Triggering Altruism Increases the Willingness to Get Vaccinated Against COVID-19

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Abstract

Introduction: Once a vaccine against COVID-19 is available, the question of how to convince as many people as possible to get vaccinated will arise.

Objectives: We test three different strategies to reach this goal: two selfish motivations (highlighting personal survival risk or the inconveniences in the event of getting infected), and altruism (reducing the danger for individuals who cannot be vaccinated or remain vulnerable even after getting vaccinated).

Methods: We conduct an online experiment with N=303 subjects (64% female, 79% university students, average age 26 years) with the three aforementioned treatments and compare the treatment effects on vaccination willingness with the baseline.

Results: Results suggest a positive effect of all treatments, but the treatment where reducing the danger for individuals who cannot be vaccinated was highlighted was by far the most effective. This result implies that this rarely discussed aspect should be given more attention in order to increase the willingness to get vaccinated against COVID-19.

1 Introduction

The current COVID-19 pandemic will likely remain a public health concern until a vaccine against SARS-CoV-2 is widely available. Availability of the vaccine, however, is not the only hurdle: there also has to be enough willingness among the population to get vaccinated or, alternatively, a consensus on mandatory vaccination. This problem has already been studied in connection with other diseases [1,2] and, in particular, for the H1N1 pandemic in 2009/2010 [3]. In case of COVID-19, first survey results by Neumann et al. [4] indicate a fairly large but not an overwhelming willingness to get vaccinated against COVID-19, with rates ranging between 62% and 80%. In a US survey, Thunstrom et al. find similar rates. [5] There are also some differences regarding age and gender that are studied in the EU sample but they are not as substantial as one would expect (65%-75% for women and 73%-82% for men).

To reach herd immunity, it is important to increase these rates as much as possible. Thunstrom et al. estimate that with current vaccination willingness rates in the US, herd immunity would probably not be achievable. [5] While a mandatory vaccination seems to be the easiest way to solve this problem, in many democratic countries it is unlikely to be implementable, simply due to political reasons. Therefore, it is of utmost importance to adopt efficient strategies to increase the willingness to get vaccinated. Here, social science can play an important role in identifying and testing such strategies. [6,7]

The problem is essentially similar to other measures that have already been implemented to curtail the disease, in particular enforcing social distancing and wearing face masks: these measures were also met with opposition, and compliance was and still remains an issue. [8,9]

In this article, we present results from an online experiment with N=303 (mostly young participants) that tested three different strategies to increase the willingness to get vaccinated against COVID-19.[1] The results suggest that triggering altruistic behaviour by highlighting the danger for persons who cannot get vaccinated and, thus, implying an indirect positive effect of vaccination in protecting these people, is the most promising strategy. This connects to a rich literature on motivations for altruistic behaviour and its impact on subjective well-being. [11,12] The article is structured as follows: Section 2 summarizes the survey methodology, Section 3 presents the empirical findings, and Section 4 concludes.

2 Methodology

We conducted the online experiment in the period between May 17 and June 6, 2020. The survey was conducted on Unipark and was advertised at two German universities (in Trier and Magdeburg). The participants were, therefore, mostly university students and employees. Of the total 331 participants, after removing incomplete and inconsistent responses, 318 responses remained for further analysis, 303 of which contained responses to all the relevant questions. Demographic characteristics of the participants are summarized in Table 1. While the sample was not representative, it covers a broad range of the population, in particular many young people who might be more reluctant to get vaccinated, given the statements that COVID-19 poses a significantly greater risk to older adults (corresponding to the very age-dependent mortality rate).

Number of participants (after data cleaning)	318
Proportion of female participants	64%
University students	79%
University degree	48%
Mean age (years)	26 (standard dev. 8.6, ranging from 18 to 65) [2]

Table 1: Sample characteristics for the two surveys.

We used a within-subject design to measure the impact of a treatment, and a between-subject design to compare the efficiency of the different treatments: all subjects were asked three initial questions about vaccinations (see Table 2). All subjects who did not state that they would "definitely" get vaccinated (N=180), were then randomly assigned to one of three treatment groups (see Table 3) using the automatic random assign function of Unipark. In each treatment, after being asked to read an information text (specific to the treatment), participants were once again asked about their willingness to get vaccinated, once a vaccine would be available.
After being asked to read the text, the subjects could once again state their willingness to get vaccinated (No, definitely not / probably no / probably yes / yes, definitely).

