

Social Isolation and Psychological Distress During the COVID-19 Pandemic: A Cross-National Analysis

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Abstract

Background and Objectives: The coronavirus disease 2019 (COVID-19) pandemic resulted in social isolation globally, creating heightened levels of stress and anxiety. This study investigates the link between social isolation and mental well-being in later life, and how it varies across countries.

Research Design and Methods: We draw on a subset of older adults from Global Behaviors and Perceptions in the COVID-19 pandemic, a unique global online survey of 13,660 participants from 62 countries. We use mixed-effects models to analyze the data.

Results: Social isolation (distancing) significantly predicts poor mental health operationalized as coronavirus-induced distress ($p < 0.01$). At the aggregate level, average distress varies positively across countries with higher numbers of coronavirus-related deaths ($p < 0.10$) and more fragile state capacity ($p < 0.05$), while varying negatively across those with more stringent anti-coronavirus policies ($p < 0.05$). Finally, we report several cross-level interactions between social isolation and the total number of deaths ($p = 0.025$), policy stringency ($p = 0.065$), state fragility ($p = 0.061$), and globalization index ($p = 0.071$).

Discussion and Implications: Our study shows that a proper understanding of the impact of COVID-19 on the mental well-being of older adults should consider the moderating role of national context.

Keywords: Mental well-being, Social distancing, National context, Multilevel analysis, COVID-19

The coronavirus disease 2019 (COVID-19) pandemic has profoundly altered the lives of people throughout the world, as the virus reached almost every continent with over a half million deaths as of early July, 2020 (Johns Hopkins University & Medicine 2020). In particular, the risk of mortality from COVID-19 is significantly higher for older adults (Remuzzi & Remuzzi, 2020). According to the World Health Organization (WHO), fatality rates for those over 80 years of age are five times the global average (WHO, 2020). Aside from the harmful or deadly physical consequences, the coronavirus disease has also created a mental health catastrophe (United Nations, 2020). A recent systematic review and meta-analysis reveals that the onset of the COVID-19 pandemic is associated with heightened levels of psychiatric symptoms across all age segments (Rogers et al., 2020). Yet, findings focusing specifically on older adults are limited and inconclusive. For example, a study in the U.S. shows that older adults experienced greater depression and loneliness following the onset of the COVID-19 pandemic (Krendl & Perry, 2020). Yet, a longitudinal study in Sweden highlights that the pandemic does not exert negative effects on the well-being of older participants (Kivi, Hansson, & Bjälkebring, 2020). In addition, according to another study the U.S., although older adults perceive greater risks of dying if infected, they show less negative response to the COVID-19 pandemic and even exhibit better mental health during the early stages of the pandemic (e.g., Bruine de Bruin, 2020).

Given such diverging findings, we offer in this article additional evidence concerning the psychological impact of the COVID-19 pandemic by focusing on the harmful effects of social isolation resulting from government-imposed measures of physical distancing across multiple countries. In so doing, we draw on a classic Durkheimian perspective that highlights the importance of social integration, or lack thereof, as a critical determinant of health and well-being (Berkman, Glass, Brissette, & Seeman, 2000). A Durkheimian perspective argues

that individual pathology is conditioned by social dynamics, and that large-scale social crises may take a toll on individual health and well-being through depleting social integration (Durkheim, [1897] 1951). A wealth of evidence supports this perspective by demonstrating that the lack of social connectedness and companionship may be detrimental to health and well-being (York Cornwell & Waite, 2009). We extend this perspective to social isolation caused by the COVID-19 pandemic and its deleterious consequences for mental health in later life.

While movement restrictions mandated by governments helped to slow the spread of the virus (Robertson et al., 2020), they have contributed to increasing social isolation and loneliness generally and particularly for the older generation (Krendl & Perry, 2020; van Tilburg et al., 2020), which can in turn adversely impact mental health (Giallonardo et al., 2020). In line with this observation, a systematic review based on 24 papers across 10 countries regarding the psychological repercussions of quarantine during previous global disease outbreaks (e.g., SARS, Ebola, H1N1 influenza) suggests that the COVID-19 pandemic may also present self-isolation as a serious risk factor (Brooks et al., 2020). These empirical results imply that social isolation induced by the outbreak of COVID-19 may be especially detrimental to older adults as they tend to have smaller social networks than their younger counterparts (Charles & Carstensen, 2010).

The present study seeks to contribute to the existing scholarship in the following way. Although a nascent body of research documents that social isolation due to government lockdown raises COVID-related distress among older adults (Krendl & Perry, 2020), this literature does not offer general claims about the global population of older adults, since most findings are based on (intra-national) case studies. That is, the lack of evidence precludes a clear understanding of how the experiences of physical distancing affect the mental health of

older persons *across* countries. To overcome this limitation, we investigate the link between social isolation and coronavirus-induced distress by using large cross-national data. Our results thus help advance the literature by providing a broader level of generalization of this crucial link in later life.

