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Factors influencing the willingness of and supporting informed decision making about COVID-19 vaccinations among the Dutch general public

Bachelor thesis

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Summary

Background: Due to the outbreak of the SARS-CoV-2 virus, major problems have arisen worldwide in the field of health, healthcare and the economy. One of the most promising ways out of this pandemic is mass vaccination of the population. However, it appears that COVID-19 vaccination willingness fluctuates and differs, both in the Netherlands and worldwide. To increase vaccination willingness, various public health campaigns have been launched by governmental institutions. Yet, for such campaigns to be successful, they must fit the target audience's information needs and worries that contribute to their vaccination willingness.

Aim: The aim of this study was to determine the factors that contribute to vaccination willingness among the Dutch general public, what information is needed and how this should be disseminated so that citizens can make an informed decision.

Method: First, the determinants that contribute to vaccination willingness, both globally and in the Dutch context, have been defined by means of a literature review. Second, existing vaccination campaigns from different countries and health authorities were collected and their content coded using the Theoretical Domains Framework. Third, an online survey was used to study potential determinants of vaccination willingness among the Dutch general public. Constructs included in the survey are: perceived susceptibility, perceived severity, perceived barrier (vaccine delivery, trust and safety), anticipated regret, perceived benefits, perceived vaccine knowledge, attitude, subjective norm and perceived behavioural control. The survey was distributed via the author's social networks. The data analysis of the survey consisted of descriptive variables of participants' demographics and the vaccination willingness towards age and education, a one-way ANOVA to compare the willingness to the different constructs of the theoretical models and a Bonferroni post hoc test.

Results: It appears that the willingness to vaccinate differs between countries. Especially younger people indicate that they prefer not to be vaccinated. People who do have doubts, most often have doubts about the effectiveness and safety of the vaccines. Also, trust in the government is declining, which is harmful because when this decreases the willingness to vaccinate will also decrease. The campaign analysis shows that many existing messages are aimed to persuade people to take vaccine and place little emphasis on the freedom of choice to (not) take a vaccine. In the questionnaire, 57 of the 77 (74.01%) respondents indicated that they would like to be vaccinated. Furthermore, most trust is placed in information about the vaccines from governmental agencies (92.1%), health organizations (85.5%) and healthcare workers

(73.4%). Besides, many respondents (41.6%) indicate that they do use Facebook to obtain information about COVID-19. However, it appears that the most respondents (70.2%) have little trust in social media. The ANOVA analysis shows that people who perceive themselves as less susceptible, who perceived the condition to be less severe, who perceive more barriers and who perceive less regret were less willing to take a vaccine for COVID-19. People who perceive more trust, safety, benefits, knowledge, a positive attitude and behavioural control were more willing to take a vaccine for COVID-19. In summary, the factors related to vaccination willingness are mainly: trust in the vaccine, safety, perceived benefits, perceived knowledge, attitude, perceived behavioural control, perceived severity, perceived barriers, anticipated regret, level of education and income, age, trust in government and information sources.

Conclusions: Facebook is a widely source of information, but not much trust is placed on it. However, communication could be done through here. There are a few conditions to keep in mind. This also applies to messages/campaigns outside Facebook.

- Discuss the possibilities with regard to where they can get the vaccine and by whom when citizens are informed
- Refer to scientific studies and sources in messages related to vaccination for COVID-19 or translate it into understandable language and present at an appropriate time.
- Better communicate the benefits that take place when more people are vaccinated
- Emphasize in e.g., messages or campaigns that vaccination is a personal choice without social pressure since this is not often communicated very clear.

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Introduction

SARS-CoV-2

In November 2019, COVID-19 was first identified in Wuhan, China. In January 2020, the virus was identified as 'severe acute respiratory syndrome coronavirus2' (SARS-CoV-2).

This new virus is spreading very quickly around China and later around the rest of the world and is causing major problems. In fact, it is currently the most important international public health problem [1]. By March 10th 2020, the World Health Organization declared that there was a global pandemic [2]. COVID-19 is mainly spread by moisture droplets released when a person, for example, sneezes or coughs. People can become infected if they inhale such droplets or if they touch something contaminated and then touch the nose, eyes or mouth with their hands [3]. COVID-19 can cause several symptoms and these can arise in 2 till 14 days. Most people develop relatively mild symptoms such as: fever, chills, cough, shortness of breath, headache, myalgia, sore throat or loss of taste or smell [2]. However, a person can quickly deteriorate when he or she has become infected. In the worst case, patients can develop life-threatening complaints which can lead to death. There are a number of risk groups who are more likely to have a serious course of COVID-19 such as: people with diabetes, chronic obstructive pulmonary disease, hypertension and obesity and male sex [4]. However, a severe COVID-19 infection can also occur in people outside these risk groups. Worldwide, 179 million infections have been identified, which resulted in 3.88 million deaths [5]. In the Netherlands, 1.68 million cases have been identified, which resulted in 17.730 deaths and these numbers are increasing every day [5].

Consequences of the COVID-19 pandemic

Due to the pandemic and the many measures that have been introduced, several problems have emerged in recent times with regard to healthcare, health and the economy. First of all, major problems arise in healthcare which complicates the goal of maintaining regular care. Hospitals are under immense pressure because of the vast amount of people with COVID-19 infections who are being hospitalized. Especially, the IC stays are quite long because the treatment is not always successful. In addition, people have to recover for a long time from a COVID-19 infection after an IC stay. Regular care is also required for non-COVID patients, but they cannot or dare not seek that care because of COVID-19 [6]. This in turn leads to postponed care seeking and thus worsened health status in the future. The required treatments are then more invasive, expensive and longer.

This pandemic has also caused secondary health costs. A prior review study among 5 articles [7] concluded that several health conditions have increased significantly. These problems may include

anxiety, depression, fear, loneliness, mood swings, severe stress symptoms, sleep insomnia and high prevalence of PTSD.

There are also major economic consequences. Many companies, for example restaurants, were forced to close down and therefore lost revenue. Several companies have been declared bankrupt. In 2020 this number was 2703 companies]. Due to the support packages from the government, many companies were able to survive the economic crisis brought by this pandemic, but this support will not always be able to continue and not every company is always entitled to it.

Infection prevention and control

The government has imposed many measures throughout the year to reduce infections with a huge impact on society. The first measures consisted of washing hands, sneezing in the elbow and not shaking hands [9]. Since then, many consecutive measures have been introduced. These measures mainly consisted of keeping a distance of 1.5 meters from other people, restriction of access to public facilities, restrictions on the number of guests at home, the closure of the catering industry and schools and working from home as much as possible [9]. These measures are intensified or reduced based on a roadmap that the government had developed. There have also been several riots and vandalism in the Netherlands against the measures introduced by the government. This was mainly when the curfew was introduced. A study by RIVM [10] has shown that fewer and fewer people trust the measures and the government. The data also shows that over time there is increasing resistance to the measures. The support is disappearing. Besides, there are also several people who believe in conspiracy theories. Oleksy et al. [11] demonstrated that the content of an endorsed conspiracy theory may differently influence protective behaviour and adherence to governmental recommendations during a pandemic. This must therefore be anticipated.

An important development is that from June 1 2020, every citizen can have themselves tested for the SARS-CoV-2 virus [12]. This testing is crucial in suppressing the community spread of COVID-19 [13], but it is better to avoid infections or reduce the severity. That is why vaccinations have been developed. Alongside testing, this is among the most important measures that will hopefully abate the pandemic. However, it is still unclear how our society will recover from this pandemic.

Vaccines

The importance of vaccination for COVID-19 is high. If more and more people are vaccinated, can worldwide spread of COVID-19 be stopped and freedom will increasingly return without restrictive measures. Also, all people will be better protected against the virus. Worldwide, researchers are working on vaccines against the SARS-CoV-2 virus. At the moment there are vaccines in development from 12 different companies [14] and 4 vaccines thereof are currently approved for use in the Netherlands [15].

