very much worried*, *Md* = 4, *M* = 3.47), "I am afraid that the coronavirus will cause me a serious illness" (from 1 = *completely disagree* to 7 = *completely agree*, *Md* = 4, *M* = 3.84), "I am afraid that the coronavirus can kill me" (from 1 = *completely disagree* to 7 = *completely agree*, *Md* = 4, *M* = 3.93), and "How worried are you that the Czech Republic is threatened by epidemics of infectious diseases" (from 1 = *I am not worried at all* to 7 = *I am really worried*, *Md* = 5, *M* = 4.69).

2.2.3 | Distrust of politicians (T1)

Three items with response scales from 1 = *completely disagree* to 7 = *completely agree* were adopted from the Political Culture Questionnaire (Klicperová-Baker et al., 2007): "When you go into politics, you become part of a fraudulent system and help corrupt politicians" (*Md* = 4, *M* = 3.98), "When I think about the state and government, I either get angry or depressed" (*Md* = 5, *M* = 4.41), and "Politics in our country is an immoral farce defying the common sense" (*Md* = 5, *M* = 5.04).

2.2.4 | Submission to political authorities (T1)

The submission was measured by three items also taken from the Political Culture Questionnaire with response scales from 1 = *completely disagree* to 7 = *completely agree*: "A good government will make sure that people obey the laws, whether they are good or bad" (*Md* = 4, *M* = 3.96), "People should respect the state and the government no matter what they do" (*Md* = 3, *M* = 3.02), and "People should mind their own business and let the state and government do what they have to do" (*Md* = 2, *M* = 2.70).

2.2.5 | Trust in people (T1)

Four items measured general trust in people. Two traditional ANES items were used: "In general, would you say that most people can be trusted, or that one can never be too careful when dealing with people?" (from 0 = *never be too careful* to 10 = *most people* can *be trusted*, *Md* = 4, *M* = 4.03) and "Would you say that most people try to help others or that they mostly take care of themselves?" (from 0 = *take care of themselves* to 10 = *try to help others*, *Md* = 5, *M* = 4.26). They were complemented by two ad hoc items: "In the last 14 days, how strongly have you felt unity with fellow citizens of this country?" (from 1 = *not at all* to 7 = *very intensively*, *Md* = 3, *M* = 3.17) and "I believe in society, mutual solidarity and humanity" (from 1 = *completely disagree* to 7 = *completely agree*, *Md* = 4, *M* = 4.08).

2.2.6 | Vaccine uptake (T2)

Participants were asked whether they had been vaccinated against COVID-19. Out of those who answered, 484 (76%) had been vaccinated and 157 had not (24%). Thirteen people refused to answer and 209 did not take part in data collection at T2.

2.3 | Data analysis

Data were analyzed using structural equation modeling in Mplus 7.4 (Muthén & Muthén, 1998-2015). This enabled us to estimate latent variables based on items with diverse response scales and to obtain their more reliable estimates by explicitly modeling measurement errors. Vaccine uptake was modeled as a binary outcome variable. COVID-19 health worries, distrust of politicians, submission, and trust in people were set to predict vaccine uptake and modeled as latent variables. Their indicators with five or seven points were treated as ordinal, and indicators with 11 points as continuous. Control variables were set to predict all other variables in the model. Education and municipality size were recoded into dummy variables, the first categories serving as references. The model was estimated on a matrix of polychoric correlations by the WLSMV estimator with missing data (Asparouhov & Muthén, 2010). Ordinal and binary outcomes were predicted using probit regression.

3 | RESULTS

3.1 | Preliminary and attrition analyses

First, a measurement model was estimated (vaccine uptake and control variables not included). After allowing one residual correlation between two indicators of COVID-19 health worries, the model showed an acceptable fit (χ^2_{70} = 397.75, p < 0.01; CFI = 0.96; TLI = 0.95; RMSEA = 0.07, 90% CI [0.07,0.08]). Standardized factor loadings were reasonably high, ranging from 0.46 to 0.82. Composite reliabilities were 0.77 (health worries), 0.65 (distrust of politicians), 0.72 (submission to political authorities), and 0.70 (trust in people).

Next, the vaccine uptake and control variables were added to assess bivariate correlations. Correlation coefficients shown in Table 1 suggested that the vaccine uptake had weak to moderate associations with all latent variables.

Attrition analysis comparing participants with and without (i.e., refused to answer or were not present at T2) valid data on vaccine uptake showed no significant differences in terms of gender (χ^2_1 = 0.85, p = 0.36), education (χ^2_2 = 5.00, p = 0.08), or municipality size (χ^2_2 = 0.58, p = 0.75). However, participants with valid data in both measurements (M = 45.33) were significantly older than those without both valid data (M = 38.23; t_{861} = 6.94, p < 0.01, Cohen d = 0.54). Availability of data on vaccine uptake was also weakly related to greater COVID-19 health worries

TABLE 1 Bivariate correlations between latent variables and vaccine uptake.

