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The Relationship of Threat Perceptions and Optimistic Attitude with Protective Behavior in the COVID-19 Crisis

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The Relationship of Threat Perceptions and Optimistic Attitude with Protective Behavior in the COVID-19 Crisis[1]

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Abstract

Mortality in the COVID-19 crisis is highest among older adults and other vulnerable groups. Based on Protection Motivation Theory and using data from the first SHARE Corona Survey, we investigate how threat perceptions and optimistic attitudes are associated with motivation to engage in protective behavior in the population 50+. Multivariate regression analyses are based on a sample of more than 30,000 individuals from 26 countries. Our results show that around 15 percent of all respondents stayed home completely during the initial phase of the COVID-19 crisis—mainly the elderly aged and those with prior health risk conditions. On average, older Europeans responded strongly to the recommended protective behavior measures (6 out of 7 measures adopted). While feeling more anxious than before Corona and fear of infection are the main motivators for protective behavior, an optimistic outlook into the future shows an equally strong association with protective behavior. Optimistic attitudes are the strongest predictor in the Czech Republic, France, Luxembourg, and Sweden—all countries with high levels of trust in their health care systems. In contrast, fear is the strongest predictor in Estonia, Latvia, Finland and Poland—all countries with below average mortality rates. We further hypothesize that the influence of threat appraisal and optimistic attitudes vary based on contextual severity of and perceived institutional protection against COVID-19 (measured as COVID-19 mortality, stringency of control measures, and trust in the health care system). We find that the influence of personal exposure varies and can be observed mainly in country groups with high COVID-19 mortality, medium stringency, and high trust in the health care system. Against the background of negative, long-term health effects of fear and the situation of a long-term crisis, the results of this study may help evaluate and revise governmental policy responses and communication strategies.

Keywords: Protective Behavior, COVID-19, Protection Motivation Theory, Fear, Cross-National Comparison, SHARE

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Introduction

On March 11, 2020, the World Health Organization declared that the coronavirus disease 2019 had become a pandemic. Since then, the virus has affected many facets of people's lives through national lockdowns and other control measures. It is known that COVID-19 mortality is highest among older adults and other vulnerable groups (Jordan et al., 2020). They are more likely to be affected—both directly and psychologically. Governmental policy responses have polarized people and societies and entailed non-intended health, economic, and social consequences. While most of the consequences will become visible over time, people's short- and medium-term response to the threat and control measures are already measurable on the basis of their perceptions, feelings, and behavior. This study uses data from the first SHARE Corona Survey to investigate how respondents aged 50+ in 25 European countries plus Israel differ in terms of their motivation to engage in nationally recommended protective behavior. The primary research interest is in the relationship of individual threat perceptions (with regard to the severity of the virus, one's vulnerability, and feelings of fear) and respondents' capability to deal with the threat (captured by statements expressing an optimistic attitude or outlook).

Previous research on threat perceptions has shown that people tend to have a distorted perception of the severity of threats, especially in scenarios with high uncertainty. For instance, analyses by Slovic et al. (1980) on the individual risk assessment of the seriousness of threats revealed that people usually overestimate the number of deaths due to natural disasters such as earthquakes, but they underestimate the number of deaths due to diseases like diabetes or asthma. Extant studies on risk perceptions during pandemics have found that people who perceive themselves to be more vulnerable or susceptible to the threat engage more in protective behavior (e.g., study by Brug et al. (2004) on people's risk perceptions, knowledge, and precautions during SARS-CoV-1 in 2003). With respect to the individual assessment of fear, Jones and Salathe (2009) demonstrated that anxiety increased the likelihood to engage in protective behavior in response to swine flu (H1N1) in 2009. Recent studies by Harper et al. (2020), Jørgensen et al. (2020), and Yıldırım et al. (2021) found similar results for COVID-19. Jørgensen et al. (2020) emphasize that even though fear works to predict compliance with recommended protective behavior, there are negative implications for mental health and society. While there is little evidence that individuals with higher interpersonal and institutional trust are more likely to engage in protective behavior, they find that knowledge-based efficacy (i.e., knowing about the virus and how to protect oneself well) provides "a pathway to compliance without fear" (p. 18). Apart from people's risk perceptions, sociodemographic factors such as age, sex, education, occupation, region, migration background, and social contacts have been among the determining factors for protective behavior during the swine flu and COVID-19 (e.g., Jones & Salathe, 2009; Qiu et al., 2020).

In this study, we explore how older European citizens and countries differ in terms of adopting recommended behavior to protect against COVID-19 using data from the SHARE Corona Survey. The survey was fielded simultaneously in 27 countries, primarily in June and July 2020. Therefore, we measure individual protective behavior patterns not during the first national lockdowns, but two to three months later. The primary research interest is in how respondents' threat perceptions and optimistic attitude are linked with statements about their protective behavior. By including data on governmental control measures, we examine whether macrolevel factors help explain potential country disparities. To our knowledge, none of the existing studies on threat perceptions and protection during the COVID-19 crisis have used a theory-driven approach that combines self-reports and aggregate-level indicators in a cross-country perspective. The results of this study may help evaluate and revise governmental policy responses.

Theory

For the theoretical foundation of this research, we borrow aspects from two types of concepts of risk perception, the psychosometric paradigm and expectancy-value models. While the former focuses on mapping people's perceptions of different types of risks and hazards via assessment instruments, the latter explore how individuals' risk perceptions affect their behavior. One of the key aspects in this study is the role of fear with regard to individual threat appraisals. Within the psychosometric paradigm, Roseman (1996) hold that fear is elicited by events that are appraised as motive-inconsistent, unknown, unexpected, and uncertain. According to Slovic et al. (1980), dimensions such as familiarity (characterized by attributes such as observability, knowledge, immediacy of consequences), dread (characterized by attributes such as uncontrollable severity, catastrophic, involuntary, threat to human future), and exposure (i.e., number of people exposed) play an important role in people's risk perception. Leppin and Aro (2009) attribute a high unknown risk and dread risk to hazards such as pandemics since they are hard to observe and control, catastrophic, fairly unknown to science, and their effects are delayed. Therefore, we assume that COVID-19 poses an unknown threat that has stimulated negative emotions and uncertainty at a global scale, especially at its inception.

Protection Motivation Theory (PMT) is based on expectancy-value models. It is a social cognition theory developed to understand how people respond to health threats. The likelihood to engage in protective behavior is determined by the beliefs, appraisals, or perceptions that people have about the threat itself and about engaging in the desired protective behavior. Individuals who appraise potential stressors as more threatening (e.g., those who are personally at risk) are more motivated to protect themselves (Ling et al., 2019; Rogers, 1975, 1983). Intention is the best predictor of behavior and determined by two parallel processes: threat appraisal and coping appraisal (Ling et al., 2019).

Threat appraisal captures individuals' evaluation of three attributes of a fear appeal or threat, all of which are expected to increase protective behavior: perceived severity (i.e. individual assessment on the seriousness of the threat to oneself), perceived vulnerability (i.e., individual assessment on the susceptibility of oneself to the threat), and fear arousal (i.e., individual assessment of the fear the threat evokes for oneself) (Floyd et al., 2000; Slovic et al., 1980). In this study, we refer to fear as a self-reported, situational, affective or emotional state (i.e., state anxiety). Hence, it refers to a present-moment assessment of physiological and emotional symptoms associated with anxiety and not a personal trait that describes the predisposition to react with anxiety in stressful situations (i.e., trait anxiety) (see Wirtz et al., 2019). "The greater the perceived threat, the more likely the individual is to be motivated to protect himself or herself …" (Floyd et al., 2000, 109; Wirtz et al., 2019). In the case of COVID-19, we assume that fear arousal as the affective or emotional component of a threat appraisal belongs to the main determinants for people's risk perceptions and motivation to engage in protective behavior. However, neither theory nor data allow us to differentiate between the underlying causes of fear arousal. Perceiving the virus as a concrete health threat may motivate older and vulnerable people to protect themselves, whereas considering the virus and all related control measures as a financial or sociocultural threat might trigger adverse behavior (see Kachanoff et al., 2020). In this study, we can only account for the association of COVID-19 as a health threat and individuals' behavioral response.

Coping appraisal captures individuals' beliefs about their response efficacy and self-efficacy, that is, whether they consider the recommended protective behavior effective in reducing the threat and whether they consider themselves able to perform the recommended protective behavior. In short, response and self-efficacy describe individuals' perceived capability to cope with a threat. The involved response costs (e.g., expenses, penalties, time, effort) can decrease the adaption of protective behavior (Floyd et al., 2000; Milne et al., 2000). According to Ling et al. (2019), people engage most in protective behavior when they believe that non-engagement poses a threat to themselves (high threat

appraisal) and when they believe that their behavior can reduce the threat (high coping appraisal). In the light of COVID-19, the former may apply especially to individuals that are personally affected and/or belong to the high-risk group, the latter to individuals who confide in the effectiveness of governmental and/or their own coping strategies. Due to the lack of any established indicators for coping appraisal, we deviate from the theoretical construct by replacing response and self-efficacy with two proxy measures for optimistic attitude. We argue that statements expressing an optimistic attitude or outlook are the best available approximation for individual coping strategies in the data at hand. Since testing the construct validity has been done by many other studies (e.g., Chen et al., 2009; Xiao et al., 2014), we believe that despite this deviation we can draw on PMT as the theoretical foundation of our research.

