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# Visiting Parents in Times of COVID-19: the Impact of Parent-adult Child Contacts on the Psychological Health of the Elderly

Agar Brugiavini, Cinzia Di Novi, Cristina Elisa Orso

*Working Paper Series 73-2021*

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This project has received funding from the European Union under grant agreements VS/2019/0332, VS/2020/0313 and the European Union's Horizon 2020 research and innovation programme under grant agreements No 870628, No 101015924.



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## **Acknowledgements**

Research in this article is a part of the EU Horizon 2020 SHARE-COVID19 project (Grant agreement ID: 101015924).

This paper uses data from SHARE Waves 4, 5, 6, 7 and 8 (1010.6103/SHARE.w4.710, 10.6103/SHARE.w5.710, 10.6103/SHARE.w6.710, 10.6103/SHARE.w7.711, 10.6103/SHARE.w8.100, 10.6103/SHARE.w8ca.100), see Börsch-Supan et al. (2013) for methodological details. The SHARE data collection has been funded by the European Commission, DG RTD through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N°676536, SHARE-COHESION: GA N°870628, SERISS: GA N°654221, SSHOC: GA N°823782) and by DG Employment, Social Affairs & Inclusion through VS 2015/0195, VS 2016/0135, VS 2018/0285, VS 2019/0332, and VS 2020/0313. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01\_AG09740-13S2, P01\_AG005842, P01\_AG08291, P30\_AG12815, R21\_AG025169, Y1-AG-4553-01, IAG\_BSR06-11, OGHA\_04-064, HHSN271201300071C, RAG052527A) and from various national funding sources is gratefully acknowledged (see [www.share-project.org](http://www.share-project.org)).

# Visiting Parents in Times of COVID-19: the Impact of Parent-adult Child Contacts on the Psychological Health of the Elderly

Agar Brugiavini\*, Cinzia Di Novi<sup>+</sup>, Cristina Elisa Orso<sup>\*</sup>

## Abstract

The novel coronavirus pandemic (COVID-19) and the consequent restrictions imposed by governments worldwide have affected individuals' health and well-being globally. The most significant public health costs of lockdown restrictions include potential adverse effects on mental health. In the recent literature on symptoms of depression in the elderly due to the COVID-19 pandemic, one of the neglected topics is the impact of disrupting parent–adult child contacts on their psychological and emotional well-being. Using data from the 8th wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) and the SHARE Corona Survey, this study aims to fill this gap, providing additional insights into the psychological status of, and strain on, older people during the COVID-19 outbreak and contributing to the body of research on the negative association between social isolation and the psychological well-being of the elderly. Our findings show that the interventions deemed essential to reduce the spread of the pandemic, such as the “stay-at-home” order, have necessarily disrupted personal parent–child contacts and the social processes that facilitate psychological well-being, with negative consequences on the mental health of elderly parents.

**Keywords:** COVID-19; stay-at-home order; parent–adult child relationship; disruption; mental health.

**JEL Classification:** I10; I18; C26

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\* Department of Economics, Ca' Foscari University of Venice.

<sup>+</sup> corresponding author: European Commission, Joint Research Centre (JRC), Via Enrico Fermi 2749, TP 267, 21027 Ispra (VA), Italy. Email: Cinzia.DI-NOVI@ec.europa.eu

<sup>\*</sup> Department of Economics, University of Verona.

## Introduction

The worldwide crisis due to the COVID-19 pandemic is having an impact on almost every aspect of our society. At the beginning of the pandemic, when no medicines or vaccines were available, countries relied on other types of intervention, including social distancing: isolation, quarantine, travel restrictions and the closure of schools, universities, workplaces and public spaces. Even though social distancing has reduced the rate of infection, naturally it has come at the cost of an economic crisis and forgoing the benefits of physical and social contacts. Lockdown might have exacerbated individuals' pre-existing mental health issues and negatively affected their well-being (due to increased anxiety, stress and other negative feelings and concerns about the practical implications of the pandemic response, including financial difficulties) (White & Van der Boor, 2020; WHO, 2020; Tucci et al., 2017).

Although, at the time of writing, the full effects of COVID-19 and the associated crisis are yet to be seen, it is expected that they will not affect people uniformly. Vulnerable and disadvantaged groups will be impacted more severely. Older adults, in particular, have a higher risk of infection from COVID-19: and are more likely already to be suffering from multiple chronic diseases such as cardiovascular disease, diabetes, or respiratory illness, raising the risk of severe COVID-19 consequences, including death.

The balance between age-related disorders and good health during the lockdown suffered immense pressure. Social distancing was often necessary to protect older adults from the risk of coronavirus. However, the elderly, especially those with cognitive decline or dementia, need emotional support through informal networks and health professionals. Isolation may have created a new set of challenges affecting pre-existing health conditions, including their mental health.

Historically, in Europe, family members and in particular (non-cohabiting) adult offspring, have provided most of the informal care in later life; much lower proportions of older people receive regular help from friends or neighbors (Brenna and Di Novi, 2016; Di Novi et al., 2015). The support of sons and daughters continues to play a substantial role in the total care provided, especially among frail older people who depend on youngsters for their daily needs. Contacts between adult children and elderly parents and the informal care provided by adult children represent an important support for the elderly and a valuable substitute for, and complement of, formal care particularly in welfare states where there are strong family bonds (Van den Berg et al., 2004; Van den Berg et al., 2005). According to the existing literature the support provided by offspring positively affects the physical and emotional well-being of parents throughout their lives and is especially crucial in later life (Albertini and Mencarini 2014; Litwin and Stoeckel 2013; Litwin et al. 2015; Shiovitz-Ezra and Litwin 2015).