	1.	2.	3.	4.	5.	6.	7.	8.
1. Age								
2. Gender (female)	−0.02							
3. Education	−0.20**	−0.03						
4. Municipality size	0.02	0.02	0.06					
5. COVID-19 health worries	0.29**	0.13**	−0.11**	−0.02				
6. Distrust of politicians	0.03	0.04	−0.12**	−0.01	−0.11**			
7. Submission to political authorities	0.14**	−0.02	−0.19**	0.02	0.38**	−0.35**		
8. Trust in people	0.14**	−0.07	0.12**	0.01	0.03	−0.29**	0.02	
9. Vaccine uptake	0.07	−0.08*	0.04	0.01	0.22**	−0.23**	0.11*	0.17**

Note: For simplicity, education and municipality size are treated as continuous variables in the correlation analysis.
**$p < 0.01$. *$p < 0.05$.

($r = 0.13$, $p < 0.01$) and political submission ($r = 0.11$, $p < 0.01$), but not to distrust of politicians ($r = -0.06$, $p = 0.12$) or trust in people in general ($r = 0.01$, $p = 0.79$).

3.2 | Predictors of vaccine uptake

The fit of the main model was acceptable ($\chi^2_{140} = 546.19$, $p < 0.01$; CFI = 0.95; TLI = 0.93; RMSEA = 0.06, 90% CI [0.05,0.06]). A greater likelihood of vaccine uptake was predicted by stronger COVID-19 health worries, lower distrust of politicians, and greater trust in people. No relation between vaccine uptake and political submission was found. As for control variables, males were slightly more likely to get vaccinated than females. Regression coefficients predicting vaccine uptake are presented in Table 2. More information can be found in the Supplementary Material: the model is shown in Figure S1, effects of control variables on latent predictors can be found in Table S2, Mplus input is presented in Table S3, and full model results are in Table S4.

4 | DISCUSSION

This study investigated how COVID-19 health worries and selected sociopolitical attitudes at the beginning of the nationwide vaccination campaign in the Czech Republic predicted the uptake of the COVID-19 vaccine as reported 14 months later. The likelihood of the vaccine uptake was higher for people who were more concerned about the impact of COVID-19 on their health, less distrustful of politicians, and more trusting of others. Submission to political authorities was not related to vaccine uptake. These findings indicate that people's tendency to get vaccinated is shaped not only by their private health worries but also by broader views of society and politics.

Our findings both support and expand the current knowledge. The effect of *health worries* is consistent with previous research (e.g., Allington et al., 2023). This study corroborates previous results using data in which predictor variables and vaccine uptake are captured at different time points. The significant effect of *trust in people* on vaccine uptake is more unexpected because previous studies have produced inconsistent findings. It is possible that our study was able to detect this effect because it used a relatively broad measure of trust, including also a belief in humanity and solidarity between people, compared to narrower measures (sometimes even single-item) used in some other studies (e.g., Viskupič et al., 2022). The lacking effect of *submission* might be given by the fact that the effect of submission to authorities (and perhaps authoritarianism in general) on vaccine uptake is context-specific, depending, for example, on the political culture of the country (specifically, the degree of parochialism) and whether

TABLE 2 Predictors of vaccine uptake (probit regression).

	B	*SE*	β
Age	0.00	0.01	0.00
Gender (female)	−0.25*	0.11	−0.12
Education: high school with the final exam	−0.02	0.13	−0.01
Education: university	0.09	0.15	0.04
Municipality size: a town	0.01	0.12	0.01
Municipality size: a city	0.14	0.14	0.06
COVID-19 health worries	0.37**	0.08	0.30
Distrust of politicians	−0.52**	0.14	−0.24
Submission to political authorities	−0.07	0.13	−0.04
Trust in people	0.28*	0.14	0.14

Note: Non-standardized (*B*) and standardized (β) coefficients are presented. Reference categories are "lower than high school with the final exam" (for education) and "a small municipality" (for municipality).
**$p < 0.01$. *$p < 0.05$.

the ruling political elites are perceived as legitimate (cf. Lacko et al., inpress). Taking all of the above together, it is not a surprise that submission does not play a role in some contexts. Indeed, in contrast to submission, we found a considerable predictive effect of *distrust in politicians* on future vaccination. This finding corroborates the logic according to which the alienated anti-systemic rebels tend to reject the government along with vaccination and vice versa.

The effects of control variables were rather modest. Not surprisingly, older participants were more concerned about contracting COVID-19, which, in turn, positively predicted their vaccine uptake. Older participants were also slightly more trusting in people, which can represent an additional reason for their increased vaccine uptake, but it should be kept in mind that this effect was weak and needs further investigation. A non-negligible role was also played by higher education that was associated with lower political submission and distrust, and higher trust in people.

A limitation of our study, shown by the attrition analysis, is that people who reported their vaccine uptake at T2 were slightly more worried about their health and politically submissive than those who had quit the study. Additionally, it is possible that people with high levels of political or interpersonal distrust were already underrepresented at T1. When interpreting our results, this potential limitation should be considered.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the supplementary materials of the article.

ETHICS STATEMENT

The study has been approved by the Czech Academy of Sciences Ethical Board (PSU-199/Brno/2021).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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