

# The Politics of Loneliness during the COVID-19 Pandemic

The HOPE project ([www.hope-project.dk](http://www.hope-project.dk))

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# HOPE

## Introduction

In the beginning of the COVID-19 pandemic, several experts raised concerns about the anticipated repercussions of social restrictions on wellbeing and mental health disorders and some experts even warned about an epidemic of loneliness (Galea et al., 2020; Panchal et al., 2020; Weissbourd et al., 2021). Several studies have documented that levels of loneliness *did* increase during the COVID-19 pandemic (Petersen & Roepstorff, 2021; Horigian et al., 2020; Killgore et al., 2020; AARP, 2021).

Keeping feelings of loneliness at a minimum level is intrinsically desirable, but loneliness is also known to be a prominent risk factor for future anxiety and depression (Varga et al., 2021). Thus, increasing levels of loneliness might lead to an increase in mental health disorders in the future. Furthermore, the potential negative effects of increasing levels of loneliness are not necessarily limited to mental health disorders. Reducing feelings of loneliness might also be relevant from a pandemic management perspective, since loneliness could lead to lower adherence to restrictions.

Thus, it is important to understand how loneliness has developed over the course of the pandemic, but also how loneliness is related to factors such as time, stringency and severity of the pandemic, and whether there are negative effects of increasing loneliness that should be taken into account during a pandemic. In this report, we therefore analyze (1) whether loneliness is predicted by time, stringency and severity of the pandemic. Furthermore, we also (2) assess how loneliness is associated with political discontent and protective behavior.

## Methods and Materials

### *Data*

We fielded quota-sampled surveys in eight countries (N = 128,878) from April 9, 2020 until July 20, 2021: Denmark, France, Germany, Hungary, Italy, Sweden, the United Kingdom, the United States. These countries were chosen to represent a diversity of national responses to the COVID-19 pandemic as well as a diversity in the severity of the local epidemic. Data are collected one or two times per month in rounds of 500 respondents per country. In each round, some participants are re-contacted, which provides a panel component to the data (N = 55,040). In each of the eight countries, the survey company Epinion sampled adult respondents using online panels. The survey was conducted in accordance with the guidelines of the Danish

National Committee of Health Research Ethics for survey research that do not involve human biological material and all participants provided informed consent. Survey respondents were quota sampled to match the population margins on age, gender, and geographic location for each of the eight countries.

### *Measurement*

We measure loneliness using the following question: *“To what extent do you agree or disagree with the following statement? I feel lonely”*. Respondents answered on a 5-point scale from “completely disagree” to “completely agree”. The question is rescaled to range from 0 to 1, with higher values indicating a higher level of loneliness.

To assess macro-level correlates of loneliness, we measured the stringency of government COVID-19-policies using the Oxford Covid-19 Government Response Tracker (Hale et. al, 2020). The index is a composite measure of the number of non-pharmaceutical interventions taken in a specific country (e.g., school and workplace closings, curfews and restrictions on international travel). The index is scaled from 0 to 1, with higher values indicating a higher level of stringency of the government response. To measure the severity of the local epidemic, we use the registered count of daily deaths and case counts per capita. These numbers are also taken from the Oxford Government Response Tracker dataset. To ease interpretation of the estimated coefficients, these measures are rescaled from 0 to 1, with higher values indicating the maximum observed levels of daily deaths and case counts per capita.

To assess whether loneliness is associated with political discontent and protective behavior we include the following six individual-level measures: (1) opposition to pandemic policies, (2) concern about democratic rights, (3) government distrust, (4) vaccination willingness, (5) behavior change, and (6) fatigue. Table 1 provides an overview of question wordings and scales for these measures.