Based on the psychosometric paradigm and PMT, we expect that respondents' intention to engage in protective behavior increases with individuals':

- H1: perceived severity of COVID-19 (severity hypothesis)
- H2: perceived vulnerability to the threat (vulnerability hypothesis)
- H3: fear arousal and fear of infection (fear hypothesis)
- H4: optimistic attitude (optimism hypothesis)

Since individual perceptions can also be influenced by the national severity of the COVID-19 situation and systemic health protection, we expect variations in protective behavior based on the following macro indicators:

- H5: We anticipate a stronger influence of threat appraisal and optimistic attitudes in countries with higher COVID-19 mortality indicated by the number of deaths per 100,000 (mortality hypothesis).
- H6: We anticipate a stronger influence of threat appraisal and optimistic attitudes in countries with "stricter" control measures indicated by the Oxford stringency index (stringency hypothesis).
- H7: We anticipate a weaker influence of threat appraisal and optimistic attitudes in countries with higher trust in the healthcare system (healthcare hypothesis). We consider trust in the healthcare system as a proxy for the degree of systemic protection against the virus and as an additional factor for severity (e.g., low trust if the health care system is not in good condition).

Data and Methods

Data and Sample

The present study is conducted with the preliminary SHARE Wave 8 COVID-19 data (Release 0, Börsch-Supan, 2020a, h) from the first SHARE Corona Survey, augmented by variables from all regular SHARE waves from Release 7.1.1 (Börsch-Supan, 2020b, c, d, e, f, g) and the preliminary Wave 8 Release 0 (Börsch-Supan, 2020h). The SHARE Corona Survey was conducted via computer-assisted telephone interviews (CATI) in 27 countries: Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Germany, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, and Israel (Scherpenzeel et al., 2020). In contrast to many other studies, the vast majority of fieldwork was carried out from June to August 2020, months that were characterized by a slight relaxation of restrictions in most countries after the (partly) severe containment measures in spring 2020. Overall, 98 percent of all interviews were conducted in June or July 2020[2]. In addition to the SHARE data, we include

[2] These numbers hold for the overall fieldwork sample as well as our sample of analysis.

contextual information on the spread of the virus and governmental containment strategies from the Oxford COVID-19 Government Response Tracker (Hale et al., 2020).

We employ multiple logistic and linear regression analysis with robust standard errors. Our study population are European citizens aged 50 and older living in private households. Our analytical sample excludes respondents from the Netherlands due to a different survey mode in prior waves. After deleting cases with missing information on all variables of interest, our analysis sample consists of 38,580 persons from 25 European countries plus Israel. All analyses were conducted using Stata version 14.2.

Measures

We distinguish between respondents who stayed at home and those who left their home since the outbreak of Corona until the day of interview (question wording: "Since the outbreak of Corona, have you ever left your home?"). We consider staying home as the strictest form of protective behavior and therefore dichotomize the first outcome variable "Stayed home" (reference category "Left home"). For the second outcome variable, we take the subsample of respondents who left their home and create an additive index for protective behavior. It accounts for seven protective measures generally recommended by official representatives: avoidant behavior such as keeping distance ("Often" or "Always"), contact reduction measures such as visiting other family members and meeting with more than five people from outside of the household ("Less often" or "Not any more"), preventive behavior such as wearing a face mask ("Often" or "Always"), and hygiene measures such as washing hands, using special hand sanitizer or disinfection fluids, and covering one's mouth when coughing or sneezing more frequently than usual ("Yes"). For all answers listed in parenthesis, we assign one point per respondent to the index. Hence, the second outcome variable "Protective behavior index" is an index score which can range between 0 and 7 and comprises the subsample of those who left home.

Our explanatory variables measure respondents' threat perceptions and optimistic attitude. With regard to threat perceptions, we distinguish between perceived severity, perceived vulnerability, and fear arousal. Two indicators capture perceived severity. While the number of newly confirmed cases[3] from the previous to the interview day enters the model log-transformed as an indicator for increased geographical closeness and potential exposure to the virus, actual exposure is measured by whether a respondent reports to be (i.e., self-exposure) or to know someone (i.e., network exposure) with symptoms, tested positive, hospitalized, or reports to know someone who died with COVID-19 (question wording example: "Have you or anyone close to you been hospitalized due to an infection from the Corona virus?"). The first two indicators are categorized as "mild", the two last ones as "severe". Multiple answers are assigned according to the most severe response category. While it theoretically might make a difference if someone had personal experiences with the virus or just through the network, Litwin and Levinsky (2021) show that self-exposure and network-exposure are similarly associated with protective behavior in terms of direction, significance, and magnitude. Therefore, we do not distinguish between these two types of exposure.

Perceived vulnerability is measured by the number of health risk conditions (0-6) obtained from respondents' last available regular SHARE wave data. The risk conditions include being in need for home care and having health conditions such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease or a weakened immune system. The variable enters the models linearly after testing for non-linearity. It is truncated to 4 due to low case numbers in the upper categories. In addition, age is added as vulnerability measure with the age categories 50-64, 65-79, and 80+. We

[3] According to the WHO, a confirmed case refers to a "person with laboratory confirmation of infection with the novel coronavirus" (WHO 2020).

refrain from simply adding the official risk indicator of age 60+ as 90 percent of our sample are in this age group.

We use two indicators for fear arousal. State anxiety is measured with a one-item question asking "In the last month, have you felt nervous, anxious, or on edge?" Note that the time of reference ranges from the beginning of May to mid-July 2020, depending on the day of interview. It is the first item of the Generalized Anxiety Disorder Questionnaire (GAD-7) used as a screening tool and severity measure for generalized anxiety disorder. Since this question is kept general, we also use the Corona-specific follow-up question: "Has that been more so, less so, or about the same as before the outbreak of Corona?" We take both items and generate a categorical variable with the following three categories: "Not anxious", "Anxious, but not more than before Corona", and "Anxious, more than before Corona" (the latter based on answer "More so"). The second indicator is fear of infection, a binary variable that captures if a medical treatment was forgone due to Corona (question wording: "Since the outbreak of Corona, did you forgo medical treatment because you were afraid to become infected by the Corona virus?").

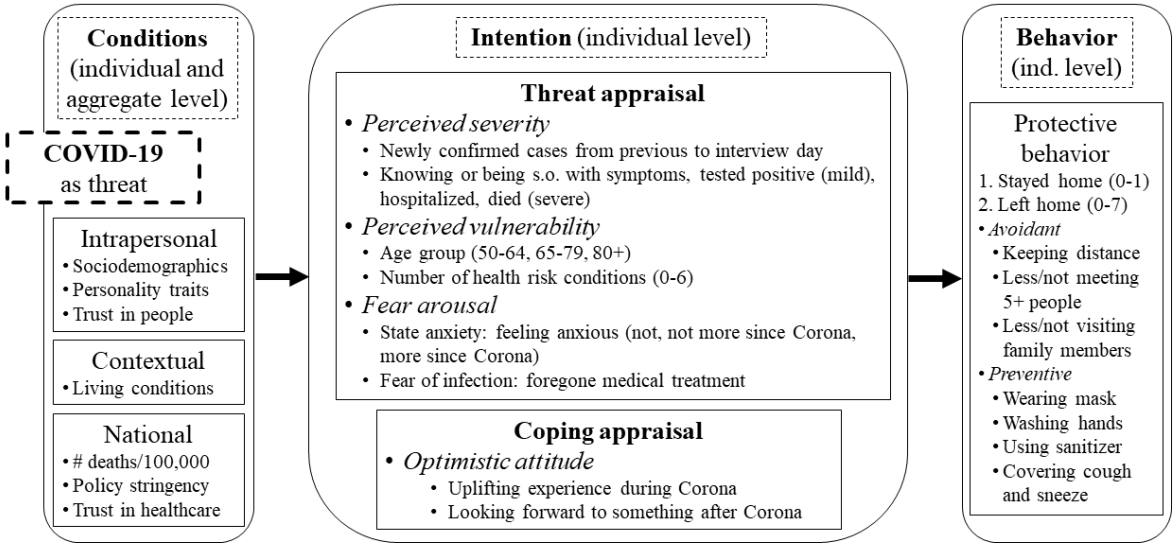
Our measure for optimistic attitude consists of two indicators describing whether a respondent named any uplifting experience since the outbreak of Corona ("What was your most uplifting experience since the outbreak of Corona, in other words, something that inspired hope or happiness?") and/or named something to look forward to once Corona abates ("…, what is it that you are looking most forward to doing once Corona abates?").

