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Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020

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Abstract

Fear is an adaptive response in the presence of danger. However, when threat is uncertain and continuous, as in the current coronavirus disease (COVID-19) pandemic, fear can become chronic and burdensome. To better understand predictors of fear of the coronavirus, we conducted an online survey (N = 439) between March 14 and 17, 2020, which started three days after the World Health Organization declared the coronavirus outbreak a pandemic. Fear of the coronavirus was assessed with eight questions pertaining to different dimensions of fear (e.g., subjective worry, avoidance, preferential attention) and an open-ended question. The predictors included measures of psychological vulnerability factors (i.e., intolerance of uncertainty, worry, health anxiety), media exposure, and personal relevance (i.e., personal health, risk for loved ones, and risk control). We found that respondents reported a wide range of concerns relating to the coronavirus outbreak, such as their employment, spreading of the virus, and economic and societal consequences. Four predictors for fear of the coronavirus were retained after forward selection in a multiple regression analysis: intolerance of uncertainty, health anxiety, more media exposure, and risks for loved ones ($R^2 = .36$). We discuss the relevance of our findings for managing people's fear of the coronavirus.

Keywords: Fear; Coronavirus; Intolerance of uncertainty; Health anxiety; Media exposure

1. Introduction

Fear is an adaptive emotion that serves to mobilize energy to deal with potential threat. However, when fear is not well calibrated to the actual threat, it can be maladaptive. For instance, when fear is too excessive, this may have detrimental effects both at the individual level (e.g., mental health problems such as phobia and social anxiety), and at the societal level (e.g., panic shopping or xenophobia). On the other hand, when there is insufficient fear, this may also result in harm for individuals and society (e.g., due to people ignoring government measures to slow the spread of coronavirus or due to reckless policies that ignore the risks). Furthermore, safety behaviors (e.g., hand washing) can mitigate certain threats (e.g., contamination), but they can paradoxically also enhance fear (e.g., contamination concern and health anxiety) (see Deacon & Maack, 2008; Engelhard et al., 2015; Olatunji et al., 2011). Likewise, societal safety measures (e.g., lockdowns) have their use to prevent spreading of infections. However, when such safety measures are too prolonged or strict, they can have negative consequences (e.g., disruption of the economy, unemployment).

With the outbreak of the coronavirus (COVID-19) in China in December 2019 and in Europe in February 2020, national polls indicate sharp increases in fear and worries relating to the virus (Asmundson & Taylor, 2020; McCarthy, 2020). Given the potential detrimental effects of both excessive and insufficient fear (at both the individual and societal level), it is important to better understand and know the relevant predictors of fear of the coronavirus.

Several possible predictors can be derived from the scientific literature. First, there are psychological vulnerability factors (see also Asmundson & Taylor, 2020). Some people are more disposed to experiencing anxiety and fear than others. Of particular interest is intolerance of uncertainty, which is usually described as a disposition towards finding uncertain situations

unpleasant and difficult to endure. Higher intolerance of uncertainty is associated with various anxiety-related disorders, such as generalized anxiety disorder (Boswell et al., 2013; Rosser, 2019). We expected intolerance of uncertainty to predict higher levels of coronavirus fear. Furthermore, two other vulnerability factors implicated in anxiety-related disorders are of interest here: worry and health-related anxiety (Abramowitz et al., 2007; Meyer et al., 1990). We also expected these factors to be related to fear of the coronavirus, but it was uncertain whether they would explain variance beyond the explained variance by intolerance of uncertainty.

Another variable of interest is exposure to information about the impending threat. Threat information is known to elevate levels of fear, both in laboratory (Mertens et al., 2018; Muris & Field, 2010) and in field (Cauberghe et al., 2009) studies. There is evidence that repeatedly engaging with trauma-related media content for several hours daily shortly after collective trauma may prolong acute stress experiences (Holman et al., 2014). Therefore, we expected that for the coronavirus outbreak, more exposure to threat information (e.g., reading news bulletins about new deaths, social media posts) would increase fear of the virus (Garfin et al., 2020).

