Master of Science

Compliance with corona measures: Predictive mechanisms and perceptions of governmental crisis communication.

Master Thesis

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Abstract

Increasing compliance with health-protective corona measures is crucial to contain the spread of the coronavirus further. The present study investigated possible predictors of compliance while also exploring the impact and people's satisfaction with governmental crisis communication among a sample of n = 204. The study employed a questionnaire survey design measuring the effect of multiple variables on compliance with corona measures. People's opinions about governmental crisis communication were examined using open questions. Multiple regression analysis revealed that response-efficacy, self-efficacy, risk perception (feelings), and social norms significantly predicted compliance with corona measures. Response-efficacy was found to be the strongest predictor. Satisfaction with governmental crisis communication was concluded to be relatively low. Qualitative analysis suggests that more accurate and transparent explanations would potentially increase satisfaction with governmental crisis communication. Based on the findings, enhancement of predictive mechanisms to increase voluntary compliance with corona measures is recommended. Explicitly increasing people's response and self-efficacy, strengthening social norms, and addressing feelings towards the risk are suggested to improve compliance. Unexpectedly, trust in authorities did not show a predictive effect. Future research could potentially further examine the impact of trust in authorities on compliance. Additionally, future investigations could explore how to increase satisfaction with crisis communication and further analyse its effect on compliance.

Keywords: Corona measures, compliance, health protective behaviour, crisis communication, COVID-19 pandemic

Presently, the world's population experiences one of the most extraordinary global health and economic crisis for centuries. The coronavirus or COVID-19 disseminated across the world, causing an unpredictable pandemic (Gates, 2020). To contain the dissemination of COVID-19, we are highly dependent on people's behaviour. Therefore, governments hold that as many individuals as possible should adhere to authorities' proposed corona measures (Sailer et al., 2020). Aimed at decreasing the tremendous amount of infections, measures such as social distancing, quarantine, wearing face- masks, and keeping 1.5 meters distance have been initiated by the Dutch and German government (Die Bundesregierung, 2021; Government of the Netherlands, 2021). For these measures to be effective, voluntary, and intentional, compliance is essential (Xu & Peng, 2015; Sailer et al., 2020, Zhao et al., 2020).

Consequently, examining and understanding determinants of compliance is of considerable importance. Previous research already pointed out that compliance is generally closely linked to people's underlying psychological mechanisms (Kooistra et al., 2020; Bogg & Milad, 2020; Harper et al., 2020). In particular, a study conducted by Clark and colleagues (2020) found that, for instance, efficacy beliefs and risk perception play a fundamental role in predicting compliance with corona measures. However, due to the novelty of the current pandemic, research lacks exploration on further determinants of compliance with corona measures. Hence, further verifying existing knowledge and investigating possible other psychological predictors of compliance is crucial for sustaining compliance with corona measures.

To address the public's underlying mechanisms and increase compliance with corona measures, the government exerts crisis communication. Reynolds and Seeger (2007) declare that crisis communication intends to clarify and elucidate the threat. Among other things, this includes explaining the threats' impacts and consequences and providing information about protective actions (Reynolds & Seeger, 2007).

At first glance, it appears that governmental crisis communication in times of corona worked fairly well, as a study conducted by Reinders Folmer et al. (2020) demonstrated that self-reported compliance among the Dutch population towards distance measures was already relatively high in May 2020. Yet, they also found that the standard to comply with corona measures decreased and still decreases with more time passing (Reinders Folmer et al., 2020). Considering this declining compliance trend, it remains to be determined why compliance declines and what the government can do to counteract it.

Accordingly, the present study aims at identifying critical psychological constructs influencing people's tendency to comply with governmental corona measures. Additionally,

the impact of governmental crisis communication and people's level of satisfaction with it will be explored. For this reason, the research questions are as follows:

RQ1: Which psychological constructs mostly predict compliance with corona measures?
RQ2: To what extent are people satisfied with current (15.03.2021-15.04.2021) governmental crisis communication?

Theoretical Framework

To decelerate the coronavirus's spread, voluntary compliance with authorities' proposed corona measures is vital (Sailer et al., 2020, Zhao et al., 2020). However, recent studies have shown that non-compliance with corona measures poses a daily issue and is expected to increase with time (Reinders Folmer et al., 2020; Nivette et al., 2020). In this regard, the term compliance is used as the health-protective corona measures were explicitly set by the government. Still, to achieve high compliance with governmental set corona measures, it is crucial to identify and address the psychological drivers that play a role in persuading individuals of the necessity and effectiveness of certain measures.

According to Gudjonsson (1989), compliance can be understood as 'the general tendency or susceptibility of individuals to comply with requests and obey instructions that they would rather not do, for some immediate gain' (pp-535-536). Wearing face masks and keeping 1.5 meters distance can be inferred as the types of behaviours individuals would usually rather not do. Nevertheless, considering the current situation, individuals need to comply with them. Foundational research and theories such as the Protection Motivation Theory (PMT) were already concerned with identifying important message characteristics for achieving high compliance with protective health recommendations (Maddux & Rogers, 1983; Rogers, 1975; Brouwers & Sorrentino, 1993). As a result, past research has already successfully discovered multiple psychological drivers of compliance with protective health behaviour. However, the coronavirus pandemic represents a new situation that requires different and extensive behavioural adjustment. Consequently, more extensive research on possible predictors of compliance with corona measures is of considerable importance for decreasing the negative impacts of the coronavirus pandemic.

Potential predictors of compliance with corona measures

Self-efficacy

A variable that has to be examined is self-efficacy. Widely accepted theories such as the Extended Parallel Processing Model (EPPM) and the protection motivation theory (PMT) hold that people's level of perceived self-efficacy is an essential predictor of peoples' motivation to protect themselves (Lewis, Watson, & White, 2013; Williams et al., 2015). Hence, as perceived self-efficacy is proven to have a considerable impact on people's actions, it might also influence people's willingness to comply with corona measures. Considering a dangerous situation, Witte and colleagues (1996; p. 310) define self-efficacy as the 'belief about one's ability to perform the recommended response to avert the threat.' Multiple experimental studies have proven the effectiveness of increasing peoples' perceived self-efficacy. For instance, Gore and Bracken (2005) tested the theoretical design of a health risk-message to promote vaccination against bacterial meningitis. Results demonstrated that only increasing people's perceived efficacy (without fear appeals) leads to the desired result, namely, the motivation to protect oneself. When no efficacy component was included in the health risk message, participant's willingness to protect themselves was significantly reduced (Gore & Bracken, 2005). This result underlines that raising people's perceived efficacy beliefs might be a substantial predictor of peoples' willingness to comply with corona measures.

Response-efficacy

Besides self-efficacy, response efficacy is another important determinant for people's compliance with corona measures. According to the EPPM, including response-efficacy components in a health-risk message, increases people's willingness to protect themselves (Witte, 1994; Shi & Smith, 2015). Response-efficacy refers to an individual's valuation of the effectiveness of a specific action to counteract a threat (Clark, Davila, Regis & Kraus, 2020). To put it differently, if an individual believes that a specific (health protective) action is likely to reduce the threat, this individual is significantly more likely to engage in this action/behavior. Clark et al. (2020), already substantiated the predicting effect of response-efficacy on compliance with corona measures. Nevertheless, due to the novelty of the coronavirus pandemic, the predicting effect of response efficacy on compliance with corona measures need further verification.