**Table 1. Measures of political discontent and protective behavior**

	Questions	Values
<b>Opposition to pandemic policies</b>	The government's response to the coronavirus has been too extreme.	1. Completely disagree 2. Somewhat disagree 3. Neither agree nor disagree 4. Somewhat agree 5. Completely agree
<b>Concern about democratic rights</b>	I am concerned about my democratic rights in the current circumstances.	1. Completely disagree 2. Somewhat disagree 3. Neither agree nor disagree 4. Somewhat agree 5. Completely agree
<b>Trust in the government</b>	Give your assessment on a scale from 0 to 10, where 0 indicates that you have no confidence in the government at all, and 10 indicates that you have full confidence in the government.	0. No confidence at all 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. Full confidence
<b>Vaccination willingness</b>	If the health authorities advise people like me to get an approved vaccine against the coronavirus, I will follow their advice.	1. Completely disagree 2. Somewhat disagree 3. Neither agree nor disagree 4. Somewhat agree 5. Completely agree
<b>Behavior change</b>	To what degree do you feel that the current situation with the coronavirus has made you change your behavior to avoid spreading infection?	1. Not at all 2. To a lesser degree 3. To a certain degree 4. To a high degree
<b>Fatigue</b>	I do not think I can keep up with the restrictions against the coronavirus for much longer.	1. Completely disagree 2. Somewhat disagree 3. Neither agree nor disagree 4. Somewhat agree 5. Completely agree

*Note: All measures are rescaled to range from 0-1, with higher values indicating a higher level of (1) opposition to pandemic policies, (2) concern about democratic rights, (3) trust in the government, (4) vaccination willingness, (5) behavior change, and (6) fatigue.*

Finally, we measured the following demographic variables: sex, age and education. Sex is an indicator variable (0 for females; 1 for males). Age is a continuous variable asking respondents how old they are. Age is rescaled from 0-1, with 0 being the minimum age in the sample (18 years) and 1 being the maximum age (100 years). Education is an indicator variable based on the internationally comparable ISCED-scale (0 for non-tertiary education; 1 for tertiary education).

### *Statistical analysis*

To answer our research question, we conduct three different sets of statistical analyses. First, we plot the two macro-level predictors; stringency and COVID-19 death counts along with loneliness over the survey period. Furthermore, we present an aggregated model that investigates how these macro-level predictors, along with time, predict the average daily reported country-levels of loneliness within each dataround. In this model we use country-level fixed effects.

Second, we investigate the correlations between loneliness and the six measures of political discontent and protective behavior. These models include demographic variables along with dummies for each data round to control for time-specific fixed effects.