In addition, we contribute to the literature by assessing how negative psychological effects of social isolation differ by national contexts. Undoubtedly, the COVID-19 outbreak has impacted people differentially not only according to *who* they are (socioeconomic and demographic factors) but also *where* they live (country-level factors). However, previous research has overwhelmingly emphasized the former, i.e., variables such as gender, race and income (Garcia et al., 2020; Raisi-Estabragh et al., 2020). That is, most existing findings focus on how the health consequences of the COVID-19 pandemic vary by individual-level characteristics. Consequently, less is known about the ways in which contextual factors condition the impact of the new coronavirus on individual health and well-being.

To bridge this gap, our study shifts the analytic attention to how and the extent to which measures of national context modify the relationship between social isolation and coronavirus-induced distress in later life. We focus on four contextual measures: 1) the number of deaths due to COVID-19, 2) how effectively anti-coronavirus measures (shutting down schools, banning public gatherings, limiting travels, etc.) have been instituted. 3) how “strong” or “capable” the government is, and finally 4) how globalized the country is. We select these factors as they may serve as either a stressor or a stress-buffer in the context of the COVID-19 pandemic. Below, we provide a theoretical rationale for their moderating effects regarding the link between social isolation and coronavirus-induced psychological distress in later life.

First, we expect that the relationship between social isolation and psychological distress will be stronger in countries with more deaths due to COVID-19. As older adults watch and hear the news about high rates of mortality, they may worry about the real possibility of personally experiencing the same fate. Such concerns, often referred to as anticipatory stressors, can create anxiety and fear of infection (Pearlin & Bierman, 2013), which would ultimately exacerbate deleterious psychological effects of social isolation. Second, the link between social isolation and psychological distress will be weaker in countries with stricter policy measures. Living in a country with more restrictive measures mandated by the government can provide some assurance that the political leaders are “doing the right thing.” And this assurance may act as a stress-buffer, mitigating the negative mental health consequences of social isolation.

Third, the association between social isolation and psychological distress will be mitigated in countries with limited state capacity. Individuals living in countries with stronger governments may have lower immunity to life stressors because their governments tend to provide them with better resources and support to properly address them. As a result, they may lack the opportunities to fully develop resilience to cope with stressful conditions, suggesting that social isolation might be more distressing for them. By contrast, residents of more fragile states tend to be exposed to a range of stressors. Given that they may have lower expectations of state authorities to provide adequate public health and safety, they are more likely to mobilize their own personal resources to deal with stressors. Hence, exposure to stressors may contribute to building toughness and resilience to hardships (Seery, Holman, & Silver, 2010). Consequently, they may better cope with stressors and thus are less vulnerable to social isolation due to physical distancing.

Fourth, the relationship between social isolation and psychological distress will be stronger in countries that are more globalized. Since the novel coronavirus is highly contagious, a more open country can increase the fear and spread of the infection among its residents. This may lead to greater levels of anticipatory stressors that in turn amplify the positive relationship between social isolation and psychological distress. Taken together, our empirical analysis is guided by the following hypotheses:

- H1: Social isolation due to physical distancing is associated with greater levels of psychological distress.
- H2: The positive relationship between social isolation and psychological distress is *stronger* in countries with more deaths due to COVID-19.
- H3: The positive relationship between social isolation and psychological distress is *weaker* in countries with stricter policy measures.
- H4: The positive relationship between social isolation and psychological distress is *weaker* in countries with limited state capacity.
- H5: The positive relationship between social isolation and psychological distress is *stronger* in countries that are more globalized.

Methods

Data Source

Data are drawn from the Global Behaviors and Perceptions in the COVID-19 Pandemic (hereafter “GB&P COVID-19”), a unique international online survey originally consisting of more than 100,000 respondents from over 100 countries which was initiated by a consortium of researchers from a dozen academic institutions. Details of this study are described in the National Bureau of Economic Research (NBER) Working Paper (Fetzer et al., 2020a). GB&P COVID-19 was launched on March 20th (and completed on April 5th) of 2020, when there were roughly 240,000 confirmed cases in the world, with 9,900 deaths due to the virus. Two weeks later, those numbers increased four- and five-fold, respectively, by which over 85

percent of the countries sampled with more than 1,000 confirmed cases had adopted various measures of closure and restrictions. Data analyzed for the present study thus capture global public attitudes in the early and accelerating phases of the pandemic (between March 20th and April 5th), during which governments faced challenges and difficulties of implementing anti-coronavirus policies (Fetzer et al., 2020a). Data files and documentations are available at an open source repository (<https://osf.io/3sn2k/>). Case weights are applied to adjust the data to be representative of age, gender, education, and income between survey respondents and the general population in each country. In constructing the weights, GB&P COVID-19 uses information on the population structure from the United Nations statistical agency and the Gallup World Poll data for income (see Fetzer et al., 2020b).

