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# The relationship between benevolence and attitudes towards preventive behaviour during the COVID-19 pandemic in Sweden

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## Abstract

**Aim** The COVID–19 pandemic initially required sustainable behavioural changes to mitigate the spread of the infection. Thus, people were requested to comply with the recommendations given by the authorities. However, adherence to the recommendations varied considerably. Therefore, it is important to understand the driving forces behind such behavioural change. This study aims to investigate how people’s willingness to comply with preventive behaviour, including vaccination, during a pandemic is related to the prosocial emotion of benevolence, the inclination to do well.

**Subject and methods** An online cross-sectional study was performed ( $N = 1014$ ).

**Result** The result showed a significant correlation for the whole study population between how well they followed the recommendations ( $M = 4.16$ ,  $S = 0.92$ ) and the levels of benevolence ( $M = 3.58$ ,  $S = 0.74$ )  $r = 0.22$ ,  $p = < 0.001$ .

**Conclusion** Further, there was a significant correlation between altruistic motives and compliance with recommendations, including the view on taking the vaccine. Our findings add to the concept that prosocial orientation during the COVID-19 pandemic increases compliance with preventive behaviour.

**Keywords** Benevolence · Prosocial behaviour · Prevention · COVID-19

## Introduction

The global outbreak of SARS-CoV-2 causing COVID-19 disease emerged in December 2019, leading to a great need for collective actions and accountability. Measures to mitigate the spread of infection such as physical distancing, wearing face masks, washing hands and finally taking the vaccine were proclaimed by WHO (2021) and several governments across the globe, including Sweden (Public Health Agency of Sweden 2022).

To mitigate the spread of such viruses, it is of utmost importance to adopt efficient strategies to increase the willingness of the population to change their behaviour as well as get vaccinated in order to protect themselves and the whole society (Ferguson et al. 2020). To what extent these measures are complied with has been suggested to be determined by the level of acceptance of recommendations, selfish motives and the extent to which people are prepared to temporarily sacrifice their personal needs and change their behaviour for the group (Anderson et al. 2020; Jordan et al. 2021). Basic psychological needs such as social networks, altruism and the need for belonging

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(collective responsibility) are considered important to increase the willingness to vaccinate oneself (Wismans et al. 2021; e.g. Ryan and Deci 2000, 2017; Weinstein and Ryan 2010). For instance, people's sense of opportunity to influence their own decision (e.g. getting vaccinated), the experience of trust in authorities and the feeling of belonging to the ingroup, affect compliance with recommendations (Porat et al. 2021; Martela et al. 2021).

The Swedish strategy to handle the spread of the SARS-CoV-2 virus has been described to be based on voluntariness and personal responsibility rather than more intrusive measures (Sjödin et al. 2020; SOU 2021:89 2021). The notion that the actions were voluntary suggests that people's psychosocial and moral behaviour played a more significant role in influencing the outcome of the pandemic as compared to societies regulated by rules. According to Aquino and Reed (2002), volunteering and social involvement are associated with moral identity. Emergencies tend to bring about a sense of we-ness (Zaki 2020) and shared identity increases the willingness to help others and show solidarity with those in need (Tekin et al. 2021).

Prosocial behaviour encompasses many acts and can be defined as a voluntary action that is beneficial to other people (Penner et al. 2005). During long-term emergencies, such as the COVID-19 pandemic, the challenge is to remain altruistic and act prosocially for an extended period of time, not knowing how long the pandemic will last (ibid). Both selfish and considerate motives define the social orientation of an individual (Gantt and Burton 2013). Previous research indicates that combining self-interest and prosocial framing is the most optimal approach to motivate people towards preventive behaviour (Jordan et al. 2021; Liekefett and Becker 2021). For example, individual vaccination will lead to a higher level of immunity in the population, thus reducing the probability of infection also in unvaccinated individuals (Gong et al. 2021).