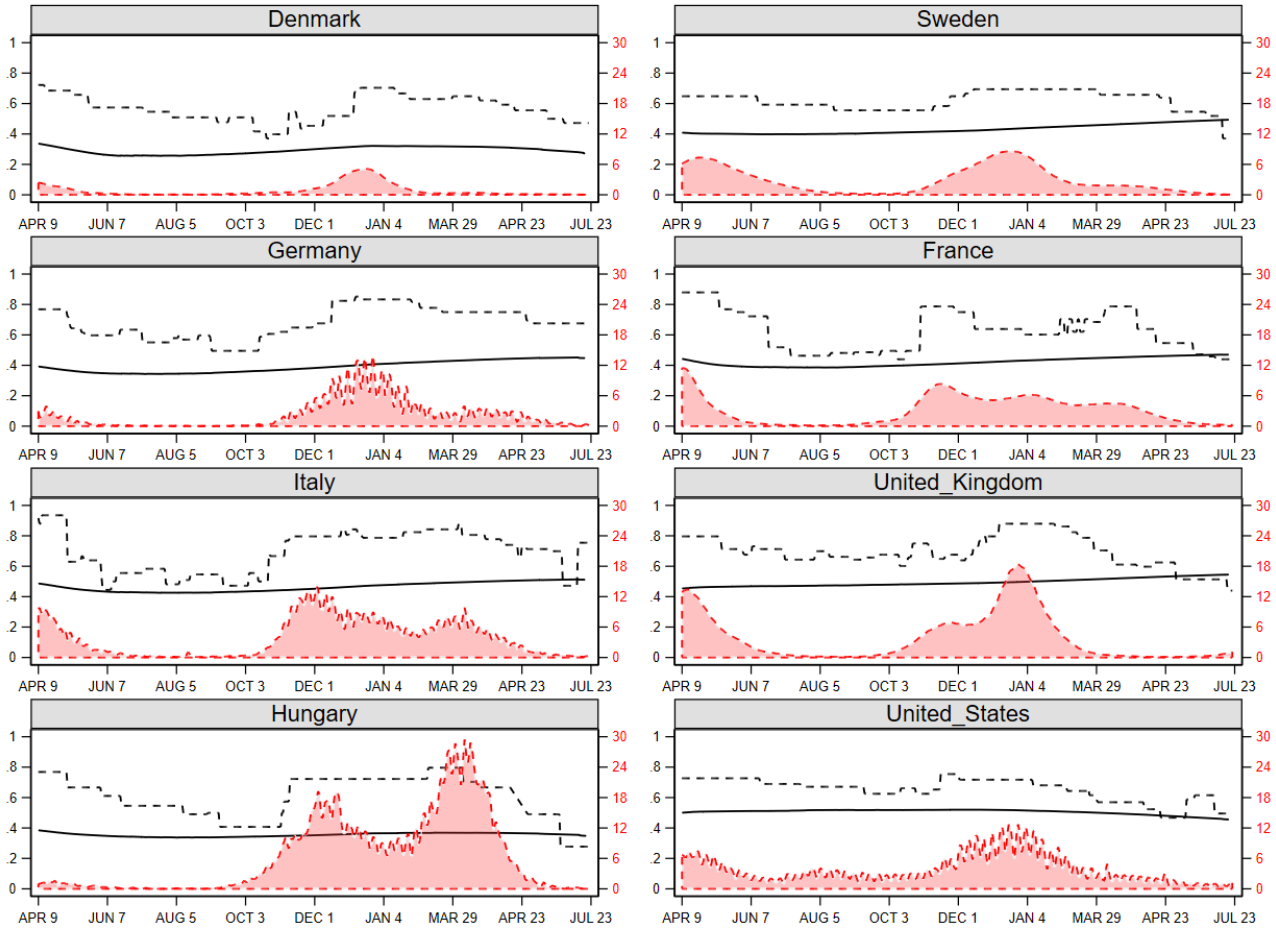
Third, to gauge causality, we utilize our panel component and present a model that uses a two-way fixed effects estimator. To account for the fact that individuals are nested within countries, we cluster the standard errors at the country level.

All variables in the analysis below are scaled from 0-1. Given that both the outcome and predictors are scaled to range between 0-1, the size of the estimated coefficients reported below reflects the percentage points change in the outcome variables when we compare individuals at the minimum and maximum values for each of the correlates, respectively.

## Results

In Figure 1 below, we illustrate the country-level developments in (1) loneliness, (2) stringency, and (3) severity of the pandemic from April 2020 until July 2021.

**Figure 1. Development in loneliness, stringency and daily deaths per million**



*Note: Solid lines are the developments in loneliness. Dashed lines are the developments in stringency of government response to COVID-19. Red areas display the developments in the daily COVID-19 death counts per million using a kernel smoother.*

First, we see that loneliness (the solid line) increases over time in most of the countries. However, loneliness starts at a relatively high level in April 2020, where most countries are under lockdown. Through the summer of 2020, we observe a decrease in loneliness in most countries, and then increasing levels of loneliness again during the winter of 2020/2021.

Second, we observe an increase in stringency (the dashed line) over time. In most countries, we observe high levels of stringency in the beginning of the survey period. However, for most of the countries, the level of stringency decreases during the summer 2020, and then we observe

an increase again in the fall of 2020. In most of the countries, the level of stringency decreases again during the summer 2021.

Third, in most of the countries we observe the highest levels of daily deaths in April 2020 and again in the winter of 2020/2021 where the second wave of the pandemic hits all countries in the sample.

In table 2 below, we present an aggregated model that investigates how time (measured as the number of weeks since the beginning of the data collection), stringency and daily deaths and cases per capita are related to loneliness. The estimated correlations are based on pooled data from all countries and fixed on country.

