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Public Preferences for Policies to Promote COVID-19 Vaccination Uptake: A Discrete Choice Experiment in The Netherlands



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ABSTRACT

Objectives: The COVID-19 pandemic forms an unprecedented public health, economic, and social crisis. Uptake of vaccination is critical for controlling the pandemic. Nevertheless, vaccination hesitancy is considerable, requiring policies to promote uptake. We investigate Dutch citizens' preferences for policies that aim to promote vaccination through facilitating choice of vaccination, profiling it as the norm, making vaccination more attractive through rewards, or punishing people who reject vaccination.

Methods: We conducted a discrete choice experiment in which 747 respondents were asked to choose between policies to promote vaccination uptake and their impacts on the number of deaths, people with permanent health problems, households with income loss, and a tax increase.

Results: Respondents generally had a negative preference for policies that promote vaccination. They particularly disliked policies that punish those who reject the vaccine and were more favorable toward policies that reward vaccination, such as awarding additional rights to vaccinated individuals through vaccination passports. Respondents who reject vaccination were in general much more negative about the policy options than respondents who consider accepting the vaccine. Nevertheless, vaccination passports are supported by both respondents who accept the vaccine, those who reject vaccination, and those who are unsure about vaccination.

Conclusions: This study provides concrete directions for governments attempting to increase the vaccination uptake in ways that are supported by the public. Our results could encourage policy makers to focus on policy options that make vaccination easier and reward people who take the vaccine, as especially the implementation of vaccination passports was supported.

Keywords: COVID-19, discrete choice experiment, vaccination passport, vaccination policy, vaccine uptake.

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Introduction

The COVID-19 pandemic forms an unprecedented public health, economic, and social crisis. Achieving a high uptake of safe and effective vaccines against COVID-19 is critical in taking control of the pandemic.¹ At the end of 2020, the first vaccines were approved for use in the European Union based on their safety and effectiveness and the first vaccination programs were launched. Various studies investigated people's preferences for a COVID-19 vaccine using preference elicitation techniques such as discrete choice experiments (DCEs), conjoint analyses, and regular surveys.^{2–11} These studies investigated how the uptake of a COVID-19 vaccine would be affected by characteristics such as effectiveness, availability, country of production, price, duration of protection, and risk of side effects. Some of these studies established that, at the end of 2020, a sizable proportion of the population in various western countries was either opposed to or unsure about becoming vaccinated against COVID-19.^{2–5} This is concerning from a public health standpoint

given that high vaccine uptake is paramount to slowing the pandemic's spread.¹ Besides informing citizens about vaccine characteristics, merits, and potential side effects, governments can incentivize vaccination by reducing barriers for vaccination, by profiling vaccination as a norm, by rewarding people who take the vaccine, or by imposing restrictions on people who refuse vaccination.¹² For instance, Craig¹¹ finds that offering proof of vaccination through cards verifying COVID-19 vaccination status is an effective measure to increase uptake. In addition, many countries introduced "green passports" for vaccinated persons that allow access to public events, restaurants, and fitness centers^{13,14} The implementation of policies aimed to actively encourage citizens to vaccinate against COVID-19 poses ethical dilemmas to policy makers. Several scholars argue that the far-reaching health, social, and economic effects of the COVID-19 pandemic make it ethically acceptable for governments to consider policies that incentivize vaccination, such as granting more freedom from lockdown measures to vaccinated individuals, offering financial incentives, and

perhaps even obligating vaccination.^{12,15} Nevertheless, such policies can be seen as a form of shaming those who do not want to get vaccinated and as a way of restricting people's freedom of choice and their bodily integrity. Hence, public debates on such matters are often emotional and morally challenging.^{12,15,16} Despite the fact that sufficient public support is also a key variable for a successful vaccination policy,^{17,18} only a few studies examine the public support for policies that encourage the uptake of a vaccine.^{19–21} Nevertheless, to the best of our knowledge, no studies have done so in the context of the COVID-19 pandemic. Moreover, no studies have attempted to investigate public support for a wide variety of vaccination-stimulating policies. Therefore, the key objective of our study is to investigate the preferences of the public in The Netherlands for 9 policies to promote vaccination and to examine whether preferences differ among subgroups in the population. We conducted a DCE in a period (December 2020) when national polls showed that hesitancy toward COVID-19 vaccination was quite high; <60% of the adult population intended to take the COVID-19 vaccine.^{22,23}