Evolutionary, prosocial behaviour can encourage mutual advantages in terms of cooperative alliance to support breeding and of the offspring (Feigin et al. 2014; Myers and Twenge 2017; Goetz et al. 2010); however, antisocial strategies can also be part of survival by creating the best resources for close family members and making people intolerant towards outgroups (Seitz et al. 2020).

Motivation is linked to self-determination theory (Ryan and Deci 2000), which states that people are motivated to engage in, for example, health-promoting behaviors based on three basic psychological needs: autonomy, competence, and relatedness. Engaging in prosocial actions can satisfy these three basic needs by making individuals feel competent and connected to others, which in turn can promote their own well-being.

Benevolence has recently emerged, e.g. in motivation theory and research on altruism, pro-social behaviour and psychological wellness (Andersson et al. 2021) and has been defined as the sense of *being able to give* (Martela and Ryan 2016). Benevolence is therefore a good measure to use to examine how willing people are to change their behavior for the benefit of others.

Understanding human nature and what motivates behaviour that complies with recommendations increases the knowledge that helps mitigate the spread of infections. This paper presents results from an online survey which was carried out in February 2022, with  $N=1014$  participants who answered a questionnaire about attitudes towards recommendations and motives for following or not following them during the last part of the pandemic. These data were then related to data measuring benevolence.

## Aim of the study

This study aims to investigate how people's willingness to comply with preventive behaviour during a pandemic is related to the level of benevolence.

Research questions:

- What motivates compliance with recommendations?
- Is there a relationship between levels of benevolence and willingness to comply with recommended preventive behaviour in a pandemic?

## Methods

### Design

A cross-sectional study was performed online.

### Participants

Participants were recruited using a cohort of 20,000 people from which a sample of  $N=1014$  people were recruited. Non-response reasons remain undisclosed due to constraints in time and budgetary considerations that influenced the selection process. Inclusion criteria for the cohort were adults, age 18 to 85. These measures were obtained by closing the quota group when the representative numbers were reached (Bryman 2016). The mean age was 46 years, and 49% identified themselves as female. In Sweden, the abolition of restrictions began in mid-February 2022 and lasted until the end of April 2022 (Government offices of Sweden 2022). The survey was conducted in the last week of February 2022, when the pandemic had affected society for two years. The participants in the panel received points that

could be exchanged for, e.g. gift cards or donated to charity. How many points they got were based on how long it took to answer the survey.

## Questionnaire

The questionnaire consisted of 13 topics divided into sub-questions, totalling 33 questions. Respondents were informed of the purpose of the study and had to confirm their participation before completing the questionnaire. Responses were made on a 5-point rating scale (where 1 = do not agree at all, 5 = agree completely) or as yes or no. The first questions were taken from the Beneficence scale developed by Martela and Ryan (2016) to assess beneficence satisfaction. These statements measure the emotion of benevolence, and the items are the following “*I feel that my actions have a positive impact on the people around me*”, “*The things I do contribute to the betterment of society*”, “*I have been able to improve the welfare of other people*”, “*In general, my influence in the lives of other people is positive*”. The translation of the scale from English to Swedish was conducted according to Streiner and Norman (2008) (Andersson et al. 2021). The mean of the four items of benevolence was calculated and defined as the value for benevolence with adequate reliability (Cronbach’s Alpha = 0.83). A literature review was performed with a focus on the measurement of compliance with recommendations and provided a theoretical background for the design of six additional items with subscales. The items were designed to capture a variety of motivations for complying or not complying with recommendations, and getting vaccinated or not.

## Statistical analyses

Descriptive statistics for each question were calculated where mean, standard deviation, minimum and maximum values were included. Furthermore, an independent sample t-test and one-way ANOVA were used to analyse the data. A correlational analysis was performed using a bivariate Pearson  $r$  correlation between the variables mean of benevolence, compliance with recommendations, the importance of being vaccinated against COVID-19, motives to comply with recommendations and motives to vaccinate or not vaccinate against COVID-19. The regression analysis consists of an ordinary least squares regression which measures the linear relationship between the independent variables and the dependent variable. The OLS regression consists of a bivariate regression and a multivariate regression. Correlation movements between two variables and a regression analysis allow controlling for more characteristics that explain the dependent variable. The two-way

significance level was set to 0.05. Finally, a principal component analysis was used to show whether participants could be divided into selfish and altruistic groups based on how they responded to the motives for following recommendations and getting vaccinated or not. The PCA uses mathematics to construct components which are by default uncorrelated to each other, and the first of them explains most of the variance in the data.