Prior research on parent-child relationships and the well-being of older parents has mostly focused on the frequency of contacts, assuming that the more numerous the contacts, the greater the parent's well-being (Mancini & Blieszner, 1989; Tommasini et al., 2004). However, the COVID-19 pandemic and the consequent

self-isolation, has led to a disruption of parent–adult child contacts. Indeed, the recent literature on symptoms of depression in older persons related to the COVID-19 pandemic, one neglected topic is the influence of the disruption of the parent–adult child relationships on the psychological and emotional well-being of the elderly parent. Using data from the 8th wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) until its suspension in March 2020 and the SHARE Corona Survey fielded from June to August 2020, this study aims to fill this gap providing additional insights into the psychological status of, and strain on, older parents during the COVID-19 outbreak and contributing to the very limited, but growing body of research on the negative association between social isolation and the psychological well-being of the elderly.

Our findings show that the interventions deemed essential to reduce the spread of the pandemic, such as the “stay-at-home” order, necessarily disrupted personal parent–child contacts and the social processes that facilitate psychological well-being, with negative consequences for the mental health of elderly parents.

Since we are facing additional waves of this epidemic and, as a lesson for future epidemics, the potential impact of the disruption of care and parent–child relationships on older individuals’ psychological health should be analyzed. Indeed, the potential benefits of a mandatory lockdown need to be weighed carefully against the psychological health costs. The successful use of isolation as a public health measure requires the reduction, as far as possible, of the negative effects associated with a lockdown (Layard et al., 2020).

The remainder of the paper is organized as follows. Section 2 describes the data and the empirical strategy, while the results are presented and discussed in Section 3. The concluding remarks are in Section 4.

## **2. Data and Methods**

### **2.1 Data**

This study makes use of individual-level data drawn from the 8th wave (release 1.0.0) of the Survey of SHARE and the SHARE Corona Survey. The 8th wave of SHARE is a regular wave collecting information on the health, demographic and socio-economic status of individuals who are 50 years old or over. The interviews took place between October 2019 and March 2020. A sub-sample of SHARE panel respondents was interviewed from June to August 2020, via a Computer Assisted Telephone Interview (CATI), partly to collect a set of basic information as in the regular SHARE questionnaire, and partly to elicit information on life circumstances in the presence of COVID-19. The data collected with the latter questionnaire provide a detailed picture of how older adults were coping with the health-related and socio-economic impact of COVID-19 (Scherpenzeel et al., 2020). It also included the most important life domains for the target population and specific questions about the COVID-19 infection and life changes during the lockdown i.e. physical health (general health before and after the COVID-19 outbreak, infections and COVID-19 related symptoms); mental health (anxiety, depression, sleeping problems and loneliness before and after the COVID-19 outbreak); health behavior (social distancing, mask wearing etc.); SARS-CoV-2 testing and hospitalization; any medical treatment

missed; satisfaction with treatment; changes in work and the patient's economic situation; social networks (changes in personal contacts with family and friends, help given and received, personal care given and received).

Our sample consists of 15,526 individuals living in 24 European countries plus Israel. This paper focuses specifically on individuals aged 65 and over. The COVID-19 pandemic has taken a heavy toll on their physical as well as mental health. The restrictive measures taken by governments (social distancing and isolation) to prevent the spread of the infection, have often resulted in social isolation and loneliness, to which older adults are in principle more vulnerable because of their functional dependency, which in turn may have increased their depression and cognitive dysfunction with significant consequences for their psychological wellbeing (Banerjee, 2020).

## **2.2. Empirical Strategy**

The aim of our paper is to investigate the effect of an unexpected disruption of parent-child contacts due to COVID-19 in terms of the mental health of elderly parents. We constructed a binary indicator of mental health based on the SHARE Corona Survey. Respondents were asked to report whether, in the month before the interview, they felt sad or depressed. If the answer was “yes”, they were also asked to report whether they felt sad or depressed “more”, “less”, or “about the same” compared to the period before the COVID-19 outbreak. Based on the answers, we created a dummy variable with value 1 if respondents, who said they felt sad or depressed, also said they were more depressed than before the COVID-19 pandemic outbreak, and 0 otherwise (less or about the same).

In order to measure the potential disruption of the parent-child relationship due to the pandemic, we created a binary variable taking into account the variation in the frequency of parent-child contacts in the periods before and during the first wave of the COVID-19 outbreak. Specifically, the 8th wave of SHARE includes a module on respondents' personal social networks. Each respondent can name up to seven people considered confidants. The social network module also gathers information on a respondent's relationship with these confidants (children, relatives, friends and neighbors) as well as additional characteristics for each social network member (gender, degree of kinship, network proximity). Using information drawn from the social network module, we were able to identify children considered “confidants” by respondents. In addition, we established whether respondents had had regular contacts with them before the COVID-19 outbreak (either in-person, by phone, email or any other electronic means). In line with Cohen et al., (1997) “regular contacts” were either (i) daily; (ii) several times a week, (iii) about once a week, and (iv) about every two weeks (against less than once a month and never). Using the information in the SHARE Corona Survey, we were also able to elicit the frequency of respondents' contacts with their “confidant” children during the COVID-19 outbreak.