Risk perception

Certainly, COVID-19 poses a severe and prevalent health risk for many people. The public's perception of that risk may play a fundamental role in determining compliance with corona measures. Studies consistently demonstrated that whether a risk is perceived as severe or not greatly impacts people's protective behavior (Barnett & Breakwell, 2001; Honarvar et al., 2020) and their compliance with corona measures (Honarvar et al., 2020). Loewenstein and colleagues (2001) explained that traditional risk-perception theories hold that people base their risk-related decisions on their subjective evaluation of the consequences of the risk and the probability of being affected by the risks' possible outcomes. However, a substantial amount of evidence argues for additionally considering risk as feelings when assessing people's risk perception (Loewenstein et al., 2001; Slovic & Peters, 2006; Kerstholt, Duijnhoven, & Paton, 2017). Studies concerned with risk as feelings showed that feelings associated with a risk were a principal determinant of people's risk perception (Slovic & Peters, 2006). Thus, the impact of risk perception on compliance with corona measures needs to be examined, separating risk perception into 'risk perception (probabilities)', 'risk perception (consequences)', and 'risk perception (feelings)'.

Trust in authorities

Trust in authorities appears to be another fundamental construct. Research has generally shown that trust in authorities enhances voluntary compliance with governmental policy (Knack, 2002; Bargain & Aminjonov, 2020). Still, Bargain and Aminojonov (2020) pointed out that the influence of trust on compliance lacks scientific exploration, considering a pandemic. In their study, the influence of trust on compliance was closely examined. It was concluded that trust in authorities is an essential factor, affecting compliance with corona measures (Bargain & Aminojonov, 2020). Conversely, other findings suggest that trust in the government does not play an important role for increasing compliance with corona measures (Clark, Davila, Regis, & Kraus, 2020). To elucidate this contradiction in existing studies, further research is needed. Especially in times like these, where authorities have to make radical decisions, trust in authorities seems indispensable.

Social norms

Humans are fundamentally social beings. Therefore, including the notion of social norms is of great significance as well. Social norms usually represent the groups' attitudes and opinions, and when consensus is reached, behavioural patterns emerge (Bourgeois, Harell, &

Stephenson, 2020). Literature divides social norms into two broad kinds, descriptive and injunctive norms. Both types, descriptive and injunctive social norms, are strong influences of human behaviour. Descriptive norms refer to a consensual standard on how most people typically feel and act in a certain situation. Whereas injunctive norms are how people should think, feel, and act in a given situation. More specifically, injunctive norms are what other people regard as acceptable behaviour (Stok, De Ridder, De Vet, & De Wit, 2014). As cited by Alashoor, Han and Berente (2020), strong social norms have the potential to either strengthen or weaken compliance, depending on the nature of the norm. In the case of COVID-19, social norms have shown to be very influential in raising people's compliance with measures. Investigations in Italy demonstrated that even young people who were more skeptical in advance eventually complied due to strong social norms (Germani, Buratta, Delvecchio, & Mazzeschi, 2020). This, however, depends on how sensitive individuals are towards their social context (Germani et al., 2020; Alashoor, Han, & Bernete, 2020). Overall, the effect of social norms on compliance was shown to be prevalent across multiple correlational and experimental studies (Chung & Rimal, 2016).

Crisis communication

In times of crisis, the speed, accuracy and quality of an institutions' communication significantly determines how well the overall crisis is managed (Lawson, 2007). To combat the corona virus pandemic, the government tries to enhance compliance with corona measures. Therefore, the government frequently communicates with their citizens. Existing literature is in agreement: to achieve compliance with health protective measures, competent and transparent crisis communication is necessary (Lawson, 2007; Lin, McCloud, Jung & Viswanath, 2018; Christensen & Laegreid, 2020). In crisis communication, firstly, the government must ensure that the public develops an accurate understanding of the threat. Secondly, it is crucial that the government presents convincing measures that help reduce the threat's consequences (Christensen & Laegreid, 2020). Furthermore, to fully comprehend the impact of crisis communication, it's critical to consider that crisis communication is a two-way process between the message receiver and the communicator (Lawson, 2007). For this process to be effective, understanding how the receiving side perceives the communication process might provide substantial insights for increasing compliance with corona measures.

The present study

In total, five primary constructs, namely self-efficacy, response-efficacy, risk perception, trust in authorities, and social norms have been identified as particularly important in predicting people's compliance behaviour. Firstly, the present study aims at establishing the relationship between these psychological constructs and compliance behaviour. Specifically, it will be investigated whether the selected psychological constructs can predict compliance with corona measures by using a questionnaire survey design. Secondly, people's satisfaction with governmental crisis communication will be explored using open questions.

Methods

Design

For the present study, a questionnaire survey design was used to measure people's compliance behaviour with corona measures based on five psychological constructs. A questionnaire was employed to investigate the impact of the independent variables '*Self-efficacy', 'Response-efficacy', 'Risk perception', 'Trust in authorities',* and *'Social norms*' on the dependent variable '*Compliance with corona measures'*. Moreover, people's level of satisfaction with the current governmental crisis communication was assessed. Lastly, personal opinions concerning governmental crisis communication were explored by means of open questions.

Participants

To be included in this research, participants had to be 18 years or older. Additionally, participants had to understand the English language in order to answer the questionnaire. Apart from that, no other inclusion criteria were set. All participants were recruited via convenience sampling. The study was promoted on the social media platform Instagram and published on SONA systems (only available for staff and students of the University of Twente).

Table 1 shows the demographic characteristics of the sample. In total, 204 people participated in the study. Respondents' ages ranged between 18 and 58, with a mean age of $M = 23.59$ ($SD = 8.26$). Furthermore, 147 respondents were female, 54 were male, and three were non-binary/third-gender. Out of 204 respondents, 144 were of German nationality, 41 were Dutch, and 19 respondents indicated a different nationality. Moreover, 109 respondents

reported living in Germany, and 91 indicated living in the Netherlands. Lastly, four participants indicated to live in a different country.

Table 1

Characteristics of the Sample

Demographic variables	N
Mean age in years (SD)	23.59 (8.26)
Gender	
Male	N= 54
Female	N=147
Non-binary	N=3
Nationality	
German	N=144
Dutch	N=41
Other	N=19
Country of residence	
Germany	N=109
Netherlands	N=91
Other	N=4

Note. $N = 204$.

Materials

The questionnaire used for this research consisted of 47 items and two open questions. Table *2* illustrates all items for each construct and their respective α. Moreover, four additional items were used to assess people's demographics (age, gender, nationality, and residence).

