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LIFETIME EVENTS AND THE WELL-BEING OF OLDER PEOPLE

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Lifetime events and the well-being of older people¹

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Abstract

This paper investigates the relationships between physical health, work, family history and mental well-being of people aged 50+ years and tests whether their children's education, family formation and work circumstances also affect their level of depression. We use data for 10 European countries from six waves of the Survey of Health Ageing Retirement in Europe, from which we can observe current circumstances, past events and changes of conditions over time for older parents and their adult children. We find strong beneficial effects of being retired and detrimental effects of bad health conditions. A problematic family of origin, as well as grief over the death of spouses or children, persists over the entire life. Regarding non-coresident adult children, we observe that having children in better working and family conditions beneficially affects parental mental well-being. Geographical variability allows testing of whether the effects vary across different cultural contexts and institutions. Important context heterogeneities emerge: unemployment is more burdensome in countries with more difficult labour market conditions, sickness is less heavy in countries with better healthcare systems and divorce is less bearable in countries characterized by more traditional family values.

Keywords: depression, mental health, SHARE, life events

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1. Introduction

Depression is an important public health problem, and one of the leading causes of disease burden worldwide (Moussavi et al., 2007). Beyond personal and family suffering, depression worsens the outcomes of many medical disorders and promotes disability (Alexopoulos, 2005). Depressed adults have poorer functioning, have a higher perception of poor health, and make use of more medical services (Cole & Dendukuri, 2003).

In old age, depression is common. There is a substantial multi-disciplinary research literature on the relationship between well-being and the ageing process. The general conclusion that emerges from this body of empirical work is of a rising age profile of general well-being or happiness after the age of 50, after accounting for specific factors like health status and bereavement. Most of the available long-term data are repeated cross-sections rather than longitudinal surveys, so there has been some debate about the interpretation of this age profile as a true age effect rather than period or cohort effects (Yang, 2008), but there is general acceptance of the hypothesis that any true influence of age is positive rather than negative (Arezzo & Giudici, 2017). In a multiple regression framework, the association between age and depression becomes negative when variables concerning basic demographic and physical health conditions are taken into account (Blazer, Burchett, Service & George, 1991). Controlling for education, work and health Cantarero-Prieto, Pascual-Sáez and Blazquez-Fernandez (2017) reached the same conclusions when looking at quality of life.

How is this rising age profile to be reconciled with the decreasing profile of income, reduced social network size and increasing health problems? What is the role of multi-generational relationships and geographically dispersed family that is so common in developed countries?

Concerning the relationship between physical and mental health, among several papers, we refer to the detailed analysis on the effects of different physical health conditions on mental health carried out by Lindeboom, Portrait and van den Berg (2002). It is interesting to observe that, apart from the significant effect of experiencing serious diseases and surgeries, becoming aware of decreasing physical abilities importantly affects the mental well-being dimension.¹ Braam et al. (2005), using data for 11 European countries (EURODEP) found that, later in life, the relationship between physical health and depression is much stronger. Hill-Joseph (2018) found that chronic illnesses contribute greatly to mental health disparities among adults, especially if the illness onset was early in life (before age 36).

Activity status is an important determinant of mental health. Given increased life expectancy and better physical conditions at later stages in life, policy suggestions have been made to encourage workers to postpone retirement; this has included increasing the statutory pension age. These policies are being

discussed for their potential consequences on the mental and physical well-being of older people. Going on a pension may be a stressful event, leaving the person without a structured day or close network of colleagues and friends and making him or her feel lonely, useless and obsolete. Retirement should, however, remove the stress and fatigue related to work, and therefore bring relief to the retired person. Answering these concerns requires empirical study, but as going on a pension is a choice and workers in bad physical and/or mental condition may be more likely to choose to become a pensioner, this may lead to biased estimates. When taking into account the risk of endogeneity (exploiting a discontinuity regression design), Johnston and Lee (2009) – among others (Kim & Moen, 2002; Oliffe et al., 2013; Choi, Stewart, & Dewey, 2013) – found that retirement had a beneficial effect on individuals' sense of well-being. Coe and Zamarro (2011), using as an instrument the different statutory retiring ages across Europe, found a null effect for pension on depression, while the corresponding OLS estimate would have indicated that retired people are more depressed. Reitzes, Mutran and Fernandez (1996) did not find that retirement had any detrimental effect on self-esteem.

The reasons for feeling more or less depressed later in life may depend on the family in a broad sense, including the family of origin in which the person grew up, the current household where the person resides and the members of the extended family with whom the person has contact. Childhood conditions have been found to be important determinants of many outcomes later in life. Stressful events in childhood have been found to be associated with higher rates of morbidity and mortality later in life (McFarland, Taylor, Hill, & Friedman, 2018). Socio-economic conditions in childhood also matter for later life well-being: according to Pakpahan, Hoffman and Kröger (2017), difficult economic conditions affect health later in life. Shuey and Willson (2014) confirm this hypothesis by analysing the same issue with work/health trajectories.

Being in a partnership is beneficial to old people (Bures, Koropecj-Cox, & Loree, 2009; Gibney, Delaney, Codd, & Fahey, 2017). There is a huge literature on the consequences (especially short term) of divorce (for a review, see Amato, 2000). From a gender perspective, women are usually found to be more depressed than men, which does not seem to be due to different reporting (Acciai & Hardy, 2007).