In order to generate a variable to accurately measure the disruption of parent-children contacts, we compared the respondents' answers to the questions concerning the frequency of in person and electronic contacts, as in the social network module of the 8th wave of SHARE with the answers reported in the SHARE Corona Survey. We constructed a binary variable with value one if those reporting regular contacts with confidant children living outside the household (in-person, by phone, email or any other electronic means) before the outbreak also reported contacts with them "less often" or "never" during the outbreak. Unfortunately, the 8th wave of SHARE does not distinguish between in-person and electronic contacts with people who live outside the household (children, parents, relatives, friends and neighbors). We assumed that the negative trend in the frequency of contacts with children was mainly due to the disruption of face-to-face contacts. Indeed, the restrictions many countries adopted during the first wave of the pandemic meant that people had to stay home and avoid any contacts with non-household members. This is confirmed by our data. In the Appendix, figure 1 shows the fraction of individuals aged 65+ in each country who reported personal or electronic contacts with offspring "less often" or "never" since the outbreak. The majority of respondents who stated "less often" or "never" indicated face-to-face contacts. On average, about 50.8% of our sample had personal contacts with children "less often" or "never" since the outbreak, against about 10.2% for electronic contacts.

From the methodological point of view, it should be noted that associating the disruption of parent-children contacts with the psychological well-being of the elderly may be complicated by the presence of endogeneity. The disruption of parent-children contacts associated with the pandemic might have undermined older adults' mental health which, in turn, might have simultaneously influenced parental access to the informal support of their offspring (Cacioppo, Hughes, Waite, Hawkey, & Thisted, 2006; Holt-Lunstad, Smith, & Layton, 2010). In order to take this potential simultaneous relationship into account, we adopted a recursive bivariate probit model. The recursive structure of the bivariate probit model is built on a first structural form equation determining the probability of a worsening in mental health conditions ( $y_{1i}$  in the equation (1)) and a second reduced form equation for the potentially endogenous dummy measuring the disruption of the parent-adult child relationship ( $y_{2i}$  in the equation (1)). In the probit model used to predict a deterioration of mental health, among the dependent variables, we included the indicator of disruption of the parent-adult child relationship ( $y_{2i}$ ). Thus:

$$y_{1i}^* = \beta_1' x_{1i} + \varepsilon_{1i} = \delta_2 y_{2i} + \alpha' z_i + \varepsilon_{1i} \quad (1)$$

$$y_{2i}^* = \beta_2' x_{2i} + \varepsilon_{2i}$$

where  $z_i$  and  $x_{2i}$  are vectors of exogenous variables,  $\alpha$  and  $\beta_2$  are parameter vectors,  $\delta_2$  is a scalar parameter.  $\varepsilon_{1i}$  and  $\varepsilon_{2i}$  are the error terms distributed as bivariate normal, each with a mean zero and a variance covariance matrix  $\Sigma$ .  $\Sigma$  has values of 1 on the leading diagonal and correlations  $\rho_{12} = \rho_{21}$  on off-diagonal elements. In the above setting, the exogeneity condition is stated in terms of the correlation coefficient, which can be interpreted as the correlation between the unobservable explanatory variables of the two equations. The equations in (1) can be estimated separately as single probit models only in the case of independent error terms, i.e., the correlation coefficient is not significantly different from zero.<sup>1</sup>

The above specification means dealing with a well-known identification issue and imposing exclusion restrictions. In particular, to achieve identification, the  $z_i$  equation should not include all the variables included in the  $x_{2i}$  equation (Maddala, 1983). For the reduced form (i.e., the disruption equation for parent-child contacts), we included a variable which was assumed to directly affect the disruption of parent–adult child contacts and only indirectly the probability of a deterioration in mental health. Specifically, to determine an appropriate instrument to predict the reduced form equation, we used information from the social network module included in wave 8 of the SHARE survey (where the data were collected before the COVID-19 outbreak): for children named by respondents as confidants, SHARE provides additional information including where they live. Specifically, respondents were asked the following question: *Where does “name of confidant” live?* 1. *In the same household;* 2. *In the same building;* 3. *Less than 1 kilometre away;* 4. *Between 1 and 5 kilometres away;* 5. *Between 5 and 25 kilometres away;* 6. *Between 25 and 100 kilometres away;* 7. *Between 100 and 500 kilometres away;* 8. *More than 500 kilometres away.* Based on this information, we created a dummy variable with value 1 if “confidant” children did not live in the same household or in the same building, and 0 otherwise.

Along with information on non-cohabiting vs cohabiting offspring, we considered the implementation of lockdown in European countries, and data were taken from the open-access database of the European Centre for Disease Prevention and Control (European Centre for Disease Prevention and Control Data, 2020).<sup>2</sup> Specifically, we constructed a dummy indicator with value one for respondents who live in country where lockdown (aka “shelter-in-place” or “stay-at-home”) restrictions were adopted, limiting the free circulation of the populace and prohibiting non-essential services and activities. Parent-child non-cohabitation, the

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<sup>1</sup> The STATA software provides the statistic  $z = \hat{\rho} / S_{\hat{\rho}}$  to test the hypothesis  $H_0: \rho_{jk} = 0$ . If the error terms are independent, the maximum simulated likelihood estimation is equivalent to the separate maximum likelihood probit estimation.