In total, 13 items were developed that measured the dependent variable *'compliance with corona measures'*. A five-point Likert scale (*1 = Never, 5 = Always*) was utilized to respond to the items measuring the dependent variable. An example item for the construct '*compliance with corona measures*' is: 'I stay at home as much as I can.' To assess the construct's internal consistency, Cronbach's alpha (α) was assessed. After removing item 9 from the analysis, items for compliance with corona measures showed good reliability (Cronbach's $\alpha = .82$) (Tavakol & Dennick, 2011). Furthermore, confirmatory factor analysis was used to evaluate how well the items represent the measured construct (Pohlmann, 2004). The Kaiser-Meyer-Olkin (KMO) measure was adequate (KMO = .84), and Bartlett's Test of Sphericity was significant ($X^2 (78) = 848.63$, $p < .001$), indicating a strong relationship among

the items. Inspection of the scree plot demonstrates that there is only one factor. This factor explains 35% of the total variance. Additionally, all factor loadings were greater than .3.

To measure the independent variables (*self-efficacy, response-efficacy, risk perception, trust in authorities, and social norms*), 33 items were used. A five-point Likert scale was employed (1 = *Totally disagree,* 5 = *Totally agree*).

The first independent variable *'self-efficacy'* was measured by six items. An example item for assessing '*self-efficacy'* is: *'It is easy for me to wear face masks*'. The scale's internal consistency was acceptable (Cronbach's α = .73). The KMO measure of self-efficacy was moderate (KMO = .77), and Bartlett's Test of Sphericity was significant (X^2 (15) = 237.38, p <.001). Moreover, factor analysis showed only one factor with an eigenvalue >1 that explained 44% of the common variance. Additionally, all factor loadings were greater than .3.

To assess the second independent variable *'response-efficacy'*, six items were constructed. 'I believe that staying home reduces the various risks associated with COVID-19', represents an example item. Overall, the scale demonstrated good internal consistency (Cronbach's α = .87). The KMO measure was adequate (KMO = .86) and Bartlett's Test of Sphericity was significant (X^2 (15) = 599.42, p <.001). The first factor had an eigenvalue of 3.75 that explained 62% of the total variance. In addition to that, exploration of the scree plot also showed that there is only one factor. Furthermore, all factor loadings were greater than .3.

The third independent variable '*risk perception*' was separated into three sub-dimensions, namely *probabilities, consequences, and feelings*. In total, eleven items were developed to measure the overall construct of risk-perception. Firstly, for assessing '*risk-perception (probabilities)'* three items were developed (e.g. 'I feel I am unlikely to get infected with COVID-19'). Secondly, to measure the sub-dimension *consequences,* three items were used as well (e.g. 'Getting infected with COVID-19 can result in serious health consequences'). Lastly, to investigate the sub-dimension *feelings* five items were constructed (e.g. 'I feel anxious about COVID-19'). Overall, all items together of the *risk-perception* scale displayed good internal consistency (Cronbach's α = .86). Concerning the factor analysis, the results showed an adequate KMO (KMO = .85) and Bartlett's Test of Sphericity was significant (X^2 (55) = 922.96, p <.001). Additionally, the first three factors had an eigenvalue ≥ 1.

To measure the fourth independent variable '*trust in authorities',* five items were used. 'I trust the government to take the right measures to deal with the coronavirus pandemic' is an

example item. The scale demonstrated a good internal consistency (Cronbach's α = .83). Results of the factor analysis showed a moderate KMO (KMO = .79). Additionally, Bartlett's Test of Sphericity was significant (X^2 (10) = 410.07, p <.001). Inspection of the eigenvalues and the scree plot revealed that there is only one factor that accounted for 61% of the total variance in the data. All factor loadings had a higher value than .3.

The last independent variable of interest '*social norms',* was assessed using five items measuring descriptive and injunctive social norms. An example item for descriptive social norms is represented in the following: 'Most of the people I know, stick to the corona measures.' 'We expect each other to stay home when someone has COVID related complaints', represents an example item for injunctive social norms. Overall, the scale displayed good reliability (Cronbach's α = .80). The KMO measure (KMO = .80) was adequate and Bartlett's Test of Sphericity was significant (X^2 (10) = 354.37, p <.001). Furthermore, examination of the scree plot and eigenvalues demonstrated that there is one factor that explains 57% of the total variance. All factor loadings were above .3.

At the end of the questionnaire, one item was posed, measuring participant's level of satisfaction with current governmental crisis communication. On a five-point Likert scale, participants could indicate to what extent they are satisfied with the current (15.03.2021-15.04.2021) crisis communication. Ultimately, participants were asked to name positive and negative aspects of their government's crisis communication by means of two open questions.

Table 2

Items per Construct and their respective Cronbach's alpha (α)

Construct	Items	α
Compliance with corona measures	1. Whenever possible, I work from home. 2. I stay at home as much as I can. 3. At home, I still receive visitors. 4. I pay close attention to hygiene rules. 5. If someone visits me, I keep 1.5 meters distance. 6. In public spaces, I am wearing face masks. 7. I still meet people in person outside of my direct household. 8. Everyone is still welcome to visit me. 9. I meet people outside of my direct household online. 10. I would have a corona test if I would have any symptoms associated with the coronavirus. 11. If I would test positive, I would stay home even when I had no complaints. 12. In public spaces, I keep 1.5 meters distance. 13. I would stay home if I had any symptoms associated with the coronavirus.	**.82**
Self-efficacy	1. It is easy for me to wear face masks.	**.73**

	2. It is easy for me to keep 1.5 meters distance from people outside my direct household.	
	3. I consider myself capable of sticking to the current corona measures.	
	4. I know how to protect myself against COVID-19.	
	5. It is difficult for me to reduce personal meetings with others.	
	6. Even if it is not easy for me, I can stick to the measures.	
Response-efficacy	1. I believe that staying home reduces the various risks associated with COVID-19.	**.87**
	2. I believe that wearing face masks effectively reduces the risk of getting infected with COVID-19.	
	3. Sticking to the given corona measures effectively reduces the risk of infecting others with COVID-19.	
	4. I believe that washing my hands regularly reduces the risk of getting infected with COVID-19.	
	5. I believe that keeping 1.5 meters distance effectively reduces the risk of getting infected with COVID-19.	
	6. If everyone would comply to the measures, the spread of the virus would be considerably reduced.	
Risk-perception		**.86**
Probabilities	1. I feel I am unlikely to get infected with COVID-19.	
	2. I could spread the virus, although I do not have symptoms.	
	3. The risk of getting infected with COVID-19 is large.	
Consequences	1. Getting infected with COVID-19 can result in serious health consequences.	
	2. I believe that COVID-19 is more dangerous than having the flu (influenza).	
	3. There are considerable long-term effects when infected with COVID-19.	
Feelings	1. I feel anxious about COVID-19.	
	2. I am not afraid of COVID-19.	
	3. I am worried about COVID-19.	
	4. I feel responsible for the health of others.	
	5. I am worried about infecting other people.	
Trust in authorities	1. I trust the government to take the right measures to deal with the coronavirus pandemic.	**.83**
	2. I believe that the government acts in my best interest	
	3. I trust the government's reports on the spread of the epidemic and the statistics on the number of COVID-19 cases and deaths.	
	4. I think that my country is able to fight the coronavirus.	
	5. I think that my country is able to fight the economic and financial consequences of the coronavirus.	
Social norms	1. Most of the people I know, stick to the corona measures.	**.80**
	2. My friends and relatives expect me to stick to the corona measures.	
	3. My friends and relatives think that sticking to the corona measures is important.	
	4. In our group, we make sure not to infect each other.	
	5. We expect each other to stay home when someone has COVID related complaints.	