These are the vaccinations of BioNTech/Pfizer, Janssen, Moderna and AstraZeneca. Since January 2021 the first people in the Netherlands have received a vaccine [16]. A specific vaccination strategy has been drawn up to ensure that the vaccination program runs as efficiently as possible. In order for vaccines to be as effective as they can, a vaccination rate of about 60/70% is required [17]. To reach that, governments from all over the world have launched public health campaigns to raise awareness about vaccination.

Public health campaigns

Many public health campaigns have been launched all over the globe, to promote vaccination. The campaigns include, for example, radio commercials, advertisements and television spots. Attention is also paid to social media [18] and this channel may also play a role with regard to whether or not to take a vaccine [19]. Dunn et al. [20] indicate in their study that exposure to negative vaccine content may lead to the formation of negative opinions and subsequent sharing of anti-vaccine content, thus contributing to and perpetuating anti vaccine content on social media. During this pandemic, a lot of information is being disseminated and that is why it is important that correct and adequate information is shared. Research has shown that exposure to multiple types of fake news can reduce a person's resistance over time and make them increasingly susceptible to the fake news [21]. The more often they are exposed to this, the more likely they are to actually believe it. There is considerable evidence that especially the elderly, the youth, those active on social media and the less educated are the most susceptible to fake news [21]. Fear also plays a role with regard to misinformation. Confusion can increase anxiety and this is often amplified when trusted authorities express conflicting opinions [22]. WHO has therefore launched an awareness campaign about the risks of incorrect and false information about COVID-19.

Research aim and questions

At the moment, there is not yet enough knowledge on how a campaign can be properly tailored to the Dutch population. A previously conducted study concluded that identifying characteristics of health misinformation on social media will help to inform targeted interventions and tailored messages to spread corrective information and stories [23]. It is therefore important to take into account these characteristics and trust. A further study will have to be carried out to determine what the factors, variables and predictors are that make Dutch citizens more or less willing to get vaccinated for COVID-19. After that, it is relevant to analyze where people get their information from and what kinds of messages or sources they trust. Furthermore, 3 different models were used for this study, namely: Protection Motivation Theory, Health Belief model and Theory of Planned Behaviour. The data is linked to the 3 models in order to understand why people want or do not want the vaccine. Once this information is clear, such a campaign can be properly tailored to the Dutch population. This leads to the following research question:

How should the Dutch government inform their citizens in order to ensure they have the right information to make an informed decision regarding taking the SARS-CoV-2 vaccine?

Besides, a number of sub-questions will be answered in this study:

- What are the factors, variables and predictors that make Dutch citizens more or less willing to engage in vaccine uptake?
- How does the Dutch population receive (online) information about COVID-19 vaccines?
- How reliable does the Dutch population consider various sources of information about COVID-19 vaccines?
- (How) is the willingness to vaccinate among this target group related to the information sources used and the confidence placed in them?

Theoretical framework

In this chapter a theoretical framework will be outlined. Attention will be paid to the theories relevant to this research. The 3 models that are central for this research will be explained further. Using the models, the factors can be identified that make individuals want to take or not take a vaccine against COVID-19.

Protection Motivation Theory

The Protection Motivation Theory (see Figure 1) was originally developed to better understand fear appeals and how individuals deal with it. This theory is relevant to this research, because it can be better understood why people exhibit certain (health) behaviour. In this situation, it can also be checked which aspects individuals consider important with regard to information provision and whether or not to take a vaccine against COVID-19. The theory identifies factors that play a role with regard to the health protective behaviour of individuals. These factors are described as: the perceived severity of a threatening event, the perceived probability of the occurrence (or: vulnerability), the efficacy of the recommended preventive behavior, and the perceived self-efficacy. Figure 1 shows 2 pathways, namely threat appraisal and coping appraisal. Protection motivation stems from these 2 aspects. The threat appraisal examines the seriousness of the situation and assesses the situation how it currently applies, hence the concepts severity and vulnerability [24,25]. The coping appraisal is how one responds to the situation. This consists of response efficacy, self-efficacy and response cost [24].
Ultimately, the threat appraisal and the coping appraisal will work together to determine the behavioural intention. In conclusion, it can thus be said that an individual must believe that there is a serious threat that may occur and that by adopting certain health behaviours, they can effectively mitigate the threat. The individual must also be convinced that he is capable enough to perform the behaviour and that this is not going to cost too much.

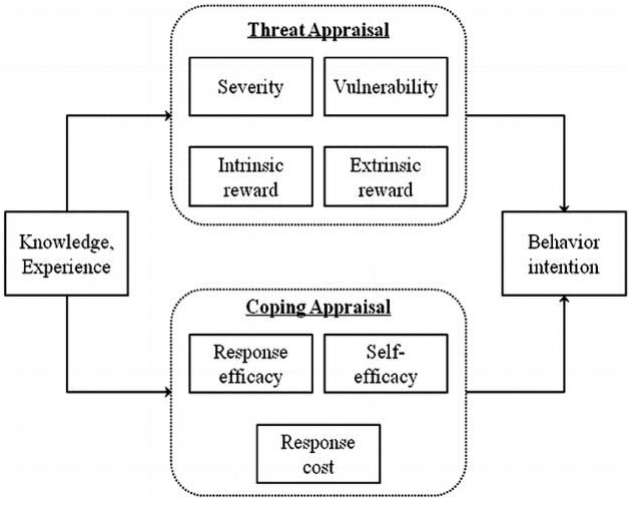

Figure 1: Protection Motivation Theory [26]

Health Belief Model

The Health Belief Model (see Figure 2) is a social psychological health behaviour change model that is designed to explain the (health) behaviour of individuals through health perceptions [27]. The theory assumes that positive factors increase health-promoting behaviour, while negative factors decrease it [27]. A person's belief in a threat of disease or illness, along with belief in effectiveness of recommended health behaviours, will ultimately lead to whether the individual will display the behaviour [28]. The perception of an individual of the benefits and obstacles to health behaviour will be leading. Perceived susceptibility refers to an individual's perception of how big their risk is of getting a disease or illness. When someone's perceived susceptibility is high, they will engage in behaviours to reduce the risk of health problems. Individuals with low perceived susceptibility are more likely to exhibit unhealthy and risky behaviour. Perceived severity refers to the feelings of an individual about the severity of contracting a disease or illness. Perceived benefits refer to one's belief in the efficacy of the recommended health behaviour in reducing the risk or seriousness of the condition. What behaviour an individual shows in order to prevent a certain disease depends on both the perceived susceptibility and the perceived benefit. Perceived barriers refer to an individual's assessment of the barriers or obstacles that someone might encounter during behavioural change. Research has shown that this variable appears to be the most powerful of the model [29]. This means that the perceived benefits must outweigh the perceived barriers in order to ultimately achieve behavioural change. Self-efficacy was added later to the model and has the same meaning as in the Protection Motivation Theory. This variable was added to better explain and understand the differences in health behaviour between individuals. Finally, cue to action is the trigger that starts the process until health-promoting behaviour. These triggers can occur internally and externally. Internal triggers can be pain or shortness of breath, for example. External triggers are, for example, certain information from loved ones or illness of a family member. The modifying factors influence how different health behaviours are viewed. For example, older people generally have more motivation to engage in health-promoting behaviour than younger people.

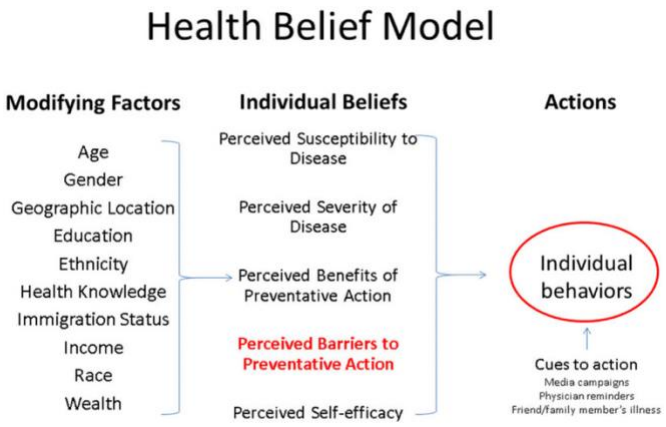

Figure 2: Health Belief Model [30]

Theory of Planned Behaviour

The Theory of Planned Behaviour (see Figure 3) assumes that individuals use personal subjective considerations when deciding whether or not to perform certain behaviour. It is more of a general theory that can be applied to many different types of behaviour [31]. This is in contrast to the Protection Motivation Theory and the Health Belief Model that were primarily developed to explain health behaviour. According to this theory, the intention to perform a certain behaviour is the most important and a direct determining factor for the display of that behaviour [32].