The multi-generation family is potentially an important influence on well-being in later life. In fact, while income and social networks decrease, life satisfaction and subjective well-being can be maintained or even improved (Baltes & Baltes, 1990). There are thus good reasons to examine the role of adult offspring. First, from an economic point of view, the utility or enjoyment that parents derive from their children is an important motivation for childbearing. Despite the existence of public welfare services, there is a range of qualitatively different benefits that cannot be supplied publicly, including pride in children's achievements, access to further generations of children and various forms of personal care and emotional support. Parents may also feel proud of or shamed by the decisions their children make, and such feelings may affect their

own well-being. These feelings may be especially important for parents because parents have socialized their children and hence may feel that they are partly responsible for how their children turn out as adults (Ryff, Lee, Essex, & Schmutte, 1994). Parents care very much about their children, so it seems plausible that what happens to the children may affect the parents (Knoester, 2003). Children also provide parents with a sense of gratitude and feelings of meaning in life, which might positively affect mental health (Evenson & Simon, 2005).

A relatively large number of studies have looked at the effect of having children rather than remaining childless. In contrast to what has been theorized thus far, most of the empirical studies have found that having children has a null or small detrimental effect on parents' level of depression (Bures et al., 2009; Hank & Wagner, 2013; Koropeckyj-Cox, 1998; Umberson & Gove, 1989). The results appear more coherent once marital status is taken into account: high levels of depression are observed when considering never married parents and formerly married women who have outlived their children (Bures et al., 2009). Gibney et al. (2017) looked at the effect of childlessness: no main effect of childlessness is observed across different European regions for adults aged 50–75 years old. Again, detrimental effects emerge among separated parents. Mixed results were also found by Kruk and Reinhold (2013), who looked at the effect of the number of children: exploiting exogenous variation of the number of children due to multiple birth and sex composition of the first two children, they found additional children had no effect on men's mental health, while having a third child had a detrimental effect on women's mental health. Other papers have found other heterogeneities: Neuberger and Preisner (2017), for example, found that parenthood influences the quality of life positively later in life of people with less economic resources or in countries with worse economic conditions.

There is limited literature on the impact of children's life events, rather than the existence of children, on parents' mental well-being. Concerning the relationship between parents and their adult children, Buber and Engelhardt (2008) found that few contacts with adult children increased the presence of depressive symptoms among parents. With respect to adult children's family decisions, there is evidence that adult children's divorce has a detrimental effect on parents' mental well-being (Kalmijn & de Graaf, 2012; Tosi & Albertini, 2018, especially in Southern European countries), while adult children's marriage has a beneficial effect (Kalmijn & de Graaf, 2012). The effect of having grandchildren seems to depend on the possibility of looking after them: Arpino, Bordone and Balbo (2018) found a negative association between grandparenthood without grandparental care and mental well-being in countries where intensive grandparental care is expected, while a positive association of grandparenthood and mental well-being was found in countries where intensive grandparental care is not expected (i.e. where weekly care is more common than daily care). Some studies have looked at the effects of problematic conditions in which adult children can find themselves, and the presence and number of children's problems (e.g. depression, poor

health or use of alcohol) decreases parents' mental well-being (Greenfield & Marks, 2006; Pillemer & Suito, 1991), as does adult children returning to the parental house as a result of unemployment or separation (Tosi & Grundy, 2018). Unemployment itself may affect parents' mental well-being. Courtin and Avendano (2016) found that, in the context of high unemployment during the Great Recession in Europe, the rate of co-residence between adult children and their older parents increased, with beneficial mental health effects for older parents. However, returns to home seem to decrease parents' quality of life in houses where none of their children are still residing (Tosi & Grundy, 2018).

More than the family network may contribute to mental well-being. Arezzo and Giudici (2017) looked at the effect of a wider social capital and found, however, that family contacts mattered more than participating in volunteering activities or attending courses. Choi et al. (2013) have found that the availability of informal volunteering opportunities reduced the risk of depression.

We contribute to the topic by studying the impact of life-course events in many domains and by exploiting time and geographical variability. We use data for 10 European countries from six waves of the Survey of Health Ageing Retirement in Europe, where we can observe current circumstances, past events and changes of conditions over time for older parents and their adult children. By considering a heterogeneous selection of determinants, we can determine what matters more for people's mental well-being. The large number of observations for 10 European countries allows the investigation of whether culture and institutions influence the relationship between what happens in life and how people feel. Understanding the socio-economic determinants of mental health (and how they may be mitigated or reinforced) is particularly important from a public health perspective, because depression is becoming an important determinant of national healthcare expenditures.²

This paper is organized as follows. Section 2 presents the data, the sample selection and the variables used throughout the analyses, while Section 3 explains the empirical methods employed. Section 4 contains the results for the whole sample and for subsamples of countries, while conclusions follow in Section 5.