## Ethical considerations

The participants were informed about the study and consent was collected in the survey questionnaire. The study adhered with the Helsinki declaration and was assessed by the Swedish Ethical Review Agency (Dnr 2021–06421-01) and not considered as potentially damaging with regard to ethics.

## Results

Descriptive statistics regarding demographic characteristics are presented in Table 1.

**Table 1** Descriptive statistics

	N	%
Age		
18–30	221	22%
31–59	487	48%
60–	255	25%
Missing values	51	5%
Total	1014	100%
Education		
Elementary School	82	8%
High school	378	37%
Post-high school	133	13%
University	399	39%
Other	19	2%
No answer	3	0%
Total	1014	100%
Marital Status		
Married	388	38%
Not married	603	59%
No answer	23	2%
Total	1014	100%
Gender		
Male	498	49%
Female	505	50%
Other	7	1%
No answer	4	0%
Total	1014	100%

## Willingness to comply with recommendations

The data were analysed to answer the question of whether benevolence was related to compliance with recommendations. A correlation test (Pearson's  $r$ ) showed that there was a significant relationship for the whole sample between how well they followed the recommendations ( $M = 4.16$ ,  $S = 0.92$ ) and the benevolence level ( $M = 3.07$ ,  $S = 0.59$ )  $r = 0.22$ ,  $p < 0.001$  according to Tables 2 and 3. The higher the score on benevolence the more the participants followed the recommendations.

The motives for following recommendations also showed a significant correlation to benevolence level ( $p < 0.001$ ), except for participants who answered: "I did not think much about it but followed the recommendations" ( $M = 3.4$ ,  $p < 0.1$ ).

The results also showed that older respondents had a high degree of willingness to follow the recommendations but also that they were less benevolent. This was according to bivariate regression analysis, as described in Table 4.

## Willingness to get vaccinated

Individuals who were vaccinated ( $M = 4.18$ ,  $S = 0.89$ ) reported a significantly higher mean value on the question of whether the recommendations were followed than individuals who were not vaccinated ( $M = 3.96$ ,  $S = 1.1$ ).

There was a significant relationship between high benevolence and how participants answered the question about the importance of being vaccinated ( $r = 0.08$ ,  $p = 0.008$ ). Similarly, bivariate regression analysis, with the dependent variable question: "how important is it to get vaccinated?" and the independent variable age, shows that increasing age by one year increases the importance of getting vaccinated ( $\beta = 0.0187$  \*\*\*,  $SE = 0.0019$ ). However, an independent sample t-test showed there was no relationship between

whether you are vaccinated ( $M = 3.06$ ,  $Sd = 0.02$ ) or not ( $M = 3.12$ ,  $Sd = 0.59$ ) and benevolence. That is, regardless of whether you were vaccinated or not, there was no statistically significant difference in mean value between the groups ( $p = 0.38$ ).

Several motives to get vaccinated had a significant connection to high benevolence according to Tables 5 and 6. The socially responsible motives "I did not want to infect anyone close" ( $r = 0.229$ ), "It helps mitigate the spread of COVID-19 in society" ( $r = 0.227$ ) and "Out of consideration for the healthcare staff" ( $r = 0.24$ ) had the strongest correlation.