Three determinants influence this intention: Attitude toward the behaviour, subjective norm and perceived behavioural control. These determinants are formed by individual beliefs and ideas. Attitudes refer to the state of mind of individuals towards objects and behaviours. This attitude is determined by the desirability of the behaviour and the desirability of the expected consequence of that behaviour. Attitudes are primarily shaped by the past personal experiences of individuals [32], but can also be determined by emotions, intelligence, values and characteristics.

The subjective norm refers to the social pressure of other important individuals in the social environment. These important individuals, often referred to as reference groups [33], impose certain norms. Subjective norm is also related to the motivation to meet these norms. These norms depend, for example, on age, race, education and income.

Perceived behavioural control refers to the ability to perform certain behaviour. This takes into account personal capacities and perceived control over the behaviour. It therefore does not only refer to actual control, but also to the assessment of whether an individual can carry out the behaviour. A high perceived behavioural control is important for behavioural change. An individual's self-confidence plays a role in the perceived behavioural control.

For each model, different questions have been included in the questionnaire that will be used for this research and that relate to the different constructs of the models.

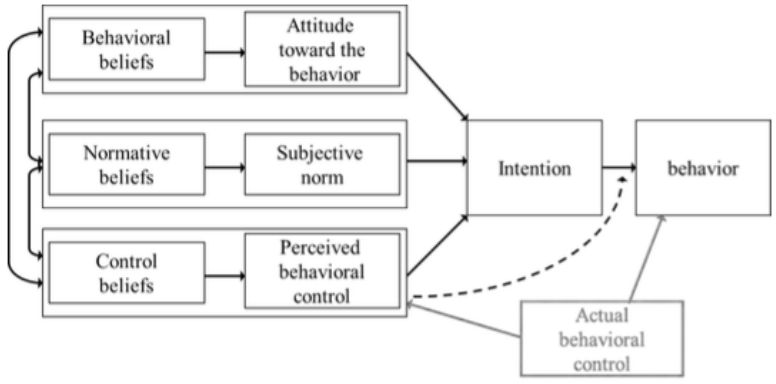

Figure 3: Theory of Planned Behaviour [34]

Methods

To answer the research questions, this study consists of two parts: (1) desk research into COVID-19 vaccination willingness and existing public health campaigns on that topic, and (2) an online survey on determinants of vaccination willingness among the Dutch general public. A combination of desk research and quantitative research has been chosen, because in this way the existing literature can be correctly combined with the results of the questionnaire in order to form a good conclusion. Besides, the literature can support new findings from the survey.

Study 1 - Desk research

Factors that influence vaccination willingness

First of all, desk research was carried out into known factors that contribute to the willingness to vaccinate, particularly within the Dutch context. These can be various factors, for example environmental factors or the behaviour of others. Different databases were used to search for literature such as FindUT (University of Twente library), Scopus, Google Scholar, Cochrane Library, Psycnet and Google. In addition to scientific literature, grey literature is also included in the analysis to include all kinds of valuable documents. The main focus was on scientific and non-scientific articles about vaccinations and people's motives for taking or not taking a vaccination. Table 1 shows the inclusion and exclusion criteria, the research area, the sources and the search terms that were used. 13 articles and 8 pages were scanned based on the search terms. Besides, it was checked whether the information is relevant for this study. This was done by first reading all the abstracts. When it contained remarkable or relevant information, the full article was included in the analysis.

Table 1: Specifications search behaviour

Inclusion criteria	Determinants of willingness Vaccinate for COVID-19 Mainly focus on the Netherlands instead of other countries
Exclusion criteria	Other diseases than COVID-19
Research area	Healthcare
Sources	FindUT, Scopus, Google Scholar, Cochrane Library, Psycnet, Google

Search terms	"Willingness to vaccinate COVID-19", "bereidheid vaccineren COVID-19", "factoren vaccinatiebereidheid COVID-19", "cijfers vaccinatiebereidheid COVID-19", "acceptance COVID-19 vaccine"

Analysis of existing Covid-19 vaccination campaigns

Second, existing vaccination campaigns were analyzed to examine what is being communicated and how this is done. These campaigns were scanned for what kind of messages were used. Campaigns from the Netherlands, UK, Germany, Singapore, WHO, CDC USA and ECDC Europe were included in the study, since they may be further advanced in their vaccination campaigns or because they are comparable to the Dutch culture and situation. The main source used for this is Google. The search was mainly on short messages or one-liners, because of the assumption that the average person will not read through entire reports. The content of each campaign is analyzed. For each campaign/message it was checked whether it contains empirical or persuasive communication. The details are also noted.

Study 2 - Survey

A survey was conducted to examine determinants of vaccination willingness among the Dutch general public. The BMS ethical committee / Domain Humanities & Social Sciences from the University of Twente has given ethical approval to continue this research (BCE210084).

Participants

The method that was used to recruit participants is convenience sampling [35]. This method was chosen partly because of the available time. It is important that the sample is representative of the entire Dutch population but due to the available time, this was difficult to achieve for this study. However, this is a pilot study for a large-scale study among a representative sample of the Dutch general public. The questionnaire was distributed via social networks such as Facebook and LinkedIn and personal networks of the researcher. The two inclusion criteria that were used were that the age of the participant must be at least 16 years and that they must live in the Netherlands. A total of 81 people started filling out the survey, of whom 77 completed the entire survey and were included in the data-analysis.

Materials

This online survey is developed using Qualtrics software. The survey was based on a questionnaire that was previously used in the UK [36] and questions from a WHO [37] questionnaire. The questionnaire

consists of 7 demographic questions and after that 43 questions about different topics. First of all, there are a number of questions about social and economic characteristics. After that there are 4 questions about one's health in general, 3 questions related to information sources, 9 questions about someone's experience with COVID-19, 2 questions about health literacy, 12 questions about vaccine willingness and 33 and questions about the different constructs of theoretical models. Perceived susceptibility was assessed with 2 items (e.g., I believe that I'm at high risk of catching coronavirus compared to others), so a low score means that someone perceive more susceptibility. Perceived severity was also assessed with 2 items (e.g., Complications from coronavirus would be serious for me). A low score on perceived severity means that someone perceive COVID-19 as severe. Perceived barrier vaccine delivery was assessed with 8 items (e.g., I would be happy to have a vaccine from a nurse). A low score on perceived barrier vaccine delivery means that someone experience less barrier in terms of vaccine delivery. Perceived barrier trust (e.g., I believe that a coronavirus vaccine approved by a European Union agency (via EMA), is very safe) and perceived barrier safety (e.g., I believe that any side-effects from a coronavirus vaccine that I might experience would be mild) were both assessed with 2 items. A low score on trust and safety means that someone has trust in the vaccine and thinks it's safe. Anticipated regret was assessed with 4 items (e.g., Imagine that you caught coronavirus, but that a vaccine might have prevented it). A low score on anticipated regret means that someone has little regret when something will happen. Perceived benefits was assessed with 6 items (e.g., If I have a coronavirus vaccine, I'm confident that I will not catch the coronavirus). A low score on perceived benefits means that someone experience more benefits from the vaccine. Perceived vaccine knowledge (e.g., I know enough about the safety of a coronavirus vaccine to make an informed decision about whether or not to get vaccinated for coronavirus) and Perceived Behavioural Control (e.g., I feel in total control as to whether I will have a coronavirus vaccine) were both assessed with 1 item. A low score on perceived vaccine knowledge and perceived behavioural control means that someone perceive that he has enough knowledge and enough self-control to make an decision. Attitude was assessed with 3 items (e.g., I feel that having a vaccine against coronavirus would be:) and subjective norm was assessed with 4 items (e.g., My family would expect me to be vaccinated for coronavirus). A low score on attitude means that someone has a more open positive attitude towards vaccination. For all constructs, participants were asked to score from 1 (strongly agree) to 5 (strongly disagree) except for 'Attitude', this construct consists of a scale from 1 - 3 (Valuable - Worthless, Beneficial - Harmful, Tolerable - Painful) and 'Anticipated regret'. This construct consists of a scale from 1 (not at all) to 5 (a great deal). Finally, 12 questions are asked about the respondents' belief in conspiracy theories. All questions were closed ended to limit respondents' burden and reduce risk of errors in data analysis. All questions are answered on 2-point (yes/no), 5-point or 7-point Likert scales. There are also

questions in which participants must indicate the answer that fits best. Finally, the participant is asked to write down their email address if he or she wants to participate in a follow-up study.