Sample Selection

After excluding countries with less than 100 survey participants and using listwise deletion of cases with missing values, our effective sample size is 13,660 older adults nested in 62 countries. Since we analyze an older subsample, a significant number of countries in the models consist of sample sizes smaller than 100. We retain them in the analysis since small cluster sizes do not lead to serious bias in estimating random effects (Austin & Lecki, 2018). In selecting our subsample we used a cut-off point of 55 years and older, consistent with the guidelines in major surveys including the National Social Life, Health, and Aging Project (NSHAP) and the Survey of Health, Ageing, and Retirement in Europe (SHARE).

Variables

The outcome measure (*COVID distress*) is operationalized using multiple survey items asking respondents about their psychological state during the coronavirus pandemic: “To which extent do the following statements apply to you right now? A. *I am nervous when I think about current circumstances*; B. *I am calm and relaxed*; C. *I am worried about my*

health; D. *I am worried about the health of my family members*; E. *I feel stressed about leaving my house*. Answers are coded on a 5-point scale (e.g., 1 = Does not apply at all, 3 = Neither applies nor does not apply, 5 = Strongly applies). Based on principal component analysis, we transformed the original responses to factor scores (Bartlett's Test of Sphericity $p < 0.001$; KMO Test = 0.7; Cronbach's alpha = 0.6). Using the z-scored transformation of the sum of these items as the dependent variable yields similar results.

Our main predictor is *Social distancing*. Concerning the coronavirus situation, a question inquires, "To what extent do the following statements describe your behavior for the past week? A. *I stayed at home*; B. *I did not attend social gatherings*; C. *I kept a distance at least two meters to other people*." The original answers, coded on a scale ranging from 0 ("Does not apply at all") to 100 ("Applies very much"), are summed and standardized as z-scores. At the individual level of analysis, estimated models adjust for the following socioeconomic and demographic confounders including gender (*female* = 1), *age* (in years), *education* (in years), marital status (*married* or *partnered* = 1), *household size* (number of family members currently living together), and *monthly income* (pre-tax household earnings transformed and coded on a 5-point scale).

We also include these additional confounders for a stringent test of the relationship between social distancing and the outcome variable. The first is *co-morbidities* ("Please consider the following list of health conditions: A. cardiovascular diseases; B. diabetes; C. hepatitis; D. chronic obstructive pulmonary disease; E. chronic kidney disease; F. and cancer. How many of these conditions do you have?"). *Perceived infection* is another, a subjective assessment of the (logged) number of confirmed COVID-19 cases in the country at the time of the survey. Third, we add a variable (*Transparency*) to adjust for people's trust in government based on the item that asks, "How factually truthful do you think your country's

government has been about the coronavirus outbreak?” (1 = very untruthful, 2 = somewhat untruthful, 3 = neither truthful nor untruthful, 4 = somewhat truthful, and 5 = very truthful). Lastly, we include *Public Insufficiency* (“Do you think the reaction of your country’s public is appropriate, too extreme, or not sufficient?”) coded on a 5-point scale (e.g., 1 = too extreme, 3 = appropriate, 5 = not at all sufficient) that may confound the main association under investigation.

At the contextual (country) level, we include the following: a measure of the efficacy of government responses to COVID-19 (*Stringency index*), a proxy for government capacity in dealing with the pandemic (*State vulnerability*), a variable that gauges the level of economic, social and cultural globalization (*Openness scale*), the number of coronavirus-related deaths (*Mortality*), and the average level of social distancing (*National lockdown*). *Stringency index* is from the Oxford COVID-19 Government Response Tracker (OxCGRT) created by a cross-disciplinary team of researchers at the University of Oxford (<https://covidtracker.bsg.ox.ac.uk/>), which records the strictness of government policies restricting people’s behaviors or physical mobility. *State vulnerability* derives from the Fragile State Index (FSI) compiled by The Fund for Peace, a Washington DC-based think tank that annually ranks 178 countries in terms of state capacity. A higher score indicates more fragility. According to the 2019 report, Yemen ranked the highest (i.e., the most “fragile”). More methodological details are available at the organization’s homepage (<https://fragilestatesindex.org/methodology/>).

Openness scale is based on the multidimensional globalization index maintained by the KOF Swiss Economic Institute (Gygli et al., 2020), which combines a host of economic, social and political measures of cross-border interconnectedness, including volumes of trades in goods and services, foreign direct investment, number of embassies, international NGOs,

international tourism, and migration. A higher index score means more globalized countries. Details on the methodology are available at the KOF website (<https://kof.ethz.ch/en/>), where the data can also be retrieved. *Mortality* uses the daily updates provided by the Johns Hopkins University's Coronavirus Resource Center (<https://coronavirus.jhu.edu/>). GB&P COVID-19 collected these data and merged them to individual respondents based on the date on which the survey had been completed. This measure thus varies within countries over time. Given the skewness, we transformed the data using the natural log and aggregated them at the country level. Lastly, *National lockdown* is constructed by averaging individual values for the variable *Social distancing* across countries. Table 1 contains the descriptive statistics. A country-by-country overview of the contextual variables is shown in Table 2. Appendix A and Appendix B summarize the correlation matrices.