Methodology

Setup of the Experiment

DCEs are frequently applied to elicit preferences of citizens for policies in the context of health^{24,25} and safety.²⁶ In a DCE, respondents are asked to make a series of choices between 2 or more policy options specified by a number of dimensions (called “attributes”) that differ in their settings (called “levels”) between the options. By observing a large number of choices, researchers can infer how attributes and levels implicitly determine the value of the competing options for respondents.^{24,25} This information can then be used to learn about the relative importance groups in society attach to various policies and their impacts and predict levels of support for specific policies.²⁷ In addition, by including a monetary attribute, the trade-offs respondents make between the policy options can be measured in monetary terms, indicating respondents' willingness to pay for the different levels of the options. We chose to conduct a labeled DCE, which specifies policies both in terms of their nature (eg, “vaccination passport”) and in terms of their attributes (eg, “number of deaths prevented” and “increase in tax”), because this allows policy makers to learn about how individuals value the attributes of policies that incentivize vaccination and how individuals value the policy options irrespective of the levels of the attributes.

This study was designed under time pressure; the policy options and their attributes and levels were selected based on a literature review, discussions with policy makers, expert opinion, and feedback from a pilot study in a convenience sample (see Appendix A in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.03.013> for more details), but not on formative qualitative research.²⁸ Table 1 describes the 9 policies that were eventually selected.

These 9 policies describe possible government actions that vary in intrusiveness from “enabling choice” to “restricting choice,” in line with the Nuffield intervention ladder.²⁹ Note that respondents were asked to consider these options as additional measures besides the already planned policies such as providing information about the vaccine. In the experiment, these policy options were accompanied by 4 attributes representing the potential impacts of the policies that were considered most relevant in this context: (1) decrease in the number of deaths, (2) decrease in the number of people with permanent health problems, (3) decrease in the number of households with income loss, and (4) one-time tax increase. The attribute levels are presented in see

Appendix Table A1 in Appendix A in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.03.013>.

Participants received information on the purpose of the study, data storage, and who would have access to their data before starting the questionnaire. An informed consent was obtained at the start of the questionnaire. Participants were presented with 9 consecutive choice tasks. In each choice task, they had to choose between 2 strategies to promote vaccination uptake that each consisted of a combination of 2 of the 9 policies outlined before, the 3 attributes concerning the effects of these policies on health and the economy, and the tax attribute. Respondents were first asked “Which policy strategy would you prefer?” (forced choice), followed by “Would you actually recommend the chosen policy strategy to the government?” (opt-out choice). For this second question, respondents could choose between 2 options: (1) Yes, I would actually recommend this strategy to the government, and (2) No, if these are the 2 strategies the government can choose from, I would recommend against implementing any of these policies. Choosing the second alternative (the opt-out alternative) implies that respondents recommend the government to not implement additional measures, but to keep the policies conducted in the status quo (eg informing people about the vaccine). This is in line with the recommendation of Determann et al³⁰ to incorporate a status quo in case there exists one.

An example of a choice task is provided in see Appendix Figure A1 in Appendix A in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.03.013>. To gain insight into preference heterogeneity regarding (impacts of) the 9 policies to promote vaccination, we collected information about sociodemographic characteristics (eg, age, sex, education), intention to take the vaccine, and perceived risk of being hospitalized or dying after infection with COVID-19. Our study was exploratory in the sense that we did not aim to test any a priori hypotheses regarding people's preferences for policies to promote vaccination.