² <http://www.oecd.org/health/mental-health-problems-costing-europe-heavily.htm>

2. The data

We use data from the first six waves of the harmonized Survey of Health, Ageing and Retirement in Europe (SHARE). SHARE is an exceptional data source in several respects: it is cross-national, allowing national-level cultural differences to be explored; it provides evidence on well-being through a set of 13 subjective assessments; it includes current and past information over different personal dimensions (work, health, family); and it contains unusually extensive questions relating to a maximum of four non-coresident adult-children.

SHARE was launched in 2004 in 11 countries, and over time, was extended to 28 countries. It collects the same information, in a panel format, almost every two years: in 2006, 2008, 2011, 2013 and 2015. The only exception is represented by the 2008 survey (third wave – SHARELIFE) where a small selection of variables is the same as in the other data collections and most of the questions concern the entire past life (childhood, family, work and mobility history).

We selected our sample according to the following criteria. We excluded countries where SHARELIFE was not carried out; we dropped individuals with missing information for the variables used in the paper; we only included individuals aged 50+ years old who were observed for at least two consecutive waves (over the five panel surveys) to observe, during the time of the survey, changes in their life and in the lives of their adult children. We ended up with a first sample of 81,281 observations (observed for at least two consecutive waves) and with a second sample of 46,537 observations (observed for at least two consecutive waves and interviewed in wave 3 – SHARELIFE). The (smaller) sample with retrospective information allowed us to investigate the effects of past events on current mental health; the (larger) sample without retrospective information provided statistical robustness to our estimates, especially when investigating heterogeneities across countries.

The 10 countries analysed in this paper are Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Switzerland and Belgium. The distribution of individuals interviewed over different countries is described in Table 1. On average, in 2004, we have at our disposal country-samples of around 3,000-6,000 observations. The size almost doubles by 2014 for the sample without retrospective information, where no condition for participation in wave 3 is required.

Concerning our dependent variable, mental health, in SHARE it is measured by the 13 questions that compose the so-called EURO-D instrument (Prince et al., 1999). The EURO-D instrument has good test-retest reliability and internal consistency and, in terms of validity, correlates well with other well-known health measures (Prince et al., 1999). The scale covers the following 13 items: depression, pessimism,

suicidal ideation (wishing death), guilt, sleep, interest, irritability, appetite, fatigue, concentration (in two sub-categories), enjoyment and tearfulness.

Table 2 summarizes the answers to the 13 questions. The answers given are – on average – very similar in the two samples. Of the total sample, 35% stated they have been sad or depressed in the last 12 month, while 13% do not have hopes for the future, 6% feel that they would rather be dead and 7% feel guilty for something she or he has done. Additionally, 22% have felt irritable, 8% have lost interest in things, 12% have not enjoyed anything recently and 23% have cried in the last month. Of the sample, 30% have had trouble sleeping, 8% have noticed they have had less appetite and 32% have felt a sense of fatigue recently. Finally, 13% have had more difficulties in concentrating when reading and 11% more difficulties in concentrating in general.

Depression may influence the probability of continuing to participate in the survey. Attrition could thus be a problem if the probability of abandoning the survey is related to the object of our study. In Table A1 (Appendix), we report the estimates from a logistic model where the dependent variable is equal to one if an individual interviewed in wave 1 is not included in our final sample. We observe that irritability, tearfulness and difficulty in concentrating on reading increase the probability of dropping out, while feeling depressed and guilty decreases it. We will try to understand, through simulations, how this selection may impact on our main findings.

3. The methodological framework

The EURO-D instrument consists of 13 binary indicators that we observe in five waves. We assume the 13 binary indicators to be the expression of the individual's latent mental health. To capture the phenomenon, we implement principal component analysis to develop better insight into the common latent dimension that the different symptoms may share. Given the binary nature of the variables, we use polychoric correlations to construct the covariance matrix from which the eigenvalues and eigenvectors are calculated (Kolenikov & Angeles, 2004). To facilitate the interpretation of the extracted components, we rely on orthogonal rotation using the varimax approach. Using the Kaiser criterion, we retain a component if the corresponding eigenvalue is higher than 1 (Yeomans & Golder, 1982; Table A2, Appendix).

The first factor extracted is highly positively correlated with feelings of guilt and suicide and with loss of appetite, interest in things and the ability of concentrating (Table A3, Appendix). The second factor extracted is highly positively correlated with difficulties in concentrating, with no feelings of enjoyment and no hopes for the future (Table A3, Appendix). We will analyse only the determinants of the first extracted factor, which we refer to as 'Depression symptoms'.³ The lifetime events we include in the regression models are related to the demographic characteristics of the individual, his or her current family circumstances, family history and family of origin; his or her work and health status; and his or her adult-children and their life circumstances.

We specify the relationship between the factor and the life events to be linear, with additive country-specific effects:

$$Y_{i,t} = \alpha + D_i' \beta_D + S_{i,t}' \gamma_S + P_{i,before\ t}' \gamma_P + C_{i,t-1 \rightarrow t}' \delta_C + N_i' \theta_N + u_i + \varepsilon_{i,t}$$

where Y represents the mental well-being of the person i at time t , D represents a vector of time-invariant characteristics (gender, schooling), S represents a vector of characteristics at time t (employment situation, family structure, health, adult-children life conditions), P represents a vector expressing facts that happened in the past (the death of a child, the experience of a widowhood or divorce), C indicates changes between the previous wave and the current one in any S domain and N is a set of dummy-countries. Finally, u represents a random individual error, normally distributed, and ε is the usual error term, also normally distributed.