Procedure

First of all, a short think aloud pilot study was carried out. The questionnaire was distributed to 6 people and they all gave feedback via e-mail and face-to-face. After this, a number of minor adjustments were made to the questionnaire. Some questions were not completely clear, so the answer options have been adjusted. This also applies to the spelling.

The participants reached the questionnaire through a link. It led the participant to the program Qualtrics. The questionnaire is filled out completed independent and anonymous by every participant. The introduction consists of some general information about the research, contact details of the principal researcher for any questions/comments and an informed consent. This complies with ethical standards for research. After that the questionnaire starts. All questions are in Dutch and it should take no longer than 30 minutes to complete.

Data analysis

First of all, the data has been prepared. Missing values were indicated as 999. All the participants who did not complete the questionnaire, were removed from further analysis (n= 4).

The statistical software IBM SPSS version 25 was used for the analyses. First of all, a table has been drawn up with demographic data of the respondents. After that, the relationship between age and willingness to vaccinate, and between education and willingness to vaccinate were examined by means of descriptive statistics. Subsequently, frequencies have also been drawn up about information seeking behaviour, used information sources and trust in these sources.

Finally, a one-way ANOVA was performed. In order to properly perform this analysis, the mean scores of questions that together measure each construct of the theoretical models were first calculated. In this way 11 new variables were created for: Perceived susceptibility, perceived severity, perceived barrier (vaccine delivery), perceived barrier (trust), perceived barrier (safety), anticipated regret, perceived benefits, vaccine knowledge, attitude, subjective norm and perceived behavioural control. A new variable for willingness to be vaccinated has also been created. The original question from the questionnaire on willingness to vaccinate has been recoded. When people indicated “1. I’ve not yet thought about getting vaccinated against coronavirus” or “2. I’m not yet sure about getting vaccinated against coronavirus, but will probably have a vaccine” are these grouped into group 1. Group 1 is stated as: Unsure on whether to take SARS CoV-2 vaccine. Group 2 consists of the answer options “3. I’m not yet sure about getting vaccinated against coronavirus, but will probably NOT have a vaccine” or “4. I’ve decided I don’t want to

get vaccinated against coronavirus". This group is stated as: Will not take the SARS CoV-2 vaccine. Finally, a third group has been created. This group consists of one answer option, namely: "5. I've decided I do want to get vaccinated against coronavirus". This group is therefore indicated as: Will take the SARS CoV-2 vaccine. The new variable "willingness" is the factor and all other new created variables are the dependent variables.

To see how the groups differ, a Bonferonni post hoc test has been performed. A significance level of 0.05 was used. In addition, the means and standard deviations of the groups for the associated constructs have been reported.

Results

Desk research

First of all, existing literature has been examined as to what factors contribute to determining if people will or will not take a vaccine. This will be divided into two parts. First there is a part with literature from international studies and then a part with literature related to the Netherlands.

International studies

Overall vaccination willingness

It appears that there is a large part of the population who has doubts about the vaccine. That is evident from a survey conducted worldwide [38]. However, results differ greatly between countries. The respondents from China gave the highest proportion of positive results (88.6%), versus the participants in Russia who represent the lowest proportion (54.9%) [38].

Personal characteristics

To determine the factors that contribute to whether or not to take a vaccine, it is also interesting to note the differences within the characteristics of people. It appears that in general the willingness to vaccinate for COVID-19 is higher in older age groups than in younger age groups [39,40]. Overall, women had a lower acceptance of COVID-19 vaccines, because they have more concerns about the safety of vaccines and expressing lack of trust [40]. Also, black/African people had a lower acceptance of COVID-19 vaccines [40]. Income and education are also factors that influence acceptance of COVID-19 vaccines. People with a lower income have lower acceptance of COVID-19 vaccines. The same also applies to people with a lower level of education [40].

Barriers and motives

In order to make the data more meaningful, it is interesting to look at the different motives why people do or do not want to take a vaccine. People who want to take the vaccine straight away have several reasons for this. What is often mentioned is that people would like to resume their normal life [41]. Moreover, it is often said that taking a vaccine protects the person's social environment against COVID-19 [41]. There are also several reasons why people might not want to take the vaccine. One of the most frequently mentioned motives is the mistrust in the safety and effectiveness of the vaccine [41,42]. The proportion of people who would rather wait a while before taking the vaccine is substantial. A number of motives can be also mentioned for this group of people. The most frequently cited argument was that they wanted to

know what the side effects are for other people [41]. Fear and distrust play a major role here. It was also mentioned that the vaccine is only taken when many people have taken the vaccine [42].

The importance of information and trust in the government

Trust in the government is important in the control of COVID-19. Also, health behaviours are better when trust in the government is high [43]. What is also related to trust in the government, is the severity of the measures in a country and the number of deaths [44]. Research shows that Thailand has least trust in the government and Vietnam has the most [44]. Transparency is important to increase the trust in the government. However, it does matter which information comes out and who reads this information [55]. When information is presented in an untimely and difficult manner, this is also called the hygiene factor of transparency, this will lead to a decline in confidence in the government [45]. Research shows that countries with good information hygiene have a higher willingness to vaccinate for COVID-19 than countries with a lower information hygiene [46]. It also appears that light optimism about one's own policy is appreciated [45]. It is therefore good to take this into account with regard to the provision of information about COVID-19 and vaccines.

The Dutch context

Overall vaccination willingness

It appears that there are quite a few differences in data on vaccination willingness. Dutch studies show that the majority do not want to be vaccinated immediately when a vaccine is available [47]. People could be divided into 5 groups:

1. 13% would let themselves be vaccinated immediately when an approved vaccine is available.
2. 19% would let it depend on the characteristics of the vaccine, for example effectiveness or safety, whether they will take the vaccine immediately or wait a little longer.
3. 25% are willing to be vaccinated but want to wait a while to see what the experiences are for other people.
4. 28% let it depend on the characteristics of the vaccine whether they will take it or not.
5. 14% will not take the vaccine.

So, there is a large part of the population who has doubts about the vaccine. However, this research was published in November 2020. Different data from 2021 show different figures. Figures from Statistics Netherlands show that the willingness to vaccinate continues to rise [48]. This willingness increases with age and education level. The RIVM also confirms that the willingness to vaccinate is increasing [49]. So, there is quite a lot of data about the willingness that differs from each other.

Personal characteristics

Also, in the Dutch context it appears that in general the willingness to vaccinate for COVID-19 is higher in older age groups than in younger age groups [47,50]. What is striking is that the willingness to vaccinate has increased in all age groups, especially from the measurement in November 2020 [50]. The largest increase for every age group can be seen between November 2020 and January 2021 [50]. For the middle group (40-54 years) this is the highest, namely 25% [51]. However, other research shows completely different figures. This shows that the proportion of respondents who do not want to vaccinate or want to wait is relatively large among all age groups [47]. So, this does not correspond to the numbers of the RIVM. An explanation for this could be that the RIVM research approached people from the GGD and via social media channels using their own name. As a result, there may be more people who indicate that they are willing to vaccinate. The other study took a random sample from a panel of Kantar Public. What is also striking is that relatively many women indicate that they want to take the vaccine but prefer to wait a while to see what the experiences of others are [47]. Besides, it appears that the majority of the respondents working in the healthcare sector first want to wait and see what the characteristics of the vaccine are [47]. Finally, the people in good health are the ones who often say not to take the vaccine [47]. This is in contrast to the respondents who estimate that they run a high risk of becoming ill after infection, also called high severity from the Protection Motivation Theory and Health Belief Model. They do want to take the vaccine.