Experimental Design

Once we defined the attributes and the initial set of attribute levels, we constructed a Bayesian D-optimal design for the DCE. We incorporated previous knowledge in the design that represents that lower risk of (negative) effects and lower taxes are generally preferred over higher risk of (negative) effects and higher taxes. Furthermore, we expressed uncertainty around our beliefs in a multivariate prior parameter distribution. The final design consisted of 36 choice tasks that we grouped into 4 blocks of 9 choice tasks such that the 9 policies were about evenly distributed over the blocks. Respondents were randomized to one of the 4 blocks. The design is Bayesian D-optimal for the precise estimation of the policy and attribute effects and has a Bayesian D-criterion value of 32.04. This Bayesian D-criterion value is the maximum value for the logarithmic transformation of the determinant of the model's information matrix averaged over a normal prior parameter distribution.³¹ The underlying design generating model is the multinomial logit model, but the design also performs well for the precise estimation of the panel mixed logit (PML) model, given that the latter assumes multinomial logit models for all individuals over which it averages. We generated the design using the coordinate-exchange algorithm in the JMP Pro 16 software. All 36 choice tasks are presented in see Appendix Table B1 in Appendix B in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.03.013>.

Data Collection

The DCE survey was performed between December 1 and December 4, 2020. At the time, it was generally known that 2

Table 1. Policies included in the DCE.

Shorthand description of the policy	Level of intervention	Description of the policy in the DCE
(1) Vaccination at home	Enable choice	People are given the option of getting vaccinated at home.
(2) Vaccination when and where convenient	Enable choice	People are given the option of getting vaccinated in the evening or during weekends and at locations in the neighborhood such as schools, community centers and pharmacies, or at a drive-through location.
(3) Vaccination ambassadors	Guide choice through changing the default	An intensive public campaign to encourage people to get vaccinated. Celebrities in The Netherlands who have been vaccinated act as ambassadors and try to convince other people.
(4) Pay €250 if does not get vaccinated	Guide choice through disincentives	Adults who do not get vaccinated pay a one-time extra 250 euros health insurance premium. Exception is made for people who cannot be vaccinated for medical reasons.
(5) Receive €100 if gets vaccinated	Guide choice through incentives	Adults who get vaccinated receive a one-time discount of 100 euros on their health insurance premium.
(6) Vaccination passport daily activities during outbreak	Guide choice through incentives	People who get vaccinated receive a vaccination passport that allows them to continue to visit certain places (such as stores, bars and restaurants, nursing homes, fitness centers, and public transportation) when there is an outbreak of the virus in their region. People who do not get vaccinated may be refused entry during an outbreak. The passport will not take effect until all adults in The Netherlands have had the opportunity to get vaccinated.
(7) Vaccination passport large events	Guide choice through incentives	People who get vaccinated receive a vaccination passport that allows them to visit certain places where large groups of people gather and it is not possible to keep 1.5 meters distance (such as concerts, festivals, sporting events, and other large-scale gatherings). People who do not get vaccinated may be refused entry. The passport will not take effect until all adults in The Netherlands have had the opportunity to take the vaccine.
(8) Counseling if does not get vaccinated	Guide choice through disincentives	Adults who do not get vaccinated must have a mandatory counseling interview with a doctor who has received special training on how to stimulate people to get vaccinated. People who refuse this interview will be fined 100 euros.
(9) Mandatory testing at own cost if does not get vaccinated	Restrict choice	Adults who do not get vaccinated must have a COVID-19 test every 2 weeks at their own expense (95 euros each time) when there is an outbreak of the virus in their region or self-quarantine during the outbreak.

DCE indicates discrete choice experiment.

vaccines were close to being approved by the European Medicines Agency and that the COVID-19 vaccination program in The Netherlands was expected to start in January 2021. Participants were recruited from an internet panel (Kantar Profiles) with the aim to be representative of the adult population (≥ 18 years) of The Netherlands with respect to age, sex, and education level. Participants received a small incentive to participate. The Human Research Ethics Committee of Delft University of Technology approved our study protocol (Nr. 1300). A total of 895 respondents started the survey, and 818 respondents (91.4%) completed the survey. We excluded respondents from this data set when they met 2 of the following 3 criteria: (1) they filled out the survey too quickly, that is, in less than a third of the median time of 17 minutes; (2) they provided the same answer to each choice question (ie, always left or right choice option); and (3) they provided nonsensical answers to the debriefing questions in the survey. Based on these criteria, we excluded 71 respondents (8.7%) and performed our analyses on the final data set of 747 respondents.