Finally, individual vulnerability factors and exposure to threatening messages may not suffice to explain subjectively experienced threat and fear. A third important factor to consider is whether the threat is personally relevant, either to oneself or to loved ones (Stussi et al., 2015). As such, one would expect more worry and fear if the threat of the coronavirus is highly relevant for oneself (e.g., because of worse general health) or to loved ones (e.g., grandparents). Additionally, fear of the virus may be moderated by perceived coping potential. Coping refers to available (mental) resources to mitigate potential threat (Taylor & Stanton, 2007). If perceived coping is high, threat perception and fear are expected to be low. Hence, we expect that personal

relevance of the threat for oneself and loved ones and coping ability (risk control) would be related to the coronavirus fear.

To investigate individual vulnerability, media exposure, personal relevance, and coping ability as predictors of the coronavirus fear, we conducted an online survey with a custom-built questionnaire to assess fear of the virus. The study was conducted between March 14 and 17, 2020, which was three days after the World Health Organization (WHO, 2020) declared the coronavirus outbreak a pandemic, and it included the weekend after most European countries announced increasingly strict measures to contain the coronavirus outbreak.

2. Methods

2.1. Sample and sample size determination

Respondents for this study were recruited through online advertisements using social media platforms of the involved researchers (e.g., LinkedIn, Facebook, Twitter, Reddit). Data from 695 respondents were recorded. However, 253 respondents did not complete the questionnaire and data from three additional respondents were removed because they did not answer all questions, so the final sample consisted of 439 respondents (completion rate: 63.17%), representing 28 different countries. The majority of our sample consisted of women (69.93%) and a large portion of the respondents lived in the Netherlands (47.61%) (see Table 1 for a detailed overview of the demographics of our sample). Participation was on a voluntary basis. The Ethics Committee of the Faculty of Social and Behavioral Science of Utrecht University approved this study (FETC20-166).

The minimal sample size of this study was based on an a priori power calculation. Particularly, we decided to recruit at least 194 respondents, as this would provide sufficient statistical power (.80) to detect small sized correlation coefficients (.20) (https://www.sample-

size.net/correlation-sample-size/). We allowed a larger sample size, because this would increase the statistical power for detecting smaller effects and strengthen the robustness of the findings. Data collection was stopped after three days due to the collection of sufficient responses and the announcement of stricter safety measures by the Dutch government and other European countries (which could affect subsequent responses).

Table 1. Demographic information of the respondents (total N = 439).

	N	**%**
Age in years		
16-20	46	10.48%
21-30	215	47.97%
31-40	98	22.32%
41-50	47	10.71%
51-60	16	3.64%
61-70	16	3.64%
71-80	1	0.23%
Gender		
Male	126	28.70%
Female	307	69.93%
Prefer not to say	6	1.37%
Highest education		
Less than High School	22	5.01%
High School diploma	34	7.74%
College degree	63	14.35%
Master's degree	277	63.10%
Doctorate (PhD or equivalent)	43	9.79%
Country of residence by region[1]		
Asia (incl. India)	3	0.68%
Australia	4	0.91%
Europe (incl. Russia)	321	73.12%
Middle-East (incl. Israel)	2	0.46%
North-America	102	23.23%
South-America	7	1.59%
Sub-Sahara Africa	0	0%
Work in healthcare		
Yes	48	10.93%
No	345	78.59%
Unsure	46	10.48%
Infected by the coronavirus?		
Yes	0	0%
No	392	89.75%
Unsure	47	10.71%

Note: [1]Full list of countries of residence*:* Australia, Austria, Belgium, Canada, Chile, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hong Kong (S.A.R.), India, Israel, Italy, Latvia, Netherlands, Norway, Peru, Romania, Russian Federation, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, USA.

