MASTER THESIS SOCIAL PSYCHOLOGY

Universiteit Utrecht

WHO SHOULD TELL YOU TO VACCINATE?

THE ROLE OF THE *PROVIDER OF INFORMATION* IN THE *ATTITUDE TOWARDS THE CORONA VACCINE*: *NEED FOR CONFORMITY* AS A MODERATOR?

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Publicly accessible

Abstract

In order to control the current Corona pandemic, the Dutch population will have to get vaccinated. New attitudes towards the Corona vaccine will originate, this study focussed on influencing those attitudes. The current research attempts to prove the importance of the 'provider of information', examining whether people form a more positive 'attitude towards the Corona vaccine' after receiving information from someone of close social proximity versus someone of distant social proximity. In addition, it was tested whether the extent to which someone has the 'Need for Conformity' (NfC) plays a role in this. The 'provider of information' was determined by means of a manipulation text that randomly assigned the sample into two conditions (friend/family vs. RIVM). Expected was that the participants in the friend/family condition would have a more positive attitude towards the Corona vaccine than the participants in the RIVM condition. Also, it was expected that the reported 'NfC' would positively affect the reported 'attitude towards the Corona vaccine'. In addition, a moderating effect of 'NfC' on the effect of 'provider of information' on 'attitude towards the Corona vaccine' was expected, the higher the 'NfC', the stronger the effect of the 'provider of information'. All hypotheses were rejected in the current study. However, 'trust in government agencies' and 'political orientation' emerged as significant covariates in the model. In addition, several significant correlations were found and there are a number of exploratory findings. Implications for further research are discussed.

Introduction

The year of 2020 has been through a lot since the start. A Pandemic of the Coronavirus (Covid-19) is currently causing a lot of commotion worldwide. Currently (16th of August) there are a total of more than 22 million Corona cases which caused more than 780 thousand deaths worldwide (Worldometers, 2020). The pandemic caused the urgency of a partial to complete lockdown for most countries worldwide, which not only results in logistic difficulties but also a lot of social, economic and personal challenges. Although there appears to be a stabilization of the situation, it seems that there is no end in sight in the short term, a second wave of the pandemic is expected. Development of vaccination is seen as the solution, but it takes time and a lot of research, to be completed (RIVM, 2020). In the Netherlands, most vaccines are given from infancy, so the choice is up to the parents (Rijksvaccinatieprogramma, 2020). As an adult you do not have to necessarily actively form opinions about the subject, only when becoming a parent yourself. Because the Corona vaccine will be ready within a short period of time, the Dutch population will be expected to make a choice whether or not to take up on it. This means that the discussion about whether to vaccinate or not will be rekindled and is made extra relevant again.

Although vaccination is proven to be beneficial for the general health, the immunization coverage in the Netherlands is decreasing over the last few years (Olthuis & Hanssen, 2018). There are many reasons and motives to consider whether to vaccinate or not. For instance, accessibility of vaccination (Fu, Cowan, McLaren, Engstrom, & Teach, 2009) or personal health issues (Nichol, 1991). In addition, are socio-economic factors like income and educational level proven to be of impact on the vaccination rate. As well as both political and religious conservatism are connected to lower willingness to vaccinate (Baumgaertner, Carlisle, & Justwan, 2018). Given that in this study, from a social psychology perspective, there is interest in possibly exerting social influence, there will be a focus on the changeable, like attitudes.

Attitudes form and change individually, for instance by personal experience. However, attitudes can also form and change on a larger scale, like within a social group or a whole population (Maio, Haddock, & Verplanken, 2018). Although the average consensus in the western world is still pro-vaccination, the popularity of anti-vaxx movements and conspiracy movements increases (Dube, Vivion, & MacDonald, 2015; Hotez, 2019). Also, research by

Chapman and Coups (2006) found that people who chose not to vaccinate, reported to have a sense of security in the fact that most diseases against which one has to be vaccinated do not or hardly occur, for there is no need to get vaccinated. The fact that this exists only through the presence of herd immunity seems to be ignored therein (Parker, Vardavas, Marcum, & Gidengil, 2013). The vaccination rate has to be at least 95% to achieve herd immunity, individuals who take this for granted are therefore a threat to public health (Sadaf, Richards, Glanz, Salmon, & Omer, 2013).

For it is the purpose of vaccination to achieve and maintain herd immunity, it is important to achieve the highest vaccination rate possible, this is also the case with the Corona vaccine. Given the unique circumstances of the current pandemic and the development of a new vaccine, an 'attitude towards the new Corona vaccine' should be formed by the population of the Netherlands. The goal of the current research is to contribute to the knowledge about influencing attitudes towards vaccination, in this case specifically the attitude towards the Corona vaccine. This is done by researching how information should be provided and how other factors might play a role.

Provider of information

Previous research searched for effective ways of distributing information, to increase vaccination rates. In spreading anti-vaccination information, the internet plays a large role, anti-vaxers oppose the scientific medical facts in favour of their own interpretations. This is not only encountered when searched for but is also widely shared on media such as twitter, facebook and forums (Kata, 2010). People who lack information are more susceptible to this misinformation (Van der Meer & Jin, 2020). Exposure to a certain type of information is proven to be linked to expression of a certain opinion. Dunn, Leask, Zhou, Mandl, and Coiera (2015) found that among users that tweeted about HPV *(Human papillomavirus)* vaccines, those who were more often exposed to negative opinions were more likely to subsequently post negative opinions. But the other way around, with positive information, the effect was less strong. Only online exposure does not seem sufficient enough for positive attitude change, and misinformation seems to be predominant. In research examining the effect of distributing pamphlets and information leaflets

on vaccination in waiting rooms of general practitioners, there was only a marginal effect on the attitude towards vaccination among the visitors (Jungbauer-Gans & Kriwy, 2003). In addition to research in the method of distribution, extensive research has also been conducted into the content of the information about vaccination.