Statistical Analysis

For the analysis of both the forced choice data and the opt-out data, we estimated PML models using the hierarchical Bayes technique in the JMP Pro 16 Choice platform (based on 10 000 iterations, of which the last 5000 were used for the actual estimation). For the estimation of the opt-out alternative, a dummy variable was specified in a so-called opt-out PML

model.³² More precisely, we estimated the intrinsic utility or preference of respondents for choosing none of the policy strategies compared with a set of base policy measures that would be taken irrespective of these additional policy measures (opt-out). These base policy measures were the possibility of being personally informed by the general practitioner, information campaigns in the media, and sending reminders to people who do not respond to the invitation to be vaccinated via a letter or an SMS message. Therefore, respondents who opted out of the choice set at hand chose to maintain the status quo. Finally, we estimated the value respondents attached to the policy options and their impacts. In the estimations, we distinguished among respondents who indicated that they (probably) will take the vaccine (hereafter “willing to vaccinate”), respondents who indicated they are in doubt whether to take the vaccine (hereafter “unsure about vaccination”), and respondents who indicated that they (probably) will reject the vaccine (hereafter “not willing to vaccinate”) because this covariate information turned out to be most significant for the preference heterogeneity (see Results). This led to marginal utilities that are the sum of main effects and interaction effects involving respondents’ willingness to take the vaccine.

Results

The sociodemographic characteristics of our sample are presented in Table 2. Statistical tests demonstrated that, after

Table 2. Data obtained from our sample, in comparison with population census data from CBS.

Demographics	Our sample, %	Census, %	Chi-square test
Age, years			
18-24	7.1	10.9	Chi-square: 37.505 $P < .0001$
25-34	16.5	15.8	
35-44	11.5	14.8	
45-54	15.8	18.0	
55-64	19.1	16.7	
65-74	19.3	13.7	
75+	10.7	10.1	
Sex			
Male	46.1	49.3	Chi-square: 2.739 $P = .098$
Female	53.6	50.7	
Education level*			
Low	29.6	28.5	Chi-square: 13.093 $P = .001$
Middle	30.8	36.8	
High	39.6	34.6	
Province			
Drenthe	4.4	2.8	Chi-square: 29.605 $P = .002$
Flevoland	3.4	2.4	
Friesland	4.4	3.7	
Gelderland	11.4	12.0	
Groningen	3.8	3.4	
Limburg	8.5	6.4	
North Brabant	11.8	14.7	
North Holland	15.7	16.5	
Overijssel	4.2	6.7	
South Holland	23.2	21.3	
Utrecht	7.4	7.8	
Zeeland	2.0	2.2	
Employment status			
Working full time	30.4	32.3	Chi-square: 218.19 $P < .0001$
Working part time (<32 hours)	20.1	32.3	
Incapacitated	8.9	6.3	
Retired	25.3	23.0	
Housewife/househusband	6.9	1.5	
Not working, looking for work	4.6	2.2	
Student	3.8	2.9	

CBS indicates Statistics Netherlands.

*Education levels according to the education system in The Netherlands: low concerns primary school, vmbo, havo, onderbouw, vwo onderbouw, and mbo1; middle concerns havo, vwo, and mbo 2-4; high concerns BSc or MSc at university of applied sciences or university.