Barriers and motives

Also, for the Dutch context, the factors and motives are virtually the same for whether or not to take a vaccine. People who want the vaccine would like to resume their normal life and they say it protects the person's social environment against COVID-19 [47]. The risks are estimated to be small according to this group of people. This refers to perceived severity.

About 75% of the respondents say that they have no trust in the safety and effectiveness of the vaccine [47]. In addition, fear of possible side effects of the vaccine is mentioned by 70% of the respondents [47]. There is also a group of people who believe that the government has bad intentions [47]. The group of people that say they want to wait to take a vaccine also wanted to know what the side effects other people have experienced [47]. Finally, there is a group of people who would rather wait for a better vaccine or want to see whether a vaccine is really necessary [47].

The importance of information and trust in the government

After the first measures were announced in the Netherlands in March 2020, trust in the government, RIVM and GGD has fallen considerably [44]. Moreover, there is increasing dissatisfaction with

government policy [44]. Various measurements have shown that this trust is declining further [52]. Research shows that the willingness to vaccinate is strongly related to people's trust in the government and social position [44]. It also appears that more trust in social media leads to less willingness to vaccinate [52]. It is therefore important to check what is shared on social media. It turns out that social media is by far the most used in contrast to, for example, expertise sites or TV [53]. However, it appears that watching public broadcasting has a positive effect on political trust [53].

Analysis of campaigns

An overview of all analyzed campaign messages and their codes is provided in Appendix 1. There are a number of overarching concepts that were found in the messages that are central to this analysis.

Autonomy

The focus of these messages is on emphasizing that taking a vaccine is one's own choice, and that people should make sure to be well-informed. These messages usually provide information and describe possible consequences of (not) taking the vaccine. It is noticeable that almost all messages belong to western cultures and these are communicated from government agencies. Most messages already include a lot of information about the vaccine itself and risk groups. Cultural differences are also taken into account, because some messages are directly addressed to certain cultures, e.g. Muslims. These messages aimed to appeal a certain religious group. Most messages are about vaccine effectiveness and safety. Here the emphasis is on the safe development of vaccines and their use. For example:

"Vaccine approved

- Safe

- Effective

Vaccines are only made available to the public after meeting strict safety and effectiveness criteria"

This message was published by Public Health England through posters/images.

Moreover, there is a lot of attention for what we can achieve with the vaccine and what the consequences are. This is on a personal, national and global level. For example:

"Your body makes antibodies"

"Vaccine safety is paramount"

"Rapid vaccine development isn't compromising safety"

"More than one suitable vaccine"

"Vaccination makes it harder for the virus to spread"

"Vaccination is voluntary"

These messages were published by the government of the Netherlands on their website.

Persuasion

Persuasive communication has been used in about 80% of the messages. Emphasis is placed on convincing people to take a vaccine. Often reference is made to the social norm. For example:
"Let's #ACTogether for #VaccinEquity"

"To protect yourself and ultimately the people around you against the coronavirus, vaccination is the most important step. So let's roll up our sleeves. If we get vaccinated, we regain more freedom step by step. Every approved vaccine has been tested on tens of thousands of people. This way we know that it is well protected and safe for us"

"The more of us are vaccinated, the harder it will be for the virus to spread, and the safer we will all be as a society" - Prime minister Lee Hsien Loong"

These messages show that the emphasis is mainly on society and norms and values. The emotional level also plays a role here. Research has shown that emotions are motivating drivers for decision-making [54]. Ultimately, emotions can influence judgement and choices [54]. This is not only done in text form, but also with the help of images or posters. Appendix 2 shows a number of posters from different countries. Some posters come from the Netherlands. Sometimes also used for campaigns/posters are celebrities from the Netherlands or people from different cultures. The other poster provides additional information for low-literate people. In this way, different types of population groups are thought of. However, many posters or messages miss the fact that vaccination is one's own choice.

Survey

A total of 77 respondents were included in the analysis. As shown in Table 2, the majority of the respondents are female (n=54, 70.1%). There is a reasonable spread in the population in terms of age. Most respondents were 50-59 years old, but all age groups from 16-19 until 80-89 years were represented in the study population. Additionally, 52% of the respondents had higher education compared to 36.4% of the respondents with middle education and 11.7% with low education. Most of the respondents were born in the Netherlands (89.6%).

Table 2: Demographic data of respondents

Characteristic	**Subcategories**	**Frequency (N)**	**Percentage (%)**
Gender	Male	23	29.9
	Female	54	70.1
Age	16-19 years	1	1.3
	20-29 years	20	26.0
	30-39 years	7	9.1
	40-49 years	12	15.6
	50-59 years	29	37.7
	60-69 years	4	5.2
	70-79 years	3	3.9
	80-89 years	1	1.3
Degree	MAVO	9	11.7
	HAVO	5	6.5
	VWO (Atheneum/Gymnasium) or HBS	4	5.2
	MBO (MTS/UTS/MEAO)	19	24.7
	HBO (HTS/HEAO)	33	42.9

	Master	6	7.8
	Postdoctoral/doctoral candidate	1	1.3
Country of birth	Netherlands	69	89.6
	Other non-Western of Asian country	1	1.3
	I don't know	1	1.3
	Missing	6	7.8
Total respondents		77	100

Vaccination willingness

First of all, the relationship between age and willingness to vaccinate against COVID-19 was examined. This can be seen in Table 3 using the 3 different groups of willingness. Overall, most respondents indicated that they would like to be vaccinated against COVID-19. The largest number of respondents who have indicated that they do not want to be vaccinated are in the age category 50 till 59. Besides, it appears that the most uncertainty is in the age category 16-29.

Table 3: Vaccination willingness towards age

		Group 1 Unsure on whether to take the vaccine	Group 2 Will not take the vaccine	Group 3 Will take the vaccine	Total
Age	16-29 years	**5**	2	14	21
	30-49 years	4	3	12	19
	50-59 years	1	**5**	23	29
	60-89 years	0	0	8	8
Total		10	**10**	57	77

After that, the relationship between education and vaccination willingness was examined. This can be seen in Table 4. It turns out that most uncertainty occurs among people with middle or higher education. However, no real conclusions can be drawn from this as most respondents have middle or higher education and the majority of all levels have indicated that they do want to be vaccinated.

Table 4: Vaccination willingness towards education

		Group 1 Unsure on whether to take vaccine	Group 2 Will not take the vaccine	Group 3 Will take the vaccine	Total
Highest education attained	Lower	2	1	6	9
	Middle	4	5	**19**	28
	Higher	4	4	**32**	40
Total		10	10	57	77

Information sources

Information seeking behaviour

In order to better understand how citizens should be informed about COVID-19 and vaccines, several questions were asked about this in the questionnaire. The majority of the respondents actively search for information about the coronavirus once a week (31.2%), or "rarely" (29.9%).

32 (41.6%) of the respondents indicated that they use Facebook to gather information. This channel is the most used out of social media channels. Also, a large number of respondents, 31 (40.3%), indicated that they do not use social media but other channels. These are for example channels like: RIVM, NU.nl, Google and the website of the national government.

The relation between trust in information sources and vaccination willingness

Most respondents, 54 (70.2%) have little trust in social media sources. Sources of information that generally score high with regard to trust are: RIVM, VWS, WHO, national information number coronavirus and healthcare workers. Radio, television and newspapers score average (around 4 on scale 1-7) on trust.