An intervention by Nyhan, Reifler, Richey, and Freed (2014) showed images of sick children to parents to illustrate the consequences of not vaccinating children, these showed no significant effect to increase the vaccination rate. In fact, the images increased belief in a vaccine-autism link and an increased self-reported belief in serious vaccine side-effects. In addition, research by Paulussen and colleagues (2006) they found that Dutch parents believe that doctors only inform them on the benefits of vaccinating their children and disregard possible drawbacks. They concluded that information, when provided, should be complete with advantages and disadvantages, enabling parents to make a deliberate choice. This suggests that correcting myths about vaccines may not be an effective approach to promoting immunization and even reduce the intent to vaccinate or get vaccinated. (Nyhan & Reifler, 2015; Nyhan, Reifler, Richey, & Freed, 2014). On the other hand, it has also been shown that information from prominent persons in the medical professional field does positively influence the public opinion (Jacobs & Mettler, 2011). For instance, in research by Jungbauer-Gans and Kriwy (2003) there appeared to be great value in the attitudes that General Practitioners (GPs) themselves have and shared with their patients. This suggests that acceptance of the content of information on vaccination might also depend on the provider.

In a study about adopting attitudes by Egebark and Ekström (2011) suggests that the likes below a facebook-message has an effect on the reading and liking behaviour of the recipient. Three conditions were set up, one in which one unknown person liked the message, one being liked by several unknown persons and one liked by one well-known (to the recipient) person. Only the latter two had a significant positive effect on the recipients behaviour. The condition in which several unknown people liked the post can be explained by the Social Identity Theory (SIT), individuals feel the need to belong to a group (Tajfel, Turner, Austin, & Worchel, 1979). The condition in which only one well-known person liked is, could also be explained by the SIT, people like to behave in accordance with others who are of close social proximity (Tajfel,

Turner, Austin, & Worchel, 1979). In addition, people are more likely to follow advice on vaccination from family/friends than they would with government advice. An even greater effect can be achieved when provided by a medical professional (Zijtregtop, et al.,2009). Preferably their own GP for that they are most trusted and familiar (Freed, Clark, Butchart, Singer, & Davis, 2011). According to the SIT, one takes on part of the personality of the people of close social proximity, like friends, family, roommates or close colleagues (Urberg, Değirmencioğlu, & Pilgrim, 1997).

Thus, the 'provider of information' appears to have a significant influence on the attitude formation towards vaccination. People are more likely to adopt behavior or an attitude from someone who is of close social proximity. In this research, it will be further investigated whether this can also have a positive effect on influencing attitudes towards the Corona vaccine. The following hypothesis has emerged based on the aforementioned literature; '*Expected is that a provider with close social proximity has a more positive effect versus a provider with a distant social proximity on the attitude towards the Corona vaccine of the recipient*'.

This tendency to adopt behavior and attitudes of those who are of close social proximity is described by the SIT, this also describes the need to conform. It explains that people have such a great need to belong to a social group that they need to conform to the consensus of those around them, in order to maintain participation within 'the group'. This need for conforming to others, leads to changes in attitudes (Stueckemann, 2019).

Need for conformity

The term 'conformity' includes the act of matching attitudes, beliefs, and behaviors to group norms, politics or being like minded (Cialdini & Goldstein, 2004). The extent to which 'need for conformity' versus the 'need for uniqueness' is present in an individual varies per person (Cialdini & Goldstein, 2004; Liang & He, 2012). People with a high 'Need for Conformity' (NfC) have a high need for behaving and thinking like the group would do. This, because one does not want to stand out but rather fit in with the group (Cialdini, 2007). Research from Attwell, Smith, and Ward (2018) applied insight from the SIT to research thought formation of vaccine-rejecting parents. They show that these parents protect their self-concept and maintain a

sense of identity by employing a discourse that casts vaccinators as an unhealthy other, *the outgroup.* Research by Korn, Böhm, Meier, and Betsch (2020) showed that vaccination, in terms of the SIT, works as a social contract. When the social group, with which one identifies, predominantly is pro-vaccination, there is an implicit and explicit reported pressure to get vaccinated as well.

Also, research states that the level of 'NfC' has a positive correlation with adopting the attitude of others (Anderson, Tomlinson, Robinson, & Brown, 2011; Doeze Jager-van Vliet, Born, & Van der Molen, 2017). Individuals with a high 'NfC' are more likely to adopt the attitude of others than individuals with a low 'NfC'. In short, the level of 'NfC' means the extent to need to share and thus conform. to opinions with others. Thus, people with a high 'NfC' seem more susceptible to the attitudes of others. It has been proven that the level of 'NfC' has a stronger effect on behavior and attitude in cases where the other was someone of close social proximity (Egebark & Ekström, 2011). Therefore, it is important to have a consensus of positive 'attitudes towards vaccination' within social groups. When these turn negative, people with a high 'NfC' would presumably adopt these attitudes. Research even states that 'capitalizing on our innate compunction to conform, is perhaps the single most effective way to change social behaviours' (Goetz, 2014).

In case of the Corona vaccine, new attitudes are formed. In the current study, this would demonstrate the importance of the social proximity of the 'provider of information' in case of influencing attitudes towards the Corona vaccine, because the 'NfC' reinforces this effect. This leads to the second hypothesis; *'There is an expected moderating effect of the level of 'NfC' present in the recipient on the effect of 'provider of information' on 'attitude towards the Corona vaccine. The higher the level of 'NfC' present in the recipient, the stronger the positive effect of the providers' close social proximity on the attitude towards the Corona vaccine'.*

Finally, in addition to the expected moderating effect, it can also be expected, based on aforementioned theory, that 'NfC' has a positive main effect on the 'attitude to the Corona vaccine'. As mentioned earlier, high levels of 'NfC' have been correlated with faster attitude acquisition and behavioral change. The general consensus in the Netherlands is predominantly positive about vaccination. It is therefore expected that people with a high 'NfC' in both

conditions (distant social proximity vs. close social proximity) will have predominantly a more positive attitude towards Corona vaccine, than the participants with a low reported 'NfC'. This leads to the last hypothesis; *'Expected is that the level of reported need for conformity in the recipient, has a positive effect on the attitude towards the Corona vaccine of the recipient'.*

Current research

The current research attempts to prove the importance of the 'provider of information', examining whether people form a more positive 'attitude towards the Corona vaccine' after receiving information from someone of close social proximity versus someone of distant social proximity. In addition, it was tested whether the extent to which someone has a 'NfC' plays a role in this. This to add to the science that is already provided by previous research on the content and distribution of information on vaccination.