Analytic Method

We fitted multilevel linear regression models using the latest version of HLM 8 (Raudenbush, Bryk, & Congdon, 2019), a statistical package uniquely designed to handle nested data.

Formally, at the individual level (L1), we have the following equation:

$$Y_{ij} = \beta_{0j} + \sum_{q=1}^Q \beta_{qj} X_{qij} + r_{ij},$$

where Y_{ij} is the predicted value of *COVID distress*, β_{0j} is the intercept; β_{qj} ($q = 1, 2, \dots, Q$) are the L1 coefficients; and X_{qij} is the value of covariate q associated with respondent i in country j . The error term r_{ij} is the L1 random effect, which is assumed to be independently and normally distributed with constant variance σ^2 . At the country level (L2), our model takes the form:

$$\beta_{qj} = \gamma_{q0} + \gamma_{q1} W_{1j} + \gamma_{q2} W_{2j} \dots + \gamma_{qS_q} W_{S_q j} + u_{qj}$$

$$= \gamma_{q0} + \sum_{s=1}^{S_q} \gamma_{qs} W_{sj} + u_{qj},$$

where γ_{qs} ($q = 1, 2, \dots, S_q$) are the L2 coefficients; W_{sj} is a L2 predictor; and u_{qj} is the L2 random effect.

We first run a series of random intercept models in examining the direct link between *Social isolation* and *COVID distress*. We then estimate a set of random coefficient models in testing cross-level interaction terms by allowing the slope for the lower-level term to vary across countries, a critical requirement to generate unbiased point estimates and reliable t-ratios (Heisig & Schaeffer, 2019). In Table 3 (to test H1), Model 1 is the null model. Model 2 contains the bivariate analysis. Model 3 introduces the confounders at the individual level. Model 4 adds contextual variables. Models 1 through 4 in Table 4 contain cross-level interaction results to test H2 through H5, respectively. Country-level predictors are grand mean centered; and individual-level variables are group mean centered, which removes all between-cluster variation in the lower-level predictor (Enders & Tofghi, 2007) and is the recommended approach when estimating cross-level interactions (Aguinis, Gottfredson, & Culppeper, 2013).

<Insert Tables 1&2>

Results

Table 1 shows that slightly more than half of the sample are female (56%), and the average respondent is about 62 years old. Approximately 70 percent of the sample are married. In addition, on average, respondents in the sample were living together with slightly more than two family members. With respect to income and education, the mean values are around 4 (coded on a 5-point scale) and a little under 17 years, respectively.

Before running multilevel analysis, we first calculate the intraclass correlation (ICC) to check the degree of clustering. Results from the unconditional model (Model 1 in Table 3) shows significant data dependence as indicated by the variance components and the ICC value. About 7.8 percent of the variance in the outcome variable occurs between countries. Model 2 shows a bivariate analysis, according to which one-standard deviation increase in *Social distancing* raises the distress level (in terms of factor score) by 0.130 ($p < 0.001$). In model 3, we include the background controls, many of which significantly predict *COVID distress*. Education ($p < 0.05$) is negatively related to distress whereas married people show higher levels of distress ($p < 0.05$). Being female ($p < 0.001$) and having prior physical conditions ($p < 0.05$) are both positively related to coronavirus-related stress and anxiety. In addition, believing that the government has been truthful about the pandemic is significantly associated with lower levels of coronavirus-induced distress ($p < 0.001$). Conversely, thinking that the public reaction to the pandemic has been insufficient is related to higher levels of distress ($p < 0.001$). Net of these socioeconomic, demographic and other confounders, more social distancing is shown to contribute significantly to worse mental well-being.

In Model 4, we incorporate the country-level predictors, two of which are significant. On average, countries with stricter policy measures to combat COVID-19 exhibit lower levels of distress, as shown by the negative sign for *Stringency index* ($p < 0.05$). In comparison, the positive sign for *State vulnerability* ($p < 0.05$) indicates the opposite (higher aggregate distress) is the case for more fragile countries. Further, on average, countries with higher numbers of deaths due to the virus show greater levels of distress, although this relationship is marginally significant ($p < 0.10$). In this fully specified model, while holding constant

individual- and country-level covariates, the relationship between *Social distancing* and *COVID distress* remains robust, hence lending empirical support for H1 ($b = 0.09, p < 0.01$).