When looking into the relation between trust in information sources and vaccination willingness, we can state that the highest significant positive correlation is present between the trust in the information source "National information number coronavirus" and the willingness to vaccinate (r=0.480; p=*.000;* N=71). All other values are lower. This means that there is a low to hardly any correlation between the trust placed in certain information sources and the willingness to vaccinate.

No significant relationship was found between the information sources used and the willingness to vaccinate.

Relationship between predictors and vaccination willingness

A one-way ANOVA was conducted to compare the 3 groups of willingness to the different constructs of the theoretical models (see Table 5). There was a statistically significant difference between all the groups except the subjective norm as determined by the one-way ANOVA.

Table 5: Analysis of willingness to take the SARS-CoV-2 Vaccine group differences (one-way ANOVA), N=77

Predictors	Group 1 Unsure on whether to take the vaccine	Group 2 Will not take the vaccine	Group 3 Will take the vaccine	F	p
	Mean (SD)	*Mean (SD)*	*Mean (SD)*		
Protection Motivation Theory & Health Belief Model					
Perceived susceptibility (1-5, 2 items)	3,30 (0,67)	3,80 (1,48)	2,87 (,78)	5,54	,006
Perceived severity (1-5, 2 items)	3,50 (,58)	4,15 (1,00)	3,23 (1,07)	3,47	,036
Perceived barrier - vaccine delivery (1-5, 8 items)	2,79 (,42)	4,24(,91)	2,70 (,49)	30,76	,000
Perceived barrier - trust (1-5, 2 items)	2,80 (1,03)	4,45 (0,96)	2,02 (0,61)	49,40	,000
Perceived barrier - safety (1-5, 2 items)	2,65 (0,85)	3,95 (1,28)	2,03 (0,59)	28,88	,000
Anticipated regret (1-5, 4 items)	3,25 (1,02)	1,45 (0,55)	4,19 (0,92)	40,45	,000

Perceived benefits (1-5, 6 items)	3,05 (0,69)	4,08 (0,69)	2,62 (0,48)	31,56	,000
Perceived vaccine knowledge (1-5, 1 item)	3,05 (0,69)	2,30 (1,57)	1,95 (0,80)	4,05	,022
Theory of Planned Behaviour					
Attitude (1-3, 3 items)	1,70 (0,42)	2,42 (0,58)	1,09 (0,25)	62,26	,000
Subjective norm (1-5, 4 items)	2,73 (0,65)	3,25 (0,93)	2,88 (0,58)	1,92	,154
Perceived behavioural control (1-5, 1 item)	2,20 (1,14)	2,90 (1,45)	1,71 (0,96)	5,72	,005

After that, a Bonferonni post hoc test (Appendix 3) was conducted to see between which groups there are significant differences. The post hoc test revealed that that people who perceive themselves as less susceptible *(p=,007)* to acquiring a COVID-19 infection and people who perceived the condition to be less severe *(p=,033)* were less willing to take a vaccine for COVID-19. In addition, people who perceive more barriers in terms of vaccine delivery *(p=,000)*, were less willing to take a vaccine for COVID-19. It appears that for people who perceived more trust *(p=,000) (p=,008)*, they were more willing to take a vaccine. Furthermore, people who perceive more safety *(p=,001) (p=,000)*, they were more willing to take a vaccine. The test also shows that people who experience less regret if something happened while they did not take the vaccine *(p=,000) (p=,010)*, were less willing to take a vaccine. When people experience more benefits *(p=,000)* from taking a vaccine, they are more willing to vaccinate. Also, when people perceive that they have enough knowledge *(p=,021)* about the safety of the vaccine to make an informed decision, are more willing to vaccinate than people who are still unsure about taking a vaccine. For attitude the test revealed that the willingness to vaccinate for COVID-19 was statistically significantly different between all the groups and shows that people with a more positive attitude towards vaccination are more willing to vaccinate *(p=,001)*. Finally, people who perceive a higher level of behavioural control *(p=,005)*, are more willing to vaccinate.

Conclusion and discussion

The aim of this study was to determine the factors involved in whether or not to take a vaccine and what information is needed and how this should be disseminated so that citizens can make an informed decision. First the sub-questions will be answered.

What are the factors, variables and predictors that make Dutch citizens more or less willing to engage in vaccine uptake?

The results show that there are many similarities between the Netherlands and other countries. When we look specifically at the vaccine, doubts about effectiveness and safety have been mentioned a lot in the literature. Fear of side effects is also an important factor. People who are willing to take a vaccine cite as a factor the continuation of normal life and protection of themselves and others. The data also shows that trust in the government is an important factor with regard to willingness to vaccinate. If we look at the characteristics of different groups, it appears that the willingness to vaccinate is higher in older people. Education level and income are also contributing factors with regard to the willingness. This means that when people have a higher income and are more educated, they are more willing to vaccinate.

How does the Dutch population receive (online) information about COVID-19 vaccines?

A large part of the respondents indicated that they use Facebook to obtain information about COVID-19. This channel was, by a large majority, the most often used. This is interesting as the literature states that using social media to gather information about COVID-19 and trust in it reduces vaccine willingness [23,24]. However, the questionnaire in this research shows that the majority of respondents do want to be vaccinated. This could also be because a large part of the respondents indicated that they use channels other than social media.

How reliable does the Dutch population consider various sources of information about COVID-19 vaccines?

Based on the results of our survey, it can be stated that in general, people place most trust in governmental agencies and health organizations, such as RIVM, VWS, WHO, national information number coronavirus and healthcare workers. Television, radio and newspapers score average with regard to trust. Social media channels are not trusted by most respondents.

(How) is the willingness to vaccinate among this target group related to the information sources used and the confidence placed in them?

Little or no correlation was found in this study between trust in information sources and the willingness to vaccinate.

How should the Dutch government inform their citizens in order to ensure they have the right information to make an informed decision regarding taking the SARS-CoV-2 vaccine?

The one-way ANOVA has shown that people who do not want to be vaccinated perceive a significantly lower risk of getting sick from COVID-19 than people who do want to be vaccinated. The same applies to the seriousness of contracting COVID-19. People who do not want to be vaccinated therefore generally experience less threat from COVID-19. It is striking that for the group that is still uncertain about taking a vaccine, they experience about as much barrier with regard to vaccine delivery as the group that definitely wants the vaccine. It would therefore be good to clearly discuss the possibilities with regard to where they can get the vaccine and by whom when citizens are informed. The group that does not want a vaccine also experiences significantly less trust and safety in the vaccine. What could be a solution for this is to refer to scientific studies and sources in messages related to vaccination for COVID-19. If the government or the source who disseminating messages makes this information more accessible or communicates in a more understandable language, it will probably come across better. The group that does not want a vaccine perceives significantly fewer benefits from taking a vaccine. What could be a solution for this is to better communicate the benefits that take place when more people are vaccinated. For example, now that we are a little further into this pandemic, reference could be made to positively impacted events that have occurred. The group that is uncertain about taking a vaccine indicates that they do not know enough to make an informed decision. It is striking that the group that says they do not want to take a vaccine, beliefs to know enough to be able to make an informed decision. With regard to the variables assessed as part of the Theory of Planned Behaviour, it is striking that the group that is uncertain about taking a vaccine has a more open and higher positive attitude towards the vaccine than the group that indicates that they do want a vaccine. Finally, the group that does not want a vaccine experiences lower perceived behavioural control from themselves with regards to whether or not to take a vaccine. A suggestion would be to emphasize in e.g., messages or campaigns that vaccination is a personal choice without social pressure since this is not often communicated very clear.

How should information be communicated to the public?

Since a large part of the respondents indicate that they sometimes obtain information about COVID-19 via Facebook, it is important to take this into account. The literature indicates that when someone is exposed a lot to fake news via social media, he or she experiences less and less resistance to actually believe it. In this study, the majority indicated that they do not trust Facebook (social media) as a source

for information about COVID-19, although this can indeed influence someone's opinion. Therefore, the next suggestion is to be careful with what is posted on Facebook by government agencies and (health)organizations and to mainly stick with scientific information or information from government agencies or (health)organizations. It would also be a suggestion to monitor what is being spread or what is going viral on Facebook so that the information provision can be better respond to it and that any incorrect information can be removed from Facebook. The campaign analysis shows that vaccine posters or short messages often do not cover enough content, so slightly longer messages are preferred with all the necessary information.