For the manipulation of 'provider of information' it is therefore important that there is a 'close social proximity condition' and a 'distant social proximity condition'. Research has shown that people respond positively to vaccination information from their own GP. However, a personal relationship with the GP is built up over years and varies from person to person. It will therefore be difficult to manipulate this personal bond by means of a one-time manipulation text. Therefore, for current research it has been chosen to apply a manipulation of which it can be assumed that there is a certain near vs distant social proximity in the population; family/friend versus government agency as suggested in research by Zijtregtop and colleagues (2009).

If the current research does indeed show that the 'provider of information' has an influence on the 'attitude towards the Corona vaccine', this can be taken into account in the development of future interventions to increase the vaccination rate. With the manipulation and moderating effect of 'NfC', this research attempts to prove that specifically the social proximity of the provider affects the recipient. Also, when the 'NfC' appears to have a positive effect on the 'attitude towards the Corona vaccine', this would provide additional substantiation that 'NfC' plays a substantial role in influencing attitudes towards (the Corona) vaccine and might even influence other health choices.

Method

Participants

Overall 192 respondents participated in the research, due to a couple of incomplete surveys thirteen respondents were deleted from the results. These respondents stopped the survey at various points in the survey, a particular cause is therefore not expected. The remaining sample consisted of 179 individuals, age 18 to 71 ($M = 34.70$, $SD = 14.27$). 48 men and 131 women participated in the research. The sample size is determined by doing a power analysis using G*Power Version 3.1.9.6 (2020 updated version) based on the assumption of a regression analysis (Green, 1991). This given, the total required sample size should consist of at least 77 participants ($f^2 \geq 0,15$, $\alpha = 0,05$). Participants were recruited by means of a convenience sample. The researchers social network and the website for test subjects of the University of Utrecht (*SonaSystem*) were used.

Design

A survey based experimental design was developed to measure the effect of 'provider of information' on the individuals' 'attitude towards the Corona vaccine' and to what extent their level of 'NfC' has a moderating effect on this. Also a main effect of 'NfC' on 'attitude towards the Corona vaccine' was tested. The experiment consisted of a 2 (Provider of info: distant social proximity vs. close social proximity) x 1 (Need for Conformity: continuous variable) design. The participants got to read a text in which the 'provider of information' was manipulated.

Instruments and Procedure

Hence the questionnaire was conducted via an online survey in Qualtrics XM, the participants could participate from their own home. Through an anonymous link the survey was distributed. By clicking the link, the participants were led to the informed consent they had to accept before they could continue with the questionnaire.

When accepted, the participants were asked some demographic questions; 'age', 'gender' and highest 'educational level' in which they graduated/participated. The options for age were

restricted to being at least 18 years old, this because the participants needed to be at least 18 years of age to be relevant in the research. De research examines assumptions on a subject (vaccination) in which choices are made by parents/caretakers to the age of 18. Therefore, individuals who attempted to enter a lower age were automatically removed from the survey. For 'educational level' the participants got six options to choose from ascending from 'high school' to 'PhD/Post Doc', with an seventh option 'other' where the participant could type their educational level if it was not listed in the options given. In the analysis these answers were assigned to the level that most resembled the specified options for 'level of education'. Then, the participants were asked to rank their 'political orientation' on a scale varying from left (minimum score 0) oriented to right oriented (maximum score 100). The respondents answered using a slider.

On the next page of the survey the participants got to read the manipulation text (see Appendix 1) in which the 'provider of information' was manipulated. The fictional text suggested a situational sketch in which the participants were informed on the new Corona vaccine. The text states that the vaccine has been extensively tested and closely resembles other flu vaccines. Which made it possible to rule out unintended side effects in the short and long term. Both narratives contained information based on medical information, as this appears to be a precondition of vaccination information (Paulussen, et al., 2006). The participants were randomly assigned to the 'RIVM provider of information manipulation' ($n = 88$, 25 male and 63 female) or the 'friends/family provider of information manipulation'($n = 91$, 23 male and 68 female). In both manipulations the 'provider of information' concluded that they would recommend taking up the corona vaccine in the future.

After reading the manipulation the participants were asked to rate eight statements (see appendix 2), concerning their 'attitude towards the Corona vaccine', on a 5-point likert scale ascending from "totally do not agree" to "totally agree". The questionnaire was developed for this particular research. The statements were based on questions and statements from other studies in which they examined attitudes and opinions about other vaccinations. Research of Opel and colleagues (2011) inspired the statements; "I am concerned about the possible side effects of the Corona vaccine" and "I rely on the information provided on the Corona vaccine".

The other six statements were based on topics and questions that recur in various studies (Larson, et al., 2015). The seventh statement "I am concerned about the possible side effects of the Corona vaccine" was formulated negatively while the others are formulated positively. This was to increase the participants' attention. In the data-analysis the value on this statement will be inverted. The eight items for measuring the 'attitude towards the Corona vaccine' were combined into one average score. Cronbach's alpha for the 8-item 'attitude towards the Corona vaccine' scale was $\alpha = .95$. This is considered as excellent for research purposes. Cronbach's alpha would increase with .01. if item 'I am concerned about the possible side-effects of the Corona vaccine' was deleted. Since this is only a small improvement and there are no other reasons to suspect the statement to be ambiguous, it was decided to preserve the item. However, when checking for the inter-item correlations, it appeared that the correlations varied from $\alpha = .47$ to $\alpha = .82$, which is higher than desired (Piedmont, 2014). Unfortunately, an existing scale to measure the 'attitude towards the Corona vaccine' was not found and a test for convergent validity between the two scales was not possible.