The independent variables are described, for the two samples, in Table 3. On average, the samples are composed of 54% women, and the average age is 67–68 years old. The majority of the people are retired (57%–60%), and only one out of four or five is still in paid employment. For 4%–5% of the individuals, we

³ We get fewer significant coefficients when analysing the second factor, and no heterogeneous effects by European context, which we consider one of the main contributions of the paper. Results upon request.

observe a movement from work to pension over time; 60%–61% stated they have suffered from at least one illness, and 15% have been hospitalized in the last twelve months. Between 8% and 9% experienced the onset of a new illness between one wave and the following one. In the sample, 67%–70% of the individuals are currently in a couple, 16% have experienced a divorce during the life course, 16% a widowhood, and 2% a widowhood during the time of the survey. Most (89%–90%) have children – two on average – and less than 1% experienced the death of a child. Concerning their adult children’s lives, we observe that 2% of sons and 2% of daughters are unemployed (0.6% experienced a new episode of their children’s unemployment during the time of the survey), 30% of adult children are married and 6% are divorced (9%–12% experience the marriage of a child during the time of observation, but less than 1% a divorce). The average number of grandchildren is 2.5, and 4%–5% of individuals in our samples look after grandchildren on daily basis and 10%–11% on weekly basis. It is important to keep in mind that these figures contain zeros for the part of the samples without adult children (and/or without grandchildren). The inclusion of zeros also explains the relatively low mean for years of schooling. Finally, going back to the past, we have a variable indicating a stressful family environment when the individual was 10 years old: 7% of the sample with retrospective information report that their parents were addicted to alcohol.

Our hypotheses, so far, are that all dimensions taken into consideration, measured at different times, matter for individual mental well-being. The interest lies in understanding the relative weight of each of these dimensions. The second, more specific, set of hypotheses concerns the relationship between the determinants of mental well-being and the context that individuals face. We investigate three kinds of heterogeneities across countries and test the following three hypotheses:

- 1) Unemployment decreases mental well-being more detrimentally in countries with worse labour market conditions, because it can be more difficult to find a new job. Human capital may be more important in these countries, because it can make more the difference.
- 2) Being sick and being hospitalized may less negatively affect mental well-being in countries with a good healthcare system. A relatively high income may be less important in these countries, because potential patients can rely on the provided healthcare system.
- 3) Marriages and divorces may matter more – in a beneficial and detrimental way – in countries characterized by more traditional family values.

To understand the influence of the context, we interact the variables of interest (e.g. experiencing an illness) with a dummy variable indicating whether the country belongs to a better/worse context with respect to that dimension (e.g. high/low expenditure in the healthcare system). For the robustness analysis, we also interact the variables of interest with the context variable itself (e.g. % of GDP spent in the healthcare system). The last strategy probably better identifies the direction of the relationship between each determinant of mental

well-being and the context. However, it is highly parametric, implying that – for example – one additional percentage point spent in the healthcare system improves mental well-being the same amount.

4. Results

We report the main results in Table 4. The results, in terms of estimated coefficients and statistical significance, are very similar between the two samples. We find a beneficial effect of age on mental health, which is in line with the literature: if general descriptive evidence may indicate an increase of depression with ageing, this analysis confirms that it is due to changing conditions and not to the natural process of ageing itself.⁴ For the effect of other demographic characteristics, we find that women are generally more depressed while more educated people feel less depressed.

Compared to unemployment (excluded category), any other activity situation (work, retirement and house-caring) leads to better mental well-being. A new retirement, from one wave to the following, has an additional beneficial effect. A spouse's unemployment appears to be a reason for depression.

Health, as expected at this age, has an important impact on depression. Suffering from illnesses increases depression, as does having experienced a hospital recovery in the last year. A long period of illness influences mental well-being more strongly: in fact, a new illness (from one wave to the following) increases depression but does so less than a 'persistent' one (0.230–0.080).

We now turn to the influence of family history. A problematic family of origin still affects mental well-being after 40 or more years: living with parents addicted to alcohol as a child affects mental well-being with almost the same intensity as a current illness. Concerning their own family, we observe that family has a beneficial impact: being in a couple is good, as is having children. However, the interaction between the two circumstances reveals important heterogeneities: being childless is detrimental only for currently unpartnered adults, probably because they need more meaning in their lives. A new widowhood is, in relative terms, the most important factor in determining mental well-being for people over 50 years of age. Having experienced a divorce increases depression, as does the death of one's child. The number of children does not have a significant influence on mental well-being.

We now comment on the effects of the life circumstances of adult children on their parents' well-being. Having better educated children beneficially affects parental mental well-being, while having unemployed

⁴ The coefficient of the age squared is positive, suggesting a turning point. However, from age 50 to age 106 (considered as oldest age to reach), mental well-being is constantly increasing.

children is detrimental. The family formation of adult children also significantly influences parental mental health: having married children decreases depression, while having divorced children increases it more intensely. Finally, having grandchildren does not seem to matter: what it matters is spending regular time with grandchildren, which increases mental well-being.