Based on PMT, we consider the following control variables as relevant influential factors in this analysis. We measure sociodemographic background and intrapersonal characteristics by including information on age, sex, marital status, migration background, education, home ownership, financial hardship during Corona, and employment status. Financial hardship during Corona is measured as a variable with three categories that identify whether respondents did not report any financial difficulties, experienced financial difficulties, or postponed regular payments, dipped into savings, and/or lost their job or closed their business. In addition, we draw on respondents' personality traits openness, conscientiousness, extraversion, agreeableness, and neuroticism taken from the Big Five Inventory (Rammstedt & John, 2007) and general trust in people (on a scale from 0 to 10). As contextual factors or living conditions, we add respondents' household composition and information on whether they live in an urban or rural area. As we use the most recent data available for each respondent, we account for a time lag of the control variables by including an indicator if the respondent's last participation was in Wave 8 (directly before the outbreak of Corona) or in earlier years. Finally, we generate country dummies to account for country-specific effects.

In order to evaluate country differences based on national conditions or macrolevel factors, we rely on an indicator for COVID-19 mortality expressed by the number of confirmed deaths per 100,000 inhabitants and a measure for governments' policy stringency on a scale from 0 to 100. Both are taken from the Oxford COVID-19 Government Response Tracker (Hale et al., 2020). In addition, we draw on the idea of institutional trust by Jørgensen et al. (2020) and include a domain-specific trust indicator for institutional trust in the healthcare system based on Eurobarometer data from 2013 (European Commission, 2014). We argue that it is important to examine to what extent individuals believe that they are treated well in case of having severe COVID-19 symptoms.

Figure 1 shows how our measures are embedded in the theoretical framework. In our analyses, we investigate how the components of threat appraisal and coping appraisal (middle panel) influence protective behavior (right panel). The conditions mentioned in the left panel serve as anticipatory controls.

Figure 1: Illustration of theoretical framework including measures



Source: Own illustration

Results

Sample description

In Table 1, we present all sample characteristics by reporting means and standard deviations (SD) for all variables that enter the regression models (except country dummies) for both analytical samples. Country characteristics are presented separately in Table 2. All indicators are weighted. The overall sample consists of 38,580 individuals aged 50+ in 26 countries. It can be seen that 6,626 respondents (15.5 percent) stayed at home completely between the outbreak of Corona and the day of interview. The "Protective behavior left-home subsample" comprises 31,954 individuals (84.5 percent of the overall sample). Respondents from this subsample adopted on average six from seven recommended protection measures. The samples differ significantly in several characteristics (indicated in the last column of Table 1 based on a t-test, p-value levels displayed).

With regard to indicators for threat and coping appraisal of the overall sample, the majority of respondents (83 percent) was not directly exposed to Corona (measured as being or knowing someone who developed symptoms, was tested positively, was hospitalized, or knowing someone who died). Concerning the average change in confirmed case numbers (189 cases), we can bear in mind that they fluctuated between 0 and 8,618 during the time of fieldwork. In terms of vulnerability, the mean number of health risk conditions is .7 (out of 6) and on average 16 percent belong to the oldest age group. The fear arousal indicators show that 70 percent did not report any feelings of anxiousness. However, more than one in five respondents (22 percent) reported to feel more anxious than before Corona. Despite the circumstances, older respondents have an optimistic attitude. About 71 percent named an uplifting experience during Corona and over 80 percent look forward to something once Corona abates.

In terms of demographic characteristics, the overall sample consists of almost 57 percent female and 9 percent foreign-born respondents, 28 percent live alone and 18 percent are widowed, almost 54

percent of all respondents are retired and 31 percent (self-)employed, about 30 percent achieved higher education levels, and 25 percent experienced severe financial difficulties due to the Corona situation.

Table 1: Descriptive statistics by sample type (means, standard deviations, t-value)

	Overall sample		Stayed-home subsample		Left-home subsample		
Characteristics	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**T-test**
Outcomes							
Stayed home (ref: left home)	0.155	0.362					
Protective behavior index					5.953	1.209	
Threat appraisal							
Not exposed	0.833	0.373	0.902	0.297	0.820	0.384	***
Mildly exposed (symp/test)	0.116	0.320	0.064	0.244	0.126	0.332	***
Severely exposed (hosp/died)	0.051	0.220	0.034	0.181	0.054	0.226	***
Change in confirmed cases (prior day)	188.820	329.166	154.323	299.823	195.140	333.881	***
Number of health risk conditions	0.662	0.852	0.937	0.989	0.611	0.815	***
Age<65 (Professionally active)	0.433	0.495	0.218	0.413	0.472	0.499	***
Age 65-79 (Young retirees)	0.412	0.492	0.421	0.494	0.410	0.492	
Age 80+ (Elderly aged)	0.156	0.363	0.361	0.480	0.118	0.323	***
Not anxious	0.702	0.457	0.631	0.483	0.715	0.451	***
Anxious, not more than before Corona	0.080	0.272	0.122	0.328	0.072	0.259	***
Anxious, more than before Corona	0.217	0.413	0.246	0.431	0.212	0.409	***
Afraid of infection (foregone med treatm)	0.122	0.328	0.132	0.338	0.120	0.325	
Coping appraisal							
Uplifting experience during Corona	0.712	0.453	0.614	0.487	0.729	0.444	***
Looking forward to sth after Corona	0.830	0.376	0.722	0.448	0.850	0.358	***
Controls							
Female	0.567	0.496	0.652	0.476	0.551	0.497	***
Migrant (foreign-born)	0.086	0.280	0.087	0.282	0.086	0.280	
Married/registered partnership	0.639	0.480	0.571	0.495	0.652	0.476	***
Never married	0.071	0.256	0.047	0.212	0.075	0.264	***
Divorced	0.108	0.310	0.063	0.243	0.116	0.320	***
Widowed	0.182	0.386	0.319	0.466	0.157	0.364	***
Single household	0.281	0.450	0.339	0.473	0.271	0.444	***
2 ppl household	0.495	0.500	0.435	0.496	0.506	0.500	***
>2 ppl household	0.224	0.417	0.226	0.418	0.224	0.417	
Urban area	0.392	0.488	0.348	0.476	0.400	0.490	***
Home ownership	0.811	0.391	0.817	0.386	0.810	0.392	
Retired	0.538	0.499	0.670	0.470	0.514	0.500	***
(Self)employed	0.311	0.463	0.110	0.312	0.348	0.476	***
Unemployed	0.029	0.168	0.025	0.156	0.030	0.171	
Sick/disabled (employment status)	0.033	0.179	0.043	0.202	0.032	0.175	**
Homemaker	0.071	0.258	0.127	0.333	0.061	0.240	***
Other employment status	0.017	0.129	0.026	0.159	0.015	0.122	***
No financial difficulties	0.604	0.489	0.478	0.500	0.627	0.484	***
Experienced financial difficulties	0.252	0.434	0.394	0.489	0.226	0.418	***
Severe financial difficulties	0.144	0.351	0.128	0.335	0.147	0.354	*
Primary education	0.320	0.467	0.542	0.498	0.280	0.449	***

Secondary education	0.388	0.487	0.298	0.457	0.404	0.491	***
Post-secondary education	0.292	0.455	0.161	0.367	0.316	0.465	***
Personality Trait - Openness	3.325	0.930	3.163	0.900	3.355	0.932	***
Personality Trait - Conscientiousness	4.108	0.791	4.048	0.816	4.119	0.786	***
Personality Trait - Extraversion	3.478	0.915	3.398	0.889	3.493	0.919	***
Personality Trait - Agreeableness	3.671	0.813	3.632	0.813	3.678	0.813	**
Personality Trait - Neuroticism	2.662	1.003	2.803	0.975	2.637	1.006	***
Trust in other people	5.910	2.409	5.628	2.485	5.962	2.391	***
Control variables from Wave 7 or earlier (ref: from Wave 8)	0.260	0.439	0.290	0.454	0.254	0.436	***
N	**38,580**		**6,626**		**31,954**		

Data: Preliminary SHARE Wave 8 Release 0 and Release 7-1-0. Oxford COVID-19 Government Response Tracker. Weighted data. Conclusions are preliminary. * p < 0.05, ** p < 0.01, *** p < 0.001

Protective behavior in Europe

Even though the overall mean of those who stayed home since the outbreak of Corona is 15 percent, Figure 2 shows that the rates vary strongly by country. While at least 30 percent of all interviewed persons from Croatia, Cyprus, Italy, and Malta, stayed home completely during the time of observation, this applies only to a maximum of 5 percent in the Northern European countries (Denmark, Finland, and Sweden), France, and Germany. Countries with low stay home rates also show high degrees of trust in the existing national healthcare system (ranging from 86 to 94 percent). In contrast to that, Italy faced an especially uncertain situation with being the first severely-hit country in Europe. Cyprus required all its citizens to send a text message to a governmental number to be able to leave the house (Cyprus Government, 2020). Malta introduced age-specific lockdown regulations. For instance, persons over 65 were not allowed to leave their homes unless absolutely necessary (e.g., for medical emergencies and hospital appointments) (Grech, 2020). In Croatia, a ban on leaving one's place of residence was imposed during the lockdown in spring 2020 (Forjan, 2020).