After rating these statements, there were two more questions to be answered about vaccination. The first one being if the participant to his/her knowledge is vaccinated with all the vaccinations available in the Dutch vaccination program, the options were 'none', 'some of them', 'all of them' or 'other, namely…'. The second question is about whether they would or would not actually intend to get the Corona vaccine when it will be available, and why they would or would not. These two questions were added not to test the hypotheses but for exploratory purposes. Since the question had an exploratory purpose it is an open question, the participants can give any answer, motive or reason they feel giving.

The following eight statements moved on to the next topic. To measure the 'NfC' the eight-item scale by Hayes, Glynn, and Shanahan (2005) was used (see appendix 3). Again the statements would be rated on a 5-point likert scale ascending from "totally do not agree" to "totally agree". To increase the participants attention, the fourth and eighth question were formulated positively while the others were formulated negatively. During data-analysis these values were inverted. The eight items for measuring the 'NfC' have been combined to one average score. Cronbach's alpha for the 8-item 'NfC' scale was $\alpha = .83$. This is considered as

good for research purposes. The Cronbach's alpha would not increase if any items would be removed.

Finally, the participants were asked to rate their 'trust in government agencies'. Participants could give their answer on a slider, on the left was stated "no trust" (minimum score 0) on the right "a lot of trust"(maximum score 100). This question was added not to test the hypotheses but for exploratory purposes.

Right before the end, students of University Utrecht had a chance to fill in their student number so they could receive course credit. When the participants finished the survey they were shown a text of which they were asked to read carefully before closing the survey. This text serves as a debriefing and a word of thanks for the participant and shows the researcher's email address one last time for any questions. A debriefing was needed because of the use of a manipulation text, in which information was provided which was made up in favor of the current research.

Analysis

In order to estimate the effect of the 'provider of information' (by manipulation text) on the 'attitude towards the Corona vaccine' and the moderating and main effect of 'NfC' on this, a PROCESS analysis v3.0 was conducted using SPSS (SPSS Inc. (2005). *SPSS Base 14.0 user's guide*. Prentice Hall). Descriptives were determined by means of descriptive tables and frequency tables, bivariate correlations and *t* tests were also used to analyse correlations between the other variables. In addition, a qualitative analysis for the answers to the question whether the participants would get vaccinated or not was conducted. This can be found in Table 3.1 and 3.2 (appendix 4). The answers were coded by shared motives, answers sometimes reported multiple motives and were therefore coded multiple times. Finally, additional analysis was conducted, a PROCESS analysis v3.0 was conducted using SPSS (SPSS Inc. (2005). With the 'provider of information' as the predictor, 'attitude towards the vaccination' as outcome variable, and 'trust in government agencies' as moderator.

Descriptives

Mean scores, standard deviations and correlations between the continuous variables are listed in Table 1. Prior to calculating the Coefficients (*r*), the assumptions of normality, linearity, and homoscedasticity were assessed. All variables were roughly normally distributed in the histograms but the Shapiro-Wilk coefficients all scored a significant difference (*p* < .001). Therefore the 0-hypothesis for normality for the scale 'NfC' and the scale of 'attitude towards the Corona vaccine' should be rejected. Since the sample size is larger than 30, according to the central limit theorem, it can be assumed that this is not a problem for the analysis (Field, 2013). But, because linearity and/or homoscedasticity can not be met, it is chosen to perform Kendall's tau-b correlation analysis.

Table 1
Means, standard deviations and Kendall's tau-b correlations between variables (n = 179)

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.
1.Age	34.70	1.07						
2.Educational level	3.50	.09	-.16**					
3.Political orientation	38.03	1.88	.03	-.14*				
4.Trust in government agencies	63.22	1.71	-.14**	.11*	-.04			
5.Attitude towards the Corona vaccine	3.45	.07	-.19**	.17**	-.18**	.38**		
6.Need for Conformity	2.48	.05	-.13*	-.02	.05	.01	.01	

Note. **Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

To the question 'Did you receive all / some of the / none of the vaccinations available in the Dutch vaccination programme?' None of the participants answered they received no vaccinations

at all, 23 received most of them and the majority 156 received all vaccinations available to their knowledge.

Also, to the question whether to vaccinate or not to vaccinate against Corona, the majority of 128 (72%) participants answered that they would indeed get vaccinated. The three most important motives were 'social duty / herd immunity' (18%), 'Does not want to get sick' (19,5%) and 'trust in vaccination, science and organizations' (17,2%). A minority of 51 participants (28%) said that they would not get vaccinated if the Corona vaccine would become available. The three main reasons were mentioned were 'Too little information available' (22%), 'Developed too fast' (22%) and 'long term side-effects' (28%). Which are all in the subscale 'Lack of information', for more information and a summary of all reasons given, see Table 3.1 and Table 3.2 (Appendix 4).

Table 2.1
Sample Descriptives using t test for Equality of Means, 'Yes, I would get vaccinated' versus 'No, I Would not get vaccinated' (df = 177)

Variable	Yes, I would get vaccinated (*n* = 128)		No, I would not get vaccinated (*n* = 51)				
	M	*SD*	*M*	*SD*	*t*(177)	95% CI	*d*
Age	33.10	14.11	38.75	14.00	-2.43*	[-10.26, -1.06]	-.39
Educational level	3.64	1.20	3.14	1.32	2.45*	[.10, .91]	.43
Political orientation	34.53	25.45	46.78	22.44	-3.00[1]**	[-20.30, -4.19]	-.49
Trust in government agencies	70.44	17.05	45.12	25.62	6.51**	[17.56, 33.08]	1.27
Attitude towards the Corona vaccine	3.92	.56	2.27	.70	16.49**	[1.45, 1.84]	2.70
Need for conformity	2.48	.70	2.36	.63	-.08	[-.23, .21]	

Note. [1] df = 66.83, **Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

In addition, independent samples *t* tests (Table 2.1) were used to compare the 'NfC', 'age', 'educational level', 'political orientation', 'trust in government agencies' and 'attitude towards the Corona vaccine' estimates reported by participants who answered 'Yes, I would get vaccinated' (*n* = 128) to the estimates reported by participants who answered 'No, I would not get vaccinated' (*n* = 51). Effect Size is only reported for significant correlations. Assumptions were met, only the assumption for Equality of variances for 'trust in government agencies' was not met, therefore the results for 'equal variances not assumed' will be reported.