Summarizing the main results, in light of past studies, we confirm the beneficial effect of ageing itself on mental well-being, after controlling for other dimensions (Blazer et al., 1991; Cantarero-Prieto et al., 2017) and the systematic difference between women and men (Acciai & Hardy, 2007). We also confirm the strong expected relationship between physical and mental health (Lindeboom et al., 2002) and the beneficial effect of being retired (Johnston & Lee, 2009), which is particularly high just after the exit from work. As suggested by previous studies (Bures et al., 2009; Gibney et al., 2017), we investigated the effect of childlessness, by interacting it with the partnership circumstance, and finding a detrimental impact only for individuals not in a couple. More novel is the whole impact of the family, from the very beginning to the present. Growing up in a stressful family environment, having experienced divorced or the death of child, experiencing a recent widowhood, knowing their own adult children are in more or less happy work or family conditions, having the possibility of looking after grandchildren – all of this has an important impact on the well-being of individuals later in life.

We can also say something about the relative size of these effects. Having experienced a recent widowhood has the largest impact, followed by the individual work and health situation. How important is the adult children component for depression among older people? Suppose a person has an adult child with tertiary education; the child is employed, married and the adult child's children meet with the grandparent every week. The overall impact of the adult child situation is similar to the impact of having a partner rather being alone. Estimates are robust to attrition.⁵

We tested our hypotheses about the potential mitigation or reinforcement of these effects due to the context where individuals live. We start by studying whether the effect of unemployment and education is different across countries with different labour markets. As an indicator of labour market health, we chose the youth unemployment rate. We interact the variables related to the unemployment of the individual, his or her spouse and his or her children with living in a country with high youth unemployment (i.e. Spain, Italy, France, Belgium, and Sweden).⁶ As hypothesized, being unemployed and having unemployed adult children

⁵ We test the influence of attrition in Table A4 (Appendix). We compare the original estimates (first two columns) with the estimates we would get by dropping, respectively, those 10% more likely to leave the survey (third and fourth column) and those 20% (fifth and the sixth column) more likely to leave the survey. The probability of leaving the survey is predicting using the estimates shown in Table A1 (Appendix). Estimated coefficients and standard errors across the three samples are very similar.

⁶ Data on youth unemployment (2019) are taken from <https://www.statista.com/statistics/266228/youth-unemployment-rate-in-eu-countries/>.

has more detrimental effects in countries with a high unemployment rate, while education is more valuable (see Table 5A).

We then tested whether health problems greatly affect individuals in countries where less is spent on the healthcare system.⁷ We included in this cluster of countries Spain, Italy, France, Belgium and Sweden. We found that illness and hospitalization made individuals more depressed in these countries. Moreover, a higher income seemed to be more relevant (Table 5B).

Finally, we tested whether marriages and divorces have a different impact in countries where traditional family values are more common. To divide the countries into two groups, we used the answers to six questions about family values included in the European Value Survey (2008). We ran a principal component analysis and grouped the countries according to the extracted factor.⁸ The cluster of more traditional countries included Spain, Italy, France, Belgium and Switzerland. We observed that the detrimental effect of a child's divorce on mental well-being seemed to be driven by residence in these countries (Table 5C).

Overall, we observed differences across countries related to the characteristics of their context. Interacting the variables of interest with the context variables measured in a continuous way confirmed most, but not all, of the results (see the notes on the Tables for more details). The main methodology proposed here was based on the simple idea of grouping the countries into two. Luckily, for our identification purposes, the grouping led to different clusters of countries for each research question.

⁷ Data on healthcare expenditure (2015) are taken from https://ec.europa.eu/eurostat/statisticsexplained/index.php/Healthcare_expenditure_statistics.

⁸ Results upon request.

5. Conclusions

This paper investigated the determinants of mental well-being among people aged 50 years and older. We used data for 10 European countries from six waves of the Survey of Health Ageing Retirement in Europe, in which we could observe current circumstances, past events and changes of conditions over time for older parents and their adult children. We found strong beneficial effects of being retired and detrimental effects of bad health conditions. A problematic family of origin, as well as grief over the death of spouses and children, persists over the entire life. Regarding non-coresident adult children, we observed that having children in better working and family conditions beneficially affects parental mental well-being. Having experienced a recent widowhood has the largest negative impact, followed by the work and health situation. The adult children component was revealed to be an important determinant for old people's depression: a person who has an adult child in good family and work conditions (with tertiary education, employed, married, whose children s/he meets every week) feels the same relief that is felt by having a partner rather than being alone.

Geographical variability made it possible to test whether the effects varied across different cultural contexts and institutions. We found that in countries with worse labour market conditions episodes of unemployment were more burdensome, while having higher education might matter more. In countries where more money is spent in the public healthcare system, being sick or being hospitalized was less onerous than having a lower level of income. Finally, in countries characterized by more traditional family values, a child's divorce was less bearable.

Understanding the socio-economic determinants of mental health is particularly important from a public health perspective. It is not easy to say what policies can do to help this situation. Related to the family, we saw the strong detrimental effects of having recently experienced a widowhood, being un-partnered and being un-partnered and without offspring. This suggests a lack of meaning in life, which could be tackled with psychological support. With respect to the other important dimensions – health and work – we observed that the detrimental effects are mitigated when the general context is more favourable. The assurance of a dynamic labour market and a generous healthcare system leads to relatively fewer depressive symptoms.