Procedure

After ethical approval was permitted by the University of Twente's ethical committee, the questionnaire was posted on the platform SONA systems (only available for staff and students of the University of Twente) and further promoted on the social media platform Instagram.

At the beginning of the questionnaire, participants were informed about the study's nature and purpose (see Appendix A). Subsequently, participants were asked to give consent (see Appendix B), and by clicking on 'Proceed', they indicated that they agree with participating in the study. After giving consent, participants were asked to continue with the questionnaire and answer the given items and open questions. Overall, it took approximately 15 minutes to complete the questionnaire.

Data Analysis

Quantitative Analysis

Once the data was collected, the raw data was downloaded from the Qualtrics software. As a first step, the data set was screened for incomplete responses. Ten participants who did not complete the questionnaire or did not indicate their demographic characteristics were excluded from the data set. For the purpose of analysing the influence of the demographic variables 'gender' and 'residence', additional seven participants were not included in the analysis. Specifically, three participants who indicated to be of non-binary gender and four participants who indicated to live somewhere outside Germany or Netherlands.

Next, confirmatory factor analysis using principal component analysis and varimax rotation was employed to assess the scales overall validity. Additionally, the scales internal consistency reliability (Cronbach's alpha (α)) was examined to ensure adequate reliability.

To get an overview about the data, descriptive statistics were analysed. Furthermore, Pearson correlation coefficients were explored to get insights about the relationships of the variables.

A multiple linear regression analysis was conducted to assess which psychological constructs mostly predict the dependent variable 'compliance with corona measures.' Multiple regression assumes that there is a linear relationship between the predictors and the criterion. The linearity assumption was checked using a scatter plot of standardized predicted values and standardized residuals. Inspection of the scatterplot did not display a non-linear

relationship. Therefore, linearity can be assumed. Moreover, the condition of homoscedasticity was examined using the Breusch-Pagan Test for Heteroscedasticity. The result was significant ($p < .01$), indicating that the assumption of Homoscedasticity was not met. For this reason, robust standard errors (HC4) are used for multiple regression to provide more accurate results. To check the third assumption, normality of residuals, the standardized residuals were stored and checked for normal distribution. The Shapiro-Wilk test for normal distribution was not significant ($p = .998$), indicating a normal distribution. Additionally, a visual inspection of the histogram and the Q-Q plot of the residuals confirm the result (see Appendix C, Figure 1). Lastly, in the context of the multiple regression analysis, it must be further verified that there is no perfect multicollinearity. For this purpose, the Variance Inflation Factor (VIF) was calculated. None of the VIF values exceeds the critical limit of VIF > 10. Thus, it can be assumed that there is no perfect multicollinearity.

Qualitative Analysis

At the end of the questionnaire, participants were requested to answer two open questions. Specifically, they were asked to name aspects of governmental crisis communication that satisfied and dissatisfied them.

Responses were analysed via inductive coding. That means that responses were scanned on re-occurring themes. If the same theme/aspect was mentioned five times, it was included as code in the analysis.

Results

Descriptive Statistics and Correlations

Table 3 visualises mean scores and Pearson correlations of the measured constructs compliance with corona measures, self-efficacy, response- efficacy, risk perception, trust in authorities, social norms, age, gender, residence, and satisfaction with crisis communication. The dependent variable ‘compliance with corona measures’ had a relatively high score with a mean of $M = 3.98$; ($SD = .54$). This indicates that compliance with current corona measures was relatively high.

Results of the Pearson correlation indicated that the dependent variable ‘compliance with corona measures’ significantly correlated with all independent variables. Nearly all independent variables even demonstrated strong significant positive associations with the dependent variable. The most powerful was a strong significant positive association between ‘response efficacy’ and the dependent variable ‘compliance with corona measures’ ($r(195) = .72$, $p < .001$). This means that the higher the perceived level of response efficacy, the higher was also participant's level of compliance. The lowest yet moderate association was a significant positive correlation between ‘risk perception (probabilities)’ and ‘compliance with corona measures’ ($r(195) = .38$, $p < .001$). This implies that the higher people’s perception of the probability of the risk, the higher their compliance level.

Furthermore, the analysis displayed high intercorrelations among the independent variables, varying from weak to strong. The two strongest positive significant relationships were overserved between the variables ‘risk perception (consequences)’ and ‘response efficacy’ ($r(195) = .72$, $p < .001$), and ‘risk perception (feelings)’ and ‘response efficacy’ ($r(195) = .60$, $p < .001$). This means that the higher people’s perception about the consequences of the risk and the more anxious/worried they were, the higher was their level of response efficacy. The weakest significant positive association was between the variables ‘trust in authorities’ and ‘risk perception (probabilities)’ ($r(195) = .18$, $p < .001$). This finding suggests that the higher people’s level of trust in their authorities was, the higher they assessed the likelihood of infecting others and/or getting infected themselves.

Concerning the sample characteristics, the demographic variable 'residence' seemed to impact participants' risk perception. The variable 'residence' displayed a weak significant positive correlation with ‘risk perception (probabilities)' ($r(195) = .16$, $p < .05$), ‘risk perception (consequences)’ ($r(195) = .16$, $p < .05$), and ‘risk perception (feelings)’ ($r(195) = .148$, $p < .05$). Thus, participants living in Germany had in general higher levels of risk perception compared to Dutch participants. Furthermore, the analysis revealed a weak

significant positive association between the demographic variable ‘gender’ and the dependent variable ‘compliance with corona measures ($r(195) = .20$, $p < .001$). This indicates that female participants had higher level of compliance compared to male participants.

Lastly, ‘satisfaction with crisis communication’ had a mean of $M = 2.87$ ($SD = 1.02$). Thus, satisfaction with crisis communication was relatively low within the sample. In addition, it positively significantly correlated with all independent variables except ‘risk perception (probabilities)’, ‘age’, and ‘gender’. Noteworthy, ‘satisfaction with crisis communication’ demonstrated a weak positive significant correlation with the independent variable ‘residence’ ($r(195) = .16$, $p < .05$). This means that people living in Germany were slightly more satisfied with governmental crisis communication than people living in the Netherlands. Additionally, ‘satisfaction with crisis communication’ displayed a moderate significant association with the dependent variable ‘compliance with corona measures’ ($r(195) = .41$, $p < .001$). Thus, the more satisfied people were with their government’s crisis communication, the higher their level of compliance.

Table 3

Descriptives and Correlations of all Variables.