2.2. Materials & Procedure

2.2.1. Measures

2.2.1.1. Fear of the coronavirus

Fear of the coronavirus was measured using a custom-built questionnaire consisting of eight statements. Respondents were asked to rate their level of agreement with each statement on a 5-point Likert scale (1 = “Strongly disagree”, 5 = “Strongly agree”). Examples of the items are: “I am very worried about the coronavirus”, “I am taking precautions to prevent infection (e.g., washing hands, avoiding contact with people, avoiding door handles)”, and “I am constantly following all news updates regarding the virus” (see Supplementary Table 1 for a full list of all the items). These items were chosen because they correspond with different fear components, such as subjective experiences (worrying), attentional biases, and avoidance behaviors (Lang, 1968). The internal consistency of this scale was evaluated and found to be acceptable (Cronbach’s alpha = 0.77). Hence, we calculated a sum score of this scale as the outcome measure for our statistical analyses (possible range: 8-40), with higher scores indicating more fear of the coronavirus outbreak.

In addition, we included one open-ended question in which respondents were asked to describe their biggest concern about the coronavirus. Respondents were required to provide an answer to this question.

2.2.1.2. Intolerance of uncertainty scale

Intolerance of uncertainty (IU) was measured using the short IU scale developed and validated by Carleton et al. (2007), which assesses an individual’s propensity to find uncertain situations

unpleasant. It consists of 12 statements scored on 5-point Likert scales (1 = “Not at all characteristic of me”, 5 = “Entirely characteristic of me”). Examples of the statements are: “Unforeseen events upset me greatly”, “It frustrates me not having all the information I need”, and “Uncertainty keeps me from living a full life”. The internal consistency of this scale was excellent in the current sample (Cronbach’s alpha = 0.92).

2.2.1.3. Penn State Worry Questionnaire

The Penn State Worry Questionnaire (PSWQ) was used to measure a person’s tendency to worry. The PSWQ is a well-validated questionnaire that is often used in clinical settings (Meyer et al., 1990). In this study, we used a shortened version consisting of eight items rated on 5-point Likert scales (1 = “Not at all typical of me”, 5 = “Very typical of me”). Examples of the items are: “My worries overwhelm me”, “Many situations make me worry”, and “I know I should not worry about things, but I just cannot help it”. The internal consistency of this scale was excellent in the current sample (Cronbach’s alpha = 0.94).

2.2.1.4. Health anxiety inventory

The health anxiety inventory was used to evaluate individuals’ tendency to worry about their health (Abramowitz et al., 2007). It consisted of 18 four-choice questions. Examples include “1 = I do not worry about my health; 2 = I occasionally worry about my health; 3 = I spend much of my time worrying about my health; 4 = I spend most of my time worrying about my health” and “1 = I notice aches/pains less than most other people (of my age); 2 = I notice aches/pains as much as most other people (of my age); 3 = I notice aches/pains more than most other people (of

my age); 4 = I am aware of aches/pains in my body all the time." The internal consistency of this scale was good in the current sample (Cronbach's alpha = 0.85).

2.2.1.5. Media exposure

To measure voluntary exposure to news about the coronavirus, respondents were asked to answer the following question: "Have you looked up any extra information regarding the corona virus outbreak? (not taking into account coincidentally seeing/reading about it in the news)" with yes or no. Furthermore, if they had looked up any information, they were asked to indicate what sources they consulted (options: "Regular newspapers/websites/TV news", "Social media (Facebook, Twitter, Instagram, ...)", "Professional websites (health institute, blogs posted by virologists/biologists, ...)", "Friends/family/acquaintances", "Online searches (e.g., through Google, Bing, Ecosia, etc.)", "Other (please specify)"; multiple answers were possible). Finally, they were asked to rate the extent to which they paid attention to the source when looking up new information using 5-point Likert scales (1 = "Strongly agree", 5 = "Strongly disagree").

2.2.1.6. General health, risk control, and risk for loved ones

Respondents were also asked to rate their general health, their perceived control, and risk for their loved ones using 5-point rating scales. Particularly, they were asked to answer the following question: "Overall, I would rate my general health as:" (options: "Extremely good", "Somewhat good", "Neither good nor bad", "Somewhat bad", "Extremely bad"). Perceived control was assessed with the following question: "Overall, I believe that I can control or avoid becoming infected by the coronavirus (e.g., by limiting social contact, washing hands, wearing a face mask, etc.):" (options: "Strongly agree', "Somewhat agree", "Neither agree nor disagree", "Somewhat

disagree", "Strongly disagree"). Finally, risk perception for loved ones was assessed with the following question: "Overall, I believe that people that I care about (e.g., grandparents) are at risk of becoming infected and seriously ill due to the coronavirus outbreak:" (options: "Strongly agree', "Somewhat agree", "Neither agree nor disagree", "Somewhat disagree", "Strongly disagree").