<sup>2</sup> Lockdown policies differed from country to country, from a soft recommendation to stay at home to a moderate stay at home directive or an order requiring everyone to be home except for essential purposes. In our sample, the countries which introduced “stay-at-home orders” are: Belgium, France, Italy, Romania, Greece, Hungary, Luxembourg, Poland, Spain, Slovenia, Cyprus, Czech Republic, and Israel (see Table 1A in the Appendix). Country-level information on lockdowns was drawn from the European Centre for Disease Prevention and Control (<https://www.ecdc.europa.eu/en/publications-data/download-data-response-measures-covid-19>).



implementation of lockdown restrictions and the interaction between them, were assumed to be exogenous instruments for the disruption of parent-adult child relationships.

COVID-19 restrictions to movement and the fear of infection rapidly and dramatically changed people's interactions. Technology was adapted to mitigate the disruption to the social network, offering individuals digital alternatives to the face-to-face contacts often rendered impossible by the Covid crisis (Newman and Zainal, 2020). The dependent variable of the reduced form equation includes electronic contacts with children. Hence, included among the regressors is an indicator of general and regular Internet use in everyday life, as per the eighth wave of SHARE, as a measure of older users' ability to harness the Internet to cope with pandemic-induced social network disruption. The variable was constructed according to the question: *“During the last 7 days, have you used the Internet, for e-mailing, searching for information, making purchases, or for any other purpose at least once?”* Again, we constructed a binary variable with value one if respondents answered yes, and zero otherwise.

Concerning the structural equation, in order to capture the mental health consequences of an extended period of isolation and strict mobility restrictions on older adults, we included among the control variables, in the structural equation, an indicator of duration of the lockdown measured as the number of days since the beginning of the lockdown in each country in the study. The length of the “isolation period” differs between countries and may have had varying degrees of impact. For instance, in Spain the lockdown lasted 58 days, in Italy and France 55 days, while in other countries such as Poland it was for about 25 days. According to the existing literature, prolonged lockdown may lead to increased feelings of loneliness and anxiety with potentially adverse mental health consequences, especially for the eldest (Armitage and Nellums, 2020; Santini et al., 2020; Newman and Zainal, 2020).

Finally, since mental health was self-reported, presumably the time lag between the end of lockdown and the date on which respondents were interviewed may influence the quality of the response (reporting bias). To avoid potential bias related to this issue, we control for the number of days between the end of restrictions and the day each respondent was interviewed.

In our model, we also control for a rich set of individuals' demographic and socio-economic characteristics and health variables. For demographics, we included the respondent's sex (0: male, 1: female) and age. The International standard classification of education (Isced) was used to classify the education variable. Three levels of education were considered: (1) low education (no educational certificates or primary school certificate or lower secondary education); (2) medium education (upper secondary education or high school graduation); (3) high education (university degree or postgraduate). Marital status was categorized as 'living with a spouse or a partner in the same household' and 'living as single'.

We also included an indicator of current financial distress to proxy the household's ability to make ends meet. Participants were asked to think about the household's total monthly income and rate the degree to which they felt able to make ends meet: with great difficulty, with some difficulty, fairly easily or easily. This

information was treated as a dummy variable with value one if respondents reported “with great difficulty” or “some difficulty” and zero otherwise. While in a long-term view one may argue that financial distress is also endogenous, in the short time period the survey captures it is likely that the economic impact of the lockdown measures did have an immediate effect on the main variables of interest.

In order to capture “needs” unrelated to the pandemic itself and the associated lockdown, we also included information on respondents’ health status before the outbreak (between October 2019 and February 2020). The health-related variables included the number of self-reported chronic diseases (high blood pressure; high blood cholesterol; stroke; diabetes; chronic lung disease; asthma; arthritis, osteoporosis; cancer; peptic ulcer; Parkinson’s disease; cataracts; hip fracture; or other conditions); the number of self-reported problems with mobility (walking 100 meters; sitting for about two hours; getting up from a chair after sitting for long periods; climbing several flights of stairs without resting; climbing one flight of stairs without resting; stooping, kneeling, or crouching; reaching or extending the arms above shoulder level; pulling or pushing large objects such as a living room chair; lifting or carrying weights over 5 kilos; or picking up a small coin from a table) and an indicator of cognitive functions. Following Bonsang et al., (2012), in our empirical analysis, we focused on one key cognitive domain: memory recall (episodic memory). The test relies on immediate and a delayed recall of a 10-word list. The interviewer reads out 10 common words (e.g., book, child, hotel, etc.). In the immediate recall, participants are asked to recall as many words as possible in one minute, immediately after hearing them. In the delayed recall, participants are asked to recall as many words in one minute, after several other interview questions. Each word correctly recalled scores 1 point. Finally, the episodic memory score is calculated by adding up the number of target words recalled immediately and the number of target words recalled after the delay. Thus, the score ranges between 0 and 20 with a high score indicating good cognitive function (Bonsang et al., 2012; Grasshoff et al., 2021).