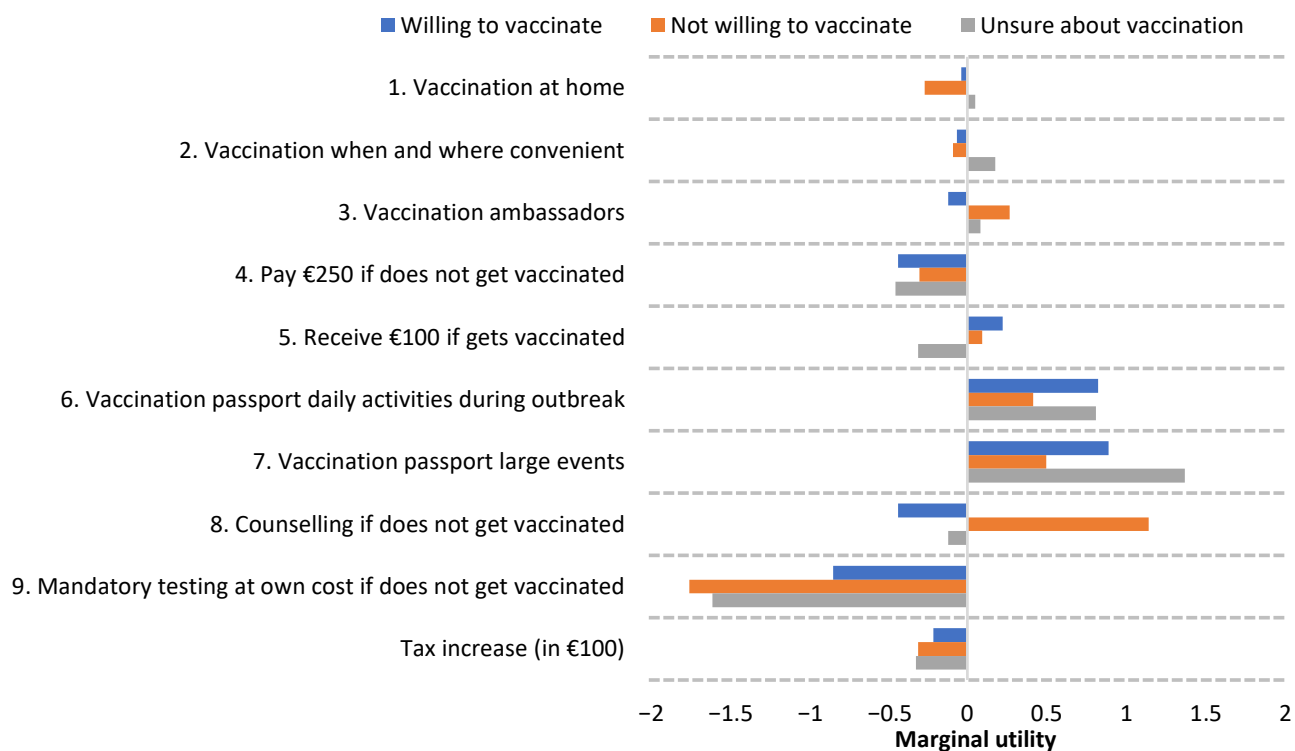
excluding the 71 respondents, our sample is representative of the population in terms of sex, but not in terms of age composition and education level.

Results of Forced Choices

The analysis of the forced choices between the 2 policy strategies to promote vaccination revealed that respondents have heterogeneous preferences regarding the policy options (see [Appendix Table C1](#) in [Appendix C](#) in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.03.013>). The overall or base model estimates showed much preference heterogeneity derived from the subject standard deviations, which are relatively large compared with the mean estimates (mostly more than a half of the absolute mean value). We could attribute some of this preference heterogeneity to people's willingness to vaccinate or not, which resulted in the marginal utilities presented in [Figure 1](#) that sum up the main effects and interaction effects with this respondent covariate, which we identified as most significant. [Figure 1](#) shows the value respondents who are willing to vaccinate, not willing to vaccinate, or unsure about vaccination place on the different policy options.