Strengths & limitations

This study only used quantitative data and not qualitative data. To measure people's real opinions and expressions, interviews would also have been useful. In addition, this sample mainly consisted of people who do want to take a vaccine, so there is little difference within the sample. This could make the results less generalizable. The same goes for different origins: most of the respondents come from the Netherlands. However, this survey was part of a bigger research project that included a more diverse target group.

Also, the questionnaire was quite long and consisted mainly of matrix questions which might have resulted in response bias. Meaning that respondents give random answers to be ready quickly. Moreover, respondents may have provided socially desirable answers as COVID-19 vaccinations can be a sensitive topic that can lead to discussion.

A strong point of this research is the combination of literature and quantitative data from a questionnaire. In this way the existing literature can be compared with newly obtained data and, if necessary, some support or explanation can be given from the literature. Another strong point of this study is the fact that several questions in the survey are taken from previous studies conducted by WHO and a study in the UK. Moreover, some of these questions cover the different constructs of the theoretical models.

Recommendations for further research

A recommendation for further research is to conduct interviews and look at non-verbal communication and expressions on certain messages. In this way, more insight is gained in real (objectified) opinions of people and not just a questionnaire which already consists of closed or scale questions. It would also be interesting to include more people who, for example, are anti-vaccine. The same goes for including more different cultures. In this way, it can be examined whether there is a possible relationship between

vaccination willingness and different cultures. Finally, an interesting finding of the current study is that people have little trust in social media, yet the majority use it, mainly Facebook, as a source of information. Moreover, it appears from the literature that high exposure to negative content on social media can lead to a decrease in vaccination willingness. These relationships could be further explored through, for example, experimental research.

Conclusion

Vaccination willingness is higher among people who perceive more trust, safety, benefits, knowledge, a positive attitude and behavioural control. Vaccination willingness is lower among people who perceived the condition to be less severe, who perceive more barriers and who perceive less regret. Moreover, it appears that people with a higher income and a higher education show more willingness to vaccinate. When there is a lot of trust in the government, people are more willing to vaccinate. It also appears that young people often still have doubts about taking a vaccine.

In summary, the factors related to vaccination willingness are mainly: trust in the vaccine, safety, perceived benefits, perceived knowledge, attitude, perceived behavioural control, perceived severity, perceived barriers, anticipated regret, level of education and income, age, trust in government and information sources.

Although the majority of the respondents indicate that they do not trust Facebook as a source of information for COVID-19, it is still often used for information purposes with regard to COVID-19. Government sites and (health)organization sources are experienced as reliable. It can therefore be concluded that government agencies or (health)organizations could communicate more via Facebook. Moreover, when trust is gained in the government, vaccine willingness will likely to increase. However, a few aspects must be taken into account which also applies to other messages/campaigns:

- Discuss the possibilities with regard to where they can get the vaccine and by whom when citizens are informed
- Refer to scientific studies and sources in messages related to vaccination for COVID-19 or translate it into understandable language and present at an appropriate time.
- Better communicate the benefits that take place when more people are vaccinated
- Emphasize in e.g., messages or campaigns that vaccination is a personal choice without social pressure since this is not often communicated very clear.

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Appendix

1. Analysis of campaigns

Countries	Campaign content	Publication date	Evaluation	Source	Target audience	Original channel	Empirical campaign	Persuasive campaign	Comments
The Netherlands	It's your choice, so make sure you are well informed Your body makes antibodies Vaccine safety is paramount Rapid vaccine development isn't compromising safety More than one suitable vaccine Vaccination makes it harder for the virus to spread Vaccination is voluntary	02-02-2021		Government of the Netherlands	General public	Government of the Netherlands website	It gives information on the development of vaccines, side effects, why and how everyone should be vaccinated		
	There is a new way to fight corona virus It is called a vaccine. And it stops you getting very sick. You can choose whether you want the injection or not. If more people get the injections, things will get safer for everyone.	10-02-2021		Government of the Netherlands	People with an intellectual disability of early-stage dementia	Government of the Netherlands website	Information on corona vaccination written in simple language and explains that vaccinating is an individual choice		
	Vaccination againsts corona Vaccination protects Vaccination is safety								

	One person is vaccinated very 0.4 seconds Vaccination is the most important step towards getting life back to normal.	Updated on 20-04-2021		Government of the Netherlands	General public	Government of the Netherlands website	Provides actual data and facts about the Dutch vaccination situation		Rather than a campaign, it's an official website with all vaccine related information. It also includes data on the willingness to be vaccinated
	To protect yourself and ultimately the people around you against the corona virus, vaccination is the most important step. So let's roll up our sleeves. If we get vaccinated, we regain more freedom step by step. Every approved vaccine has been tested on tens of thousands of people. This way we know that it is well protected and safe for us.	04-01-2021	Likes (97) Dislikes (224)	Ministry of Public Health, Well-being and Sports	General public	Youtube video published by Ministry of Public Health, Well-being and Sports		Displays (children)sporters, elderly and mentally-ill patients on wheelchairs and middle age woman	Looks like the campaign targets women since it revolved around 1 woman, but a man getting vaccination was also shown

	Hassan Barzizaoua, arabist and board member of the Taqwa Culemborg mosque: "A vaccine does not contain any nutrients, so vaccination will not break the fast."	07-04-2021	Likes (19 Dislikes (28)	Ministry of Public Health, Well-being and Sports	Muslim people who are planning to fast during Ramadan	Youtube video published by Ministry of Public Health, Well-being and Sports	x	A board member of a mosque convinces Muslims to take the corona vaccinations during Ramadan by explaining that it is not against the religion	
	Show that you roll up your sleeve too! To protect yourself and ultimately the people around you against the corona virus, vaccination is the most important step. Do you want to get vaccinated when it is your turn, or have you already been vaccinated? Let others know. Create your own "I'll roll up my sleeve" poster here. Print it or share it on your social media pages with #IkStroopMijnMouwOp			Government of the Netherlands	General public	Government of the Netherlands website		To convince others to be vaccinated, this website allows everyone with internet connection to make their own campaign poster	
Singapore	Protect yourself and your loved ones "The more of us are vaccinated, the harder it will be for the virus to spread, and the safer we will all be as a society" - Prime minister Lee Hsien Loong To protect yourself and your loved ones, including those who cannot be vaccinated due to medical reasons, you are strongly encouraged to be vaccinated. Vaccination can prevent disease and	Brochure date unavailable, but website updated on 31st March 2021		Ministry of Health	General public	Ministry of Health website	x	x	

	minimise transmission, enable us to resumes more safely, prevent our healthcaresystem from being overwhelmed The vaccination is safe								
Germany	Will there be a legal vaccination requirement? No, it is not obligatory	04-02-2021		Die Bundesregierung The federal government	General public	The federal government website	x		The other slides of the brochure tries to educate people what are the myths and facts about the corona vaccine
World wide	Let's #ACTogether for #VaccinEquity	18-01-2021		WHO	General public who wants to support the action or companies	Posters, article			This message states that we must continue to push for vaccines to be both equita

									bly distrib uted and equita bly produ ced.
Engla nd	After clean water, vaccination is the most effective public health intervention in the world for saving lives and promoting good health	Updat ed: 11-02-2021		Public Health England	Gener al public	Poster	No referen ce to studies and don't states that it's a person al choice	Yes	
	Vaccine approved - Save - Effective Vaccines are only made available to the public after meeting strict safety and effectiveness criteria	Updat ed: 11-02-2021		Public Health England	Gener al public	Poster	No referen ce to studies and don't states that it's a person al choice. Effecti veness is clearly stated	Yes	
	Having a heart disease, the Covid-19 vaccine is the best way to protect yourself from the virus	16-03-2021		Public Health England	Particu larly for people with long term health conditi on	Poster	No referen ce to studies and don't states that it's a person al choice. Effecti veness is clearly stated	Yes	