**Table 2. Macro-level predictors of loneliness**

	Loneliness
Week	0.076*** (0.013)
Stringency	0.239*** (0.033)
New cases per. capita	0.037 (0.042)
New deaths per. capita	-0.095* (0.031)
Constant	0.231*** (0.020)
Observations	1615
$R^2$	0.199

*Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Standard errors in parentheses. Estimates are fixed on country. All variables are scaled from 0-1. The daily COVID-19 cases and deaths per. capita along with the stringency-index are retrieved from Oxfords COVID-19 Government Response Tracker (Hale et. al, 2020).*

As shown in figure 1, there seems to be an overall increase in levels of loneliness over time, and this tendency is confirmed by the results in table 2. Specifically, loneliness increases with 7.6 percentage points when comparing the first week of the data collection (April 9, 2020) to the last week of the data collection (July 20, 2021). Thus, we do find support for the anticipated increasing levels of loneliness during the pandemic.

Turning to stringency of the government response to the pandemic, we see that people feel more lonely when the restrictions in a given country are more stringent. Specifically, loneliness increases with 23.9 percentage points when comparing a situation with no COVID-19

restrictions to a situation where the society is under complete lockdown. Further analyses show that the overall positive correlation is primarily driven by stay-at-home requirements and restrictions on gatherings (see table A1 in the appendix).

Third and finally, we find mixed evidence regarding the influence of the severity of the pandemic on loneliness. Citizens do not seem to experience more or less loneliness when COVID-19 infections go up. However, they do experience less loneliness when the number of COVID-19 deaths increases.

In sum, these results show that loneliness increases when time goes by, when stringency goes up and when death numbers goes down. However, it is important to note that these correlations are likely to suffer from autocorrelation. Therefore, we report the same model with a lagged dependent variable in the appendix (see table A2 in the appendix). These results are essentially similar to the results reported in table 2.

On this basis, we turn towards understanding whether loneliness predicts political discontent and protective behavior. Table 3 presents the results from regressing our six measures of political discontent and protective behavior on loneliness, pooling the data from all countries while controlling for demographics, time- and country-dummies. The coefficients reflect the change in each of the outcome measures when we compare individuals with the lowest and highest levels of loneliness.

**Table 3. Individual-level correlates of loneliness**

	Too extreme	Democratic concerns	Government trust	Vaccination willingness	Social contacts	Fatigue
Loneliness	0.097*** (0.015)	0.161*** (0.015)	-0.045*** (0.007)	0.018 (0.016)	0.001 (0.016)	0.322*** (0.027)
Male	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Female	-0.049** (0.012)	-0.020 (0.012)	0.006 (0.016)	-0.033* (0.011)	-0.045*** (0.008)	-0.006 (0.006)
Age	-0.171* (0.049)	-0.057 (0.038)	0.040 (0.036)	0.345*** (0.047)	-0.347*** (0.042)	-0.340*** (0.028)
Lower education	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Higher education	-0.020 (0.011)	-0.011 (0.008)	0.013 (0.009)	0.043*** (0.008)	-0.001 (0.007)	-0.009 (0.007)
Constant	0.562*** (0.020)	0.594*** (0.014)	0.395*** (0.023)	0.463*** (0.012)	0.982*** (0.019)	0.397*** (0.020)
Observations	125547	124802	128878	46718	128878	48714
R <sup>2</sup>	0.060	0.098	0.075	0.133	0.095	0.205

*Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Clustered robust standard errors on country level in parentheses. There is control for data round (time) and country-dummies, which are left out of the table. All variables are scaled from 0-1, except from social contacts, which is total contacts within 2 meters in the past 24 hours.*



Focusing on measures of political discontent, table 3 shows that respondents who feel lonely are more skeptical towards the government's COVID-19 policies. When comparing respondents with the highest level of loneliness to respondents with the lowest level of loneliness, we observe a 9.7 percentage point increase in the opinion that the government's response has been too extreme. We find the same association when focusing on concern about democratic rights. Specifically, the level of concern about democratic rights is 16.1 percentage points higher for respondents who experience the highest level of loneliness compared to respondents with the lowest level of loneliness. Likewise, we also find that loneliness is a significant predictor of lower trust in the government. Specifically, the level of trust in the government is 4.5 percentage points lower for respondents who experience the highest level of loneliness compared to respondents with the lowest level of loneliness.