2.2.1.7. Demographic information

As demographic predictors, respondents were asked to indicate the gender they identify with the most ("male", "female", "prefer not to say"), their age (in decade categories), their highest educational level obtained (from "less than high school degree" to "Doctorate (PhD or equivalent)"), whether they work in health care ("yes", "no", "unsure (please clarify)"), whether they already got infected by the virus ("yes", "no", "unsure"), and their country of residence.

2.2.2. Survey administration

All questionnaires described above were delivered through an online survey using the Qualtrics platform (https://www.qualtrics.com/). The online survey could be completed with the use of a personal computer/laptop and smartphone. The complete survey consisted of 60 self-report items and took approximately 15 minutes to complete.

2.3. Data analysis strategy

First, respondents' answers to the open-ended question regarding their biggest concern for the coronavirus were hand-coded by the second author. Sixteen different topics were identified relating to respondents' concerns. Coding was independently checked by the first author. Cohen's Kappa was calculated to determine the degree of inter-rater agreement (Cohen, 1960).

Conflicts were resolved by conservatively coding each conflicting response as relating to a particular topic.

Second, predictors of coronavirus fear as assessed by the custom-built questionnaire were investigated using simple Pearson's correlation coefficients for the continuous predictors and then using one-way ANOVA's for the categorical predictors. All predictors were included, with three exceptions. First, country of residence was not included as a predictor because the majority of the respondents (78.36%) was from a limited number of countries (Belgium, the Netherlands, the United Kingdom, and the United States). Second, we did not include whether respondents had paid attention to the source of the additional information they had looked up, because not all respondents had looked up additional information and including this variable would result in the list-wise exclusion of these respondents. Finally, we did not separately assess the additional information sources respondents consulted for extra information (e.g., regular news, social media, professional websites, etc.). This was decided because respondents could select multiple options, and therefore consultation of the different sources was not independent of one another other (e.g., the same respondent could have consulted social media, specialized websites, and family and friends). Instead, we calculated a sum score of the number of additional sources consulted by respondents.

Following univariate analyses, a multiple regression model was conducted including all significant predictors from the univariate analyses to investigate the unique contribution of each of the predictors in explaining variance in the fear of the coronavirus questionnaire. Predictors that explained additional variance in the model were selected using forward selection. Analyses were conducted in IBM SPSS v26 and an alpha cut-off of .05 was used in all analyses.

3. Results

3.1. Respondents' main concern about coronavirus (open-ended question)

Responses from two respondents were missing, so data were available for 437 respondents who completed the question. The results are summarized in Table 2. Each open-ended answer could relate to several concerns, so the percentages reflect the number of respondents who indicated a particular topic as a concern.

Table 2. Coded answers regarding respondents' biggest concerns about the coronavirus.

Biggest concern	N (%)	Interrater agreement (Cohen's κ)	Example
Health of others (friends, grandparents, loved ones)	202 (46.22%)	0.85	"Loved ones get very ill or die."
Health care collapse	85 (19.45%)	0.83	"That it may infect too many people and turns uncontrollable."
Consequences for the economy	79 (18.08%)	0.82	"People losing their jobs and livelihoods."
Mass panic	67 (15.33%)	0.85	"Panicking people stressing out the economy creating their own disasters."
Personal health	48 (10.98%)	0.83	"Because of my lung disease, I am afraid of getting the virus and dying."
Societal breakdown	45 (6.18%)	0.59	"Panic, disturbed balance in society."
Personal economy (e.g., losing job/future prospects)	42 (9.61%)	0.66	"I live paycheck to paycheck and can't afford disruption to work."
Virus itself being dangerous, not disappearing, mutating	40 (9.15%)	0.59	"Virus mutation into a deadlier strain."
Unknowingly spreading virus to others	40 (9.15%)	0.71	"That I will unknowingly infect others who are immuno-compromised."
Others not following rules	30 (6.86%)	0.58	"Many people underestimate the disease and its effect on some people."
Being in quarantine/lockdown	25 (5.72%)	0.51	"My biggest concern about corona virus is about how long I will be able to handle isolation."
Not trusting government or believing government is acting adequately	25 (5.72%)	0.55	"I wonder whether the government is providing us with all the available information."
Food/supplies shortage	24 (5.49%)	0.69	"Being quarantined and not having enough food."
Disruption in personal routine	23 (5.26%)	0.40	"Missing a lot of school."
Travel ban	20 (4.58%)	0.61	"I'm currently abroad for work. Not being able to return home as planned."
Role of media/ fake news	11 (2.52%)	0.62	"Mass panic and fake news."