<Insert Tables 3&4>

We now turn to Table 4 to evaluate the four cross-level interaction effects corresponding to H2 through H5. Results derive from estimating random coefficient models that allow the slope for *Social distancing* to vary across the contextual units. All models adjust for the individual-level predictors discussed above. We also included *National lockdown* but as a background control only. In a separate analysis, an interaction term between *National lockdown* and *Social distancing* was found not to be statistically significant (available on request). Proceeding with hypothesis testing, according to Model 1, we find that the cross-level interaction term is positive and significant, meaning the association between social isolation and distress is stronger in countries with higher death counts, in support of H2. Findings in Models 2-4 conform to the direction of our expectations with respect to the coefficient sign, though the interaction terms are significant only at the p -value of 0.1, providing partial evidence for H3-H5. As Model 2 shows, the isolation-distress is weaker in the national context with more stringent lockdown policies. According to Model 3, it is similarly weaker in the national context characterized by greater state vulnerability; and, conversely, the relationship is stronger in globalized countries whose national borders are more open, as Model 4 indicates.

For visual illustration, we plotted the association between *Social distancing* and *COVID distress* as a function of *Mortality*, which is divided into three subcategories: low (25th percentile), medium (50th percentile) and high (75th percentile). The three lines in Figure 1 correspond to them. Results are based on Model 1 in Table 4 with all other variables held at their means. The graph shows that, at the general level, social distancing is positively

associated with psychological distress among older adults cross-nationally. And this association is conditional on the pandemic-induced mortality. It is “weak” at or below the 25th percentile (e.g., for Israel). It, then, rises to a “moderate” level at around the 50th percentile (e.g., for Argentina), and “peaks” above the 75th percentile (e.g., for United Kingdom). The main message of this finding is: national context measured in terms of mortality amplifies the deleterious impact of social isolation on psychological distress.

<Insert Figure 1>

Discussion and Implications

The general connection between social isolation and poor mental health is well-established (Leigh-Hunt et al., 2017). Despite growing evidence, however, “little is known about the consequences of *social distancing*” in the current context of COVID-19 (Melo & Soares, 2020, p.1; emphasis added). Our goal was thus to shed additional light on this issue by using cross-national data. Does the association between social isolation caused by physical distancing and mental distress vary across countries? If so, what partly accounts for the variation? The present study adds to the scholarship by addressing these unexamined questions. Based on a rare global survey, we focus on country variables measuring the volume of coronavirus deaths, policy stringency (efficacy of government intervention), state capacity or fragility, and degree of globalization. By estimating a series of cross-level

interactions, we produced nuanced findings concerning the interplay between experiences of social isolation, national context, and coronavirus-induced anxiety.

Our findings confirmed that social isolation is positively associated with psychological distress, supporting a Durkheimian notion that lack of social integration has deleterious consequences for mental health (Berkman et al., 2000). By using a global online survey, we conducted a comprehensive test of the association between social isolation and coronavirus-induced distress across national boundaries. In doing so, we provided a firmer ground for the generalizable claim that as social isolation increases, one's psychological distress increases in the wake of the COVID-19 pandemic. Our findings showed that while social distancing measures may help protect public health, they may have unintended negative consequences for mental health among older adults. As they likely have already suffered from a loss of interpersonal ties due to the pandemic, further social isolation triggered by the mandatory physical distancing orders can worsen the psychological burden on them.

We also found the magnitude of isolation-distress connection to be greater in countries with more coronavirus-induced deaths, less strict policy measures, higher state capacity, and higher levels of globalization. Given that COVID-19 is highly contagious, both being exposed to high mortality and residing in more globalized ("porous") countries may act as an anticipatory stressor, reinforcing the positive link between social isolation and psychological distress. In this regard, our findings help illuminate the process of stress amplification, where two stressors combine to exert multiplicative effects on mental health (Young & Schieman, 2012). In models not shown, we also discovered that using the rate, not number, of deaths did not yield similar results. This makes sense since people are typically exposed to aggregate counts of "how many died" from COVID-19, not the percentage of deaths. By contrast, the isolation-distress association becomes lessened in the context of more stringent or effective

measures to contain the disease. Stricter policies may increase political trust among its residents, which in turn may buffer the negative mental health consequences of social isolation in later life. Viewed in this way, our results augment the literature on the importance of political factors in affecting individual mental health (Reeskens & Vandecasteele, 2017).

Finally, the present analyses demonstrate that lower state capacity mitigates the relationship between social isolation and psychological distress during the current pandemic. Individuals living in countries with weaker state capacity tend to be exposed to a host of stressors, which can help them build future resilience to adversities (e.g., toughening effects). As a result, they would be better able to cope with social isolation induced by the COVID-19 pandemic, while the opposite would be the case in the context of stronger state capacity. Taken together, the present study contributes to the literature by identifying various contextual factors that either exacerbate or buffer the detrimental effects of isolation on distress among older adults. Our findings regarding cross-level interactions, in short, suggest that the isolation-distress link is not evenly distributed across the older population at large. Rather, the coronavirus-induced social isolation is differentially associated with psychological distress across countries.