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[1] Similar experiments have previously been conducted for other diseases to test factors influencing vaccination willingness, see, e.g. Brown et al. [10].

[2] One subject stated her age as 11 years, most likely a typo, since she also stated to be a university student.

Question	Answer options
When do you expect a vaccine against COVID-19 to be widely available?	Number of months
Would you get vaccinated?	No, definitely not / probably no / probably yes / yes, definitely
What do you think of a mandatory COVID-19 vaccination?	Strongly oppose / rather oppose / rather favour / strongly favour

Table 2: List of the initial questions on COVID-19 vaccination.

The text in the first treatment tried to evoke altruistic motives by explaining that some people cannot get vaccinated or remain vulnerable even after getting vaccinated and that they could get infected or even die. Getting vaccinated would mean reducing the risk of infection of these people. Vaccination is in this case an altruistic act. The other two texts, instead, triggered selfish motivations. In Treatment 2, the focus was on the fact that even younger adults that are not in high-risk groups may die of COVID-19. Thus, a vaccination will also be beneficial for them. Treatment 3 stressed the inconveniences that an infection may cause, even if these are not major inconveniences (having to go to hospital or being sick for a week).

In the following, we will study whether the treatments had an effect on the willingness to get vaccinated (among subjects) and whether there were significant differences between the three treatment groups (altruistic, selfish/mortality risk, selfish/inconvenience).

Treatment 1 (Altruism)
At some point, there will be a vaccine against the coronavirus that triggers COVID-19. But vaccines may not work on everyone. The immune system of some people does not respond sufficiently to vaccination. These people can still get sick or even die. But if many people get vaccinated, they can no longer infect these vulnerable people. This implies indirect protection: thus, if you get vaccinated, you might save someone's life! If you consider this, would you get vaccinated?

Treatment 2 (Selfish/mortality risk)
At some point, there will be a vaccine against the coronavirus that triggers COVID-19. If you do not belong to a risk group yourself, you may worry less about this. But it is not quite as simple as that: young, healthy people are less likely to develop complications. That is right. However, there are also cases of healthy teenagers who have contracted and even died of COVID-19. A vaccination would protect against this risk! If you consider this, would you get vaccinated?

Treatment 3 (Selfish/inconvenience)
At some point, there will be a vaccine against the coronavirus that triggers COVID-19. If you do not belong to a risk group yourself, you may worry less about this. But it is not quite as simple as that: young, healthy people are less likely to develop complications. That is right. However, there are cases when the symptoms are not mild, and even if you have to go to hospital "only" for a few days, or perhaps "only" lie in bed with a high fever for a week, this is, of course, anything but nice. A vaccination could prevent this! If you consider this, would you get vaccinated?

Table 3: List of the "convincing" texts in the three treatment groups.

Besides the demographic items and the questions concerning vaccination, the survey had a number of other COVID-19-related items that are not discussed in the present study.

3 Results

3.1 Descriptive results

We first measured what participants thought about vaccination before the treatment. Table 4 shows that they expected a vaccine to be available in the spring of 2021, the average participant would "probably" get vaccinated once the vaccine were available and he/she had a slightly positive opinion on mandatory vaccination.

	All subjects (N=303)			
	Median	Mean	Minimum	Maximum
Expected time of vaccine availability	10 months	15 months	2 months	999 months[3]
	definitely not	probably not	probably yes	definitely yes
Willingness to get vaccinated	7.9%	16.2%%	35.3%	40.6%
	strongly oppose	rather oppose	rather favour	strongly favour
Mandatory vaccination	21.5%	27.4%	34.0%	17.2%

Table 4: Descriptive results of pre-treatment answers for all subjects and the subsample of non-students.

We compared the results for university students (N=243) and others (N=60), but did not find statistically significant differences.

3.2 Treatment effects

Next, we studied the difference between the three treatments. We measured the willingness to get vaccinated on a scale from 1 (definitely not) to 4 (definitely yes) and defined the "change" as the difference between willingness after and before the treatment.