Finally, independent samples *t* tests (Table 2.2) were used to compare the 'NfC', 'age', 'educational level', 'political orientation', 'trust in government agencies' and 'attitude towards the Corona vaccine' estimates reported by participants in the RIVM manipulation (*n* = 88) to the estimates reported by participants in the friends/family manipulation (*n* = 91). Effect Size is only reported for significant correlations. The assumptions were met.

Table 2.2
Sample Descriptives using t test for Equality of Means, RIVM versus Friend/family (df = 177)

Variable	RIVM (*n* = 88)		Friend/family (*n* = 91)				
	M	*SD*	*M*	*SD*	*t*(177)	95% CI	*d*
Age	35.14	14.39	34.27	14.22	.40	[-3.36, 5.10]	
Educational level	3.53	1.27	3.46	1.25	.39	[-.30, .44]	
Political orientation	41.32	2612	34.84	23.97	1.73	[-.92, 13.86]	
Trust in government agencies	67.53	19.78	59.05	24.91	2.52*	[1.83, 15.13]	0.37
Attitude towards the Corona vaccine	3.54	.88	3.36	1.02	1.22	[-.11, .46]	
Need for conformity	2.47	.69	2.48	.67	-.12	[-.21, .19]	

Note. [1] df = 66.83, **Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

Moderation

Prior to interpreting the results of the *process analysis*, several assumptions should be analysed. The PROCESS analysis in SPSS is based on a regular Multiple Regression, therefore the assumptions for a Multiple Regression were tested. First, a test of normality of the continuous variables was performed. Both scales were roughly normally distributed in the histograms but looking at the Kolmogorov-Smirnov ($p < .001$) and Shapiro-Wilk ($p < .001$) coefficients both scored a significant difference. Therefore the 0-hypothesis for normality for the scale 'NfC' and the scale of 'attitude towards the Corona vaccine' should be rejected. Since the sample size is larger than 30, according to the central limit theorem, it can be assumed that this is not a problem for the analysis (Field, 2013). Boxplots for both scales indicated three univariate outliers on the scale for 'attitude towards the Corona vaccine' and three on the scale for 'NfC'. The outliers have been studied individually. The scores were appropriate concerning the expected scores on the reversed statements. Also, due to the outliers not being extreme, it was decided not to remove it from the dataset and include them in the analysis. Second, the assumptions of normality, linearity and homoscedasticity of residuals were met. This was decided by means of an inspection of the normal probability plot of standardized residuals and the scatterplot of standardized residuals against standardized predicted values. Third, the Mahalanobis distance (Maximum = 13.61) did not exceed the critical X^2 for df = 2 (at α = .001) of 13.82 for any cases in the data file, indicating that multivariate outliers were not of concern.

To test the hypotheses a process analysis for moderation was conducted. The explained variance in the model is *not* significant, F(3,175) = .78, p = .51, R² = .01. This means that if the model would be significant, the model explains for only 1% what the 'attitude toward the Corona vaccine' is comprised of. The 'NfC' is *not* a significant predictor in the model, b_1 = .04, *t*(175) = .38, p = .70. This is not in accordance with the hypotheses '*Expected is that individuals with a high need for conformity are more likely to adopt the attitude towards the Corona vaccine of others*', thus this hypothesis should be rejected. The 'provider of information' is also *not* a significant predictor of 'attitude towards the Corona vaccine' in the model, b_1 = -.17, *t*(175) = -1.22, p = .22. This is not in accordance with the hypotheses '*Expected is that the provider of the information has an effect on someone's attitude towards the Corona vaccine*', thus this hypothesis is rejected. The interaction (NfC x Provider of information) in the model is also *not*

significant, $b_1 = -.18$, $t(175) = -.83$, p = .41. A moderating effect is not detected, this is not in accordance with the hypothesis '*The level of need for conformity present in an individual, works as a moderator on the effect of the provider of the information on attitude towards the Corona vaccine*', thus this hypothesis is rejected. In addition, the interaction was *not* a significant change ($p = .41$) to the model. A regression was performed to check as if the main-effects would be significant when the interaction-effect was not included in the analysis. The effect of 'NfC' on 'attitude towards the Corona vaccine' would be *not* significant ($p = .69$) as well as the effect of the manipulation text on 'NfC' on 'attitude towards the Corona vaccine' ($p = .22$).

The analysis was conducted one more time including the covariates 'age', 'gender','level of education', 'political orientation' and 'trust in government agencies' in the model. The explained variance in this model is significant, $F(8,170) = 16,44$, $p < .001$, $R^2 = .44$. This means that the model explains for 44% what the 'attitude toward the Corona vaccine' is comprised of. The interaction (NfC x Provider of information) was *not* a significant change to the model. The 'NfC' and the manipulation text are still not significant predictors for 'attitude towards the Corona vaccine' in the model. Age, gender and educational level were not significant predictors for 'attitude towards the Corona vaccine'. Political orientation is a significant predictor of 'attitude towards the Corona vaccine', $b_1 = -.01$, $t(170) = -2.86$, $p < .001$. As the score on political orientation increases (left-oriented = 0, right-oriented = 100), 'attitude towards the Corona vaccine' decreases. Also 'trust in government agencies' is a significant predictor of 'attitude towards Covid-vaccine', $b_1 = .02$, $t(170) = 9.10$, $p < .001$. As 'trust in government agencies' increases, 'attitude towards the Corona vaccine' increases.