Focusing on the association between loneliness and protective behavior, we find the loneliness is significantly associated with feelings of fatigue, but not significantly associated with vaccination willingness and contact behavior. Specifically, we observe a 32.2 percentage point increase in fatigue, when comparing respondents with the highest level of loneliness to respondents with the lowest level of loneliness.

Overall, the above findings suggest that loneliness is correlated with skepticism towards governments' handling of COVID-19, distrust in the government, democratic concerns, and fatigue across the eight countries. In figure A1 in the appendix, we show that the country-levels correlations are highly consistent with the overall findings. However, we do observe some differences with regards to vaccination willingness and contact behavior. While the overall results shows and insignificant association between loneliness and vaccination willingness, we do find that loneliness is a significant positive predictor of vaccination willingness in Hungary and in the US. Furthermore, we also find that loneliness is a significant negative predictor of social contacts in Denmark, but a significant positive predictor of social contacts in the UK (see figure A1 in the appendix).

An important limitation to the individual-level findings presented above is, however, that it may suffer from selection bias. One source of bias emerges from the possibility that there is omitted variables in our estimations, and another equally important source of bias comes from reversed causality. To limit these sources of bias and increase the internal validity of the analysis we therefore use the panel component of our data. Table 4 reports the influence of loneliness on the six outcome measures using a two-way fixed effects estimator.

**Table 4. Within individual-level correlates of loneliness**

	Too extreme	Democratic concerns	Government trust	Vaccination willingness	Social contacts	Fatigue
Loneliness	0.035*** (0.007)	0.050*** (0.006)	-0.011** (0.004)	0.021 (0.014)	-0.051*** (0.010)	0.202*** (0.017)
Constant	0.218* (0.105)	0.334*** (0.052)	0.652*** (0.024)	0.715*** (0.014)	0.759*** (0.159)	0.210*** (0.017)
Observations	53663	53515	55040	15932	55040	16629
R <sup>2</sup>	0.016	0.007	0.033	0.067	0.050	0.065

*Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Unstandardized regression coefficients from two-way fixed effects analyses. Standard errors are two-way clustered by individual and data round dummies. All variables are scaled from 0-1, except from social contacts, which is total contacts within 2 meters in the past 24 hours.*

The results displayed in table 4 overall support the earlier correlational findings from table 3. Loneliness spurs greater skepticism towards governments' handling of COVID-19, lower levels of trust in the government, leads to higher levels of democratic concerns, and a greater level of fatigue. However, we do also find that loneliness leads to fewer social contacts. Despite of a high degree of consistence with the individual-level estimators used earlier, it is worth noticing, that the influence of loneliness on all of the outcomes are substantially lower when using the two-way fixed effects estimator. As shown in figure A2, these results are essentially similar across all eight countries. However, it is important to notice that the negative effect of loneliness on social contacts is driven by Denmark and France, which are the only countries where a significant negative association is observed in this model (see figure A2 in the appendix).

## Conclusion

In this report, we have instigated (1) how loneliness developed over the course of the pandemic, (2) whether loneliness is predicted by time, stringency and severity of the pandemic, and (3) how loneliness is associated with political discontent and protective behavior.

Across most countries in our sample, we observe increasing levels of loneliness during the pandemic. Furthermore, we find that loneliness increases when time goes by, when stringency goes up and when death numbers goes down. Finally, loneliness is also associated with skepticism towards governments' handling of COVID-19, distrust in the government, concern about democratic rights, and feelings of pandemic fatigue. Overall, these findings emphasize that keeping loneliness at a minimum level is important – not just because of the negative effects on mental health – but also from a pandemic management perspective.