Note: All inter-rater reliabilities were significantly higher than chance, *p*s < .001.

3.2. Univariate analyses

3.2.1. Continuous predictors

Pearson's correlation coefficients between the fear of the coronavirus questionnaire and the continuous predictors are provided in Table 3. As can be seen, these were all significant (*p*-values < .01), except for perceived control of being infected and age. Risk of infection for loved ones was the most strongly related predictor to the fear of the coronavirus questionnaire.

Table 3. Pearson's correlation coefficients between fear for the coronavirus and the continuous predictors

	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Fear of coronavirus questionnaire	25.85	5.91	-									
2. IU	29.22	9.78	.27**	-								
3. PSWQ	21.15	8.59	.26**	0.71**	-							
4. Health anxiety	31.42	6.24	.34**	0.49**	0.57**	-						
5. Number of information sources (0-6)	2.33	1.51	.38**	.12**	.07	.15**	-					
6. Overall health (1-5)	4.07	0.83	-.15**	-.26**	-.27**	-.45**	-.07	-				
7. Control being infected (1-5)	3.61	1.00	.01	-.00	-.05	-.14**	-.03	.10*	-			
8. Danger loved ones (1-5)	4.11	0.91	.43**	.06	.10*	.18**	.12*	-.01	-.06	-		
9. Age (in decades)	2.60	1.17	.05	-.36**	-.35**	-.22**	-.03	.03	.03	-.04	-	
10. Highest education (1-6)	4.74	1.51	-.07	-.25**	-.20**	-.22**	.04	.24**	-.07	-.00	.33**	-

Note: *p < .05; **p < .01; IU = Intolerance of Uncertainty scale; PSWQ = Penn State Worry Questionnaire.

3.2.2. Categorical predictors

The results of the one-way ANOVAs investigating the categorical predictors of fear of the coronavirus questionnaire are summarized in Table 4. The only significant predictor was having looked up additional information about the coronavirus outbreak (not taking into account coincidentally seeing/reading about it in the news). The other categorical predictors did not significantly predict fear of the coronavirus.

Table 4. Results from univariate ANOVAs for the categorical predictors of fear of the coronavirus.

Predictors	Mean (SD) fear of coronavirus questionnaire	*F*-value	*p*-value	Partial Eta^2
Gender		1.64	.194	.007
Female (n = 307)	26.16 (5.73)			
Male (n = 126)	25.05 (6.28)			
Prefer not to say (n = 6)	26.67 (6.47)			
Looked up information		40.88	< .001	.086
No (n = 86)	22.35 (5.75)			
Yes (n = 353)	26.70 (5.64)			
Infected by the virus		0.04	.852	.000
No (n = 392)	25.83 (5.90)			
Unsure (n = 47)	26.00 (6.10)			
Work in healthcare		0.29	.887	.003
No (n = 345)	25.85 (5.92)			
Yes (doctor) (n = 9)	24.56 (9.17)			
Yes (nurse) (n = 12)	26.83 (5.80)			
Yes (tech/support) (n = 27)	25.26 (5.74)			
Unsure (n = 46)	26.15 (5.40)			

3.3. Multiple regression analysis

To investigate which combination of the different predictors explained best the variation in fear of the coronavirus questionnaire, all significant continuous predictors (intolerance of uncertainty, PSWQ, health anxiety, number of information sources, overall health, and danger for loved ones), and the significant categorical predictor (looked up information) were entered into a multiple regression model. Using forward selection, intolerance of uncertainty, health anxiety, number of information sources, and risk for loved ones were included in the final model (R^2 = .36, $F(4, 433) = 60.49$, $p < .001$). The other predictors (i.e., PSWQ, overall health, and looked up information) did not further improve model fit. Table 5 provides the standardized regression coefficients of the predictors in the final model. Model fit indices of the multiple regression analysis are provided in Supplementary Table 2.