Europe	Vaccines are our best chance to put an end to the COVID-19 pandemic. The European commission is building one of the broadest portfolios of different vaccines that are safe, effective and affordable	March 2021		EC Europe	General public	Flyer, brochure	Yes and clearly states that vaccination is voluntary	No	
USA	Once you are fully vaccinated, you can start doing more COVID-19 vaccination will help keep you from getting COVID-19 COVID-19 vaccination is a safer way to help build protection COVID-19 vaccination will be an important tool to help stop the pandemic COVID-19 vaccines are safe and effective None of the COVID-19 vaccines can make you sick with COVID-19	Updated: 12-04-2021		CDC USA	General public	Article	Yes but not clearly that's a personal choice	Yes	
	How to talk to your patients about COVID-19 vaccination 1. Start from a place of empathy and understanding. 2. Assume patients will want to be vaccinated but may not know where to get a vaccine or how to find an appointment. 3. Give your strong recommendation. 4. Listen and respond to patient questions. 5. Wrap up the conversation.	Updated: 05-04-2021		CDC USA	Health care professionals	Article	Yes	Yes	

2. Posters


PROTECT YOURSELF AND YOUR LOVED ONES


NHS
After clean water, vaccination is the most effective public health intervention.


Wij stropen onze mouw op
alleen samen krijgen we corona onder controle


NHS
Having heart disease, the Covid-19 vaccine is the best way to protect yourself from the virus.
- Zena


Wird es eine gesetzliche Impfpflicht geben?
NEIN
Es wird keine Impfpflicht geben!


Rijksoverheid
22 januari 2021
Prik tegen corona
Er is een nieuw middel tegen corona gemaakt.
Dit heet een vaccin. En het beschermt je tegen de ziekte.
Het vaccin is veilig. Het is heel goed getest.
2×
Je krijgt een prik in je bovenarm. Na een paar weken krijg je nog een prik.
Het kan dat je een beetje pijn van de prik hebt. Je kan spierpijn of koorts krijgen.
Praat met je familie, een begeleider of een dokter als je je na de prik niet lekker voelt.
Je krijgt een uitnodiging als jij de prik kunt halen.
De prik krijg je van een dokter of zuster.
Je mag zelf kiezen of je de prik neemt of niet.
Als meer mensen de prik nemen, wordt het veiliger voor iedereen.
Na de prik moet je je nog wel steeds aan de regels houden.
Als je je ziek voelt, laat je dan testen.
alleen samen krijgen we corona onder controle
Kijk ook op corona.steffie.nl/vaccinatie

3. Bonferroni post hoc test

Multiple Comparisons

TestBonferroni

Dependent Variable	(I) Willingness	(J) Willingness	Mean Difference (I–J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Per_Sus_HBM	1,00	2,00	-,50000	,39140	,616	-1,4588	,4588
		3,00	,44912	,30006	,416	-,2859	1,1842
	2,00	1,00	,50000	,39140	,616	-,4588	1,4588
		3,00	,94912*	,30006	,007	,2141	1,6842
	3,00	1,00	-,44912	,30006	,416	-1,1842	,2859
		2,00	-,94912*	,30006	,007	-1,6842	-,2141
Per_Sev_HBM	1,00	2,00	-,65000	,45642	,476	-1,7681	,4681
		3,00	,26316	,34990	1,000	-,5940	1,1203
	2,00	1,00	,65000	,45642	,476	-,4681	1,7681
		3,00	,91316*	,34990	,033	,0560	1,7703
	3,00	1,00	-,26316	,34990	1,000	-1,1203	,5940
		2,00	-,91316*	,34990	,033	-1,7703	-,0560
Per_BarVD_HBM	1,00	2,00	-1,44861*	,25110	,000	-2,0645	-,8327
		3,00	,08843	,18814	1,000	-,3731	,5499
	2,00	1,00	1,44861*	,25110	,000	,8327	2,0645
		3,00	1,53704*	,19676	,000	1,0544	2,0197
	3,00	1,00	-,08843	,18814	1,000	-,5499	,3731
		2,00	-1,53704*	,19676	,000	-2,0197	-1,0544
Atti_TPB	1,00	2,00	-,71296*	,16002	,000	-1,1064	-,3195
		3,00	,61037*	,11925	,000	,3172	,9035
	2,00	1,00	,71296*	,16002	,000	,3195	1,1064
		3,00	1,32333*	,12540	,000	1,0150	1,6316
	3,00	1,00	-,61037*	,11925	,000	-,9035	-,3172
		2,00	-1,32333*	,12540	,000	-1,6316	-1,0150
SubN_TPB	1,00	2,00	-,52500	,27828	,190	-1,2069	,1569
		3,00	-,17679	,21362	1,000	-,7002	,3467
	2,00	1,00	,52500	,27828	,190	-,1569	1,2069
		3,00	,34821	,21362	,322	-,1752	,8717
	3,00	1,00	,17679	,21362	1,000	-,3467	,7002
		2,00	-,34821	,21362	,322	-,8717	,1752
PerBC_TPB	1,00	2,00	-,70000	,47079	,424	-1,8533	,4533

		3,00	,48070	,36092	,561	-,4034	1,3648
	2,00	1,00	,70000	,47079	,424	-,4533	1,8533
		3,00	1,18070*	,36092	,005	,2966	2,0648
	3,00	1,00	-,48070	,36092	,561	-1,3648	,4034
		2,00	-1,18070*	,36092	,005	-2,0648	-,2966
PerBarTrust_HBM	1,00	2,00	-1,65000*	,32272	,000	-2,4405	-,8595
		3,00	,77368*	,24741	,008	,1676	1,3797
	2,00	1,00	1,65000*	,32272	,000	,8595	2,4405
		3,00	2,42368*	,24741	,000	1,8176	3,0297
	3,00	1,00	-,77368*	,24741	,008	-1,3797	-,1676
		2,00	-2,42368*	,24741	,000	-3,0297	-1,8176
PerBarSaf_HBM	1,00	2,00	-1,30000*	,33361	,001	-2,1172	-,4828
		3,00	,61491	,25576	,056	-,0116	1,2414
	2,00	1,00	1,30000*	,33361	,001	,4828	2,1172
		3,00	1,91491*	,25576	,000	1,2884	2,5414
	3,00	1,00	-,61491	,25576	,056	-1,2414	,0116
		2,00	-1,91491*	,25576	,000	-2,5414	-1,2884
AntiReg_HBM	1,00	2,00	1,80000*	,39974	,000	,8188	2,7812
		3,00	-,93627*	,30913	,010	-1,6951	-,1775
	2,00	1,00	-1,80000*	,39974	,000	-2,7812	-,8188
		3,00	-2,73627*	,30913	,000	-3,4951	-1,9775
	3,00	1,00	,93627*	,30913	,010	,1775	1,6951
		2,00	2,73627*	,30913	,000	1,9775	3,4951
Per_Ben_HBM	1,00	2,00	-1,03333*	,24176	,000	-1,6259	-,4407
		3,00	,42879	,18585	,072	-,0268	,8843
	2,00	1,00	1,03333*	,24176	,000	,4407	1,6259
		3,00	1,46212*	,18585	,000	1,0066	1,9177
	3,00	1,00	-,42879	,18585	,072	-,8843	,0268
		2,00	-1,46212*	,18585	,000	-1,9177	-1,0066
Vac_Know_HBM	1,00	2,00	,60000	,44671	,550	-,4950	1,6950
		3,00	,95455*	,34338	,021	,1128	1,7963
	2,00	1,00	-,60000	,44671	,550	-1,6950	,4950
		3,00	,35455	,34338	,916	-,4872	1,1963
	3,00	1,00	-,95455*	,34338	,021	-1,7963	-,1128
		2,00	-,35455	,34338	,916	-1,1963	,4872

*. The mean difference is significant at the 0.05 level.