## Motives for not getting vaccinated

Motives not to get vaccinated were unrelated to high benevolence except for the statement, "I believe that vaccination has another purpose than to protect against COVID" (Tables 7 and 8). These participants seem to consider it a social responsibility not to get vaccinated. This is consistent with the result that there is no difference between vaccinated and unvaccinated with regard to benevolence. The strongest correlation between motives was the statement "I believe that the risks with COVID-19 are so low, I don't need to get vaccinated" and "I think the risks with the COVID-19 vaccine are too high" ( $r = 0.513$ ,  $p = 0.001$ ). Both motives are based on personal medical viewpoints.

## Principle component analysis

This section contains a principal component analysis (PCA) to see if it is possible to determine whether the respondents can be divided into altruistic and selfish groups regarding *motives to follow the recommendation*, *motives to get vaccinated* and *motives to not getting vaccinated*.

**Table 2** Descriptive statistics on benevolence, how well the recommendations were followed, motives for following the recommendations if vaccinated and how important it is considered to get vaccinated

	N	Mean	Std	Min	Max
Benevolence	1014	3.070	0.594	1	4.2
How well did you follow recommendations?	1014	4.161	0.923	1	5
<i>Score how strong the motives for you following the commendation have been:</i>					
I did not want to fall ill with COVID-19	1014	4.176	1.080	1	5
I did not want to get long-term COVID	1014	4.293	1.106	1	5
I did not want to infect anyone close	1014	4.515	0.894	1	5
It helps mitigate the spread of COVID-19 in society	1014	4.343	0.932	1	5
Out of consideration for the healthcare staff	1014	4.380	0.939	1	5
Because I trust the experts	1014	3.833	1.151	1	5
I did not reflect much, but followed the recommendations	1014	3.360	1.288	1	5
How important do you think it is to get vaccinated against COVID-19?	1014	4.301	1.161	1	5
I am vaccinated with at least one dose	1014	1.109	0.312	1	2

**Table 3** Correlation between benevolence and motives for complying with recommendations for the whole sample

	Benevolence	I did not want to fall ill with COVID-19	I did not want to get long-term COVID	I did not want to infect anyone close	I did not want to infect any-one close	It helps mitigate the spread of COVID-19 in society	Out of consideration for the healthcare staff	Because I trust the experts	I did not reflect much, but followed the recommendations
Benevolence	1								
I did not want to fall ill with COVID-19	0.1759*	1							
I did not want to get long-term COVID	0.1558*	0.7148*	1						
I did not want to infect anyone close	0.2293*	0.5743*	0.5711*	1					
It helps mitigate the spread of COVID-19 in society	0.2270*	0.5393*	0.5283*	0.7035*	1				
Out of consideration for the healthcare staff	0.2400*	0.4815*	0.5068*	0.6539*	0.6653*	1			
Because I trust the experts	0.2004*	0.3674*	0.3181*	0.3847*	0.4571*	0.4467*	1		
I did not reflect much, but followed the recommendations	0.0518	0.2144*	0.2613*	0.2085*	0.2251*	0.2127*	0.3215*	1	

*P*-values according to: \**p* < 0.05, \*\**p* < 0.01, \*\*\**p* < 0.001

**Table 4** Bivariate regression for age

	(1)	(2)
Constant	3.291*** (0.0537)	3.719*** (0.0851)
Age	-0.00470*** (0.00112)	0.00994*** (0.00168)

Regression analysis with dependent variable Benevolence (1) and Recommendations (2). Robust standard errors in parentheses; \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

According to Table 9, motives for following the recommendations, the PCA analysis indicates that the first and second component did not show any results that align with being altruistic or selfish. The third component showed that the statements: “I did not want to fall ill with COVID-19”, “I did not want to get long-term COVID” and “I did not reflect much, but followed the recommendations” had a positive correlation with component three, which implies a selfish grouping. The fourth component showed a similar sign regarding people being more altruistic. The statements “I did not want to infect anyone close”, “It helps mitigate the spread of COVID-19 in society”, “Out of consideration for the healthcare staff” and “I did not reflect much, but followed the recommendations” group together and form an altruistic component since these statements correlated positively with the fourth component. It is important to highlight that the statement “Because I trust the experts” was strongly negatively correlated with both components three and four. This result shows a strong belief in expertise and recommendation from authorities.