Figure 2: Protective behavior across Europe

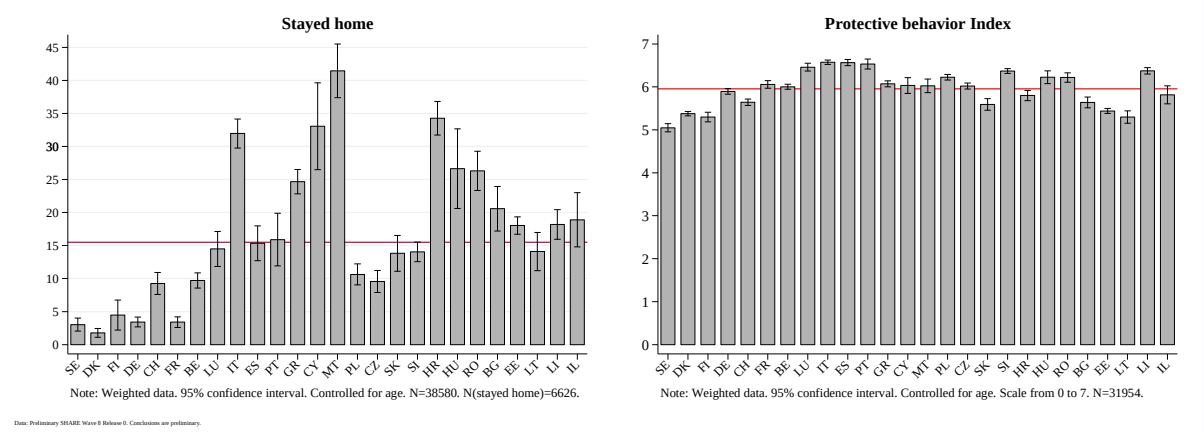


Table 2 illustrates country-specific sample sizes and corresponding macrolevel indicators on COVID-19 mortality, governmental stringency (both according to the Oxford COVID-19 Government Response Tracker), and trust in the healthcare system (based on Eurobarometer 80.2, fielded in 2013). It can be seen that some of the countries with a large share of people who stayed home implemented strict

governmental control measures (Oxford stringency index >50) such as Cyprus, Hungary, or Italy. However, the stringency index does not capture all regulations in detail.

Based on the subsample of those who left home, we see that all countries have very high average scores on the summary index of protective behavior. These rates deviate only slightly from the overall mean of 5.95, with the highest average scores in the southern countries Italy, Portugal, and Spain. While Italy and Spain had comparably high death rates after the onset of the crisis, Portugal had one of the highest stringency levels. The lowest protective behavior means can be seen in the Northern and Baltic states (Denmark, Finland, Sweden, Estonia, and Latvia). With the exception of Latvia, in those countries mask-wearing was not mandatory at the time of fieldwork (ECDC, 2021)[4] and citizens display considerably high levels of trust in the national healthcare system (see Table 2).

Table 2: Descriptive statistics of macrolevel indicators by country

Country	Stayed home overall sample (N)	Protective beh. left-home subs. (N)	Mortality – Deaths per 100k (mean)	Oxford Stringency Index (mean)	Trust in health care system (mean)
Sweden (SE)	1,116	1,077	53.37	40.22	0.86
Denmark (DK)	1,785	1,753	10.35	58.91	0.87
Finland (FI)	877	839	5.94	40.81	0.94
Germany (DE)	2,400	2,308	10.79	51.24	0.90
Switzerland (CH)	1,606	1,431	19.52	54.29	n.a.
France (FR)	1,669	1,597	44.40	55.91	0.88
Belgium (BE)	3,240	2,884	83.17	53.44	0.97
Luxemburg (LU)	673	566	17.68	49.78	0.90
Italy (IT)	2,955	1,915	57.61	61.44	0.56
Spain (ES)	1,474	1,162	59.23	56.58	0.77
Portugal (PT)	823	680	15.72	58.45	0.55
Greece (GR)	2,190	1,608	1.81	60.54	0.26
Cyprus (CY)	272	162	2.13	69.24	0.73
Malta (MT))	571	300	1.75	50.52	0.94
Poland (PL)	1,807	1,619	3.87	49.35	0.32
Czech Republic (CZ)	2,139	1,915	3.26	44.26	0.78
Slovakia (SK)	758	663	0.51	46.98	0.50
Slovenia (SI)	2,552	2,130	5.27	54.71	0.73
Croatia (HR)	1,541	992	2.84	48.43	0.59
Hungary (HU)	674	491	5.97	59.53	0.47
Romania (RO)	1,002	752	7.97	52.13	0.25
Bulgaria (BG)	609	474	4.26	44.53	0.29
Estonia (EE)	3,335	2,614	4.74	49.24	0.73
Latvia (LV)	607	518	1.60	44.19	0.47
Lithuania (LT)	1,016	806	2.77	54.21	0.65
Israel (IL)	889	698	3.74	62.08	n.a.
Overall N/Mean	**38,580**	**31,954**	**16.68**	**52.73**	**0.66**

Note: Mean per country is calculated as average across all observed interview days for mortality (June-August 2020) and since the outbreak of Corona until End of July 2020 for stringency. Countries are sorted along a north-west to south-east diagonal through Europe to make geographical closeness visible.
Data: Preliminary SHARE Wave 8 Release 0. Oxford COVID-19 Government Response Tracker. Special Eurobarometer 411, Wave 80.2. Conclusions are preliminary.

Multivariate regression models

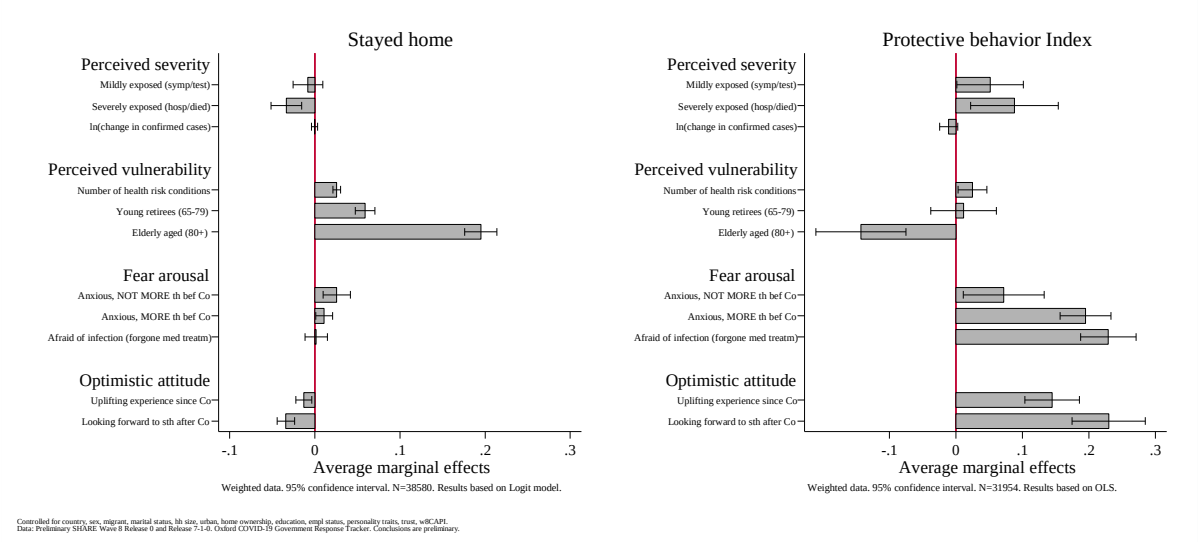
We perform multivariate logistic and linear regressions on our dependent variables "Stayed home" and "Protective behavior index". Figure 3 displays all indicators for the PMT components threat appraisal and coping appraisal. We plot average marginal effects (AMEs) to be able to compare the

[4] In Estonia and Denmark, mask-wearing was recommended throughout the whole fieldwork period. In Sweden, masks were recommended since 1 July 2020 (half-time of fieldwork). Finland is the only country where masks were not recommended nor mandatory during fieldwork. The only other country without mandatory mask regulations was Switzerland (masks were recommended). In all other SHARE countries, mask-wearing was mandatory during the entire time of fieldwork (ECDC 2021).

size of the coefficients across all indicators (Mood, 2010). The left panel of Figure 3 shows that perceived vulnerability is the main driving factor to stay at home. More precisely, this applies to persons above age 65, especially the elderly aged (AME=.195, p<.001), and is higher for higher numbers of health risk conditions (AME=.026, p<.001). Apart from those who feel vulnerable, respondents who report feelings of anxiousness tend to stay home as well (AME=.026, p<.01). In contrast to that, interviewed persons who report severe exposure to the virus (AME=-.033, p<.001) and who express an optimistic attitude (AME=-.013, p<.01 for uplifting experience; AME=-.034, p<.001 for looking forward) are rather those who left their home. With respect to sociodemographic control variables, we find that being female, not working due to sickness or disability, lower educational levels, and experiencing financial difficulties are strong and significant predictors for staying home (p<.001). However, belonging to the age group 80+ shows by far the strongest association for all other covariates, see Table A1 in Appendix). As we observe associations only, we cannot distinguish if the elderly aged stayed home due to Corona or due to any conditions occurring before Corona (i.e., selection).