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## Appendix

**Table A1. Analysis of stringency subcomponents**

	Schools	Workplaces	Public events	Gatherings	Public transport	Stay at home	Movement	International travel	Campaigns
Subcomponent	0.024* (0.008)	0.029* (0.010)	0.032** (0.007)	0.044** (0.009)	0.023 (0.012)	0.045*** (0.007)	0.030* (0.009)	0.005 (0.017)	0.000 (.)
Week	0.069* (0.022)	0.058** (0.014)	0.060** (0.017)	0.048* (0.018)	0.060* (0.018)	0.052** (0.014)	0.068* (0.019)	0.055* (0.020)	0.056* (0.019)
New cases per. capita	0.062 (0.046)	0.025 (0.033)	0.049 (0.034)	0.024 (0.052)	0.066 (0.038)	0.047 (0.040)	0.056 (0.044)	0.060 (0.041)	0.061 (0.042)
New deaths per. capita	0.007 (0.059)	0.023 (0.058)	0.012 (0.055)	-0.015 (0.050)	0.019 (0.052)	-0.057 (0.037)	0.029 (0.061)	0.036 (0.059)	0.036 (0.059)
Constant	0.344*** (0.012)	0.345*** (0.013)	0.334*** (0.015)	0.345*** (0.015)	0.332*** (0.010)	0.343*** (0.010)	0.339*** (0.013)	0.356*** (0.009)	0.348*** (0.012)
Observations	1616	1616	1616	1616	1616	1616	1616	1616	1616
R <sup>2</sup>	0.102	0.103	0.108	0.137	0.101	0.149	0.113	0.084	0.083

