Supplementary material for:

"Vaccine choice, trust in institutions, and the intention to get vaccinated against COVID-19: Evidence from an online experiment" (JBPA 2022)

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This material contains the following subjects:

1. On the preparation of the four vaccine options for the experiment
2. The twenty choice sets and quota allocation
3. Descriptive statistics for the responses to the seven trust questions
4. Balance checks
5. Manipulation (attention) check
6. Results from the ordered logistic regressions with controls
7. The list of references for this supplementary material

1. On the preparation of the four vaccine options for the experiment

The four vaccine descriptions were created based on the profiles of actual vaccines against COVID-19 available on the market at the time of designing the survey (March 2021). These were vaccines from Pfizer-BioNTech, Moderna, Oxford–AstraZeneca, and Janssen (Johnson & Johnson). One or more of these vaccines had been approved in major economies; the first three were relevant to Japan, whose government had signed contracts with the developers for a total supply of 314 million doses (Ministry of Health, Labour and Welfare, 2020, October 29; 2020, December 1). The information for the Janssen vaccine, approved in the US along with the Pfizer-BioNTech and Moderna vaccines, was used to develop a realistic range of vaccine options because it requires only one dose, albeit with lower efficacy, while other vaccines require two. The number of required doses with the interval between shots was included as a part of vaccine information, together with other attributes, namely, the type of vaccine, the dosage, its efficacy in clinical trials, the age groups the vaccine was authorized for, the temperature required for storage, and common side effects. These attributes were drawn from the publicly available information. For the Pfizer-BioNTech, Moderna, and Janssen vaccines, the information was drawn from the websites of the US Centers for Disease Control and Prevention (CDC) (CDC, 2021a, 2021b, 2021c) and cross-checked with the information published by the Japanese Association for Infectious Diseases (2021) for BioNTech and Moderna vaccines. For the AstraZenecav vaccine, the information was drawn from the UK (Medicines & Healthcare products Regulatory Agency, 2021) and Australia (Australian Government Department of Health, 2021), where the vaccine had been approved, except that the vaccine efficacy information – 81.3% if the first and second doses were taken at least 12 weeks apart – was adopted from the latest clinical study, by Voysey et al. (2021), published in *The Lancet*, to expand and update the variety of vaccine profiles.

2. The twenty choice sets and quota allocation

Supplementary Table 1 shows the 20 choice sets, which were randomly assigned to the subjects to fulfill the target number of subjects across choice sets (quotas). These choice sets differed not only in their sizes, but also in the vaccine option(s) and the order of display, such that the random assignment of these choice sets would help randomize out the effects of different vaccine options and display orders. The choice sets with one vaccine option (S01-S04) represent all of the possible selections. The choice sets with two vaccine options (S05-S16) represent all possible pair combinations derivable from a set of four vaccines. For the choice sets of four, using 24 permutations, and thus 24 choice size sets, which would be required for full randomization, was not feasible. The researcher instead adopted the Latin square design (Williams, 1949) to prepare four choice sets (S017-S20) with balanced patterns of display order, which were then randomly assigned to the respondents.

On Rakuten Insight's survey platform, the researcher was not able to arrange the randomization of choice sets by probability. Instead, the researcher had to request the randomization of choice sets with quotas, i.e., specified sample sizes for each choice set group. Rakuten Insight randomly assigned choice sets, while collecting extra survey forms with complete responses for each group as buffers. It then randomly trimmed the samples to arrive at the requested number for each group and passed them on to the researcher; see Supplementary Table 1 for the numbers of cases with complete responses targeted by the Rakuten Insight, the numbers actually collected, and the numbers retained for this study.

Supplementary Table 1

Choice sets used in the experiment, by order of display and sample distribution

Choice Set ID	Vaccine display	Survey forms targeted and collected by Rakuten Insight		Survey forms originally requested by the researcher and retained for this study	
		Targeted	Collected		
		n	*n*	*n*	% in total sample
Choice set size = 1					
S01	A	57	93	49	8.17
S02	B	57	90	49	8.17
S03	C	57	73	49	8.17
S04	D	57	77	49	8.17
Subtotal		228	333	196	32.68
Choice set size = 2					
S05	A-B	20	33	17	2.83
S06	A-C	20	28	17	2.83
S07	A-D	20	35	17	2.83
S08	B-C	20	33	17	2.83
S09	B-D	20	35	17	2.83
S10	C-D	20	33	17	2.83
S11	B-A	20	29	17	2.83
S12	C-A	20	23	17	2.83
S13	D-A	20	28	17	2.83
S14	C-B	20	33	17	2.83
S15	D-B	20	33	17	2.83
S16	D-C	20	32	17	2.83
Subtotal		240	375	204	33.96
Choice set size = 4					
S17	A-B-C-D	58	82	50	8.33
S18	B-D-A-C	58	80	50	8.33
S19	D-C-B-A	58	80	50	8.33
S20	C-A-D-B	58	76	50	8.33
Subtotal		232	318	200	33.32
Total		700	1026	600	100

Note: A, B, C, and D in the vaccine display column correspond to vaccines M87, X53, KYZ, and 9UA in Table 2 in the main text.