For the question about the motives for getting vaccinated (Table 10) there were two components found in the data. The first component did not show anything related to the research questions. The second component showed that there were altruistic and selfish respondents who got vaccinated for selfish reasons and respondents who want to help to mitigate the spread of COVID-19 in society.

**Table 5** Descriptive statistics for motives to get vaccinated

	N	Mean	Std. dev	Min	Max
Score how strong your motives for getting vaccinated against COVID-19 have been					
I did not want to fall ill with COVID-19	903	4.332	1.026	1	5
I did not want to get long-term COVID	903	4.392	1.007	1	5
I did not want to infect anyone close	903	4.520	0.893	1	5
It helps mitigate the spread of COVID-19 in society	903	4.486	0.884	1	5
Out of consideration for the healthcare staff	903	4.451	0.907	1	5
Because I trust the experts	903	4.016	1.084	1	5
It allows me to travel	903	3.630	1.322	1	5
It makes it easier to see other people	903	4.043	1.120	1	5
I have felt the expectation to get vaccinated by people close to me	903	3.537	1.357	1	5
I did not reflect much, but followed the recommendations	903	3.457	1.321	1	5
To get a vaccination passport	903	3.532	1.372	1	5

Finally, the PCA analysis did not show any interesting results regarding the stated research questions and the motives for not getting vaccinated.

## Discussion

This cross-sectional online based survey explored the association between prosocial orientation, in the form of benevolence, and compliance with recommendations during the COVID-19 pandemic. A main finding was that self-perceived benevolence was associated with compliance with preventive behaviour, but not with vaccination.

### Motives for compliance with recommendations

When motives for compliance with non-pharmaceutical interventions (NPI) were explored, apart from selfish reasons, people were motivated to change behaviour to promote well-being in society. This was also shown by the PCA analysis. The only statement that was not correlated to benevolence was: “I did not think much about it but followed the recommendations”. This could be seen as people not engaging in societal efforts and therefore not feeling related to other people. However, a controlling health care climate can put pressure on people to comply anyway. According to SDT, this could be an extrinsic motivation which is associated with social pressure and will improve compliance only for a short time if it is not combined with intrinsic motivation (Porat et al. 2021).

The motives “Out of consideration for the health care staff” and “It helps mitigate the spread of COVID-19 in society” strongly correlated to benevolence. In this case, information about how healthcare is under severe pressure or how risk groups suffer can contribute to an altruistic attitude. According to Batson (2011), “The empathy–altruism hypothesis states that empathic concern produces altruistic motivation” (Batson et al. 2015, p 1). Empathy

**Table 6** Correlation for benevolence and score how strong the motives for getting vaccinated against COVID-19 have been

	Benevolence	I did not want to fall ill with COVID-19	I did not want to get long-term COVID	I did not want to infect anyone close	It helps mitigate the spread of COVID-19 in society	Out of consideration for the healthcare staff	Because I trust the experts	It allows me to travel	It makes it easier to see other people	I have felt the expectation to get vaccinated by people close to me	I did not reflect much, but followed the recommendations	To get a vaccination passport
Benevolence	1											
I did not want to fall ill with COVID-19	0.1725*	1										
I did not want to get long-term COVID	0.1842*	0.7424*	1									
I did not want to infect anyone close	0.2219*	0.5985*	0.5986*	1								
It helps mitigate the spread of COVID-19 in society	0.2267*	0.5949*	0.5698*	0.7432*	1							
Out of consideration for the healthcare staff	0.2523*	0.5465*	0.5468*	0.6807*	0.7122*	1						
Because I trust the experts	0.2172*	0.4458*	0.4128*	0.4303*	0.4975*	0.4734*	1					
It allows me to travel	0.1545*	0.1585*	0.1565*	0.1895*	0.1900*	0.1799*	0.2338*	1				
It makes it easier to see other people	0.2612*	0.3550*	0.3437*	0.3921*	0.4187*	0.3870*	0.3410*	0.5979*	1			