Our study has some limitations that may provide avenues for future research. First, the cross-sectional design limits our ability to make definitive conclusions about causal ordering among focal measures. However, our argument that social isolation has a causal influence on psychological distress is predicated on a theoretical perspective that highlights the cost of social isolation (Berkman et al., 2000), from which we sought to illuminate how the effect of social isolation differs across national context. Hence, our reliance on cross-sectional data does not undermine the basic argument that national context modifies mental health outcomes associated with social isolation. Nonetheless, future research would benefit greatly from

using longitudinal data to better address the issue of temporal ordering in relation to our focal associations. Second, the data limitations do not allow us to precisely assess the mechanisms that contribute to the observed moderation patterns. For example, we maintain that anticipatory stressors triggered by the COVID-19 pandemic may play a role in the processes by which national context influences the relationship between social isolation and psychological distress. However, we are unable to directly evaluate this claim.

Third, the measures used in this study may be limited in gauging social isolation. The present analysis is predicated on the idea that social *isolation* is caused by social *distancing*. With this assumption, we framed our paper around social isolation and its consequences for psychological distress during the pandemic. Yet, it is possible that older adults may exercise or experience high levels of social distancing but suffer from low levels of social isolation. For instance, some can be socially integrated through various means such as digital technologies amid strict physical distancing measures. Therefore, to identify the true association between social distancing and psychological distress, we need to distinguish between older adults with *high* social distancing and *high* social isolation and those with high social distancing and *low* social isolation. Unfortunately, our data do not include items to make this distinction. More sophisticated survey instruments are required to disaggregate these groups and examine the nuanced interrelationships between physical distancing and mental health in later life.

Despite these limitations, the present study makes contributions to the literature by (1) analyzing the association between social isolation and coronavirus-induced distress using data from cross-national samples of older adults; and (2) assessing how this association is contingent on national context through multilevel modeling. By identifying the contextual factors that moderate the impact of social isolation on psychological distress, the present

study enhances our understanding of why some older adults who are socially isolated are better off in some contexts (countries) than others. In this regard, it offers novel findings on the macro–micro linkage between national context, social isolation, and mental health in later life. Finally, by specifying potential mechanisms underlying the contingent associations between social isolation and psychological distress during the COVID-19 outbreak, it may be possible to devise more effective ways to bolster the well-being of older adults. Our study serves to move forward this critical endeavor.

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Table 1. Descriptive Statistics (Global Behaviors and Perceptions in the COVID-19 Pandemic)

	Mean/Proportion	S.D.	Min.	Max.
Outcome measure				
<i>COVID distress</i>	-0.10	1.02	-3.35	2.19
(Individual level)				
<i>Social distancing</i>	0.15	0.95	-4.12	0.88
<i>Age</i>	61.74	5.72	55	85
<i>Education</i>	16.51	4.46	0	25
<i>Married</i>	70%	—	0	1
<i>Household size</i>	2.33	1.11	0	6
<i>Female (ref.: male)</i>	56%	—	0	1
<i>Comorbidities</i>	1.36	0.63	1	5
<i>Transparency</i>	3.21	1.51	1	5
<i>Monthly income</i>	4.02	1.41	1	5
<i>Perceived infection</i>	9.11	2.24	0	17.15
<i>Public insufficiency</i>	3.77	0.82	1	5
(Country level)				
<i>Stringency index</i>	78.61	14.26	34.95	100
<i>State vulnerability</i>	52.2	24.28	16.9	98.5
<i>KOF index</i>	75.27	11.36	44.6	91.3
<i>Mortality</i>	2.55	1.96	0	8.59
<i>National lockdown</i>	0.13	0.34	-0.8	0.7

Source: Global Behaviors and Perceptions in the COVID-19 Pandemic.

Table 2. Country-by-Country Overview of the Contextual Variables (Global Behaviors and Perceptions in the COVID-19 Pandemic)