The right panel of Figure 3 shows the results for the subsample of respondents who left their home. Apparently, fear arousal due to Corona and optimistic attitudes are the main motivators for adopting protective behavior. Three of the five indicators ("Feeling anxious, more than before Corona", "Afraid of infection", and "Looking forward to something after Corona") show equally strong associations of around .2 and are all highly significant (p<.001). In contrast, the AMEs are smaller for respondents who are actually exposed to the virus (mildly: AME=.051, p<.05; severely: AME=.088, p<.01). The AME for potential exposure indicated by the change in confirmed cases is insignificant. The only significant negative association can be seen among the elderly aged who appear to be less motivated or able to apply the recommended protective measures (AME=-.143, p<.001).

Figure 3: AMEs by PMT component for "Stayed home" and "Protective behavior index"



Other decisive determinants of protective behavior are shown in Table A1 of the appendix. They are being female (AME=.180, p<.001), born in a foreign country (AME=.166, p<.001), living in a two-person household (AME=.115, p<.001), reporting financial difficulties (AME=.097, p<.001), and having attained higher education levels (AME=.151, p<.001). In terms of personality traits, persons with higher degrees of conscientiousness (e.g., being disciplined and careful; AME=.068, p<.001) and neuroticism (e.g., being anxious and pessimistic; AME=.038, p<.001) take up more protective behaviors.

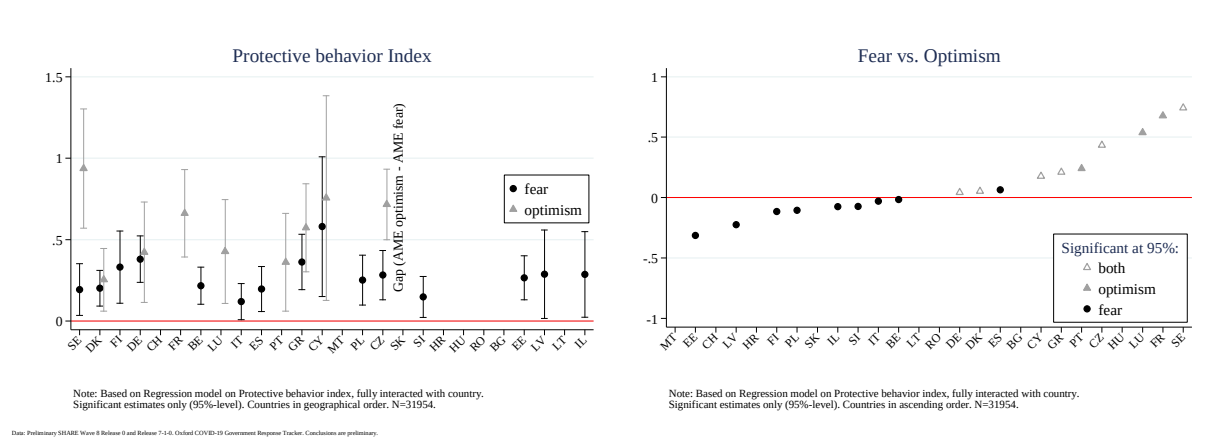
Cross-national results

The main motivating factors for adopting protective behavior in the "Protective behavior left-home subsample" model are fear arousal and optimistic attitude. In the following analyses, we investigate the country-specific influence of fear and optimism by introducing interaction terms with country dummies for all variables in the model (fully interacted model). We expect associations to vary depending on country-specific death rates, containment strategies, welfare and healthcare systems, and unobserved variation in governmental or media communication and culture.

Figure 4 (left panel) shows the conditional AMEs of "Feeling anxious, more than before Corona" by country (black dots, labelled "fear") and the variable "Looking forward to sth after Corona" by country (grey triangles, labelled "optimism"). For the sake of clarity, only significant interaction terms are displayed (p<.05). Overall, 15 out of 26 countries show a positive significant association of feeling more anxious than before Corona with protective behavior and 9 out of 26 countries show a positive significant association with optimism. With .3 or more, the largest AMEs for fear can be observed in Cyprus, Finland, Germany, and Greece. In contrast, an optimistic attitude is the main motivator in France, Luxembourg, and Portugal and outweighs fear arousal in Sweden and the Czech Republic.

In Figure 4 (right panel), all countries are sorted in an ascending order by the difference between the AMEs for fear and optimism. Hence, the figure reflects the fear-optimism gap. We can distinguish three patterns: (1) countries with a dominant fear pattern (Estonia, Finland, Israel, Latvia, Poland, Slovenia), (2) countries with an equally strong influence of both indicators (Cyprus, Denmark, Germany, Greece), and (3) countries with optimism as the dominant pattern (Sweden, France, Luxembourg, Czech Republic, Portugal). In Table 2, it can be seen that the countries with a dominant fear pattern have below average death rates and that with the exception of Portugal, the countries with a dominant optimism pattern show high trust in their health care system (78-90 percent).

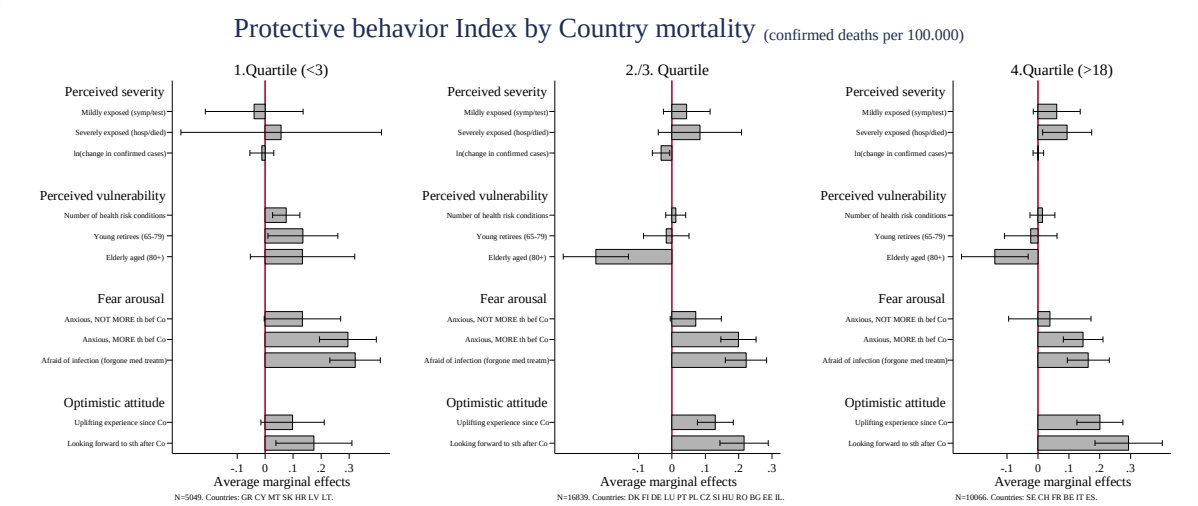
Figure 4: Significant AMEs for fear arousal and optimistic attitude by country



Due to the low country sample sizes in the "Protective behavior left-home subsample" (minimum is 162 in Cyprus), we conduct country group-specific analyses of all threat and coping appraisal measures. We base our country grouping on the aforementioned macrolevel indicators from the Oxford COVID-19 Government Response Tracker and the Eurobarometer 80.2, namely the COVID-19 mortality indicator, the Oxford stringency index, and the degree of trust in the country's healthcare system (see Table 2). For each indicator, we form three country groups based on their distribution. Group 1 contains all countries of the first quartile of the distribution, group 2 all countries of the second and third quartile, and group 3 all countries of the fourth quartile. Hence, countries with a comparably high mortality rate, policy stringency, or trust level are part of the fourth quartile.

Figures 5, 6 and 7 display the AMEs of all PMT indicators derived from country-group-specific linear regressions. The countries contained in each group are listed below each subgraph. It can be seen that the influence of fear arousal and optimistic attitude on protective behavior is very stable across all country groups. While these results are independent of all macrolevel indicators, there is a link with perceived severity. Personal exposure to COVID-19 shows a significant positive association with protective behavior only in countries with high levels of COVID-19 mortality (AME=.094, $p<.05$) and medium levels of policy stringency (AME=.100, $p<.01$). This finding points to a match of individual-level and country-level experienced severity of the virus. In addition, personal exposure shows a positive association with protective behavior in countries with high levels of trust in the health care system (AME=.126, $p<.05$). For perceived vulnerability, the elderly aged (80+) show less motivation or ability to engage in protective behavior (compared to those aged 50-64) in the country groups with average or higher mortality and stringency levels as well as low and average levels of trust in the health care system. All AMEs are reported in Table A2 of the Appendix.