Additional analysis

In addition, since 'trust in government agencies' case forward as the strongest correlation with 'attitude towards the Corona vaccine' and emerged as a significant covariate in the model, it was decided to perform a moderation analysis once more. A PROCESS analysis with the 'provider of information' as predictor, 'attitude towards the Corona vaccine' as dependent variable and 'trust in government agencies' as a moderator.

The assumptions of a multiple regression were met. The explained variance in the model is significant, $F(3,175) = 37.60$, p < .001, $R^2 = .39$. This means that the model explains for 39% what the 'attitude toward the Corona vaccine' is comprised of. The 'trust in government agencies' is a significant predictor in the model, $b_1 = .03$, $t(175) = 10.32$, p < .001. The 'provider of information' is *not* a significant predictor of 'attitude towards the Corona vaccine' in the model, $b_1 = .05$, $t(175) = .45$, p = .65. The interaction (Trust in government agencies x Provider of information) in the model is also *not* significant, $b_1 = -.00$, $t(175) = -.43$, p = .66. In addition, the interaction was *not* a significant change (*p* = .66) to the model.

Discussion

The current research attempts to prove the importance of the 'provider of information', examining whether people form a more positive 'attitude towards the Corona vaccine' after receiving information from someone of close social proximity versus someone of distant social proximity. In addition, it was tested whether the extent to which someone has a 'NfC' plays a role in this. This was done by testing a number of hypotheses, firstly; '*Expected is that a provider with close social proximity has a more positive effect versus a provider with a distant social proximity on the attitude towards the Corona vaccine of the recipient.*' Second; '*There is an expected moderating effect of the level of 'NfC' present in the recipient on the effect of 'provider of information' on 'attitude towards the Corona vaccine. The higher the level of 'NfC' present in the recipient, the stronger the positive effect of the providers' close social proximity on the attitude towards the Corona vaccine'.* And finally; '*Expected is that the level of reported need for conformity in the recipient, has a positive effect on the attitude towards the Corona vaccine of the recipient'.* However, these expectations are not supported by the results in the current study, thus the hypotheses are rejected. Although the hypotheses have been rejected, a number of significant effects have been found that provide possible new insights and implications for further research.

'Political orientation' emerged as a significant covariate and is negatively correlated with the 'attitude towards the Corona vaccine', in this study this means that participants that reported

to be more politically right-oriented, had on average a less positive 'attitude towards the Corona vaccine'. Also, like 'political orientation', 'trust in government agencies' emerged as a significant covariate, which suggests that both are stronger predictors than the manipulation of 'provider of information' used in the current research. In addition, they did not correlate with each other, suggesting that these factors had an independent influence on the 'attitude towards the Corona vaccine'. It also indicates that these covariates have a greater effect on 'attitude towards the Corona vaccine' than the other covariates ('age', 'educational level' and 'gender') have on the model.

However, when analysed with *Kendall's tau-b correlations,* a small negative effect of 'age' (the older, the less positive) and a small positive effect of 'educational level' (the higher the educational level, the more positive the attitude) were found. 'Gender' did not emerge in any correlation / effect in this research. Furthermore, it is no surprise that 'age' and 'education level' correlate with the 'attitude towards the Corona vaccine', since this is consistent with previous research. A higher 'educational level' was positively correlated with vaccination rate in previous research (Ganczak, Owsianka, & Korzeń, 2018). The negative effect of age is somewhat surprising, given that elderly people generally belong to a possible risk group. However, previous research had also suggested that it appears that elderly people in particular have a less 'positive attitude towards vaccination' (Baeyens, Lang, & Michel, 2009). The motives behind the negative effect of 'age' still need to be investigated, but it seems that this effect can possibly be partially explained by the relationship with 'educational level' and 'trust in government agencies'. 'Educational level' and 'age' are not controllable, which makes them difficult to intervene on. Therefore, these will not be discussed any further in the current research.

Also, the effect of 'political orientation' is in accordance with literature, political conservatism is linked with lower vaccination acceptance (Baumgaertner, Carlisle, & Justwan, 2018). 'Political conservatism' and 'trust in government agencies' are proven to be negatively correlated, high levels of political conservatism correlate with low levels of trust in government agencies (Baumgaertner, Carlisle, & Justwan, 2018). However, this correlation has not been found in the current research.

Based on the correlations that were conducted (Table 1), it appears that 'trust in government agencies' has the greatest effect on 'attitude towards the Corona vaccine'. In addition, there was a significantly higher 'trust in government agencies' among the participants who indicated that they did intend to vaccinate, compared to those who indicated that they did not intend to do so. Jamison, Quinn, and Freimuth (2019) found that trust in vaccines depends on the trust in the institutions that produce them, medical government agencies, which are widely distrusted, often due to perceived motives and distrust. Research on the 2009 H1N1 (Influenza A) pandemic in the USA, also found that clear and consistent communication by public health and government spokespersons about vaccination is important to the public's trust in government actions and increased the vaccination rate (Quinn, Parmer, Freimuth, Hilyard, Musa, & Kim, 2013). Research in the Netherlands has also proven the link between trust in government agencies and a higher vaccination uptake (Van der Weerd, Timmermans, Beaujean, Oudhoff, & van Steenbergen, 2011).Thus, 'trust in government agencies' appears to play a major role in achieving herd immunity when the Corona vaccine is released. However, in the Netherlands, the 'trust in government agencies' has decreased over the last few months. This decline in trust is linked to the public opinion on the actions taken by the government in the Corona crisis (Van Mersbergen, 2020). This suggests that, by the time the vaccine is released, 'trust in government agencies' is even lower than today and thereby the likelihood of a high vaccination rate is reduced. Various studies have shown that providing transparent information (i.e. pros and cons) has a positive effect on assumptions and trust (Nyhan & Reifler, 2015; Nyhan, Reifler, Richey, & Freed, 2014; Paulussen, et al., 2006; Quinn, Parmer, Freimuth, Hilyard, Musa, & Kim, 2013). This suggests conditions for follow-up research and provides information for possible intervention development in relation to the current Corona situation.