Country (N = 62)	Sample size	Stringency index	State vulnerability	KOF index	Mortality	National lockdown
Albania	39	85.71	58.90	67.50	2.26	0.31
Argentina	100	95.06	46.00	67.90	2.66	0.35
Australia	219	60.32	19.70	82.00	2.42	0.13
Austria	144	95.24	25.00	89.10	3.08	0.38
Bangladesh	7	86.90	87.70	51.30	1.41	0.02
Belgium	60	85.71	28.60	90.70	4.81	0.45
Bolivia	16	69.05	72.90	59.20	0.73	0.22
Brazil	1174	76.18	71.80	60.60	3.80	0.16
Bulgaria	19	80.95	50.60	80.70	1.52	-0.17
Canada	637	71.85	20.00	84.70	3.36	0.45
Chile	51	71.01	38.90	77.80	1.03	0.28
China	24	69.08	71.10	65.10	8.10	-0.15
Colombia	136	56.63	75.70	65.10	1.47	0.21
Czech Republic	9	85.71	37.60	85.70	1.26	0.49
Denmark	67	95.24	19.50	89.30	2.84	0.32
Dominican Republic	43	76.76	66.20	67.00	1.81	0.34
Ecuador	21	85.85	71.20	61.70	2.68	0.70
Estonia	12	70.84	40.80	83.90	0.68	-0.27
Finland	125	90.48	16.90	87.70	1.50	0.09
France	397	95.34	32.00	87.40	6.99	0.47
Germany	1249	72.00	24.70	88.70	5.77	0.25
Greece	41	65.84	53.90	82.40	3.08	0.26
Guatemala	13	100.00	81.40	63.30	0.69	-0.29
Hungary	20	85.93	49.60	85.00	1.90	-0.12
India	57	92.49	74.40	62.30	2.54	-0.12
Indonesia	18	71.17	70.40	63.40	4.03	0.43
Ireland	95	64.38	20.60	84.60	2.18	0.41
Israel	67	95.59	76.50	77.10	0.98	0.25
Italy	288	95.24	43.80	83.40	8.59	0.40
Japan	139	64.25	34.30	78.80	4.00	-0.80
Kenya	14	74.88	93.50	55.90	0.54	0.28
Malaysia	72	85.71	60.50	81.40	2.83	0.40
Mexico	487	34.95	69.70	72.50	1.75	-0.04
Morocco	33	81.86	73.00	70.60	2.83	0.16
Netherlands	207	82.71	24.80	91.20	5.42	0.10
New Zealand	85	77.31	20.10	78.30	0.36	-0.25
Nigeria	8	72.66	98.50	56.10	0.72	-0.09
Norway	35	79.61	18.00	86.30	2.33	0.34
Panama	34	90.48	47.00	73.00	1.64	0.46
Peru	195	82.98	68.20	70.40	3.39	0.57
Philippines	40	85.71	83.10	67.40	3.59	0.37
Poland	30	82.03	42.80	81.50	3.14	0.38
Portugal	61	80.99	25.30	84.90	3.28	0.51
Qatar	61	95.17	45.40	74.30	0.72	0.30
Romania	47	81.97	47.80	79.80	1.61	-0.01
Russia	214	68.65	74.70	72.60	0.40	-0.74
Saudi Arabia	9	91.17	70.40	66.10	0.57	0.16
Singapore	52	40.62	28.10	83.80	1.10	-0.61
Slovakia	27	80.95	40.50	83.70	0.00	0.27
South Africa	97	100.00	71.10	70.10	0.79	-0.06

South Korea	40	80.95	33.70	79.30	4.95	-0.25
Spain	506	95.24	40.70	85.80	7.74	0.50
Sweden	1402	42.88	20.30	90.10	3.56	-0.45
Switzerland	699	80.95	18.70	91.30	4.17	0.35
Thailand	30	66.53	73.10	72.50	1.44	0.01
Turkey	103	80.27	80.30	71.60	3.89	0.31
Ukraine	30	95.24	71.00	74.90	1.46	-0.52
United Arab Emirates	11	72.68	40.10	74.10	1.17	0.18
United Kingdom	2432	51.97	36.70	90.00	5.71	0.12
United States	2196	76.19	38.00	82.50	6.53	0.38
Uruguay	58	64.29	34.00	73.50	0.07	0.01
Venezuela	322	85.71	89.30	53.60	0.06	0.30

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Table 3. Random Intercept Mixed-Effects Models Predicting *COVID distress*

	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Constant	-0.173*	(0.065)	-0.181**	(0.065)	-0.242***	(0.058)	-0.102#	(0.058)
(Individual level)								
<i>Social distancing</i>			0.130***	(0.028)	0.092**	(0.030)	0.086**	(0.032)
<i>Age</i>					-0.005	(0.003)	-0.005	(0.003)
<i>Education</i>					-0.012*	(0.005)	-0.009#	(0.005)
<i>Married</i>					0.151**	(0.056)	0.151**	(0.054)
<i>Household size</i>					-0.022	(0.023)	-0.025	(0.021)
<i>Female</i>					0.281***	(0.050)	0.280***	(0.050)
<i>Comorbidities</i>					0.088*	(0.040)	0.090*	(0.040)
<i>Transparency</i>					-0.064***	(0.017)	-0.064***	(0.017)
<i>Monthly income</i>					-0.017	(0.012)	-0.022#	(0.012)
<i>Perceived infection</i>					0.002	(0.010)	0.004	(0.011)
<i>Public insufficiency</i>					0.207***	(0.027)	0.205***	(0.028)
(Country level; L2 N = 62)								
<i>Stringency index</i>							-0.008*	(0.003)
<i>State vulnerability</i>							0.010*	(0.004)
<i>KOF index</i>							-0.010	(0.009)
<i>Mortality</i>							0.043#	(0.024)
<i>National lockdown</i>							-0.043	(0.190)
Individual-level variance	0.953		0.942		0.882		0.897	
Country-level variance	0.078***		0.084***		0.060***		0.003***	
Deviance	38269.70		38106.54		37204.73		37431.24	
Sample size (L1)	13,660		13,660		13,660		13,660	