In addition to social isolation, the local virus spread might also be a key factor in determining mental health issues and the disruption of social network contacts during a lockdown. Therefore, we considered a set of variables related to the COVID-19 experience, including a variable that provides information on the spread of COVID-19 among respondents’ contacts. This dummy indicator has value one if anyone close to a respondent (i) had suffered from the Coronavirus; (ii) was hospitalized due to the infection; (iii) died after being affected by the Coronavirus, and 0 otherwise. We also introduced a measure that indicates whether the individual was directly affected by COVID-19, using a set of questions to establish if a respondent i) had experienced symptoms, ii) had been tested for COVID-19, and/or iii) had been hospitalized (Bergmann and Wagner, 2021). According to recent studies, symptoms indicating COVID-19 are associated with higher rates of anxiety and depression (Rajkumar, 2020). We also included an indicator of personal distance behavior, expected to influence the disruption of contacts with social networks (including adult children) and mental health.

Finally, in the empirical model, we included an indicator of regular contacts (either in-person or by phone, email, or any other electronic means) with other relative/non-relative during the outbreak and country dummies to control for country fixed effect differences.

Table 2. A (in the Appendix) sets out a full description of the variables used in the model.

### 3. Results and Discussion

Table 1 provides a simple descriptive analysis, presenting sample means and standard deviations for the variables used in the model (55% female; mean age: 74 years old). Notably, according to our definition of depression, around 15% of the sample reported feeling more depressed since the Covid-19 outbreak compared to the pre-Covid period. About 48% of respondents experienced a disruption in the regular contacts with their non- cohabitating children during the Covid outbreak.

**Table 1: Descriptive Statistics**

Variables	Mean	SD	N
<b>Dependent Variable</b>			
More depressed since outbreak	0.151	0.358	15526
Parent-children contact disruption	0.481	0.499	15526
<b>Demographics</b>			
Age	74.05	6.541	15526
Female	0.550	0.497	15526
Married	0.667	0.471	15526
<b>SES and Education</b>			
Low education	0.319	0.466	15526
Medium education	0.431	0.495	15526
High education	0.249	0.432	15526
Retired	0.886	0.317	15526
End not meeting	0.276	0.447	15526
<b>Health</b>			
# Chronic conditions	1.887	1.567	15526
#Mobility limitations	1.593	2.175	15526
<b>Cognitive Impairments</b>			
Episodic memory score	9.004	3.527	15526
<b>Covid-19</b>			
Directly affected by Covid-19	0.014	0.120	15526
Other people with Covid 19	0.09	0.096	15526
Physical distance	0.945	0.226	15526
<b>Contacts with others</b>			
Any contact with others	0.317	0.465	15526
<b>Duration of Stay-at-home measures</b>			
#days in lockdown	23.55	23.78	15526

#days from the end of lockdown	34.80	30.56	15526
<b>Instruments</b>			
Non-cohabitation	0.886	0.317	15526
Stay-at-home restrictions	0.515	0.499	15526
Internet Use	0.557	0.496	15526

Notes: Authors' processing of data from SHARE wave 8 and SHARE Corona Survey.

Table 2 shows marginal effects for the structural equation for depression and the reduced form equation for the disruption of parent–adult child contacts.

**Table 2: Results from the Recursive Bivariate Probit**

Variables	Parent-child relationship disruption equation		Depression equation	
	Marginal effects	SE	Marginal effects	SE
parent-children contact disruption	-	-	0.122***	0.050
<b>Demographics</b>				
age	-0.004***	0.001	0.001	0.001
female	0.001	0.008	0.081***	0.006
married	-0.006	0.008	-0.012**	0.006
<b>SES and Education</b>				
Medium education	-0.002	0.010	0.001	0.009
High education	0.039***	0.012	0.008	0.001
Retired	0.037***	0.013	-0.002	0.009
Ends not meeting	-0.004	0.010	0.054***	0.007
<b>Health</b>				
# chronic conditions	0.001	0.002	0.014***	0.001
#mobility limitations	0.001	0.002	0.009	0.001
<b>Cognitive Impairments</b>				
episodic memory score	0.002**	0.001	-0.002**	0.001
<b>Covid-19</b>				
directly affected by Covid-19	0.038	0.032	0.064***	0.021
other people with Covid 19	0.004	0.040	0.035	0.026
physical distance	0.082***	0.017	0.023*	0.013
<b>Contacts with others</b>				
any contact with others	-0.070***	0.008	0.002	0.006
<b>Duration of Stay-at-home measures</b>				
#days in lockdown	-	-	-0.001	0.001
#days from the end of lockdown	-	-	-0.001	0.001
<b>Instruments</b>				
Non-cohabitation	0.234***	0.020	-	-
Stay-at-home restrictions	0.219***	0.039	-	-
Non-cohabitation *stay-at-home restrictions	-0.121***	0.026	-	-

Internet use	0.062***	0.009
<b>Country dummies</b>	yes	yes
<b>Rho</b>		-0.296**
N. obs	15526	15526

Notes: Sample Selection: individuals aged 65+ from Wave 8 and SHARE Corona Survey.

Significance level: \*p value <0.1; \*\*p value <0.05; \*\*\*p value <0.01.