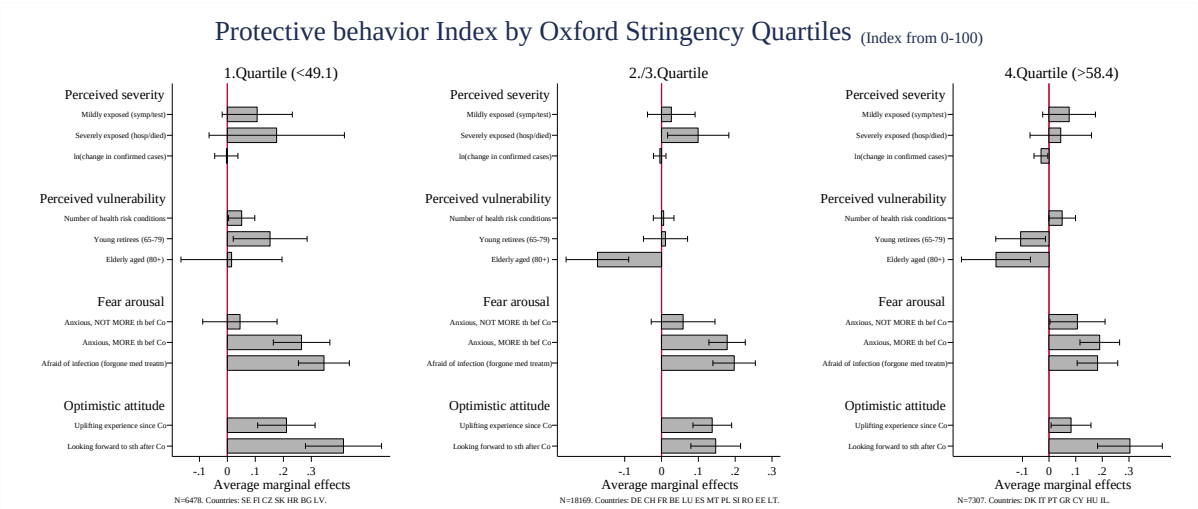
Figure 5: AMEs of PMT component and country grouping by COVID-19 mortality



Weighted data. Results based on OLS. Controlled for countries, gender, migrant, marital status, hh size, urban, home ownership, education, job status, big5, trust, w8CAPI.

Data: Preliminary SHARE Wave 8 Release 0 and Release 7-1-0. Oxford COVID-19 Government Response Tracker. Conclusions are preliminary.

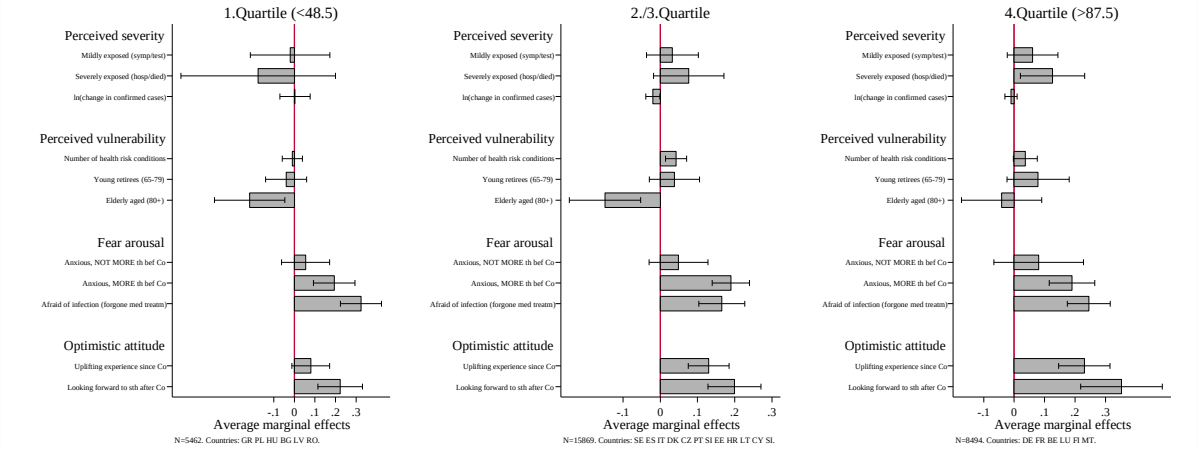
Figure 6: AMEs of PMT component and country grouping by policy stringency



Weighted data. Results based on OLS. Controlled for countries, gender, migrant, marital status, hh size, urban, home ownership, education, job status, big5, trust, w8CAPI.

Data: Preliminary SHARE Wave 8 Release 0 and Release 7-1-0. Oxford COVID-19 Government Response Tracker. Conclusions are preliminary.

Figure 7: AMEs of PMT component and country grouping by trust in healthcare



Weighted data. Results based on OLS. Controlled for countries, gender, migrant, marital status, hh size, urban, home ownership, education, job status, big5, trust, w8CAPI.

Data: Preliminary SHARE Wave 8 Release 0 and Release 7-1-0. Oxford COVID-19 Government Response Tracker. Conclusions are preliminary.

Sensitivity analyses and robustness checks

As we use an additive index for our continuous dependent variable "Protective behavior index", we examined several alternative outcome specifications and modelling strategies to check the robustness of our findings and extend the main findings where needed. Substantively, the additive index combines behaviors from different domains. While it only contains behaviors that were officially recommended in all countries (besides mask wearing in Finland), they can be subdivided into avoidant and preventive behavior on a theoretical ground (as outlined in the section on measures). Factor analysis yields three factors, which can be labelled as contact reduction, distance and mask, and hygiene measures. Regressions on these three factor scores point to important differences among the age group 80+, but conceal important differences in other variables of interest. Table 3 takes these disparities into account by showing the regression results for each item of the protective behavior index separately. We added the aforementioned theoretical and factor analytical distinctions in the upper two rows of the table to enable an adequate interpretation of the results.

Compared to the results mentioned above, we see the following differences regarding our PMT indicators. In terms of perceived severity, we observed a significant positive association of severe exposure to the virus and the protective behavior index. The breakdown by items shows that this result is driven by physical distancing and using sanitizer and is unrelated to theoretical or factor-analytical sorting. Regarding perceived vulnerability, the most vulnerable age group (80+) is not only most likely to stay at home completely, but also shows a higher likelihood to reduce any physical contact (in terms of visiting family and meeting with others). In contrast, this age group is significantly less likely to adopt any of the hygiene measures or adhere to physical distancing in general. With regard to fear arousal and optimistic attitude, the coefficients for feeling anxious due to Corona remain stable across all specifications. The same holds for optimistic attitude.

Further sensitivity analyses refer to our modelling strategy. The protective behavior index consists of seven behaviors, which result in an additive index ranging from 0 to 7 (count variable). As most people comply with the recommended measures (mean 5.95, median 6), the distribution is left-skewed (skewness -1.40, kurtosis 5.25) and not normally distributed. Log transformation did not improve the distribution (skewness -2.68, kurtosis 14.15). An alternative modelling strategy for highly right-skewed count distributions (with many zeros) are Poisson models or negative binomial regression models. In order to investigate the robustness of our findings based on linear ordinary least-squared (OLS) regression, Table A3 of the Appendix shows our chosen OLS model in comparison with (a) a reversed protective behavior index to mirror the right-skewed distribution of count models, and (b) the results of a negative binomial regression on the reversed protective behavior index. The results show that all types of models provide very similar estimates with regard to significance and coefficient size. Therefore, we report our results based on the basic linear OLS estimation using an additive index.