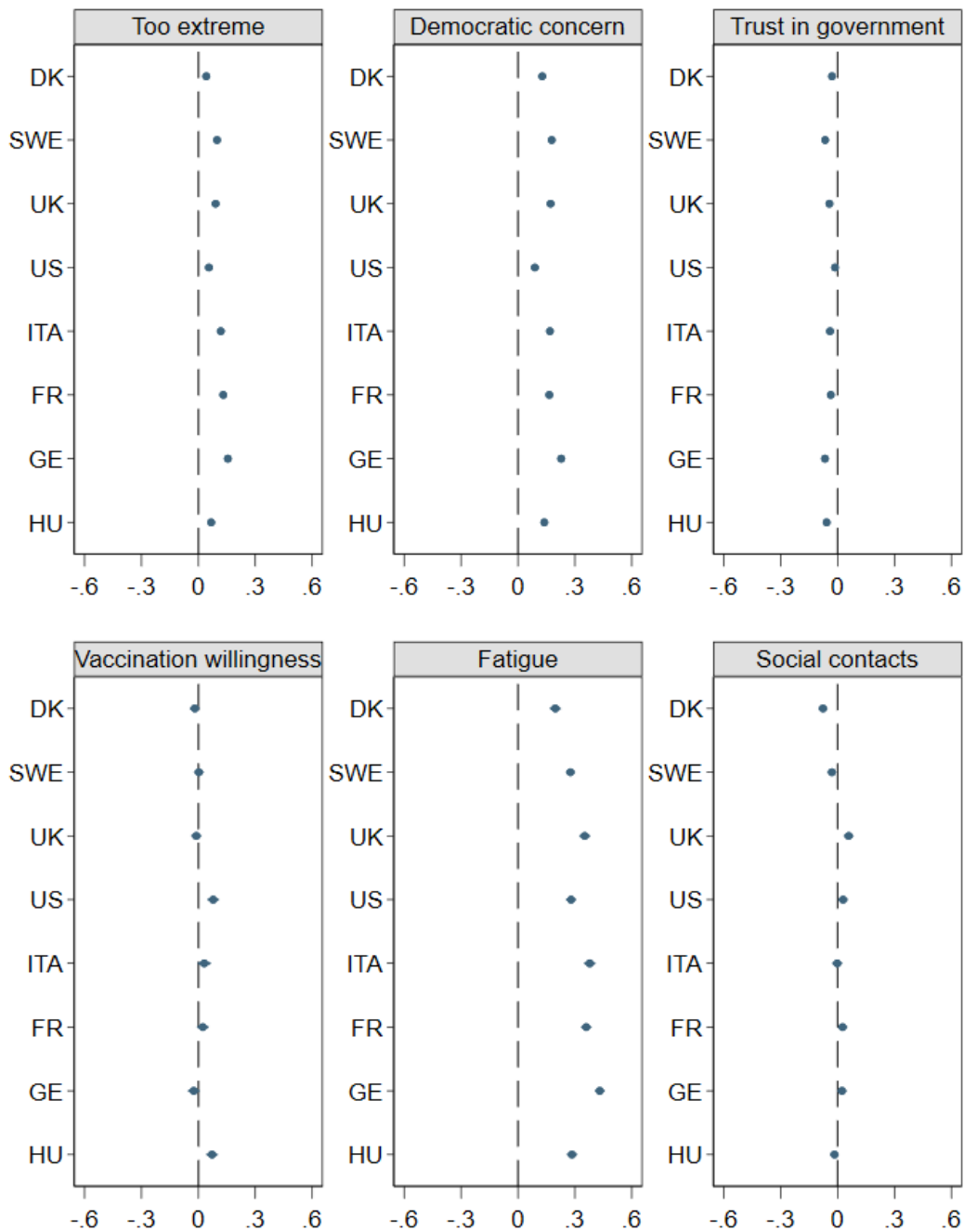
Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . The table shows estimates for each of the Stringency subcomponents, along with week, deaths and cases per. capita on loneliness. Standard errors in parentheses. Estimates are fixed on country. All variables are scaled from 0-1. The daily COVID-19 cases and deaths per. capita along with the stringency-measures are retrieved from Oxfords COVID-19 Government Response Tracker (Hale et. al, 2020). All subcomponents are dichotomous with 1 indicating lockdown in the specific area: School closing: 0 = No measures/recommended closing, 1 = Required closing some/all levels. Workplace closing: 0 = No measures/recommended closing, 1 = Required closing some sectors/all but not essential. Public events: 0 = No measures/recommended cancelling, 1 = Required cancelling. Gatherings: 0 = No restrictions/restrictions down to 11 people, 1 = Restrictions on gatherings on 10 people or less. Public transport: 0 = No measures, 1 = Recommended/required closing public transport. Stay at home: 0 = No measures/recommended not leaving house, 1 = Required not leaving with exception/minimal exceptions. Movement: 0 = No measures, 1 = Recommend or restricted not to travel between regions. International travel: 0 = No restrictions/screening/quarantines, 1 = Ban arrivals from some or all regions. Campaigns: 0 = No Covid-19 public information campaign/public officials urging caution about Covid-19, 1 = Coordinated public information campaigning.

**Table A2. Macro-level predictors of loneliness (lagged)**

	Loneliness
Week	0.060** (0.012)
Stringency	0.189*** (0.027)
New cases per. capita	0.032 (0.034)
New deaths per. capita	-0.088** (0.021)
Lagged lonely	0.214*** (0.035)
Constant	0.180*** (0.018)
Observations	1456
$R^2$	0.236