Table 5. Retained predictors of fear of the coronavirus questionnaire after backwards selection in a multiple regression analysis.

Predictor	Standardized β	*t*-statistic	*p*-value
Intolerance of uncertainty	0.124	2.79	.006
Health anxiety	0.172	3.82	< .001
Number of information sources	0.300	7.67	< .001
Risk for loved ones	0.354	8.99	< .001

4. Discussion

The current report investigated predictors of fear of the coronavirus (COVID-19) outbreak in an online survey study. Based on the literature, we expected that individual difference variables (intolerance of uncertainty, worry-proneness, and health anxiety) would predict increased fear of the coronavirus. Additionally, we expected that more media exposure and higher personal relevance of the threat (for both oneself and loved ones, and less risk control) would predict increased levels of fear. In line with these predictions, we found that all these factors predicted higher scores on the fear of the coronavirus questionnaire. Particularly, intolerance of uncertainty, health anxiety, risk for loved ones, and consulting more information sources were independent predictors for the fear of the coronavirus questionnaire. Furthermore, we found a wide range of worries that respondents reported in the open-ended question, of which concerns for others' was the most often indicated concern. Such results are relevant for policy makers and (mental) health care workers to know who is more inclined to react fearfully toward the coronavirus outbreak, and for journalists to be aware the potential fear-inducing impact of their work.

Answers of respondents to the open question revealed a wider range of concerns than those included in the fear of the coronavirus questionnaire. Particularly, apart from concerns for their own safety, those of others, and related safety and avoidance behaviors (which were already included in our questionnaire), respondents also worried about the impact of the coronavirus on the healthcare system, the economy, society, losing their job and changes in daily routines. To a lesser extent, respondents reported concerns regarding properties of the virus itself, reactions of

others, effects of the lock downs, and inadvertently spreading the virus. We suggest that future assessments of fear of the coronavirus also include items relating to these concerns.

With regard of predictors for fear of the coronavirus questionnaire, as expected, our results indicate that people who are more at risk of developing general anxiety-related symptomatology (i.e., individuals with heightened intolerance of uncertainty, worry, and health anxiety) are also more afraid of the coronavirus outbreak. Interestingly, after selection in a multiple regression model, only intolerance of uncertainty and health anxiety were retained, whereas worry was not. The latter finding is most likely due to the large overlap between the constructs. Particularly, the intolerance of uncertainty scale and PSWQ were highly correlated in this sample. Nonetheless, it is interesting that health anxiety explained additional variance beyond the variance explained by the intolerance of uncertainty scale and PSWQ. This indicates that health anxiety is a unique component in explaining fear of the coronavirus, beyond mere uncertainty and worrying.

Furthermore, we found that more media exposure was positively related to fear of the coronavirus questionnaire. This is consistent with earlier findings in other types of collective life-events (Garfin et al., 2020). Some suggestions for the management of fear can be made based on this finding. Particularly, if this relationship is causal, then there are opportunities for policy makers and journalists to affect excessive fear. One way to do this is to ensure that communication is clear and unambiguous, because uncertainty tends to increase fear (Lissek et al., 2006). Information should also be provided without sensationalism or disturbing images (Garfin et al., 2020). In addition, there are also opportunities for individuals themselves to tackle their fear. People can be advised to somewhat restrict their exposure to media coverage of the

corona crisis (e.g., to check media sources only a limited amount of times per day and not continuously throughout the day) and avoid sensational media, which may enhance stress and decrease well-being.