Table3: Sensitivity analysis 1: Item-specific regressions with thematic clustering

Logistic regression on each Protective Behavior separately (Average Marginal Effects)

Theoretical distinction	*Avoidant Behavior*				*Preventive Behavior*		
Types based on factor analysis	*Contact reduction*		*Distance and Mask*		*Hygiene measures*		
Outcome	Meet5less	Visitfamless	Distance	Mask	Washhands	Sanitizer	Coversneeze
Perceived severity							
Mildly exposed (symp/test)	0.010 (0.01)	0.012 (0.01)	0.006 (0.01)	0.010 (0.01)	-0.003 (0.01)	-0.004 (0.01)	0.016* (0.01)
Severely exposed (hosp/died)	0.022 (0.01)	-0.005 (0.02)	0.017** (0.01)	0.015 (0.01)	0.007 (0.01)	0.036*** (0.01)	0.001 (0.01)
ln(change in confirmed cases)	-0.003 (0.00)	-0.001 (0.00)	-0.002 (0.00)	0.005* (0.00)	-0.002 (0.00)	-0.004 (0.00)	-0.005 (0.00)
Perceived vulnerability							
number of health risk Conditions	0.003 (0.00)	0.014*** (0.00)	0.001 (0.00)	0.009** (0.00)	-0.003 (0.00)	0.005 (0.00)	0.001 (0.00)
Age 65-79 (Young retirees)	0.033*** (0.01)	0.039*** (0.01)	-0.002 (0.00)	0.005 (0.01)	0.001 (0.01)	-0.029*** (0.01)	-0.027*** (0.01)
Age 80+ (Elderly aged)	0.047*** (0.01)	0.052*** (0.01)	-0.026*** (0.01)	-0.004 (0.01)	-0.013 (0.01)	-0.079*** (0.01)	-0.079*** (0.01)
Fear arousal							
Anxious, not more than before Corona	0.006 (0.01)	0.016 (0.01)	0.006 (0.01)	-0.006 (0.01)	0.005 (0.01)	0.017* (0.01)	0.025** (0.01)
Anxious, more than before Corona	0.035*** (0.01)	0.055*** (0.01)	0.015*** (0.00)	0.022*** (0.01)	0.025*** (0.01)	0.026*** (0.01)	0.022*** (0.01)
Afraid of infection (foregone med treatm)	0.051*** (0.01)	0.049*** (0.01)	0.034*** (0.01)	0.035*** (0.01)	0.033*** (0.01)	0.028*** (0.01)	0.028*** (0.01)
Optimistic attitude							
Uplifting experience during Corona	0.009 (0.01)	0.004 (0.01)	0.010** (0.00)	0.017** (0.01)	0.038*** (0.01)	0.025*** (0.01)	0.028*** (0.01)
Looking forward to sth after Corona	0.034*** (0.01)	0.048*** (0.01)	0.018*** (0.00)	0.012 (0.01)	0.022*** (0.01)	0.031*** (0.01)	0.016* (0.01)
N	31,287	31,302	31,890	31,914	31,939	31,949	31,794

Weighted sample. Average marginal effects reported. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Controlled for country, sex, migrant, marital status, household size, urban, home ownership, education, employment status, personality traits, trust, w8CAPI. Data: Preliminary SHARE Wave 8 Release 0 and Release 7-1-0. Oxford COVID-19 Government Response Tracker. Conclusions are preliminary.

Discussion and Conclusion

This study explored the relationship of older people's threat perceptions and optimistic attitudes with their intention to engage in self-protective behaviors during the initial phase of the COVID-19 crisis, controlling for sociodemographic background, intrapersonal characteristics, and contextual variables. Toward this end, we used data from the SHARE Corona Survey and drew on the psychosometric paradigm and Protection Motivation Theory as our theoretical foundation. Our major findings are as follows.

In the period under review, SHARE respondents' potential exposure to the virus was considerably low in most countries (as indicated by the change in the number of confirmed cases from the previous to the interview day and the death rate per 100,000 inhabitants). In spite of that, their engagement in the recommended self-protective behaviors was remarkably high and in compliance with the governmental containment and mitigation strategies. We explain this by drawing on Protection Motivation Theory's components threat and coping appraisal and the corresponding indicators. We found that around 15 percent of older Europeans stayed home completely in the first months after the outbreak of the virus. In line with H2 (vulnerability hypothesis), the vulnerable group of elderly aged, those with prior health risk conditions, and partly those living in countries with comparably strict governmental control measures (policy stringency index above average in countries such as Cyprus, Hungary, or Italy) stayed at home most.

If respondents did not stay at home for any of the reasons mentioned above, we observed a significantly higher uptake of protective behaviors among those respondents who were actually affected by the virus (i.e., personally mildly or severely exposed or knowing someone exposed). Most of them are from countries with the largest death rates and moderately strict control measures in the sample (e.g., Belgium or Spain), which is in accordance with H5 and partly in line with H6 (death rate and stringency hypothesis). Since respondents' behavior was associated with actual exposure but not with the change in the number of confirmed cases, we can only partly confirm H1 (severity hypothesis).

Our most striking finding is that fear and optimism function as opposing motivational factors. On the one hand, feeling more anxious than before Corona and fear of infection were strong motivators for protective behavior, confirming H3 (fear hypothesis). Interestingly, we observed this especially in countries with a comparably low COVID-19 mortality such as Cyprus, Estonia, Finland, Germany, Greece, Latvia, and Poland. On the other hand, our indicator for coping appraisal shows an alternative pathway to fear and corroborates H4 (optimism hypothesis). The association with protective behavior is equally strong for respondents who report any uplifting experience since the outbreak of Corona or mention anything they look forward to after the crisis. Predictions for optimistic attitude are even larger than for fear in countries such as the Czech Republic or Sweden. Optimism is the single motivator in countries such as France or Luxembourg. In accordance with H7 and prior considerations on the role of "greater trust in the societal mechanisms that handled the pandemic" by Litwin and Levinsky (2021, 19), we show that all these countries have above-average levels of trust in their healthcare systems (see Table 2). Another contradictory result was seen for the population 80+. While the elderly aged were most likely to stay home completely, those who left home engaged significantly less in keeping distance, wearing a face mask, and hygienic measures. We assume that this is a selection of the healthy elderly aged. They might have more experience with crisis situations and therefore have a different threat perception or they are not fully capable of applying or adapting the constantly changing regulations.

Some limitations of our study should be acknowledged. First, we treat COVID-19 as a health threat, but cannot distinguish the underlying motivation for protective behavior. While we address fear of infection, we cannot distinguish further potential underlying motivators such as fear of spreading the

virus/infecting others, fear or social shaming, or fear of conflict with public officials due to non-compliance with governmental rules. Second, our protective behavior index does not capture how well respondents adhered to recommended behaviors in relation to a national benchmark. While we deliberately rely on recommended protective behaviors only, we are aware that taking into account the variation in regulations across countries and their change over time would be more precise. Third, our indicator for perceived vulnerability number of health risk conditions was measured prior to Corona and may have changed since then. Finally, we cannot draw causal conclusions. So far, we can only make statements about associations and cannot rule out reverse causality in the relationship between perceived severity, perceived vulnerability, fear arousal, and optimistic attitudes with protective behavior. According to PMT, our control variables are anticipatory covariates and measured prior to the outbreak of COVID-19, whereas all PMT components and protective behavior are in a unidirectional relationship and measured at the same point in time after the outbreak of COVID-19. We hope that the follow-up SHARE Corona survey may shed light on the direction of the relationships.

Future research should include data on media attention, media coverage, and governmental communication strategies. It can be assumed that these communication strategies have an influence on people's threat perceptions and coping appraisal, for instance through drastic language and war metaphors (e.g., when French president Macron declared France 'at war' with the virus). Given that the fear-protection link could be especially observed in countries with low death rates, we believe that we can corroborate this assumption. While fear strongly motivates people in the short-run, research documented manifold negative health consequences in the long run (Nechita et al., 2018). In contrast, this study also pointed out that an optimistic attitude can even trump fear. Especially in the COVID-19 crisis, decision-makers could consider a healthy balance between instrumenting fear as motivational factor and hope as healthy long-term motivator. Governmental communication predominantly reaches citizens through press and media, especially older people as the most affected social group that has the highest (traditional) media and news consumption (Papathanassopoulos et al., 2013); (Robinson et al., 2004) and voter turnout (Melo & Stockemer, 2014). A healthier communication approach could address the sovereignty of citizens, envision optimistic post-crisis scenarios, and ensure an honest, informative, and transparent communication. Further research is also needed in conceptualizing and analyzing the manifold threat dimensions of COVID-19. While the data at hand allowed us to focus on COVID-19 as a concrete health threat, future studies should consider alternative threat scenarios directed towards economic stability, stability of political systems, and changing dynamics in socio-psychological behaviors (see study by Kachanoff et al. (2020) on realistic and symbolic threats of COVID-19). This may be of importance since 'pandemic fatigue' becomes an increasing challenge for policy-makers to maintain people's compliance with protective measures in an enduring crisis.