	Mean (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.Compliance	3.98 (.54)	-											
2.Self-efficacy	3.82 (.62)	.64***	-										
3.Response-efficacy	4.33 (.72)	.72***	.57***	-									
4. Risk-perception (probabilities)	3.61 (.52)	.38***	.37***	.46***	-								
5.Risk-perception (consequences)	4.17 (.78)	.60***	.46***	.72***	.47***	-							
6.Risk-perception (feelings)	3.58 (.51)	.59***	.40***	.60***	.44***	.56***	-						
7.Trust in authorities	3.38 (.84)	.49***	.42***	.52***	.18**	.38***	.32***	-					
8. Social norms	3.95 (.62)	.62***	.49***	.53***	.43***	.52***	.45***	.36***	-				
9. Age	23.56 (8.05)	.06	-.05	-.01	.01	.07	-.00	.11	.07	-			
10. Gender	-	.20**	.12	.10	.09	.11	.14	.01	.12	-.23**	-		
11. Residence	-	.08	-.06	.08	.16*	.16*	.15*	-.09	.15*	.29***	.00	-	
12. Satisfaction	2.87 (1.02)	.41***	.30***	.39***	.10	.27***	.22**	.70***	.32***	.04	.10	.16*	-

Note. $N = 197$. *****Correlation significant at $p < .05$ (2-tailed). ******Correlation significant at $p < .01$ (2-tailed). *******Correlation significant at $p < .001$ (2-tailed).

Multiple Regression Analysis

To test whether the predictors 'self-efficacy', 'response-efficacy', 'risk perception', 'trust in authorities', 'social norms', 'satisfaction with crisis communication' significantly predicted the dependent variable 'compliance with corona measures', multiple regression analysis was performed. 'Gender' was added as a covariate into the model due to its significant correlation with 'compliance'. Table 4 shows the results of the analysis.

The regression model explained a significant amount of variance in the variable 'compliance' ($F(9, 187) = 45.36$, $p < .001$). The model had a high predictive value with an $R^2 = .69$ ($R^2_{\text{Adjusted}} = .67$). In other words, 67% of the variance in compliance could be explained by the predictor variables. Inspection of the analysis demonstrated, that only the variables 'response- efficacy' (ß = .31, $t(187) = 3.39$, $p < .01$), 'self-efficacy' (ß = .25, $t(187) = 4.44$, $p < .001$), 'risk perception (feelings)' (ß = .17, $t(187) = 3.13$, $p < .01$), and 'social norms' (ß = .23, $t(187) = 4.36$, $p < .001$) were predictors for 'compliance with corona measures'. The predictive effect was moderate for 'response-efficacy' and weak for 'self-efficacy' social norms' and 'risk perception (feelings)'. This means that 'compliance' increased with increasing 'response efficacy', 'self-efficacy', 'risk perception (feelings)', and 'social norms'.

Table 4

Multiple Regression Model of all Variables

Variable	B	Robust Std. Error	ß	*T*	p	Lower Bound	Upper Bound	VIF
Constant	0.49	.27		1.81	.072	-0.04	1.02	
Self-efficacy	0.22	.05	**.25**	4.44	.000	0.12	0.32	1.66
Response efficacy	0.24	.07	**.31**	3.39	.001	0.09	0.37	2.99
Risk perception (probabilities)	0.08	.06	-.07	-1.22	.224	-0.19	0.05	1.48
Risk perception (consequences)	0.02	.05	.03	.45	.654	-0.08	0.12	2.34
Risk perception (feelings)	0.19	.06	**.17**	3.13	.002	0.07	0.30	1.75
Trust in authorities	0.03	.05	.04	.54	.592	-0.07	0.12	2.36
Social norms	0.19	.05	**.23**	4.36	.000	0.11	0.29	1.69
Gender	0.09	.05	.08	1.78	.076	-0.01	0.19	2.03
Satisfaction	0.03	.03	.07	1.22	.223	-0.02	0.09	1.05

Note. $N = 197$. Outcome variable: 'Compliance with corona measures'.

Qualitative Analysis

Satisfactory aspects in governmental crisis communication

As a next step, it was explored how respondents perceive the current (15.03.2021-15.04.2021) governmental crisis communication. Particularly, respondents were asked to name positive aspects about their government's crisis communication. Respondent's statements were analysed via inductive coding. Based on the responses, five principal codes were developed, namely: 'Use and content of corona measures (1)', 'Frequency of updates (2)', 'Informational value (3)', 'Transparency of information (3.1)', 'Perceived honesty (3.2), 'Openness of communication (3.3)', 'Clarity of the message (4)', and 'Giving advice (5)' (see Table 5).

Overall, 39 respondents (19%) expressed themselves positively about the current corona measures in place. Statements such as: '[I am satisfied with] wearing face masks, 1.5m distance, cancelling big social gatherings' (Participant 105), were often made.

In particular, concerning the governmental crisis communication, the most frequently mentioned positive aspect was the frequency of governmentally provided updates. The code frequency of updates (2) entails all aspects mentioned by participants that highlighted their satisfaction with the regularity of governmental information/updates concerning the coronavirus. In total, 37 individuals (18%) specifically stated that they were satisfied with the frequency of updates. An example statement for frequency of updates is: 'Regular updates regarding progress and statistics' (Participant 16), which was an answer based on the open-ended formulation: 'I am satisfied with the following aspects of the government's current crisis communication during the COVID-19 pandemic'.

The next most frequently positive named aspect was the informational value (3) given by the government. All statements that were made regarding the informational value were included within this code. An example statement made by one participant was: 'The press conferences are informational, and they quite often keep us up to date' (Participant 22). On the whole, 30 respondents (14%) expressed themselves quite positively about the informational value of the provided information.

Moreover, based on the code informational value, three sub-codes were developed, namely transparency of information (3.1), perceived honesty (3.2), and openness of communication (3.3).

Starting with the first sub-code: transparency of information (3.1). While making positive statements concerning the informational value, seven participants (3%) highlighted that the government's information appears quite transparent.

Secondly, four individuals (1%) particularly expressed that they perceive the governmental communication as honest, represented by the sub code perceived honesty (3.2).

Lastly, the sub-code openness of communication (3.3) was based on five individuals (2%) who, apart from positively expressing themselves about the informational value, stated that they perceive the governmental communication as specifically open.

Overall 13 respondents (6%) mentioned the following main code, 'Clarity of the message (4)'. An example statement for Clarity of the message is: '[…] These conferences are clear and to the point' (Participant 184). All statements that pointed out that they perceive reasoning, argumentation, and clarity behind governmental messages were included within this code.

The last developed code giving advice (5) was represented seven times (3%). Individuals mentioned that they perceive that the government tries their best to give advice about dealing with the current situation. An example statement for the code giving advice is: '[I am satisfied with how they are] giving advice about how to deal with it' (Participant 187).

Summarizing: Across all responses, use and content of corona measures, frequency of updates, clarity of the message, and giving advice are aspects with which the sample is most satisfied within the current governmental crisis communication. Important to note, 54 participants (26%) did not respond to this question.