With specific reference to the reduced-form equation, our findings show that the binary indicators for non-cohabitating parent-children and for the “stay-at-home order” are both strong predictors for parent-child contact disruption. As expected, during the Covid-19 pandemic, the likelihood of this disruption was higher with adult children who do not live with or close to their parents (i.e., in the same household or in the same building) especially in countries where, due to the implementation of movement restrictions and lockdowns, older adults remained isolated in their homes with limited contacts with others. The interaction term between parent-child non-cohabitation and the “stay-at-home order” variables is significant too. This can be interpreted as a mitigating effect of children non-cohabitation on parental-child disruption. In other words, the effect of children non-cohabitation on parental-child disruption is mitigated by the degree of lockdown restrictions, such that the magnitude of the effect is lower for countries did not adopt the “stay-at-home order”.

Interestingly, the marginal effect of the indicator of regular Internet use is significant but positive. According to our results, regular Internet use increases the probability of disruption of parent–adult child contacts. Arguably, as a new infectious disease, COVID-19 has drastically increased the sense of uncertainty among individuals. To learn more about the disease pandemic, people have relied heavily on the Internet, which has become one of the most popular source of health information, affecting perceptions of risk and preventive behavior (Wang et al., 2020; Garfin et al., 2020). According to the recent literature, health information related to the Covid infection collected online has raised awareness of the disease and has been positively associated with engagement in all types of preventive behavior: not only wearing a face masks in public, hand washing, covering the nose and mouth when sneezing and coughing but also maintaining a distance from others and complying with stay-at-home orders, increasing the likelihood of disruptions to personal contacts especially among the elderly, who are vulnerable to Covid infections (Li et al., 2020).

With reference to the structural equation, our results show that a disruption in the contacts with offspring has positive and significant associations with mental health issues. The emergence of COVID-19 and the measures implemented to curb its spread (such as physical distancing, stay-at-home orders, travel restrictions) have forced people indoors reducing the opportunities to remain socially connected, especially among older adults, at a higher risk for a serious infection. Intergenerational family contacts, a significant part of overall relations and an important source of social and emotional support for older people, were also affected by these measures. During the COVID-19 pandemic, older people were asked or forced to reduce their physical

contacts, included those with non-cohabiting adult children, considered a critical factor in contributing to the spread of COVID-19 (Arpino et al., 2021; Bayer and Kuhn 2020). In European countries, however, welfare systems rely heavily on intergenerational solidarity, and the informal care of the elderly is carried out overwhelmingly by (non-cohabiting) adult offspring who provide assistance to their parents with their routine day-to-day activities. The containment measures adopted by almost all European countries have often led to a disruption of interpersonal contacts between older parents and their children, creating a new set of challenges including mental health consequences.

As a sensitivity check, we re-ran the model, slightly changing the dummy variable measuring the likelihood of a disruption of “regular contacts” with children compared to the baseline model. As stated above, the variable was constructed comparing the respondents’ answers to questions about the frequency of in-person and electronic contacts included in the social network module of the 8th wave of SHARE with those reported in the SHARE Corona Survey. We assessed the frequency of respondents’ contacts with children who do not live in the same household based on the options provided in SHARE which range from (i) daily; (ii) several times a week; (iii) about once a week; (iv) about every two weeks; about once a month; (v) less than once a month; (vi) never. In the baseline model, “regular contacts” were contacts in the range from “daily” to “about every two weeks”. We constructed a binary variable with value one if those who reported having regular contacts with children before the outbreak also reported contacts with them “less often” or “never” during the outbreak. As a sensitivity check, “regular contacts” were defined, using a different threshold ranging from “daily” to “about once a week”. The results are shown in Table 3.

**Table 3: Results from the Recursive Bivariate Probit with a different threshold for parent-children contact disruption.**

Variables	Parent-child relationship disruption equation		Depression equation	
	Marginal effects	SE	Marginal effects	SE
parent-children contact disruption	-	-	0.138***	0.055
<b>Demographics</b>				
Age	-0.005***	0.001	0.001	0.001
Female	0.006	0.008	0.080***	0.006
Married	-0.001	0.008	-0.013**	0.006
<b>SES and Education</b>				
Medium education	-0.001	0.010	0.001	0.009
High education	0.033***	0.012	0.008	0.001
Retired	0.035***	0.013	-0.002	0.009
Ends not meeting	-0.001	0.010	0.053***	0.007
<b>Health</b>				
# chronic conditions	0.002	0.002	0.014***	0.001

Mobility limitations	0.001	0.001	0.009	0.001
<b>Cognitive Impairments</b>				
episodic memory score	0.001	0.001	-0.002**	0.002
<b>Covid-19</b>				
directly affected by Covid-19	0.033	0.032	0.063***	0.021
other people with Covid 19	0.008	0.040	0.034	0.026
social distance	0.075***	0.017	0.023*	0.013
<b>Contacts with others</b>				
any contact with others	-0.059***	0.008	0.002	0.006
<b>Duration of Stay-at-home measures</b>				
#days in lockdown	-	-	-0.001	0.001
#days from the end of lockdown	-	-	-0.001	0.001
<b>Instruments</b>				
Non-cohabitation	0.222***	0.020	-	-
stay at home restrictions	0.226***	0.039	-	-
Non-cohabitation *stay at home restrictions	-0.118***	0.026	-	-
Use of internet	0.054***	0.009		
<b>Country dummies</b>	yes		yes	
<b>Rho</b>			-0.344**	
N. obs	15526		15526	

Notes: Sample Selection: individuals aged 65+ from Wave 8 and SHARE Corona Survey.  
Significance level: \*p value <0.1; \*\*p value <0.05; \*\*\*p value <0.01.