Also, the participants that had been exposed to the RIVM manipulation scored significantly higher on 'trust in government agencies', compared to the participants that were exposed to the friends/family manipulation. This suggests that the manipulation affected the 'trust in government agencies' instead of the 'attitude towards the Corona vaccine'. However, there can not be any certainty about causality, due to the absence of a pre-measurement. Yet it seems that participants have been positively affected in terms of 'trust in government agencies'

by receiving medical information from a government agency; the RIVM. The effect of the manipulation on 'trust in government agencies' could also explain that no correlation between 'trust in government agencies' and 'political orientation' was found. Because perhaps political conservatives in the RIVM condition reported higher trust in government agencies' than the political conservatives in the friends/family condition. This could also explain that 'trust in government agencies' was not a significant moderator in the additional moderation analysis. It would be expected that the 'trust in government agencies' would moderate in favour of the RIVM 'provider of information'. The results of the current research do not conform to this expectation. Again, perhaps because the manipulation did not affect the 'attitude towards the Corona vaccine', but on the 'trust in government agencies'.

In addition, the RIVM is a government agency that is specifically specialized in public health. The need for medical scientific information is proven in research by Chanel, Luchini, Massoni, and Vergnaud (2011). Since RIVM is a medically specialized government agency, the RIVM manipulation may have had a positive effect on the 'trust in government agencies'. Previous research found that there is a need for information from a medical professional in case of information on vaccination (Freed, Clark, Butchart, Singer, & Davis, 2011; Goldman, et al., 2020). In Table 3.1 and 3.2 (Appendix 4) it shows that the participants who answered that they would not get vaccinated showed a lack of trust in the medical world, but also gave a lack of scientific medical information as a motivator. Some even indicated when they would receive this information from a medical professional (rather than friends/family), they would reconsider their choice. This suggests that the provider of information does indeed matter in case of information of vaccination. However, the medical expertise of the provider seems to be a stronger indicator than the social proximity of the provider. In research by Jungbauer-Gans and Kriwy (2003) there appeared to be great value in the attitudes that General Practitioners (GPs) themselves have and shared with their patients, people tend to behave in accordance with the attitude of their GP. Some form of conformity seems to be of influence here, more research would be needed.

On another note, as mentioned before, the manipulation does not seem to have had the desired effect in the current research. There were a number of conditions that the manipulation, on closer inspection, should have met. First, the two conditions in the manipulation differed too

much from each other, as a result of which other factors had an influence in addition to the desired manipulation. Such as, the RIVM manipulation had a positive influence on the 'trust in government agencies'. Second, the information should have come from a medical professional/government agency. Also, the information provided must also be complete, with advantages and disadvantages. In addition, it cannot be said with certainty that the participants' 'attitude towards the Corona vaccine' was influenced by the manipulation. Since the topic has been discussed in news outlets almost every day for the past six months in the Netherlands. This broadcasted information does not differ in terms of the message in the manipulation text. Therefore, there is a chance that the sample already had a predominantly positive 'attitude towards the Corona vaccine' before they took part in the study. This could have been controlled for by means of a control group. Also, it would also have been an option to use negative reporting, in which taking up on the Corona vaccine would be discouraged. This could lead to new interesting insights on providing people with negative information.

In terms of methodology, the inter-item correlation for the scale for 'Attitude towards the Corona vaccine', was reported higher than desired. This in itself does not have to be a problem, but it does imply that the construct has been measured in a unilateral way. On the other hand, the participants who answered that they would get vaccinated had a significant more positive 'attitude towards the Corona vaccine'. This suggests that the scale is able to successfully determine the 'willingness to vaccinate', this is an expected correlation and fulfills the purpose for the current research. However, if it were to be used again, it could be supplemented on the basis of motives emerging from the qualitative research.

Conclusion

In short, the current research has been unsuccessful in proving the importance of the 'provider of information', examining whether people form a more positive 'attitude towards the Corona vaccine' after receiving information from someone of close social proximity versus someone of distant social proximity. Also the expected influence of 'NfC' was not found. Therefore all the

hypotheses were rejected. However, other effects have been found, based on which a number of implications have been mentioned.

First of all, it seems to be important that the content of the information is complete and medical in nature. Literature has shown that the 'provider of information' is ideally also a medical professional. The current research has shown that 'trust in government agencies' has a strong influence on 'attitude towards the Corona vaccine', this is conform literature. The reported 'trust in government agencies' of the population in the Netherlands has decreased since the Corona crisis started. Therefore, it may be important to intervene, as this could have a negative impact on the Corona vaccination rate in the longer term. This implies that it is therefore important for the Dutch government to regain the trust of the Dutch population. Various studies have shown that providing transparent information (i.e. pros and cons) has a positive effect on trust.

In the current study, the participants indicated that they were more likely to get vaccinated if they would receive information from a medical professional. Which is in line with literature that shows that there is a need for a medical professional when informed on vaccination. Literature also shows that an advantage can be gained here when it concerns one's own GP because he is more trusted. This suggests a component of social proximity, perhaps an implication to replicate the current research with a reinforcement of the manipulation in which a 'distant social proximate GP condition' versus 'a close social proximate GP condition' were used. This makes the conditions more equal and thereby excludes external influences, this can not be said about the current research.

Finally, because there are currently many reports about the expected Corona vaccine in news outlets, some adjustments to the manipulation are recommended. In order to allow the manipulation to actually effectively influence the 'attitude towards the Corona vaccine', the choice could be made to use negative information. This would contradict the information that has been received so far.