Table 5

Developed Codes and their Frequencies for Respondent's Satisfaction with Governmental Crisis Communication

Code	Statements	Frequency (%)
1. Use and content of corona measures	'[I am satisfied with] wearing face masks, 1.5m distance, cancelling big social gatherings' (Participant 105)	39 (19%)
2. Frequency of updates	'Regular updated regarding progress and statistics' (Participant 16)	37 (18%)
3. Informational value	'The press conferences are informational and they them quite often to keep us up to date' (Participant 22)	30 (14%)

3.1 Transparency of information	'Transparent numbers of those currently infected, those who died' (Participant 32)	7 (3%)
3.2 Perceived Honesty	'I find them to be relatively honest and trying hard to make restrictions only to a necessary extent' (Participant 202)	4 (1%)
3.3 Openness of communication	'[I am satisfied with] the frequent press-conferences and open communication.' (Participant 119)	5 (2%)
4. Clarity of the message	'The press conferences take place on a set day with a set time, which makes it very clear. These conferences are clear and to the point' (Participant 184)	13 (6%)
	'The government communicates reasons for certain measures and uses statistics and numbers to support their decisions' (Participant 150)	
5. Giving advice	'giving advices about how to deal with it' (Participant 187)	7 (3%)
No response		54 (26%)

Note. $N = 204$.

Dissatisfying aspects in governmental crisis communication

In addition to asking participants about satisfactory aspects concerning governmental crisis communication, they were also asked about what dissatisfies them. More specifically, participants were asked to name aspects that dissatisfy them about the current governmental crisis communication.

Also, in this case, respondent's statements were analysed via inductive coding. Based on the analysis, ten main codes have been developed, namely: Use and content of corona measures (1), Not enough restriction (2), Unclear updates/Changing regulations on short notice (3), Lack of arguments for the effectiveness of various decisions (4), Disregarding other consequences (5), Unclear explanations (6), Lack of transparency (7), Use of false promises (8), Use of fear/anxiety (9), and, Frequent change of used values to support decisions (10) (see Table 6).

The most frequently named negative aspect across all responses was the code 'Use and content of corona measures (1)'. In total, 34 respondents (17%) expressed themselves negatively about the current corona measures and criticised the strictness of some or even all measures. Statements such as: 'some of the measurements seem random and unfair […]' (Participant 185) were frequently made. However, some respondents communicated an even

more negative picture by stating: ‘they should not limit my freedoms, as they are supposed to represent me, not suppress me.’ (Participant 149). Nevertheless, both ‘types’ of responses were counted for the given code.

Besides individuals who feel negatively about the current corona measures in place, various respondents expressed dissatisfaction with corona measures, but in a different direction. In particular, the code ‘Not enough restriction (2)’ represents all responses that criticised the government for applying a too relaxed approach. For example, participant 64 declared: ‘I think measurements should be taken earlier and also kept strictly’ (Participant 64). Overall, 22 respondents (11%) have the opinion that the governmental corona measures are not strict enough.

The third code, ‘Unclear updates/Changing regulations on short notice’, was the second most frequently represented one. In total, 25 people (12%) complained about the frequency of changing measures and updates. Additionally, they also criticised how these changes are communicated. An example statement for the code Unclear updates/Changing regulations on short notice is: ‘Some regulations are vague. Short notice of instructing and easing regulations’ (Participant 15).

The code ‘Lack of arguments for the effectiveness of various decisions (4)’ gathers all statements made with respect to the lack of justifications and arguments for decisions made by the government. Specifically, respondents noted that decisions made by the government often lack scientific argumentation, e.g., ‘Official Announcements were often unclear, poorly justified and therefore unsatisfactory’ (Participant 8). On the whole, 21 individuals (10%) complained about this issue.

The fifth code, ‘Disregarding other consequences,’ was mentioned by 20 respondents (10%). Individuals pointed out that other consequences such as people's mental health, economic damage, lack of social life, etc., are more or less disregarded in the scope of the governmental crisis communication. Respondents often made statements such as: ‘Other issues regarding the lockdown such as bankruptcies, mental health problems or education issues are not at all or only briefly mentioned’ (Participant 19).

Next, the code ‘Unclear explanations (6)’ was observed by overall 13 respondents (6%). ‘I feel like they could add more explanation about things they agreed on. […]’ (Participant 42). This example statement serves as an indication of the problem. In other words, individuals miss the explanatory value in governmental crisis communication.

The seventh code, 'Lack of transparency', was mentioned by ten individuals (5%). Statements that clearly indicated that they do not perceive governmental information provision as transparent enough were included in the code. For example, participant 4 wrote: 'The decisions made by the government are not transparent.' Another example statement for the code is: 'some information omits details' (Participant 190).

Another pattern that became apparent while analysing responses was the code 'Use of false promises (8)'. Respondents noted that within crisis communication, the government sometimes uses false promises to calm people down. For instance, participant 68 wrote: '[I am not satisfied with the aspect that they make] false promises'. Using false promises was regarded as an unsatisfactory aspect of governmental crisis communication by eight people (4%).

The ninth code, 'Use of fear/anxiety' was represented seven times. Seven individuals (3%) criticised that governmental crisis communication uses fear-provoking stimuli in order to strengthen the message. For instance, one participant noted: '[...] the crisis communication as it is, is strongly based on fear and shame' (Participant 19).

Lastly, the code 'Frequent change of used values to support decisions (10)' was the least frequent. Overall, five respondents (2%) noted that the adjustment of used values to underline decisions is perceived as negative. For example, participant 7 wrote: 'Communication is based on constantly changing numbers, which are used to support new restrictions' (Participant 7).

In conclusion, respondents mentioned various dissatisfactory aspects in current governmental crisis communication. Based on the analysis, ten codes (see table 6) were developed that are considered negative impacts in present governmental crisis communication. Important to point out, 35 participants (17%) did not respond to this question.

Table 6

Developed Codes and their Frequencies for Respondent's Dissatisfaction with Governmental Crisis Communication

Code	Example Statement	Frequency
1. Use and content of corona measures	'I am not satisfied with some of the measures the government has taken to provide safety, […] impacting the life of many people largely in a negative way.' (Participant 3) 'they should not limit my freedoms, as they are supposed to represent me, not suppress me' (Participant 149)	34 (17%)

2. Not enough restriction	'not enough restrictions' (Participant 123) 'I think measurements should be taken earlier and also kept strictly.' (Participant 64)	22 (11%)
3. Unclear updates/Changing regulations on short notice	'Some regulations are vague. Short notice of instructing and easing regulations' (Participant 15)	25 (12%)
4. Lack of arguments for the effectiveness of various decisions (e.g. measures)	'Official Announcements were often unclear, poorly justified and therefore unsatisfactory' (Participant 8) 'government does not have a plan to stick to and the politicians do not stick to guidelines and advices provided by experts like virologists' (Participant 188)	21 (10%)
5. Disregarding other consequences (e.g. mental health, economical damage, social/student life)	'Other issues regarding the lockdown such as bankruptcies, mental health problems or education issues are not at all or only briefly mentioned […]' (Participant 19)	20 (10%)
6. Unclear explanations	'I feel like they could add more explanation about things they agreed on. Also, they could try to give a better prediction for the future' (Participant 42)	13 (6%)
7. Lack of transparency (in information provision)	'The decisions made by the government are not transparent.' (Participant 4) 'some information omits details' (Participant 190)	10 (5%)
8. Use of false promises	'[they make] false promises' (Participant 68)	8 (4%)
9. Use of fear/anxiety	'Die Regierung transportiert in der Kommunikation nur Angst' (Translation: 'The government communication only uses anxiety') (Participant 7) '[...] the crisis communication as it is, is strongly based on fear and shame' (Participant 19)	7 (3%)
10. Frequent change of used values to support decisions	‚Kommunikation […] gestützt aus zahlen die standing wechseln (fallzahlen, r-wert, inzidenz) immer passend für neue Einschränkungen. ' (Translation: 'Communication is based on constantly changing numbers, which are used to support new restrictions'). (Participant 7) 'The relevant numbers are changed every day in order to communicate a negative picture' (Participant 19)	5 (2%)
No response		35 (17%)

Note. $N = 204$.