Table 3 shows that the results are consistent with those obtained from the baseline model. Interestingly, the marginal effect of the disruption of parent-children contacts remains highly significant (at 99%) but greater than in the baseline model, increasing from 0.122 to 0.138.

For further sensitivity analysis, we used a different threshold for the frequency of contacts with parents: according to the existing literature, high contact frequency can be considered a proxy indicator of strong family ties and potential support for older people (Worsfeld, 2011). Our findings revealed that the higher the frequency of contacts between parents and children before the Covid outbreak, the greater the impact of the disruption on the psychological well-being of the elderly parents. Specifically, we used a new threshold for “regular contacts”, several times per week or daily. The results were again consistent with those presented in Tables 2 and 3, but the marginal effect, which remains significant at 99%, continued to increase from 0.138 (once per week), to 0.178 (several times per week or daily).<sup>3</sup>

Among other factors affecting the probability of a deterioration in mental health, our results show a significant effect for the worsening economic situation of respondents. Making ends meet with great or some difficulty significantly increases the likelihood of feeling sadder or depressed in elderly respondents. Moreover, reporting higher scores in the episodic memory test is negatively associated with the probability of worsening

<sup>3</sup> For the sake of brevity these results were not included in the paper but are available on request from the authors.

mental health. This finding confirms that poorer cognitive functioning is related to greater symptoms of depression (Perrino et al., 2008). Finally, married individuals are less likely to report being sad or depressed during the outbreak, compared to the elderly who live alone. Other factors that negatively influence mental health are gender (female), suffering from multiple chronic conditions, maintaining personal physical distance and being directly affected by Covid-19. Apparently, the length of forced isolation has no significant effect on the probability of reporting symptoms of depression.

As mentioned above, we estimated the two equations for the probability of a disruption in parent-children contacts and mental health issues, using the recursive bivariate probit specification. This allowed us to test for unobserved heterogeneity, the effect of which was captured by the correlation between the error terms from the single equation models. By simultaneously estimating the two equations and considering the correlation in the error terms, we controlled for the effect of unobserved factors. Tables 2 and 3 show the correlation for the full recursive models. The null hypothesis of exogeneity was rejected in both cases.<sup>4</sup>

The correlation parameter between parent-children contact disruption and depression indicates whether and how unobservable factors jointly affect the disruption and parents' mental health. Our results indicate a negative statistically significant correlation between the disturbance of the two equations i.e., unobservable variables that increase the likelihood of depression decrease the probability of disruption in parent-children contacts.<sup>5</sup>

#### 4. Conclusions

The COVID-19 pandemic and the lockdown measures adopted in almost all European countries to cope with the spread of coronavirus have drastically affected the daily life of the whole population. Older people, from the outset of the COVID crises identified as the most vulnerable portion of the population, have been faced with uniquely remarkable challenges in arranging how to manage their health and care needs without leaving home. Indeed, the social distancing measures necessary to protect them against the risk of serious infection, have in many cases also meant the disruption of social contacts and contacts with their family, in particular with their adult children, their primary source of informal care and social support.

Using the 8th wave of the SHARE and the SHARE Corona Survey, we investigated whether the disruption of parent–adult child contacts due to social distancing restrictions increased symptoms of depression in the elderly during the first wave of the COVID-19 pandemic. We constructed a joint model of parent-child

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<sup>4</sup> The statistically significant correlation coefficients suggest that the null hypothesis of two univariate probit models or the hypothesis of independence across the error terms of the two latent equations can be rejected, and that the bivariate probit model is a better model for the observed data.

<sup>5</sup> The statistically significant correlation coefficients suggest that the hypothesis of independence across the error terms of the two latent equations can be rejected, and the bivariate probit model is better for the observed data.



contact disruption and mental health issues, estimated by using a recursive bivariate probit model taking into account unobserved heterogeneity between individuals, as may characterize this relationship.

Our evidence reflected that home confinement due to COVID-19 leading to a disruption of interpersonal contacts between older parents and children, may indeed have created a new set of challenges including mental health consequences, all the tougher the stronger the family ties. Therefore, policy interventions should take into account the fact that interpersonal contacts, especially with family members and adult children, are not just a potential vehicle of transmission of the virus, but are also a source of support which may help to counterbalance the negative consequences on mental health of policy responses to the outbreak.