In this forced choice context, we found that the value attached to the implementation of vaccination passports is relatively high, especially among those willing to vaccinate and those who were in doubt about vaccination. That is, when the government decides to implement policies that incentivize vaccination, citizens generally prefer vaccination passports over other measures. Mandatory testing, which was the most intrusive policy option on offer in the choice tasks, was valued most negatively and more strongly so by respondents in doubt or not willing to vaccinate. A fine for those who do not get vaccinated was also valued negatively by all 3 subgroups. Nevertheless, counseling if one does not get vaccinated, the other policy aimed to guide choice through disincentives, was valued very differently by the 3 subgroups. People who reject the vaccine were positive about it, and people who accept the vaccine were negative. Finally, for the entire sample, respondents had a negative preference toward a one-time tax increase, whereas marginal utilities of the other 3 impact-related attributes were nonsignificant. That is, respondents did not infer positive or negative utility from a decrease in the number of deaths, the number of people with permanent health problems, or the number of households with income loss resulting from the policy options.

Figure 1. Marginal utilities attached to the policy options and their impacts based on panel mixed logit model estimates for the sample of respondents willing to vaccinate, not willing to vaccinate, or unsure about vaccination.



Results Regarding Support for Policy Options

After respondents made a forced choice between 2 vaccination strategies, they were asked whether or not they would recommend the strategy they selected to the government. The positive coefficient for the opt-out option in the opt-out PML model (see Fig. 2 and Appendix Table C2 in Appendix C in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.03.013>) shows that respondents who were willing to vaccinate, not willing to vaccinate, and unsure about vaccination all had a negative intrinsic preference for the policies that encourage citizens to get the vaccine. This negative intrinsic preference was considerably stronger for respondents who were in doubt or, in particular, who did not intend to take the vaccine than for those who were willing to vaccinate. The marginal utilities presented in Figure 2 show that all respondents had a positive preference for the vaccination passport policies (ie, 6 and 7) and a negative preference for the “mandatory testing at own cost if does not get vaccinated” and the “pay €250 if does not get vaccinated” policies (ie, 9 and 4). Furthermore, respondents who were unsure about vaccination had a positive preference for “vaccination when and where convenient” and for “counseling if does not get vaccinated.” Interestingly, these respondents negatively valued “vaccination at home.” Preferences for the remaining policies were weaker and varied somewhat with intention to vaccinate.

In respondents' decision to recommend (against) policy strategies, the negative utility toward a one-time tax increase was also apparent, whereas respondents did not assign a significant value to the other 3 impact-related attributes. Therefore, we could express the preferences for the policy options in willingness to pay in euros by dividing the marginal utilities of the policy option by

the marginal tax attribute estimates. For instance, people who are willing to vaccinate have a willingness to pay of €312 for the implementation of the policy option “vaccination passport daily activities during outbreak” through a tax increase, whereas the willingness to pay for implementation of the same policy option of people who are unsure about vaccination is only €93. People who are unsure about vaccination are willing to pay €153 and €121, respectively, for the implementation of “vaccination when and where convenient” and “counseling if does not get vaccinated.”

Apart from respondents' willingness to take the COVID-19 vaccine, we found no substantial differences among particular sociodemographic subgroups in terms of their preferences for implementing the 9 policies (see Appendix Table C2 in Appendix C in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.03.013>). Hence, the fact that our sample was a bit unbalanced in terms of age composition and education level does not hamper the generalizability of these results to the population.