First, we found a significant difference in the overall willingness across the three treatments, but a particularly large effect for Treatment 1 (see Table 5). While 42.4% of the participants in Treatment 1 expressed an increased willingness to get vaccinated, only 15.4% and 19.0% did this in Treatment 2 and 3, respectively. In total, our treatments still had an average effect on 25% of the participants.

	Change in willingness	p-value (t-test)	p-value (Wilcoxon rank)	Proportion of participants increasing their willingness
Treatment 1	0.42***	<0.001	<0.001	42.2%
Treatment 2	0.13*	0.011	0.013	15.4%
Treatment 3	0.15*	0.011	0.013	19.0%
All treatments	0.23***	<0.001	<0.001	25.0%

*=significant at 5%, **=significant at 1%, ***=significant at 0.1%

Table 5: Treatment effects on the willingness to get vaccinated are significantly positive for all treatments, but particularly large for Treatment 1.

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[3] We assumed that the one participant choosing "999 months" wanted to express that the development of a vaccine will be possible only in distant future or never. The next highest values were 180 months (=15 years) and 50 months. In total, only four participants estimated longer than two years.

The difference between Treatment 1 and the other two treatments was also significant after controlling for age, gender, student status and university degree where we used an OLS regression (p<0.001). We mention that other variables in the regression were not significant on a 5% level, i.e. we did not find any evidence that some demographic group might be differently affected by the treatments. We, therefore, concluded that Treatment 1 seems to be in general the most effective choice.

3.3 Relationship between voluntary, mandatory vaccination and estimated time of vaccine availability

Opinions on mandatory vaccination and the willingness to get vaccinated (elicited before the treatment) were — as had to be expected — highly correlated (Pearson correlation 0.67, Spearman's rho 0.65, for both p<0.001). Table 6 gives an overview on the willingness to get vaccinated of people with different opinions regarding mandatory vaccination, and how people expressing different degrees of willingness to get vaccinated think of a mandatory vaccination. In general, there are very few people who deviate from the diagonal line and, if they do, then in the direction of getting vaccinated themselves, but not favouring a mandatory vaccination. We did not find any significant relation between the estimates on the availability of a vaccine and the willingness to get vaccinated.

	Vaccination Willingness				
Mandatory vaccination	definitely not	probably not	probably yes	definitely yes	sum
strongly oppose	34%	40%	15%	11%	100%
rather oppose	2%	28%	43%	27%	100%
rather favour	0%	2%	56%	43%	100%
strongly favour	0%	0%	8%	92%	100%
	Compulsory vaccination				
Vaccination willingness	strongly oppose	rather oppose	rather favour	strongly favour	sum
definitely not	92%	8%	0%	0%	100%
probably not	51%	45%	4%	0%	100%
probably yes	9%	33%	55%	4%	100%
definitely yes	6%	18%	37%	39%	100%

Table 6: Relation between vaccination willingness and opinions on mandatory vaccination. The table on the top shows the distribution of participants expressing different degrees of acceptance with regard to mandatory vaccination, the table on the bottom shows the distribution of participants with different degrees of vaccination willingness.

4   Conclusions und policy suggestions

Once a vaccine against COVID-19 is available, we will have to find a way to convince as many people as possible to get vaccinated if we want to stop the spread of the disease and the need for ongoing restrictions with their high social and economic costs. Our study gives some first empirical evidence on the strategies that might help achieve this goal. The best approach seems

to be to explain the risks that unvaccinated individuals may present to others, and in particular to individuals who remain vulnerable even if they get vaccinated. More than 40% of the participants expressed an increased willingness to get vaccinated after this treatment. Pointing out that people who do not belong to a high-risk group may also face complications, also increased the willingness to get vaccinated but to a lesser degree. Still, 15% to 19% of the participants expressed an increased willingness to get vaccinated following these treatments.

All in all, we see that providing reasonable information can increase the willingness to get vaccinated, and we also see that some information (protection of others) works particularly well. We, therefore, suggest putting the emphasis on the altruistic idea of *protecting others* in the process of convincing people to get vaccinated against COVID-19.

This study is, of course, only a first empirical test. While we do not find evidence for significant differences between students and non-students in our sample, repeating the experiment with a more balanced population would definitely be worthwhile. Moreover, there are more interventions possible that could be tested. We hope that our study can motivate further research in this direction and that it will help develop effective strategies for increasing vaccination rates once a vaccine is available.

Acknowledgement

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