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## APPENDIX

Table 1. A: Type and Duration of Restrictions During the First Wave of COVID-19 Pandemic

Country	Lockdown		Restrictions	No. of days in Lockdown
	start	end		
Germany	-	-	Non-essential shops closed, ban on gatherings, stay-at-home-advice to general population	0
Sweden	-	-	Ban on gatherings, stay-at-home-advice to at-risk population	0
Netherlands	-	-	Non-essential shops closed, ban on gatherings, stay-at-home-advice to general population	0
Spain	14/03/2020	11/5/2020	Stay-at-home-order	58
Italy	10/3/2020	4/5/2020	Stay-at-home-order	55
France	17/03/2020	11/5/2020	Stay-at-home-order	55
Denmark	-	-	Non-essential shops closed, ban on gatherings, stay-at-home-advice to at-risk population	0
Greece	23/03/2020	4/5/2020	Stay-at-home-order	42
Switzerland	-	-	Non-essential shops closed, ban on gatherings, stay-at-home-advice to at-risk population	0
Belgium	18/03/2020	9/5/2020	Stay-at-home-order	52
Israel	19/03/2020	4/5/2020	Stay-at-home-order	46
Czech Republic	16/03/2020	24/04/2020	Stay-at-home-order	39
Poland	24/03/2020	18/04/2020	Stay-at-home-order	25
Luxembourg	18/03/2020	19/04/2020	Stay-at-home-order	32
Hungary	27/03/2020	18/05/2020	Stay-at-home-order	52
Slovenia	19/03/2020	4/5/2020	Stay-at-home-order	46
Estonia	-	-	Non-essential shops closed, ban on gatherings, stay-at-home-advice to general population	0
Croatia	-	-	Non-essential shops closed, ban on gatherings, stay-at-home-advice to general population	0

Lithuania			Non-essential shops closed, ban on gatherings, stay-at-home-advice to general population	0
Bulgaria	-	-	Non-essential shops closed, ban on gatherings	0
Cyprus	24/03/2020	3/5/2020	Stay-at-home-order	40
Finland	-	-	Ban on gatherings, stay-at-home-advice to at-risk population	0
Latvia	-	-	Ban on gatherings, stay-at-home-advice to general population	0
Malta	-	-	Non-essential shops closed, ban on gatherings, stay-at-home-advice to at-risk population	0
Romania	22/03/2020	13/05/2020	Stay-at-home-order	52
Slovakia	-	-	Non-essential shops closed, ban on gatherings	0

This Table summarizes the type and duration of the restrictions adopted in various European countries during the first wave of the COVID-19 pandemic.

Source: European Centre for Disease Prevention and Control website (<https://www.ecdc.europa.eu/en/publications-data/download-data-response-measures-covid-19>)

N.b.: Lockdown is considered as resulting from a "Stay-at-home -order" for the general population.

A "Stay-at-home-order" is an order from a government authority that severely restricts the movement of a population, adopted as a mass quarantine strategy.



Table 2. A: Variables

Variable name	Description	Data Sources
More depressed since outbreak	1 if sadder or depressed since the outbreak, 0 otherwise	SHARE Corona Survey
Parent-children contacts disruption	1 if a disruption in the contacts with children was experienced, 0 otherwise	SHARE Wave 8/SHARE Corona Survey
Age	Continuous variable	SHARE Corona Survey
Female	1 if female, 0 otherwise	SHARE Corona Survey
Married	1 if married, 0 otherwise	SHARE Corona Survey + previous waves*
Low education	1 if lowly educated, , 0 otherwise	SHARE Corona Survey + previous waves
Medium education	1 if medium educated, 0 otherwise	SHARE Corona Survey + previous waves
High education	1 if highly educated, 0 otherwise	SHARE Corona Survey + previous waves
Retired	1 if retired, 0 otherwise	SHARE Corona Survey + previous waves
Ends not meeting	1 if able to make ends meet with great difficulty or with some difficulty; 0 otherwise	SHARE Wave 8
# Chronic conditions	Number of self-reported chronic conditions	SHARE Wave 8
#Mobility limitations	Number of self-reported problems with mobility before the outbreak	SHARE Wave 8
Episodic memory score	Score (from 0 to 20) measuring episodic memory - a higher score corresponds to better cognitive functions	SHARE Wave 8

Directly affected Covid-19	1 with symptoms and/or having been tested for COVID-19, and/or having been hospitalized; 0 otherwise	SHARE Corona Survey
Other people with Covid 19	1 if anyone close had suffered from the Coronavirus, and/or was hospitalized due to the infection, and/or died after being affected by the Coronavirus; 0 otherwise	SHARE Corona Survey
Physical distance	1 if distance was kept “always” or “often” when outside the home; 0 otherwise	SHARE Corona Survey
Any contact with others	1 if with electronic or in-person contacts with relatives, friends, and neighbors; 0 otherwise	SHARE Corona Survey
#days in lockdown	Number of days of lockdown	European Centre for Disease Prevention and Control (2020)
#days from the end of lockdown	Number of days from the end of lockdown to the day on which the respondent was interviewed	SHARE Corona Survey + European Centre for Disease Prevention and Control (2020)
Stay-at-Home restrictions	1 if the country of residence adopted lockdown restrictions, 0 otherwise	European Centre for Disease Prevention and Control (2020)
Non-cohabitation	1 if “confidant” children did not live in the older parents’ household or in the same building, 0 otherwise.	European Centre for Disease Prevention and Control (2020)
#days from the end of lockdown	Number of days from the end of lockdown to the day on which the respondent was interviewed	SHARE Corona Survey + European Centre for Disease Prevention and Control (2020)

Notes: \* information about education and marital status were retrieved from previous waves for longitudinal respondents.

Figure 1: Individuals aged 65+ reporting personal or electronic contacts with offspring “less often” or “never” since the outbreak