3. Descriptive statistics for the responses to the seven trust questions

Supplementary Table 2 shows the frequency and percentage distributions of the responses to each trust question across the five Likert-scale points, as well as the median, minimum, and maximum values.

Supplementary Table 2

Descriptive statistics for the responses to the seven trust questions

Please choose the statement closest to your position on each of the following seven items.		Strongly disagree (=0) Disagree (=1) Neither agree nor disagree (=2) Agree (=3) Strongly agree (=4)					Mdn	Min	Max
		0	1	2	3	4			
a) In regard to the management of the coronavirus pandemic, I can trust **public administration.**	*n*	99	185	212	94	10	2	0	4
	%	16.50	30.83	35.33	15.67	1.67			
b) In regard to the management of the coronavirus pandemic, I can trust **science and scientists**.	*n*	25	72	256	216	31	2	0	4
	%	4.17	12.00	42.67	36.00	5.17			
c) In regard to the management of the coronavirus pandemic, I can trust **health care workers**.	*n*	20	41	148	286	105	3	0	4
	%	3.33	6.83	24.67	47.67	17.50			
d) In regard to the management of the coronavirus pandemic, I can trust **health care systems**.	*n*	34	91	209	226	40	2	0	4
	%	5.67	15.17	34.83	37.67	6.67			
e) In regard to vaccine development, I can trust **the pharmaceutical companies.**	*n*	28	62	274	211	25	2	0	4
	%	4.67	10.33	45.67	35.17	4.17			
f) I can trust **the vaccine approval process**.	*n*	30	83	282	187	18	2	0	4
	%	5.00	13.83	47.00	31.17	3.00			
g) I can trust **the vaccine supply chain**, from vaccine transport to inoculation.	*n*	45	117	261	164	13	2	0	4
	%	7.50	19.50	43.50	27.33	2.17			

4. Balance checks

Supplementary Table 3 does not show any conspicuous imbalances in the socio-demographic backgrounds of the subjects across choice-set-size groups. The researcher performed multinominal logistic regressions to predict an individual subject's assignment to a choice set size group, as a function of socio-demographic background variables. The results are shown in Supplementary Table 4: Using the .05 level threshold of significance, they show no statistically significant relationship between socio-demographic backgrounds and the assignment of individuals to the choice-set-size groups.

Supplementary Table 3

Summary statistics by experimental conditions (choice set sizes)

	Choice 1 (n = 196)	Choice 2 (n = 204)	Choice 4 (n = 200)
Age			
Mean	46.32	46.60	45.26
Standard deviation	14.77	15.75	15.86
Minimum	20.00	18.00	20.00
Maximum	80.00	80.00	90.00
Gender (% distribution)			
Male	57.65	56.86	49.50
Female	40.82	43.14	50.00
No Response	1.53	0	0.50
Education (% distribution)			
Elementary or junior high school	1.53	3.43	4.00
High school	26.53	25	26.50
Special (vocational) school	8.67	8.82	9.50
Junior college	9.18	8.82	8.00
University or postgraduate school	53.06	53.92	51.50
Others	1.02	0	0.50
Annual Income (% distribution)			
No income	12.76	12.25	13.50
Less than 4 million yen	51.02	41.67	55.50
4 to less than 8 million yen	27.55	32.84	24.00
8 to less than 12 million yen	5.10	10.29	5.00
12 to less than 16 million yen	2.55	1.96	1.00
16 million yen	1.02	0.98	1.00

Note: Choice 1, Choice 2, and Choice 4 indicate choice set sizes of 1, 2, and 4, respectively.

Supplementary Table 4

Results from multinomial logistic regressions

Baseline category	Choice 1		Choice 1		Choice 2	
Comparison category	Choice 2		Choice 4		Choice 4	
	est.	*p*-value	est.	*p*-value	est.	*p*-value
Age	0.002	0.752	-0.004	0.529	-0.006	0.347
Gender (Ref: Being male and "no response")						
Being female	0.362	0.124	0.385	0.094	0.022	0.923
Education (Ref: "Elementary or junior high school" and "other")						
High school	-0.508	0.417	-0.593	0.321	-0.085	0.876
Special (vocational) school	-0.454	0.507	-0.525	0.424	-0.071	0.908
Junior college	-0.537	0.433	-0.890	0.182	-0.353	0.570
University or postgraduate school	-0.538	0.382	-0.590	0.315	-0.052	0.923
Income (Ref: "No income")						
Less than 4 million yen	-0.140	0.663	0.077	0.806	0.217	0.491
4 to less than 8 million yen	0.406	0.255	-0.019	0.959	-0.425	0.232
8 million yen or more	0.710	0.114	-0.021	0.966	-0.731	0.113