Table 6 (continued)

	Benevolence	I did not want to fall ill with COVID-19	I did not want to get long-term COVID	I did not want to infect anyone close	It helps mitigate the spread of COVID-19 in society	Out of consideration for the healthcare staff	Because I trust the experts	It allows me to travel	It makes it easier to see other people	I have felt the expectation to get vaccinated by people close to me	I did not reflect much, but followed the recommendations	To get a vaccination passport
I have felt the expectation to get vaccinated by people close to me	0.1885*	0.2379*	0.2351*	0.2723*	0.2478*	0.3032*	0.2921*	0.3896*	0.4356*	1		
I did not reflect much, but followed the recommendations	0.0896*	0.2713*	0.2750*	0.2190*	0.2431*	0.2711*	0.2916*	0.2595*	0.3006*	0.4665*	1	
To get a vaccination passport	0.1214*	0.1122*	0.1210*	0.1358*	0.1221*	0.1547*	0.1659*	0.6163*	0.4373*	0.4086*	0.3690*	1

*P*-values according to: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

concern is an emotional response of compassion or feeling for others in need. Batson et al. (2015, p 7) suppose “the altruistic motivation proposed by the empathy–altruism hypothesis is a goal-directed force to have the empathy-inducing need removed”. This means we help each other to remove distress and suffering, the cause of our empathy arousal.

Prosocial behaviour has a connection with moral values (e.g. justice, care and benevolence) that individuals perceive they stand for (Kislyakov and Shmeleva 2021; Batson et al. 2015). The ethical norms and values shared in society are essential in promoting prosocial orientation during the COVID-19 pandemic (Schmelz and Bowles 2021; Thaker and Ganchoudhuri 2021). These mechanisms of social values have been described to encourage people to apply shared guidelines and motivate them to do what is considered correct (Bavel et al. 2020). Emotions such as guilt, stress or sadness can sometimes activate selfish motivation, while compassion and sympathy can generate altruistic motivation (Penner et al. 2005).

Interestingly benevolence had no association with being vaccinated or not. This may suggest that the correlations observed between benevolence and adherence to the NPI deal rather with how we regard these actions and their potential benefit than how we act in true life.

According to self-determination theory (SDT), three psychological needs must be fulfilled: competence, relatedness, and autonomy to motivate people to initiate behaviour that promotes health and well-being (Deci and Ryan 1985). Martela and Ryan (2016) uses the term benevolence to supplement SDT in motivating well-being and including prosocial behaviour. The four sub-statements in question 2 measure the individual opinion about actions that affect our social environment in a positive direction. The way benevolence was measured in the current study may have a weakness as it is influenced by the respondent’s self-awareness and specifically the perception of one’s own prosocial impact, which could lead to both under- and overestimations.

Societal threats or individual threats are both essential eliciting or triggering emotions and affect motives to maintain personal and group safety. People perceive personal threats in different ways. The willingness to obey experts and authorities during a pandemic is put to the test as long-term threats reduce endurance.

The COVID-19 pandemic is associated with a high sense of uncertainty, the opposite of the fundamental need for security people long for. Calling for change during threats can cause people to change behaviour if they feel they can handle the threat; otherwise, they can lead to passivity and helplessness (Bavel et al. 2020). For instance, self-interest motives, and avoiding a personal threat, can make people change their behaviour and follow the recommendations. This was also shown by the PCA analysis.