Discussion

Summary of the Results and Theoretical Implications

The present study investigated the relationship between relevant psychological mechanisms and compliance with current governmental corona measures. In addition to that, it was explored how participants perceive current governmental crisis communication and whether participant's satisfaction with crisis communication also affects their compliance.

The first research question was: 'Which psychological constructs mostly predict compliance with corona measures?' It was found that 'response efficacy', 'self-efficacy', 'risk perception (feelings)', and 'social norms' were highly predictive of the level of compliance. This means that with increasing response efficacy, self-efficacy, feelings towards the risk, and social norms, compliance with corona measures heightened as well.

Response efficacy was the most predictive factor for compliance, which is in line with prevailing literature. Multiple studies investigated the effect of response efficacy on health-protective actions and concluded that increasing response-efficacy positively affects health-protective behaviour (Popova, 2012). Moreover, Clark et al. (2020) examined possible predictors of voluntary compliance with corona measures. They found that response-efficacy positively predicts voluntary compliance. Thus, for a broad range of behaviours, it was found that if people feel that the required behaviour has the desired effect, they are more willing to actually do so.

Besides response-efficacy, well-known models such as the EPPM and the Health Belief Model (HBM) also promote the use of self-efficacy for raising people's self-protective behaviour (Clark et al., 2020). A meta-analysis by Casey and colleagues (2009) examined the use of response- and self-efficacy for AIDS education and prevention. Self-efficacy was shown to be even more predictive for risk reduction and health-protective behaviour than response-efficacy (Casey et al., 2009). However, concerning compliance with health-protective corona measures, response-efficacy demonstrated greater predictive effects in both this study and in the study by Clark et al., 2020. Possibly, these differing results in virus infection prevention could be due to the different routes of infection. Since protective health behaviour concerning the two viruses differs, the psychological mechanisms of self-and response-efficacy may play different roles. In other words, protecting oneself against AIDS requires different measures than protecting oneself against the coronavirus. Consequently, self-protective behaviour and the accompanying mechanisms of self-and response- efficacy have to be addressed differently for each virus. Further research is needed to verify this.

Of all components of risk perception (probability, consequences, and feelings), only feelings appeared to be predictive for compliance. If people were more anxious or worried regarding the risk of infection, they complied more. Previous literature already pointed towards the importance of considering the role of feelings when investigating risk-perception (Loewenstein et al. 2001; Slovic & Peters, 2006). Likewise, Kerstholt, Duijnhoven, and Paton (2017) studied influencing factors on flood preparedness and found that affect markedly impacted preparedness. Hence, it could be concluded that preparatory behaviour is impacted by emotions (Kerstholt et al., 2017). Altogether, these findings support the vital role of feelings towards crises on protective behaviour, and in this case, also on compliance with corona measures.

Lastly, the finding that social norms weakly predict compliance with corona measures is also promoted by the generally prevalent effect of social norms on compliance (Chung & Rimal, 2016; Germani et al., 2020). Social norms have an active influence on behaviour through observing and learning from others. Especially in crises, the perception of human action concerning value or approval of protective behaviour may critically influence the behaviour of oneself (Bouman, Steg, & Dietz, 2021).

Only the variables 'risk perception (probabilities)', 'risk perception (consequences)' and 'trust in authorities' did not show any predictive effects on compliance with corona measures.

Perhaps' risk perception (probabilities)' and 'risk perception (consequences)' were not predictive for compliance due to the sample's relatively young mean age (M = 23.59). It could be that young people generally perceive themselves as less vulnerable compared to older individuals. Alternatively stated, young people might evaluate the likelihood of getting an infection and the associated consequences differently than people at risk. Franzen and Wöhner (2021) reported that young people especially do not perceive themselves to be at high personal risk. Hence, the sample's young mean age could indeed be an explanation. However, more research is needed to test this.

Moreover, researchers already noted that more data is needed to understand and conclude the effect of trust in authorities on compliance during a pandemic since current data suggests diverse conclusions (Still et al., 2020). In any case, this study could not support the effect of trust on authorities on compliance. Also, in this case, the sample's relatively young mean age might be a possible explanation. It could be that particularly for young people, trust in authorities might not be of major influence. If the sample would have been more representative of the general population, maybe the effect of trust in authorities would be different. Also, it should be considered that the term 'authorities' in this context is somewhat

broad. Specifically concerning virus information provision, not only politicians but also scientists may have a substantial impact. Nevertheless, more research is needed to clarify these contradictions in the literature.

Concerning the second research question, namely: 'To what extent are people satisfied with current governmental crisis communication?' it was found that participants were relatively unsatisfied as the sample mean was below the mean of the scale. The qualitative analysis demonstrated similar results. On the one hand, five main aspects were identified as satisfying in current governmental crisis communication, namely: 'Use and content of corona measures', 'Frequency of updates', 'Informational value (transparency, honesty, openness)', 'Clarity of the message', and 'Giving advice'. On the other hand, ten main aspects were detected as being quite dissatisfying in governmental crisis communication. These were:' Use and content of corona measures', 'Not enough restriction', 'Unclear updates/Changing regulations on short notice', 'Lack of arguments for the effectiveness of various decisions', 'Disregarding other consequences', 'Unclear explanation', 'Lack of transparency, 'Use of false promises', 'Use of fear/anxiety, and 'frequent change of used values to support decisions'. Most aspects reflect people's dissatisfaction about insufficient explanations. In other words, participants mostly complained about lacking important knowledge and explanations about protective actions and governmental decisions. In principle, people want to understand the reasoning behind actions and decisions before executing certain behaviours (Modrek & Sandoval, 2020). Their need for reasoning was probably not appropriately met, which might explain the dissatisfaction with governmental crisis communication to at least some extent.

As already pointed out, it is frequently stated that effective crisis communication is crucial for increasing compliance with protective health measures (Lawson, 2007; Lin, McCloud, Jung & Viswanath, 2018; Christensen & Laegreid, 2020). Yet, no predictive effect of satisfaction with crisis communication on compliance with corona measures could be found in the present study.

Practical Implications

The present study underlines the importance of including both response- and self-efficacy components in crisis communication for increasing compliance with health-protective corona measures. Moreover, addressing and preventing a decline of people's feelings towards the risk is further advised to raise compliance. Lastly, emphasizing and consolidating stable social norms is additionally considered a vital factor for increasing compliance. Existing literature states that to enhance people's perceived self-and response-

efficacy, governmental crisis communication should emphasize conveying confidence in the ability of people to perform the measure and in the effectiveness of the measure itself (Hoeken & Geurts, 2005). Furthermore, by frequently reminding people that their overall social network mostly complies with the measures, their perceived social norm can be strengthened (Goldberg et al., 2020). This, in turn, could also positively affect compliance. In addition to that, Bults and colleagues (2011) suggest that for assuring that risk-perception remains stable, communication must happen regularly.