Another major source of fear of the coronavirus was the perceived risk of infection by the virus for loved ones. In fact, this was the strongest predictor of fear of the coronavirus questionnaire in our sample. Likewise, the risk of infection by loved ones was the most commonly reported concern by the respondents in the open-ended question. This worry could be mitigated by providing the general public with clear information about the risk of threat and by taking (additional) steps to protect vulnerable groups for risk of infection. Clear communication regarding this concern may also be helpful in motivating people to follow government guidelines: when they ignore social distancing guidelines, because they deem their own risk to be low, they are actually increasing health risks for their loved ones.

Our results may also be taken as indicative that stronger messages in the media may induce more fear and therefore more compliance with the social distancing and lock down policies imposed. However, we caution against using media messages to induce more fear in the general public. Particularly, there is evidence that suggest that such ‘fear appeals’ do not work very well to promote behavior change (Peters et al., 2013), particularly when people have little coping strategies. Under such circumstances, which may apply to the current coronavirus crisis, it may not be very helpful to maximize fear, as this may only increase distress. Furthermore, a substantial proportion of respondents in our sample was concerned about the role of (social) media on mass panic and hysteria. Hence, fear appeals in the media should be used carefully and whether fear appeals work for the current situation requires empirical evaluation.

Some strengths and limitations of this study should be noted. The strengths include the temporal proximity to the initial developments regarding the coronavirus outbreak. This study was conducted within days that the WHO declared the coronavirus outbreak a pandemic and strict safety measures imposed by various European countries. Another strength is that the included measurement instruments had good psychometric properties and that our sample size was sufficiently large for detecting small correlations. Limitations of this study include the non-representativeness of our sample, which consisted to a large extent of Dutch highly educated females aged between 20 and 40, and the cross-sectional nature of the study. This may limit the generalizability of our results to a wider population and claims about the directionality of the results.

In conclusion, in this online study, we found that respondents report a wide range of concern regarding the coronavirus outbreak. Furthermore, anxious individual differences, exposure to media information about the coronavirus outbreak, and risk of infection by loved ones were positively related to increased fear of the coronavirus. These results may help policy makers and health care workers to manage maladaptive levels of fear and worry due to the coronavirus outbreak.

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Declaration of Interest Statement

The authors declare no conflict of interest regarding the research reported in this article.

Data Availability Statement

The data of the experiment reported in this article can be obtained at https://osf.io/t5uvn/.

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Supplementary Materials

Supplementary table 1. *Items of the fear of the coronavirus questionnaire and the observed means, standard deviation and range in the current sample.*

Please select the extent to which the following thoughts, feelings and behaviors apply to you: (anchors: 1 = "Strongly disagree"; 5 = "Strongly agree")	Mean	SD	Range
1. I am very worried about the corona virus outbreak.	3.49	1.11	1-5
2. I am taking precautions to prevent infection (e.g., washing hands, avoiding contact with people, avoiding door handles).	4.29	0.85	1-5
3. I am constantly following all news updates regarding the virus.	3.80	1.16	1-5
4. I have stocked up on supplies to prepare for problems related to the coronavirus outbreak.	2.32	1.31	1-5
5. For my personal health I find the virus to be much more dangerous than the seasonal flu.	2.66	1.33	1-5
6. I feel that the health authorities are not doing enough to deal with the virus.	2.87	1.37	1-5
7. I am worried that friends or family will be infected.	3.77	1.13	1-5
8. I take more precautions compared to most people to not become infected.	2.65	1.19	1-5

Supplementary Table 2. *Model fit of the different models in the multiple regression analysis.*

	Model fit (R^2)	R^2 change	Change statistic	*p*-value
Model 1: β_0 + β_1*Risk_loved_ones	.184	.184	$F(1, 436) = 98.22$	< .001
Model 2: β_0 + β_1*Risk_loved_ones + β_2*Number_of_sources	.295	.111	$F(1, 435) = 68.82$	< .001
Model 3: β_0 + β_1*Risk_loved_ones + β_2*Number_of_sources + β_3*Health_anxiety	.347	.052	$F(1, 434) = 34.33$	< .001
Model 4: β_0 + β_1*Risk_loved_ones + β_2*Number_of_sources + β_3*Health_anxiety + β_4*IU	.358	.012	$F(1, 433) = 7.77$	.006