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TABLES

Table 1: Samples of individuals by country (with/out retrospective information)

	Sample WITHOUT retrospective information	Sample WITH retrospective information
Austria	8,541	2,854
Germany	8,073	4,079
Sweden	7,097	5,120
Netherlands	4,904	4,308
Spain	10,280	4,950
Italy	8,393	5,580
France	8,967	5,090
Denmark	8,028	5,272
Switzerland	6,015	2,696
Belgium	10,983	6,588
Total	81,281	46,537

Table 2: EURO-D instrument (mental health)

	Sample WITHOUT retrospective information (%)	Sample WITH retrospective information (%)
Sad or depressed last month	34.5	34.6
No hopes for the future	12.7	12.7
Felt would rather be dead	6.4	6.3
Feels guilty	6.6	6.5
Irritability	21.7	22.6
Less or same interest in things	7.9	7.6
No mention of any enjoyment	12.1	11.8
Tearfulness	23.2	22.6
Trouble with sleep	30.4	30.3
Diminution in appetite	7.9	7.8
Fatigue	32.1	31.5
Difficulty in concentrating	11.5	10.9
Difficulty in concentrating on reading	13.3	12.5
Observations	81,281	46,537

Table 3: Lifetime events

	Sample WITHOUT retrospective information	Sample WITH retrospective information
Age	67.1	68.1
Woman (%)	54.1	53.9
Years of schooling	11.2	11.5
Employed (%)	26.9	22.6
Retired (%)	57.0	60.5
New retirement (%)	3.8	4.7
Home carer (%)	8.7	9.5
Unemployed (%)	7.4	7.2
Spouse's unemployment (%)	2.9	2.6
Real income	11,612	9,072
Illness (%)	60.7	61.9
New illness (%)	7.8	9.1
Hospitalized (%)	14.9	14.9
Parents addicted to alcohol (%)	-	7.0
In a couple (%)	70.3	66.5
No offspring (%)	10.2	11.2
Ever widowed (%)	-	15.5
New widowhood (%)	2.4	2.6
Ever divorced (%)	-	15.5
Number of children	2.1	2.0
Number of dead children	-	0.06
Children: max years of schooling	9.4	10.7
Son's unemployment (%)	2.0	2.0
Daughter's unemployment (%)	1.8	1.9
Children: new unemployment (%)	0.6	0.6
At least one married child (%)	30.3	29.2
Children: new marriage (%)	12.3	9.4
At least one divorced child (%)	5.7	5.6
Children: new divorce (%)	0.6	0.8
Number of grandchildren	2.5	2.4
Grandchildren: daily care (%)	4.3	4.7
Grandchildren: weekly care (%)	10.3	10.9
Observations	81,281	46,537

Table 4: Determinants of depression symptoms

Mental health factor	Sample WITHOUT retrospective information			Sample WITH retrospective information		
	Coef.	Std. Err.	Sign.	Coef.	Std. Err.	Sign.
Age	-0.110	0.005	***	-0.096	0.009	***
Age squared	0.001	0.000	***	0.001	0.000	***
Woman	0.351	0.006	***	0.351	0.009	***
Years of schooling	-0.019	0.001	***	-0.020	0.001	***
Employed	-0.367	0.016	***	-0.285	0.025	***
Retired	-0.317	0.018	***	-0.279	0.021	***
New retirement	-0.066	0.014	***	-0.059	0.022	***
Home carer	-0.231	0.025	***	-0.176	0.032	***
Spouse's unemployment	0.135	0.025	***	0.134	0.038	***
Income	-0.003	0.002		-0.006	0.004	
Illness	0.230	0.008	***	0.215	0.011	***
New illness	-0.080	0.013	***	-0.062	0.015	***
Hospitalized	0.313	0.010	***	0.285	0.016	***
Parents addicted to alcohol				0.175	0.018	***
In a couple	-0.159	0.012	***	-0.128	0.021	***
No offspring	0.052	0.021	**	0.070	0.031	**
No offspring*couple	-0.059	0.029	**	-0.100	0.038	***
Ever widowed				-0.033	0.022	
New widowhood	0.514	0.032	***	0.562	0.044	***
Ever divorced				0.077	0.012	***
Number of children	0.005	0.005		-0.003	0.008	
Dead children				0.128	0.020	***
Children: max years of schooling	-0.002	0.000	***	-0.004	0.001	***
Son's unemployment	0.107	0.035	***	0.076	0.042	**
Daughter's unemployment	0.092	0.026	***	0.086	0.042	**
Children: new unemployment	0.043	0.051		0.085	0.078	
At least one married child	-0.017	0.008	**	-0.013	0.009	
Children: new marriage	-0.004	0.013		0.004	0.015	
At least one divorced child	0.054	0.017	***	0.038	0.021	*
Children: new divorce	0.050	0.043		0.020	0.050	
Number of grandchildren	0.004	0.003		0.002	0.002	
Grandchildren: daily care	0.002	0.023		-0.006	0.021	
Grandchildren: weekly care	-0.038	0.013	***	-0.031	0.012	**
Austria	-0.072	0.010	***	0.032	0.019	*
Germany	0.106	0.013	***	0.116	0.020	***
Netherlands	0.039	0.013		0.045	0.018	**
Spain	0.248	0.018	***	0.369	0.021	***
Italy	0.371	0.016	***	0.417	0.021	***
France	0.399	0.010	***	0.420	0.016	***
Denmark	-0.013	0.009		-0.038	0.014	***
Switzerland	-0.049	0.013	***	-0.054	0.018	***
Belgium	0.256	0.012	***	0.189	0.018	***
Wave	0.002	0.002		0.007	0.003	**
Constant	3.617	0.180	***	3.042	0.298	***

Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Fraction of variance due to u: 0.490 (without), 0.483 (with).

Table 5A: Heterogeneous effects by labour market conditions

Mental health factor	Sample WITHOUT retrospective information			Sample WITH retrospective information		
	Coef.	Std. Err.	Sign.	Coef.	Std. Err.	Sign.
Years of schooling	-0.003	0.001	***	-0.009	0.002	***
Years of schooling*HYU	-0.027	0.001	***	-0.024	0.002	***
Unemployed	0.337	0.022	***	0.266	0.030	***
Unemployed* HYU	0.087	0.019	***	0.081	0.024	***
Spouse's unemployment	0.144	0.031	***	0.071	0.047	
Spouse's unemployment* HYU	-0.011	0.042		0.106	0.064	*
Children: max years of schooling	-0.001	0.001		-0.001	0.001	
Children: max years of schooling* HYU	-0.002	0.001	***	-0.003	0.001	***
Child's unemployment	0.031	0.041		0.083	0.044	*
Child's unemployment* HYU	0.104	0.050	**	0.002	0.050	
High youth unemployment rate (HYU)	0.513	0.029	***	0.492	0.039	***

Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Countries with high youth unemployment rate include: Spain, Italy, France, Belgium and Sweden; countries with low youth unemployment rate include: Germany, Austria, the Netherlands, Switzerland and Denmark (Eurostat, 2019). With respect to the regressions shown in Table 4, we here include the dummy variable 'unemployed' and exclude 'employed', collapse son's and daughter's unemployment into 'child's unemployment' and exclude country dummies. Robustness analyses (for the sample without retrospective information): the interactions with youth unemployment rate in percentage points are confirmed to be significant for years of schooling and being unemployed. Results upon request.

Table 5B: Heterogeneous effects by healthcare expenditure

Mental health factor	Sample WITHOUT retrospective information			Sample WITH retrospective information		
	Coef.	Std. Err.	Sign.	Coef.	Std. Err.	Sign.
Income	0.000	0.002		0.009	0.007	
Income*HHE	-0.010	0.004	**	-0.016	0.008	**
Illness	0.198	0.012	***	0.197	0.017	***
Illness*HHE	0.068	0.017	***	0.045	0.020	**
Hospitalized	0.256	0.016	***	0.251	0.019	***
Hospitalized*HHE	0.077	0.025	***	0.048	0.028	*
High healthcare expenditure (HHE)	-0.004	0.013		0.038	0.016	**

Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Countries with low healthcare expenditure include: Spain, Italy, Austria, Belgium and Denmark; countries with high healthcare expenditure include: Germany, Sweden, the Netherlands, Switzerland and France (Eurostat, 2015). With respect to the regressions shown in Table 4, we here exclude country dummies. Robustness analyses (for the sample without retrospective information): the interactions with healthcare expenditure in percentage points (with respect to the GDP) are confirmed to be significant for income, illness, and hospitalization. Results upon request.

Table 5C: Heterogeneous effects by strength of traditional family values

Mental health factor	Sample WITHOUT retrospective information			Sample WITH retrospective information		
	Coef.	Std. Err.	Sign.	Coef.	Std. Err.	Sign.
At least one married child	-0.017	0.009	*	-0.0067	0.012	
At least one married child * TFV	0.008	0.013		-0.008	0.016	
At least one divorced child	0.028	0.023		0.008	0.028	
At least one divorced child * TFV	0.051	0.028	*	0.049	0.041	
Traditional family values (TFV)	0.251	0.010	***	0.258	0.010	***

Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. More traditional countries include: Spain, Italy, France, Belgium and Switzerland; less traditional countries include: Germany, Sweden, the Netherlands, Denmark and Austria (factor elaborated by the authors using six answers from the European Values Survey, 2008). With respect to the regressions shown in Table 4, we here exclude country dummies. Robustness analyses (for the sample without retrospective information): the interactions with the factor are not confirmed to be significant. Results upon request.