### Motives for getting vaccinated

Strong motives for getting vaccinated were the statements “I did not want to fall ill with COVID-19” and “I did not want to get long-term COVID”. These are both self-interest motives and can be explained by personal threats. Bavel (2020) suggests that behaviour change appears when intense fear is combined with a sense of self-efficacy. This relates to SDT and the opportunity to take control of the situation by making own decisions, which produces autonomy, in this case, getting vaccinated. Weak motives for getting vaccinated were the statements “To get a vaccination passport” and “It allows me to travel”. This suggests that egoistic motives unrelated to fear do not increase the willingness to get vaccinated. This result was strengthened through PCA analysis. According to Rieger (2020), the willingness to get vaccinated increases if altruistic motives are communicated. Other strongly correlated motives were the statements “It helps mitigate the spread of COVID-19 in society” and “I did not want to infect anyone close”. Both statements have a prosocial focus; however, the protection of ingroup members

**Table 7** Descriptive statistics for not getting vaccinated

	N	Mean	Std. dev	Min	Max
<i>Score how strong the motives for not getting vaccinated against COVID-19 have been</i>					
I did not have the time	111	2.054054	1.425979	1	5
I have had COVID-19	111	3.027027	1.664929	1	5
I think the risks with the COVID-19 vaccine are too high	111	3.711712	1.473323	1	5
In principle, I am opposed to vaccinating healthy people	111	3.009009	1.563769	1	5
I believe that the risks with COVID-19 are so low, I don’t need to get vaccinated	111	3.306306	1.524305	1	5
I believe the vaccination has another purpose than protecting against COVID-19	111	3.306306	1.530257	1	5
I believe it is a contribution to society to not get vaccinated	111	2.747748	1.516386	1	5
I have a phobia of needles	111	2.306306	1.565496	1	5

**Table 8** Correlation between benevolence and the score for how strong your motives for not getting vaccinated against COVID-19 have been

	Benevolence	I did not have the time	I have had COVID-19	I think the risks with the COVID-19 vaccine are too high	In principle, I am opposed to vaccinating healthy people	I believe that the risks with COVID-19 are so low, I don't need to get vaccinated	I believe the vaccination has another purpose than protecting against COVID-19	I believe it is a contribution to society to not get vaccinated	I have a phobia of needles
Benevolence	1								
I did not have the time	0.0886	1							
I have had COVID-19	0.0371	0.3478*	1						
I think the risks with the COVID-19 vaccine are too high	0.1296	0.1935*	0.2219*	1					
In principle, I am opposed to vaccinating healthy people	0.1438	0.1914*	0.2513*	0.3010*	1				
I believe that the risks with COVID-19 are so low, I don't need to get vaccinated	0.0593	0.1094	0.1794	0.5133*	0.3345*	1			
I believe the vaccination has another purpose than protecting against COVID-19	0.2432	* 0.1965*	0.0645	0.5073*	0.4167*	0.4115*	1		
I believe it is a contribution to society to not get vaccinated	0.1483	0.2754*	0.2764*	0.2642*	0.4457*	0.3208*	0.4528*	1	
I have a phobia of needles	0.0132	0.4160*	0.1328	0.0189	0.1623	0.166	0.1996*	0.1362	1

*P*-values according to: \**p* < 0.05, \*\**p* < 0.01, \*\*\**p* < 0.001

**Table 9** PCA analysis for motives for following the recommendations

Variable	Component 1	Component 2	Component 3	Component 4
I did not want to fall ill with COVID-19	0.402	-0.1743	<b>0.4489</b>	-0.3601
I did not want to get long-term COVID	0.4015	-0.1481	<b>0.5191</b>	-0.169
I did not want to infect anyone close	0.4281	-0.1976	-0.1139	<b>0.3102</b>
It helps mitigate the spread of COVID-19 in society	0.428	-0.1143	-0.2676	<b>0.2379</b>
Out of consideration for the healthcare staff	0.411	-0.1012	-0.3397	<b>0.2857</b>
Because I trust the experts	0.3171	0.4229	-0.4761	-0.6815
I did not reflect much, but followed the recommendations	0.2029	0.8406	<b>0.32</b>	<b>0.378</b>

in the last statement has a significant impact on protective behaviour (Liekfett and Becker 2021).