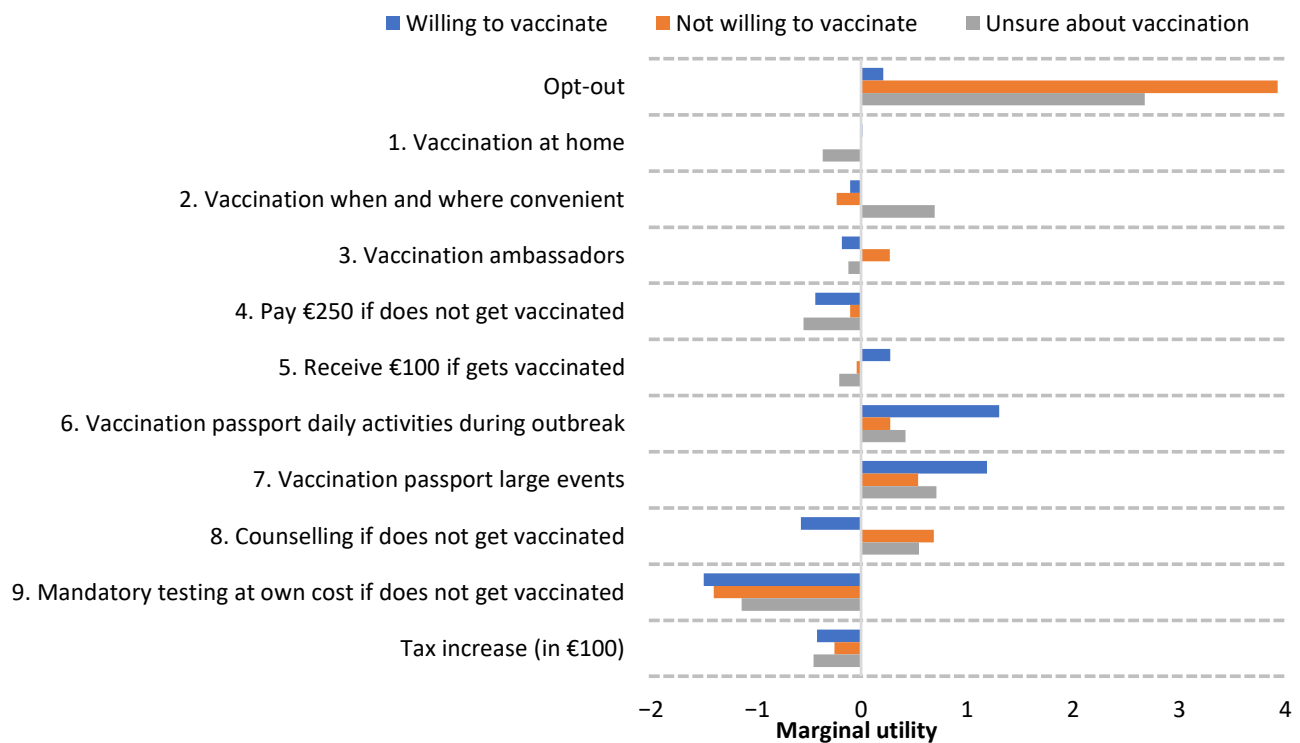
These findings regarding people's preferences for policy options can be used for predicting support levels for vaccine strategies within the population. As an example, Table 3 presents the public support for 2 potential strategies included in the design and the proportion of citizens who would recommend the government to not implement these strategies (opt-out).

Conclusions and Discussion

Main Findings

This study has quantified the public's preferences regarding policies that aim to promote COVID-19 vaccination uptake. Its

Figure 2. Marginal utilities for the 9 policy options to promote vaccination against COVID-19 in The Netherlands based on panel mixed logit model estimates for the full sample of respondents willing to vaccinate, not willing to vaccinate, or unsure about vaccination.



results can be grouped into 3 overall findings related to the support for different policy options, the importance of the impacts of the policy options in the support of policy options, and the heterogeneity in preferences across respondents.

First, respondents generally had a negative preference for policies that aim to promote vaccination uptake. Nevertheless, the included policy options strongly differed with respect to the support they received. Respondents particularly disliked the policies that punish those who do not take the vaccine and were more favorable toward policies that reward people who do. This is in line with the empirical finding by Molenmaker et al³³ that people reward cooperation more than they punish noncooperation in social dilemmas. The 2 types of vaccination passports were the most preferred policy options.

Second, in their decision to recommend (against) policies that incentivize vaccination, respondents did not infer positive or negative utility from a decrease in the number of deaths, in the number of people with permanent health problems, or in the number of households with income loss. This reinforces previous findings from Luyten et al²⁰ indicating that people form their preferences for vaccination policy alternatives largely on the basis of factors that are unrelated to their economic or public health impacts.