APPENDIX

Table A1: Attrition analysis

	OR	Std. Err.	Sign.
Sad or depressed last month	0.80	0.029	***
No hopes for the future	0.98	0.044	
Felt would rather be dead	0.92	0.061	
Feels guilty	0.86	0.054	**
Irritability	1.08	0.041	**
Less or same interest in things	1.02	0.062	
No mention of any enjoyment	1.01	0.045	
Tearfulness	1.15	0.043	***
Trouble with sleep	0.96	0.033	
Diminution in appetite	0.99	0.059	
Fatigue	0.97	0.034	
Difficulty in concentrating	1.02	0.053	
Difficulty in concentrating on reading	1.12	0.054	**
Constant	1.10	0.051	**
Observations	19,564		

Table A2: Polychoric principal component analysis on mental health items

k	Eigenvalues	Proportion explained	Cumulative explained
1	5.303	0.407	0.407
2	1.480	0.113	0.521
3	0.949	0.073	0.594
4	0.801	0.061	0.656
5	0.737	0.056	0.713
6	0.653	0.050	0.763
7	0.641	0.049	0.812
8	0.601	0.046	0.859
9	0.495	0.038	0.897
10	0.445	0.034	0.931
11	0.376	0.028	0.960
12	0.308	0.023	0.984
13	0.205	0.015	1.000

Table A3: Eigenvectors of each item over the first two components

Variables	Category	Component 1	Component 2
Sad or depressed last month	0	-0.189	0.185
	1	0.357	-0.349
Felt would rather be dead	0	-0.043	0.018
	1	0.648	-0.277
Feels guilty	0	-0.036	0.038
	1	0.524	-0.557
Trouble with sleep	0	-0.132	0.082
	1	0.305	-0.190
Less or same interest in things	0	-0.050	-0.022
	1	0.624	0.275
Irritability	0	-0.096	0.087
	1	0.329	-0.300
Diminution in appetite	0	-0.045	-0.009
	1	0.534	0.114
Fatigue	0	-0.159	-0.003
	1	0.348	0.007
Difficulty in concentrating	0	-0.060	-0.101
	1	0.493	0.688
Difficulty in concentrating on reading	0	-0.067	-0.088
	1	0.475	0.619
No mention of any enjoyment	0	-0.045	-0.083
	1	0.341	0.646
Tearfulness	0	-0.108	0.121
	1	0.370	-0.414
No hopes for the future	0	-0.055	-0.078
	1	0.380	0.537

Table A4: Robustness analysis for attrition

	Table 4		Excluding the 10% more likely to leave the survey		Excluding the 20% more likely to leave the survey	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Age	-0.110	0.005	-0.109	0.007	-0.111	0.007
Age squared	0.001	0.000	0.001	0.000	0.001	0.000
Woman	0.351	0.008	0.381	0.007	0.381	0.010
Years of schooling	-0.019	0.001	-0.019	0.001	-0.018	0.001
Employed	-0.367	0.019	-0.384	0.020	-0.400	0.026
Retired	-0.317	0.019	-0.329	0.020	-0.339	0.023
New retirement	-0.066	0.017	-0.064	0.017	-0.070	0.017
Home carer	-0.231	0.030	-0.238	0.022	-0.252	0.023
Spouse's unemployment	0.135	0.022	0.156	0.023	0.159	0.032
Income	-0.003	0.002	-0.003	0.003	-0.005	0.004
Illness	0.230	0.010	0.242	0.009	0.254	0.013
New illness	-0.080	0.016	-0.092	0.017	-0.092	0.020
Hospitalized	0.313	0.012	0.329	0.011	0.329	0.013
In a couple	-0.159	0.012	-0.175	0.013	-0.174	0.013
No offspring	0.052	0.022	0.048	0.023	0.051	0.027
No offspring*couple	-0.059	0.033	-0.048	0.031	-0.051	0.034
New widowhood	0.514	0.028	0.550	0.035	0.541	0.032
Number of children	0.005	0.006	0.006	0.006	0.007	0.006
Children: max schooling	-0.002	0.001	-0.002	0.001	-0.002	0.001
Son's unemployment	0.107	0.026	0.110	0.026	0.095	0.035
Daughter's unemployment	0.092	0.026	0.085	0.030	0.075	0.035
Children: new unemployment	0.043	0.052	0.077	0.053	0.083	0.060
One married child	-0.017	0.008	-0.016	0.009	-0.021	0.008
New marriage	-0.004	0.013	-0.008	0.014	-0.002	0.016
One divorced child	0.054	0.017	0.058	0.019	0.052	0.020
New divorce	0.050	0.052	0.053	0.051	0.064	0.056
Number of grandchildren	0.004	0.002	0.004	0.003	0.004	0.003
Daily care	0.002	0.027	-0.001	0.022	0.008	0.025
Weekly care	-0.038	0.011	-0.036	0.012	-0.036	0.014
Austria	-0.072	0.011	-0.078	0.013	-0.071	0.014
Germany	0.106	0.013	0.111	0.015	0.121	0.015
Netherlands	0.039	0.013	0.044	0.017	0.033	0.020
Spain	0.248	0.015	0.239	0.016	0.209	0.015
Italy	0.371	0.014	0.354	0.014	0.371	0.016
France	0.399	0.013	0.409	0.016	0.443	0.014
Denmark	-0.013	0.012	-0.014	0.011	-0.012	0.012
Switzerland	-0.049	0.013	-0.044	0.015	-0.031	0.016
Belgium	0.256	0.014	0.269	0.015	0.281	0.012
Wave	0.002	0.002	0.001	0.002	0.000	0.003
Constant	4.008	0.179	4.027	0.226	4.083	0.235
Observations	81,281		73,153		65,025	