Source: Global Behaviors and Perceptions in the COVID-19 Pandemic

Note: Robust standard errors (SE) in parentheses.

p*** < 0.001, p** < 0.01, p* < 0.05, p# < 0.1 (two-tailed tests)

Table 4. Results from Estimating Cross-Level Interaction Effects

	Model 1		Model 2		Model 3		Model 4	
	Coef	(SE)	Coef	(SE)	Coef	(SE)	Coef	(SE)
<i>Social distancing</i>								
x <i>Mortality</i>	0.026*	(0.012)						
x <i>Stringency index</i>			-0.003 [#]	(0.002)				
x <i>State vulnerability</i>					-0.002 [#]	(0.001)		
x <i>KOF index</i>							0.007 [#]	(0.004)
Individual-level variance	0.004***		0.004***		0.004***		0.004***	
Country-level variance	0.798		0.798		0.799		0.798	
<i>Social distancing</i> slopes	0.000***		0.000***		0.001***		0.000***	
Deviance	39923.09		39926.53		39931.97		39927.18	
Sample size (L1)	13,660		13,660		13,660		13,660	

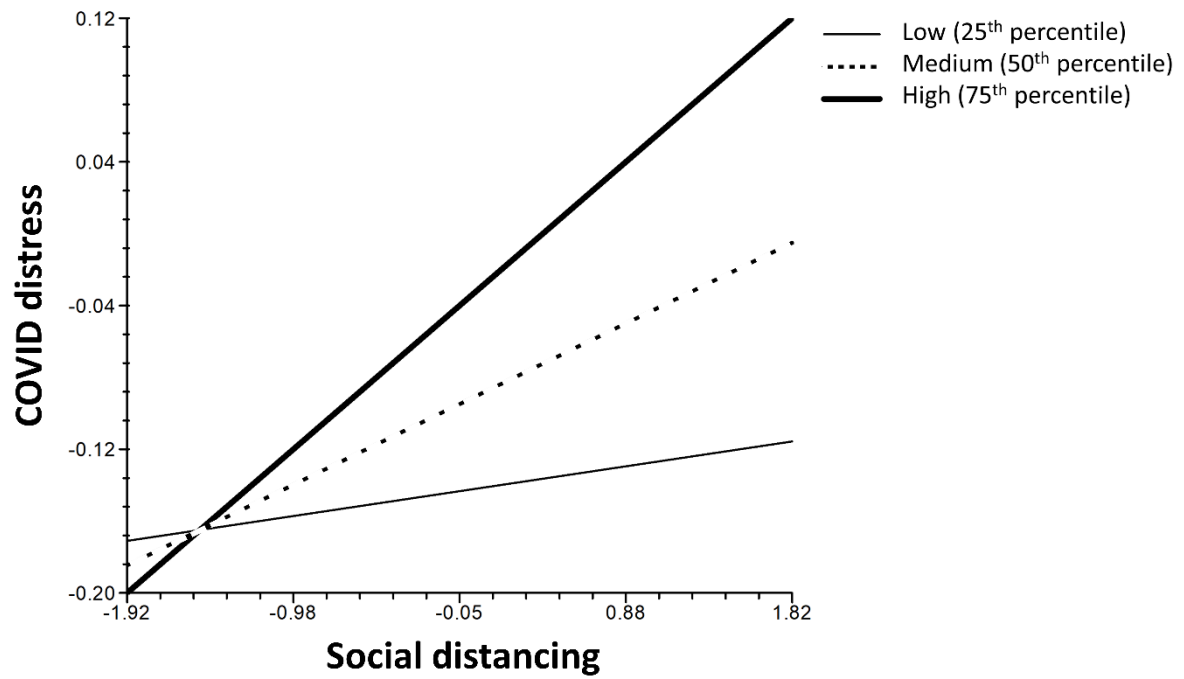
Source: Global Behaviors and Perceptions in the COVID-19 Pandemic

Note: Robust standard errors (SE) in parentheses. Models 1-4 control for *Age, Education, Married, Household size, Female, Comorbidities, Transparency, Monthly income, Perceived infection, and Public Insufficiency.*

p*** < 0.001, p** < 0.01, p* < 0.05, p[#] < 0.1 (two-tailed tests)

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Figure 1. Conditional relationship between *Social distancing* and *COVID distress* across country-level confirmed deaths



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