Third, people's support for policy options that promote vaccination uptake strongly varied with their own willingness to take a COVID-19 vaccine. That is, those who were considering to reject the vaccine were in general much more negative about the policy options than respondents who were considering to take the vaccine. This is in line with previous findings by Stecula et al³⁴ that vaccine attitudes are strongly associated with support for pro-vaccination policies. It is notable that, according to the DCE results,

the vaccination passports are supported by all 3 subgroups who were distinguished based on willingness to be vaccinated. We found no heterogeneity in preferences on the basis of the other included factors such as sex, age, and education level.

Limitations

Our study comes with a few limitations. First, it was conducted when there was not much information available regarding the potential side effects of vaccination, given that no vaccines were yet approved by the European Medicines Authority and vaccine hesitancy among the public was high.²⁻⁵ Therefore, it is unclear to what extent the results of our study can be generalized to other contexts, such as the present situation. The context in which policy choices are evaluated by the public is constantly changing, making predictions about support for policies and their potential influence on vaccination uptake challenging. Previous research indeed shows that the context can affect preferences for policies that incentivize vaccination.²¹ Future research may benefit from repeating DCEs regarding preferences for vaccination policies at several phases of the pandemic, because this provides policy makers with useful information regarding the extent to which these preferences change as a pandemic progresses and vaccination rates improve or fail to do so.

A second limitation of our study is that the outcomes are based on the stated preferences of respondents, which may differ from their preferences toward these policy options when they are actually implemented. For example, in the latter case, people's preferences may be influenced by social interactions, whereas their preferences in the DCE were elicited in social isolation. Even though this may cause a discrepancy between stated and revealed

Table 3. Illustration of public support of 2 potential policy strategies.

Attribute	Policy strategy A	Policy strategy B	Opt-out
Policy 1	(7) Vaccination passport large events	(4) Pay €250 if refusing vaccine	No policy
Policy 2	(5) Receive €100 if accepting vaccine	(1) Vaccination at home	No policy
One-time tax increase, €	150	50	0
Percentage support, %	38	17	45

preferences, De Bekker-Grob et al³⁵ find the aggregate predictive ability of the DCE method to be rather high for vaccination uptake, which supports the external validity of our findings.

A third limitation of our study is that we used an online sample and respondents participated voluntarily. This may have resulted in a bias in the sample and should be considered as a limitation of our study. Digitally less literate people, for instance, may have participated less frequently. Nevertheless, a Dutch study that compared an article-based and an online-based DCE found no evidence of inferior results in the online version.³⁶ Hence, we assume that if we would have used an article-based administration mode, we would have found similar results overall.

A fourth limitation is that our study only includes 2 variants of a vaccination passport that both would give vaccinated people more freedom from lockdown measures only after all citizens had the chance to take a vaccine. Hence, preferences for vaccination passports that have immediate implications after vaccination were not investigated. Given the relatively strong public support for this policy option, we recommend further research into public preferences for vaccination passports that go into effect while not everyone has had the chance to get vaccinated and, also, that have different specifications than the versions considered in our study.

Policy Implications

For governments attempting to increase the vaccination uptake in ways that are supported by the public, this study provides directions for concrete policy measures. For instance, our results could encourage policy makers to focus on policy options that make vaccination easier and reward people who take the vaccine, as especially the implementation of vaccination passports was supported. The attractiveness of implementing vaccination passports as found in our study is further supported by the study of Craig,¹¹ who finds that this is an effective measure to increase uptake. Moreover, our results allow policy makers to increase their understanding of citizens who oppose to policies that promote vaccination given that it is more likely that opposition stems from a negative intrinsic preference regarding active vaccination policies in general than from negative preferences for specific policies, such as vaccination passports. Finally, to raise the uptake of vaccines in the population, it is particularly important to target policy efforts at the large group of citizens who are still undecided about taking the vaccine. Our results provide insights into the preferences of this vital subgroup in terms of the policy alternatives they most strongly support (“vaccination when and where convenient” and “counseling if does not get vaccinated”) and hence the policies that can be expected to optimally contribute to the aim of raising vaccination uptake.

Supplemental Materials

Supplementary data associated with this article can be found in the online version at <https://doi.org/10.1016/j.jval.2022.03.013>.

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