Based on the qualitative analysis, it is advised to provide clear, accurate, and transparent information/explanations to increase satisfaction with governmental crisis communication. This is necessary for people to form an accurate understanding of the risk and its associated consequences. If that is provided, Lindell and Perry (2003) propose that people are even more likely to engage in protective behaviour. Also, findings of the present study suggest that arguments for various decisions should always be provided and, in the best case, be based on scientific literature. In addition to that, the use of false promises and fear appeals is recommended to be avoided. Multiple scientists claim that raising fear and anxiety should be strictly refrained from as the accompanying collateral damage might be devastating (Peters, Ruiter, & Kok, 2013; Stolow, Moses, Lederer, & Carter, 2020). Lastly, emphasizing collateral damage of the crisis, such as people's mental health and economic damage, might also enhance people's satisfaction with governmental crisis communication as 10% of the sample specifically mentioned that they would like the government to address these issues more frequently.

Limitations

The first limitation of the present study is social desirability, functioning as a confounding factor. Naturally, people are inclined to overstate desirable behaviours and understate undesired behaviours to appear more likable (Latkin, Edwards, Davey-Rothwell, & Tobin, 2017). As this research was solely based on participant's self-reported data/statements, it could be the case that participants gave more socially desirable indications. Particularly, indicating higher scores for compliance to appear more responsible.

Another limitation is that the present study was based on convenience sampling. As a result, the sample was not equally distributed in gender and age. Mostly students volunteered their time to participate in the study. Thus, the majority of participants had a high-educational background. Consequently, the generalizability of the present study's results is restricted due to the samples demographic characteristics.

In addition to that, the present study's findings can not be inferred to other cultures as this study was primarily concerned with two western countries (Netherlands and Germany).

Strengths

The present study provides valuable insights for increasing compliance with protective health measures during the coronavirus crises. Predictive effects of psychological mechanisms on compliance could be further supported. Therefore, this research might support the containment of the coronavirus.

Presently, multiple studies are exploring compliance with health-protective measures during a pandemic, and many predictive effects have already been established. However, to the best of my knowledge, this study is one of the first that specifically demonstrated a predictive effect of feelings in risk perception on compliance with corona measures.

Another strength of the current study is the additional qualitative analysis of people's opinions towards crisis communication. Thus, interesting and novel insights could be gained about people's satisfaction with Dutch and German crisis communication. Additionally, since the data collection took place during an actual crisis period, more accurate and valuable data could be gathered compared to an imagined scenario.

Considerations for future research

Present findings suggest diverse conclusions concerning the importance of trust in authorities. For example, some researchers concluded that trust in authorities plays a vital role in predicting compliance with health-protective corona measures (Bargain & Aminojonov, 2020), while this and other studies suggest the opposite (Clark et al., 2020). Future research could further investigate the effect of trust in authorities on compliance with corona health measures. Since this study's findings cannot be generalized to the entire population, a more representative sample would be necessary to draw more accurate inferences.

Furthermore, participants complained about the governmental use of fear appeals to strengthen compliance with measures. Some scientists already argued that the use of fear appeal produces enormous collateral damage, such as increased depression and anxiety rates, and even message denial and risky behaviour can be expected (Stolow et al., 2020). Interesting studies already found that self-protective behaviour can be increased by, for instance, only increasing self and response efficacy (Gore & Bracken, 2005). Future research could also experimentally test whether raising self and response efficacy and strengthening

people's perception of social norms (without using fear appeals) might produce sufficient or even more compliance with corona measures.

Moreover, future research could also explore people's satisfaction with crisis communication across countries. Thereby, one could further analyse the different communication styles and, based on that, formulate suggestions for improvement. Although satisfaction with crisis communication was not shown to predict compliance, it might increase public welfare.

Conclusion

The present study investigated psychological mechanisms influencing and predicting compliance with corona measures. Further, the paper explored people's opinions about current (15.03.2021-15.04.2021) governmental crisis communication and examined whether crisis communication satisfaction might also function as a possible predictor. Response- and self-efficacy, feelings towards the risk, and social norms were identified as significant predictors of compliance with corona measures. People's satisfaction with governmental crisis communication was relatively low, and satisfactory and unsatisfactory aspects were documented.

Further research is needed to verify existing knowledge, identify additional determinants of compliance, and explore how compliance with health-protective behaviour (corona measures) can be raised without the use of fear appeals. Ultimately, to increase compliance, it is recommended to increase the use of efficacy components, strengthening people's perceived social norms and risk perception. To enhance satisfaction with governmental crisis communication, it is advised to frequently provide accurate and transparent information.

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Appendix

Appendix A

Information about the study

Presently, the world's population experiences one of the most extraordinary global health and economic crisis for centuries. The coronavirus or COVID-19 disseminated across the world, causing an unpredictable pandemic. To reduce the spread of the virus, measures such as social distancing, quarantine, wearing face- masks, and keeping 1.5 meters distance have been initiated by the Dutch and German government. Certainly, everyone is affected by these measures, and to understand their encompassing impact, it is fundamental and necessary to consider the populations' experiences.

Consequently, the present study is interested in your personal experiences with the current corona measures. Your personal opinion and perception are extremely valuable for increasing knowledge within this uncertain situation. Please note that there are no right or wrong answers. We kindly ask you to be as honest as possible while filling out the following questionnaire. Furthermore, you need to be at least 18 years or older in order to participate in the study.

Lastly, it is important to mention that participating in this study is completely voluntary, and you may withdraw from the study at any time. Please be aware that only your demographic information (age, gender, location, and ethnicity) will be considered when participating in this study. Apart from that, your data is completely anonymized, and it will not be possible to identify you as a participant.

Appendix B

Informed consent

Before you proceed with this questionnaire, please read the informed consent information below.

By proceeding with this questionnaire, you declare that you have been informed in a manner that is clear to you about the nature and method of the research as described before. You are aware that participating in this research is completely voluntary and that you may withdraw this consent at any time without giving any reason. By no means will your real name or identifying information be included in the report of this research. Nobody, except the researcher and the research supervisor, will have access to this anonymized data in its entirety. Your personal data will not be disclosed to third parties without your expressed permission. If you have any questions, now or in the future, you may contact Kira Bibic (k.bibic@student.utwente.nl).

If you have any complaints about this research, please direct them to the secretary of the Ethics Committee of the Faculty of Behavioural, Management and Social Sciences at the University of Twente, Drs. L. Kamphuis-Blikman P.O. Box 217, 7500 AE Enschede (NL), telephone: +31 (0)53 489 3399; email: l.j.m.blikman@utwente.nl).

If you click on proceed, you indicate that you read and understood the informed consent and have been informed in a manner that is clear to you about the research's nature and method. By proceeding, you agree with participating in this study.

Appendix C

Figure 1

Normal Q-Q Plot of Standardized Residuals.