Note. "Ref." indicates a reference group, and *p*-values were computed using two-tailed z-tests. Choice 1, Choice 2, and Choice 4 indicate choice set sizes of 1, 2, and 4, respectively. The education variables are derived from the question regarding the highest-level educational institution from which the respondent graduated. The reference group consisted of the subjects who indicated "elementary or junior high school" and three subjects who indicated "other" and were prompted to "specify." However, these three subjects did not elaborate. Instead, they wrote "dropped out of high school," "dropped out of college," and "no job." A caution should be noted that the last two subjects might have belonged to a non-reference group (i.e., might have graduated from an institution beyond junior high school); however, which group that might be was difficult to determine from their responses.

5. Manipulation (attention) check

To ascertain that the subjects were aware of the choice set size given to them, the following manipulation (attention) check question was asked at the post-treatment stage: "How many vaccines did you see in the scenario in the previous page?" The participants were asked to pick from the list "1, 2, 3, or 4," without being able to return to the previous page. Of the subjects, 74% chose the correct answer. The rest failed to do so, possibly due to a lack of attention, which is to be expected in an internet survey. Nevertheless, these subjects were included in the study because it is not advisable to drop subjects based on post-treatment questions in a randomized experiment (Montgomery, Nyhan & Torres, 2018). Moreover, lack of attention may not have been the sole reason for their lapse; some of them might have paid attention, but the exact number of options might not have been important to them, in which case their incorrect answer might reflect a valid behavioral response to the treatment.

6. Results from the ordered logistic regressions with controls

At the request of the reviewers, the researcher also ran the models while controlling for age, gender, education, and income. The results are presented in Supplementary Table 5.

Supplementary Table 5

Results from the ordered logistic regression models with controls, predicting the intention to get vaccinated (*N* = 600)

	Model I		Model II		Model III	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
TRUST			4.515 (3.270 to 6.232)	< 0.001	3.398 (2.464 to 4.688)	< 0.001
CHOICE2	1.138 (0.781 to 1.660)	0.500	3.324 (0.971 to 11.378)	0.056	0.999 (0.678 to 1.471)	0.995
CHOICE2 X TRUST			0.579 (0.343 to 0.979)	0.041		
CHOICE4	0.907 (0.617 to 1.332)	0.619	1.008 (0.681 to 1.492)	0.967	0.545 (0.176 to 1.693)	0.294
CHOICE4 X TRUST					1.334 (0.801 to 2.221)	0.268
AGE (Years)	1.034 (1.024 to 1.045)	< 0.001	1.032 (1.021 to 1.043)	< 0.001	1.032 (1.021 to 1.043)	< 0.001
GENDER (Ref: Being male and and "no response")						
Being female	0.879 (0.617 to 1.251)	0.472	1.007 (0.701 to 1.447)	0.970	1.008 (0.701 to 1.448)	0.967
Education (Ref: "Elementary or junior high school" and "other")						
High school	2.857 (1.144 to 7.140)	0.025	2.144 (0.874 to 5.25)	0.096	2.073 (0.847 to 5.071)	0.110
Special (vocational) school	4.002 (1.443 to 11.100)	0.008	2.696 (0.987 to 7.363)	0.053	2.663 (0.975 to 7.277)	0.056
Junior college	2.152 (0.779 to 5.942)	0.139	1.575 (0.578 to 4.288)	0.374	1.479 (0.544 to 4.016)	0.443
University or postgraduate school	5.339 (2.149 to 13.263)	0.000	4.566 (1.876 to 11.115)	0.001	4.393 (1.810 to 10.661)	0.001
Income (Ref: "No income")						
less than 4 million yen	1.391 (0.860 to 2.251)	0.179	1.276 (0.776 to 2.099)	0.337	1.284 (0.780 to 2.113)	0.326
4 to less than 8 million yen	1.0500.613 (0.613 to 1.796)	0.860	1.058 (0.607 to 1.843)	0.842	1.079 (0.619 to 1.881)	0.789
8 million yen or more	0.866 (0.430 to 1.743)	0.686	0.860 (0.421 to 1.758)	0.680	0.892 (0.437 to 1.822)	0.754

Notes: Est., coefficient expressed in logits; SE, standard error; OR, odds ratio; CI, confidence interval. *p*-values were calculated using two-tailed χ-tests. The dependent variable is the intention to vaccinate, ranging from "definitely not getting the vaccination" (outcome = 1), "not sure now, but leaning towards not getting the vaccination (outcome = 2), "not sure now, but leaning towards getting the vaccination (outcome = 3), and "definitely getting the vaccination" (outcome = 4). CHOICE1 is the reference group for CHOICE2 and CHOICE4. TRUST is the average score of responses to the seven items regarding the subjects'trust in institutions, and it is *not* centered.

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