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Appendix

Table A1: Full regression models on Stayed home and Protective behavior Index (Average Marginal Effects)

	Stayed home		Protective behavior Index	
Perceived severity				
Not exposed (ref.)				
Mildly exposed (symp/test)	-0.008	(0.01)	0.051*	(0.03)
Severely exposed (hosp/died)	-0.033***	(0.01)	0.088**	(0.03)
ln(change in confirmed cases)	-0.000	(0.00)	-0.011	(0.01)
Perceived vulnerability				
number of health risk conditions	0.026***	(0.00)	0.025*	(0.01)
Age < 65 (Professionally active) (ref)				
Age 65-79 (Young retirees)	0.059***	(0.01)	0.011	(0.03)
Age 80 + (Elderly aged)	0.195***	(0.01)	-0.143***	(0.03)
Fear arousal				
Not anxious (ref.)				
Anxious, not more than before Corona	0.026**	(0.01)	0.072*	(0.03)
Anxious, more than before Corona	0.011*	(0.01)	0.195***	(0.02)
Afraid of infection (foregone med treatm)	0.002	(0.01)	0.229***	(0.02)
Optimistic Attitude				
Uplifting experience during Corona	-0.013**	(0.00)	0.145***	(0.02)
Looking forward to sth after Corona	-0.034***	(0.01)	0.230***	(0.03)
Controls				
Female	0.032***	(0.00)	0.180***	(0.02)
Migrant (foreign-born)	0.004	(0.01)	0.166***	(0.03)
married/registered partnership (ref)				
never married	-0.016	(0.01)	-0.222***	(0.05)
Divorced	-0.020*	(0.01)	-0.148***	(0.04)
Widowed	0.009	(0.01)	-0.101**	(0.03)
Single household (ref.)				
2 ppl household	0.002	(0.01)	0.115***	(0.03)
>2 ppl household	0.025**	(0.01)	0.074*	(0.03)
Urban area	-0.018***	(0.00)	0.036*	(0.02)
Home ownership	-0.013*	(0.01)	0.071**	(0.02)
Retired (ref.)				
(Self)employed	-0.044***	(0.01)	-0.016	(0.03)
Unemployed	0.017	(0.02)	-0.162*	(0.07)
Sick/disabled (employment status)	0.082***	(0.02)	-0.063	(0.06)
Homemaker	0.011	(0.01)	-0.004	(0.03)
Other employment status	0.021	(0.02)	-0.109	(0.07)

no financial difficulties (ref)				
experienced financial difficulties	0.022***	(0.01)	0.097***	(0.02)
Severe financial difficulties	0.014	(0.01)	0.040	(0.03)
Primary education (ref.)				
secondary education	-0.039***	(0.01)	0.100***	(0.02)
post-secondary education	-0.048***	(0.01)	0.151***	(0.03)
Personality Trait – Openness	-0.006*	(0.00)	-0.001	(0.01)
Personality Trait – Conscientiousness	-0.008**	(0.00)	0.068***	(0.01)
Personality Trait – Extraversion	-0.003	(0.00)	0.005	(0.01)
Personality Trait – Agreeableness	0.000	(0.00)	0.005	(0.01)
Personality Trait – Neuroticism	0.001	(0.00)	0.038***	(0.01)
Trust in other people	0.000	(0.00)	0.011**	(0.00)
Control variables from Wave 7 or earlier	0.025***	(0.01)	0.001	(0.02)
N	38,580		31,954	
Pseudo-R^2 / R^2	0.206		0.167	

Weighted sample. Average marginal effects reported. Robust standard errors in parentheses. Controlled for country. Data: Preliminary SHARE Wave 8 Release 0 and Release 7-1-0. Oxford COVID-19 Government Response Tracker. Conclusions are preliminary. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: Protective behavior by Country groups (Average Marginal Effects)

	Mortality (death per 100,000)			Oxford Stringency Index (0-100)			Trust in healthcare system (0-100)		
	1.Quartile (<3)	2./3.Quartile	4.Quartile (>18)	1.Quartile (<37.4)	2./3.Quartile	4.Quartile (>50.8)	1.Quartile (<48.5)	2./3.Quartile	4.Quartile (>87.4)
Perceived severity									
Not exp. (ref.)									
Mildly exposed (symp/test)	-0.010 (0.07)	0.049 (0.04)	0.061 (0.04)	0.107 (0.06)	0.027 (0.03)	0.075 (0.05)	-0.020 (0.10)	0.033 (0.04)	0.061 (0.04)
Severely exposed (hosp/died)	0.084 (0.12)	0.091 (0.07)	0.094* (0.04)	0.176 (0.12)	0.100* (0.04)	0.044 (0.06)	-0.176 (0.19)	0.076 (0.05)	0.126* (0.05)
ln(chang in conf. cases)	-0.013 (0.02)	-0.035* (0.01)	0.001 (0.01)	-0.004 (0.02)	-0.004 (0.01)	-0.030* (0.01)	0.003 (0.04)	-0.020* (0.01)	-0.010 (0.01)
Perceived vulnerability									
Number of health rsks	0.030 (0.02)	0.026 (0.02)	0.014 (0.02)	0.051* (0.02)	0.006 (0.01)	0.049 (0.03)	-0.010 (0.03)	0.043** (0.01)	0.037 (0.02)
Age <65 (ref.)									
Age 65-79 (Young retirees)	0.002 (0.05)	0.049 (0.04)	-0.023 (0.04)	0.153* (0.07)	0.011 (0.03)	-0.107* (0.05)	-0.040 (0.05)	0.038 (0.03)	0.078 (0.05)
Age 80+ (Elderly aged)	-0.116 (0.07)	-0.148** (0.06)	-0.140* (0.05)	0.014 (0.09)	-0.174*** (0.04)	-0.199** (0.07)	-0.217* (0.09)	-0.148** (0.05)	-0.041 (0.07)
Fear arousal									
Not anxious (ref.)									
Anxious notmore than before Corona	0.123* (0.05)	0.058 (0.05)	0.038 (0.07)	0.045 (0.07)	0.059 (0.04)	0.107* (0.05)	0.055 (0.06)	0.049 (0.04)	0.080 (0.08)
Anxious more than before Corona	0.280*** (0.04)	0.180*** (0.03)	0.146*** (0.03)	0.265*** (0.05)	0.178*** (0.03)	0.190*** (0.04)	0.194*** (0.05)	0.190*** (0.03)	0.190*** (0.04)
Afraid of infect	0.295*** (0.04)	0.217*** (0.04)	0.163*** (0.03)	0.345*** (0.05)	0.197*** (0.03)	0.182*** (0.04)	0.324*** (0.05)	0.165*** (0.03)	0.245*** (0.04)

Optimistic attitude									
Uplift. experience since Corona	0.071 (0.04)	0.162*** (0.03)	0.200*** (0.04)	0.211*** (0.05)	0.138*** (0.03)	0.083* (0.04)	0.080 (0.05)	0.130*** (0.03)	0.230*** (0.04)
Looking forward to sth after Corona	0.289*** (0.05)	0.140** (0.04)	0.293*** (0.06)	0.415*** (0.07)	0.147*** (0.03)	0.304*** (0.06)	0.222*** (0.06)	0.200*** (0.04)	0.353*** (0.07)
N	9,755	12,133	10,066	6,478	18,169	7,307	5,462	15,869	8,494

Weighted sample. Average marginal effects reported. Robust standard errors in parentheses. Controlled for country, sex, migrant, marital status, household size, urban, home ownership, education, employment status, personality traits, trust, w8CAPI. $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$.

Data: Preliminary SHARE Wave 8 Release 0 and Release 7-1-0. Oxford COVID-19 Government Response Tracker. Special Eurobarometer 411, Wave 80.2. Conclusions are preliminary.

Robustness Check 2: Negative binomial vs Linear regression (OLS)

Table A3: Specifications and Modelling strategies for Protective Behavior Index (PBI)

	OLS on PBI	(a) OLS on reversed PBI	(b) Negative Binomial on reversed PBI
Mildly exposed (symp/test)	0.051*	-0.051*	-0.043
	(0.025)	(0.025)	(0.024)
Severely exposed (hosp/died)	0.088**	-0.088**	-0.097*
	(0.034)	(0.034)	(0.038)
ln(change in confirmed cases)	-0.011	0.011	0.012
	(0.007)	(0.007)	(0.007)
number of health risk conditions	0.051*	-0.051*	-0.043
	(0.025)	(0.025)	(0.024)
Age 65-79 (Young retirees)	0.011	-0.011	0.001
	(0.025)	(0.025)	(0.025)
Age 80 + (Elderly aged)	-0.143***	0.143***	0.144***
	(0.035)	(0.035)	(0.032)
Anxious, not more than before Corona	0.072*	-0.072*	-0.065*
	(0.031)	(0.031)	(0.031)
Anxious, more than before Corona	0.195***	-0.195***	-0.211***
	(0.019)	(0.019)	(0.022)
Afraid of infection (foregone med treatm)	0.229***	-0.229***	-0.246***
	(0.021)	(0.021)	(0.025)
Uplifting experience during Corona	0.145***	-0.145***	-0.135***
	(0.021)	(0.021)	(0.019)
Looking forward to sth after Corona	0.230***	-0.230***	-0.200***
	(0.028)	(0.028)	(0.023)
N	31,954	31,954	31,954
R^2	0.167	0.167	

Weighted sample. Beta coefficients reported. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Controlled for country, sex, migrant, marital status, household size, urban, home ownership, education, employment status, personality traits, trust, w8CAPI.

Data: Preliminary SHARE Wave 8 Release 0 and Release 7-1-0. Oxford COVID-19 Government Response Tracker. Conclusions are preliminary.