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Appendix 1 | Both versions of manipulation text

Manipulation friend/family

Het volgende betreft een situatie die u in de nabije toekomst mogelijk kunt tegenkomen:

U hoort op het nieuws dat er eindelijk een vaccin is ontwikkeld tegen Covid-19. Omdat u nog niet helemaal weet wat u hiervan moet vinden of wat u met deze informatie moet doen doet u het volgende…

U vraagt een vriend(in)/familielid of hij/zij hierover meer weet, deze vertelt u dat er uit huidig onderzoek is gebleken dat het vaccin dat ontwikkeld is, effectief is tegen het Coronavirus. Uitgebreid onderzoek vanuit verschillende ziekenhuizen en universiteiten heeft onbedoelde bijwerkingen kunnen uitsluiten. Het vaccin heeft sterke overeenkomsten met verschillende bestaande griepvaccins waarmee ook bijwerkingen op langere termijn uitgesloten kunnen worden. Het vaccin zal binnenkort op de Nederlandse medische markt worden gebracht en gratis worden aangeboden. Uw vriend(in)/familielid zou deze zeker aanraden te halen.

Manipulation RIVM

Het volgende betreft een situatie die u in de nabije toekomst mogelijk kunt tegenkomen:

U hoort op het nieuws dat er eindelijk een vaccin is ontwikkeld tegen Covid-19. Omdat u nog niet helemaal weet wat u hiervan moet vinden of wat u met deze informatie moet doen doet u het volgende…

U kijkt op de website van het RIVM of u hier meer informatie over kunt vinden, hier staat dat er uit huidig onderzoek is gebleken dat het vaccin dat ontwikkeld is, effectief is tegen het Coronavirus. Uitgebreid onderzoek vanuit verschillende ziekenhuizen en universiteiten heeft onbedoelde bijwerkingen kunnen uitsluiten. Het vaccin heeft sterke overeenkomsten met verschillende bestaande griepvaccins waarmee ook bijwerkingen op langere termijn uitgesloten kunnen worden. Het vaccin zal binnenkort op de Nederlandse medische markt worden gebracht en gratis worden aangeboden. En dat er namens het RIVM zeker wordt aangeraden deze te halen.

Appendix 2 | Statements attitude towards Corona vaccine

Deze statements slaan op het Corona vaccin waar de vorige tekst over ging.

Lees de statements goed en probeer zo goed mogelijk uw mening geven door middel van de onderstaande opties.

1. Ik ben van plan mezelf te laten vaccineren tegen Covid-19
2. Ik heb vertrouwen in het Corona vaccin
3. Ik vind dat anderen zich ook met het Corona vaccin zouden moeten vaccineren
4. Ik zou het Corona vaccin aanraden
5. Ik vind het belangrijk dat de mensen om mij heen zich laten vaccineren met het Corona vaccin
6. Ik vind het belangrijk dat ik mij laat vaccineren met het Corona vaccin
7. Ik maak mij zorgen over de mogelijke bijeffecten van het Corona vaccin
8. Ik vertrouw op de informatie die wordt verstrekt over het Corona vaccin

Appendix 3 | Scale for need for conformity

Hieronder staan nogmaals 8 statements.

Lees de statements goed en probeer zo goed mogelijk uw mening geven door middel van de onderstaande opties.

1. Ik vind het moeilijk om mijn mening te uiten als ik denk dat anderen het niet eens zijn met wat ik zeg.

2. Er zijn vele keren geweest dat ik dacht dat anderen om me heen ongelijk hadden, maar ik liet het ze niet weten.

3. Als ik het niet met anderen eens ben, ga ik liever met hen mee dan erover te discussiëren.

4. Het is gemakkelijk voor mij om mijn mening te geven in het bijzijn anderen van wie ik denk dat ze het niet met me eens zullen zijn.

5. Ik zou me ongemakkelijk voelen als iemand mijn mening zou vragen en ik wist dat hij of zij het niet met me eens zou zijn.

6. Ik praat meestal alleen over mijn mening in de buurt van vrienden of andere mensen die ik vertrouw.

7. Het is veiliger om te zwijgen dan in het openbaar een mening te uiten waarvan je weet dat de meeste anderen die niet delen.

8. Als ik het niet eens ben met anderen, heb ik er geen probleem mee om het hen te laten weten.

Appendix 4 | Summary of Reasons to vaccinate

Tabel 3. Summary

Ja, Omdat...	128	72%
Nee, Omdat...	50	28%
Totaal	*178*	*100%*

Tabel 3.1 Ja, Omdat...

1. Zelfbescherming		
1.1 Wil niet ziek worden	25	19,5%
1.2 Zelf in risicogroep	6	4,7%
1.3 Werkt in zorg	3	2,3%
Totaal	*34*	*26.5%*
2. Voor anderen		
2.1 Anderen beschermen	16	12,5%
2.2 Voor anderen die in risicogroep zitten	16	12,5%
2.3 Bekenden in directe omgeving beschermen	5	3,9%
Totaal	*37*	*28,9%*
3. Vertrouwen in vaccinatie		
3.1 Vertrouwens in vaccinaties, wetenschap & instanties	22	17,2%
3.2 Geen reden om het niet te doen	10	7,8%

3.3 Maatschappelijke plicht / groepsimmuniteit	23	18%
Totaal	*55*	*43%*
4. Preventief		
4.1 Geen 2e golf / einde van pandemie	5	3,9%
4.2 Weer normale leven kunnen oppakken	14	10,9%
Totaal	*19*	*14,8%*
5. Algemeen/ overig		
	10	7,8%

Tabel 3.2 Nee, omdat...

1. Geen vertrouwen		
1.1 Geen vertrouwen in Corona-vaccine	9	18%
1.2 Geen vertrouwens in overheidsinstanties / politiek	8	16%
Totaal	*17*	*34%*
2. Te weinig info		
2.1 Nog weinig bekend	11	22%
2.2 Gaat te snel	11	22%
2.3 Bijwerkingen op lange termijn	14	28%
2.4 Twijfel	5	10%
Totaal	*41*	*82%*

3. Zelf geen risico		
3.1 Niet in risicogroep	10	20%
3.2 Al Corona gehad en resistant	2	4%
3.3 Geloof in andere oplossingen	3	6%
Totaal	*15*	*30%*
4. Overig		
	2	4%