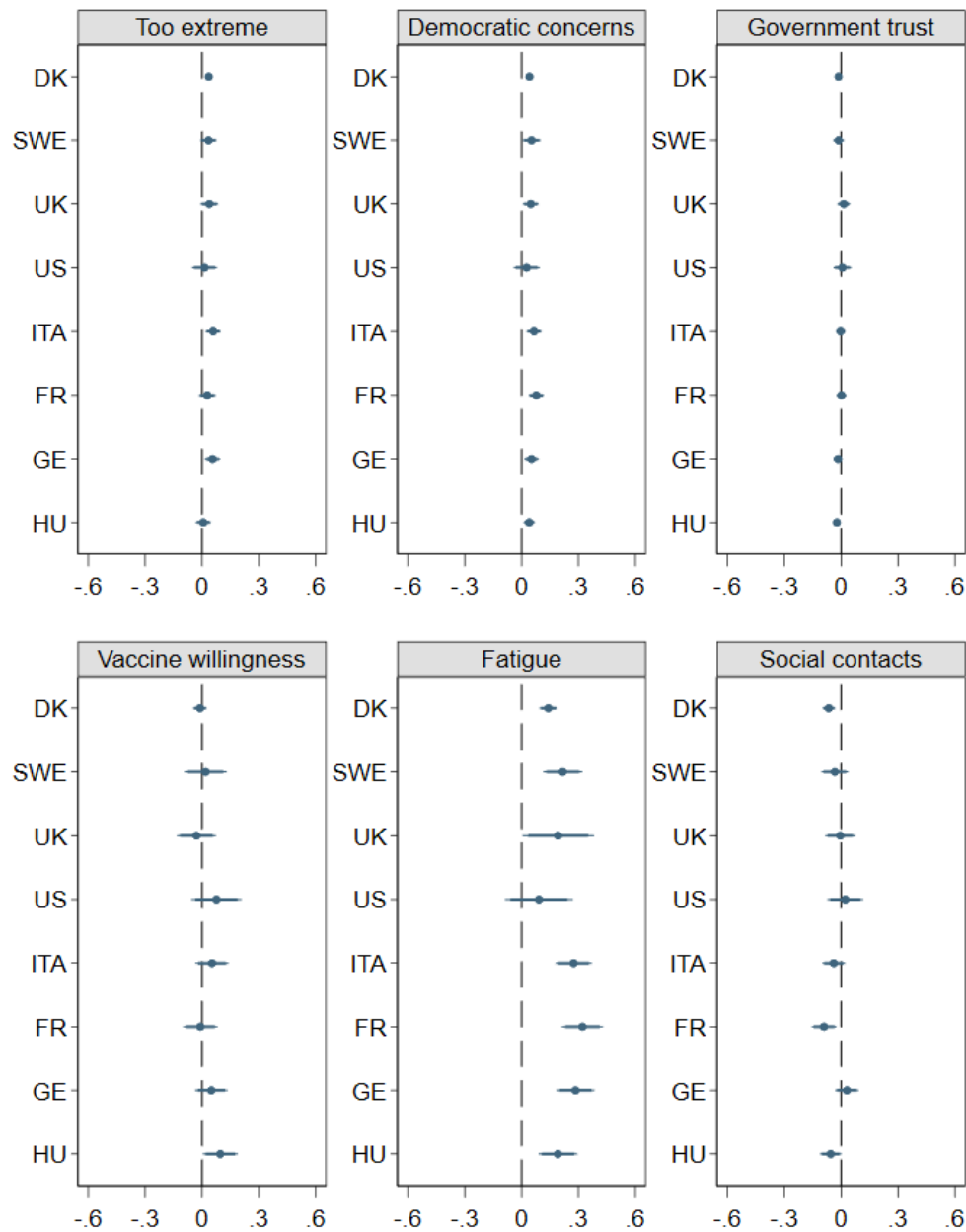
*Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Standard errors in parentheses. Estimates are fixed on country. All variables are scaled from 0-1. The daily COVID-19 cases and deaths per. capita along with the stringency-index are retrieved from Oxfords COVID-19 Government Response Tracker (Hale et. al, 2020).*

**Figure A1. Individual-level correlates of loneliness by country**



*Note: Blue circles are the estimated correlations based country-level estimations. There is control for same demographics as in table 2 along with dummies for each data round. Horizontal bars are the associated 95% confidence intervals.*

**Figure A2. Within individual correlates of loneliness by country**



*Note: Blue circles are the estimated correlations based country-level and individual fixed effects estimations. There is control for dummies for each data round. Horizontal bars are the associated 95% confidence intervals.*