### Motives for not getting vaccinated

The motives for vaccine hesitancy did not show any association with high levels of benevolence, except for one, which means health-irresponsible behaviour could be partly explained by a lack of benevolence. This supports the findings that selfish tendencies are negatively related to compliance with protective measures (Dinic and Bodroza 2021). The motive that was significantly correlated to benevolence ( $r=0.24$ ,  $p=0.01$ ) was the statement “I believe that vaccination has another purpose than to protect against COVID-19”. The significance of benevolence implicates that some people think it is a prosocial effort not to get vaccinated. Conspiracy theories, both about the origin of the SARS-CoV-2 virus and the care and prevention of COVID-19, emerged shortly after the onset of the pandemic and were accentuated when it came to vaccination (Ullah et al. 2021). Belief in conspiracy theories often follows when psychological needs are negatively affected, such as social contacts (Bavel et al. 2020). This implicates the need to counter disinformation and inform about safety and risk minimisation (Chou and Budenz 2020). Sacrificing oneself for others without knowing the benefit to oneself can reduce the willingness to follow guidelines (Bavel et al. 2020).

The analysis revealed that people with a higher score on the benevolence scale were more prone to follow the NPI put forward by the public health agency of Sweden. Our findings add to the concept that prosocial orientation during the COVID-19 pandemic increases compliance with preventive behaviour (Jordan et al. 2021; Liekfett and Becker 2021; West et al. 2021).

### Strength and limitations

There are several limitations to consider when interpreting the results. First, non-probability sampling was employed, leading to uneven inclusion probabilities for units in the population. Second, data rely on self-reports and could reflect inaccurate memory and a desire to appear prosocial. There may be a possibility of self-serving bias that people who feel that they are benevolent also respond in a more positive manner to how well they followed the recommendations, thus our data may reflect rather a willingness to follow the recommendations in people with a high level of benevolence. We do not have data to support that benevolence leads to action when it comes to following the recommendations and getting vaccinated. When we related benevolence to those that had or had not taken the vaccine, no significant correlation was found. Third, the study was cross-sectional, which means that no causal inference can be made.

**Table 10** PCA analysis for motives for getting vaccinated

Variable	Component 1	Component 2
I did not want to fall ill with COVID-19	0.3418	-0.2418
I did not want to get long-term COVID	0.3372	-0.2367
I did not want to infect anyone close	0.3572	-0.2367
It helps mitigate the spread of COVID-19 in society	0.3628	-0.2396
Out of consideration for the healthcare staff	0.3541	-0.2024
Because I trust the experts	0.2966	-0.07041
It allows me to travel	0.2212	<b>0.4766</b>
It makes it easier to see other people	0.3072	<b>0.2756</b>
I have felt the expectation to get vaccinated by people close to me	0.2506	<b>0.3266</b>

The strength of the present research is the sample size and the robustness of the measurement methods.

## Conclusions

In a situation such as a pandemic, it is crucial to communicate recommendations and guidelines in ways that lead citizens to voluntarily take responsibility and protect themselves and society at large. People's confidence in the state and authorities influence the willingness to comply with recommendations and get vaccinated, which means great responsibility is on how authorities communicate (Wismans et al. 2021). The present research indicates that people's notion that their actions have a positive effect on other people contributed to protective behaviour during the pandemic. This means that compliance with NPI increases with prosocial motivations. Prosocial behaviour, or at least such a mindset, is related to benevolence. We argue that psychological predictors such as benevolence are related to group protection and thereby contribute to compliance with recommendations. These findings can contribute to the shaping of public information when it comes to promoting protective behaviours during a pandemic.

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**Data availability** The data are not publicly available due to ethical and legal restrictions. For data requests, please contact the principal investigator and corresponding author of the study Louise Aberg.

**Code availability** Not applicable.

## Declarations

**Ethics approval** The study adhered with the Helsinki declaration and was assessed by the Swedish Ethical Review Agency (Dnr 2021–06421-01) and not considered as potentially damaging with regard to ethics.

**Consent to participate** Not applicable.

**Consent for publication** Not applicable.

**Conflict of interest** The authors declare no conflict of interest.

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