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Home alone: Widows' well-being and time

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Abstract

Home alone: Widows' well-being and time*

Losing a partner is a life-changing experience. We draw on numerous datasets to examine differences between widowed and partnered older women and to provide a comprehensive picture of well-being in widowhood. Most importantly, our analysis accounts for time use in widowhood, an aspect which has not been studied previously. Based on data from several European countries we trace the evolution of well-being of women who become widowed by comparing them with their matched non-widowed 'statistical twins' and examine the role of an exceptionally broad set of potential moderators of widowhood's impact on well-being. We confirm a dramatic decrease in mental health and life satisfaction after the loss of partner, followed by a slow recovery. An extensive set of controls recorded prior to widowhood, including detailed family ties and social networks, provides little help in explaining the deterioration in well-being. Unique data from time-diaries kept by older women from several European countries and the U.S. tell us why: the key factor behind widows' reduced well-being is increased time spent alone.

Keywords: widowhood, well-being, social networks, time use

JEL classification: I31, I19, J14

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1. Introduction

Widowhood is the fate of most married women surviving past age 70 in the majority of wealthy countries (U.S. American Community Surveys 2006-17 and United Nations, 2008) and given the years of life lost to COVID-19, both the incidence of widowhood and the average lifetime in widowhood will grow in the coming years. A large body of research stresses the negative and long-lasting consequences of widowhood, including worsened physical and mental health (Avis et al., 1991; Kristiansen et al., 2019), and lower levels of general well-being (Clark et al., 2008; Luhmann et al., 2012). However, in the literature on widowhood, the consequences for mental health occupy much more space than the impact on well-being, or, more specifically, on life satisfaction, a measure that is deemed to capture 'everything that matters' (Layard, 2006). While a long list of overview studies brings together research devoted to the relation between widowhood and mental health (Holm et al., 2019; Kristiansen et al., 2019; Stroebe et al., 2007, among many), literature examining life satisfaction in widowhood is much more sparse (Luhmann et al., 2012). Moreover, existing studies usually fail to present the problem in a satisfactorily far-reaching longitudinal setting, and even when they do, more often than not they are based on relatively small samples and/or do not account for what might be crucial explanatory variables. Recognizing the importance of this group from the viewpoint of overall well-being, it seems particularly relevant to understand how widows' feelings evolve before and after being widowed and which factors ameliorate or aggravate the drop in well-being and affect the recovery (Clark et al., 2008; Jenkins, 2014; Stroebe et al., 2007).

We combine the advantages of several datasets to address the evolution of well-being before and after the death of a partner and to study which circumstances help explain the difference in well-being between widowed and non-widowed older women. Using data from the Survey of Health, Ageing and Retirement in Europe, we provide a complex and comprehensive longitudinal analysis of implications of losing one's partner on well-being. Longitudinal data allow us to follow the trajectory of outcomes in proximity to a partner's death and to analyze their evolution over time. While studies based on cross-sectional samples deliver inconclusive results on how life satisfaction evolves after the loss, several longitudinal datasets suggest that the effect of death is long-lasting (Clark and Georgellis, 2013; Infurna et al., 2017; Lucas et al., 2003). We study the role of an exceptionally broad set of potential moderators of the impact of widowhood including family composition and broader social networks in advance of widowhood, and show that the variation in these is not very helpful in understanding of the evolution of well-being in widowhood.

Our longitudinal analysis is complemented by a closer look at how and with whom individuals spend their time—information found in time use surveys which have so far been only scarcely studied in the context of implications of widowhood (Hahn et al., 2014, 2011; Hamermesh et al., 2021; Utz et al., 2004). Using surveys which combine time use information with life satisfaction, we show that while the changed pattern of activities in widowhood does little to explain the reduced level of well-being, who respondents spent their time with is of key importance. Non-widowed older women spend a high proportion of their time with their partners, while widows are far more often alone, having lost a

partner and not spending much time with friends nor other family members. It is this dimension of their lives that accounts for the reduction in measures of their well-being.

Many authors have stressed the unique nature of the time of bereavement after the loss of a partner (Bennett and Soulsby, 2012; Stahl and Schulz, 2014), and it is difficult to imagine a more sensitive period from the point of view of different forms of policy interventions. However, reduced levels of well-being among widows last far beyond the first few months, or even the first year after the partner's death (Clark and Georgellis, 2013; Infurna et al., 2017; Lucas et al., 2003). Given these deep and substantially prolonged effects, it is important to stress the development and extension of programs to ameliorate consequences of widowhood. At a time when the number of widowed individuals has been rapidly growing in consequence of COVID-19, policymakers have the obligation to act to ensure that this important group of the population does not have to face the challenge of widowhood alone.

2. Data and Methods

This study draws on data from a well-established representative panel survey—the Survey of Health, Ageing and Retirement in Europe (SHARE), which is supplemented with time-use surveys collected in France, Poland, the U.K., and the U.S.

2.1 Sample selection and matching procedure employed in the analysis of the SHARE

SHARE is an international and multidimensional panel study of individuals aged 50 and over, carried out regularly in Europe and Israel since 2004 (Börsch-Supan, 2020; Börsch-Supan et al., 2013). Importantly from the perspective of the analysis of widowhood, apart from the regular interviews capturing the current living situation of participants, SHARE

collects information about the final months preceding the death of respondents, who had participated in the survey at least once beforehand (the so-called *end-of-life* interviews; Orlovic et al., 2017). SHARE also collects *SHARE-Life* interviews focusing on retrospective life histories of participants. These retrospective interviews were conducted in wave 3 of SHARE and, for respondents who joined SHARE later, again in wave 7. Thus, in wave 7 two types of interviews were conducted–regular interviews for panel members from before wave 3, and *SHARE-Life* interviews for respondents who first participated in wave 4 or later.[1]

The sample used here consists of women who participated in at least two waves of the survey, between waves 1 and 7, excluding wave 3, which collected only life history information and thus does not contain questions on the examined outcomes.[2] We refer to two waves of the survey on which we condition the sample as 'principal' waves. They are defined as: (i) For the widowed sample the 'principal' waves are two instances of consecutive participation in the survey separated by the death of the partner. These women lived with their partners in the first of the 'principal' waves. The partner is required to have participated at least once, either in the first of the 'principal' waves or earlier. We refer to the *end-of-life* interview for additional information on the circumstances of the partner's death. (ii) For women living in couples in both 'principal' waves we require the partner also participate in another SHARE interview, either at the time of the second 'principal' wave or in a later wave.

[1] Table S1 in the Supplementary Material gives an overview of the total number of different types of interviews collected in each participating country across all seven waves of the study conducted between 2004 and 2017.

[2] See Table S2 in the Supplementary Material.

The sample used includes only individuals who provided information on early childhood characteristics collected over the course of their participation. This information is used in the matching procedure needed to construct the control (non-widowed) sample. Since eligibility for the SHARE interview is not based on formal marital status but rather on living with a partner in the same household, we do not differentiate between married and cohabiting couples. Furthermore, apart from the two 'principal' waves, we include information from all other waves in which the widow was interviewed, and the same principle is applied to the control sample. This allows us to examine the evolution of the outcomes far into the past before the partner's death and far into the years following it. In Figures 1A–C we present the distribution of the time span between the very first and very last interview for each widow with respect to the timing of their partners' death for the final sample. The data in Figures 1A–C are split into three groups—those who have been in the survey for less than two years (98 widows in the sample), those who participated in the panel between 25 and 60 months (441) and—the largest group—those who have been followed in the survey for more than 60 months (2537).[3] For all three groups there is a discontinuity in the number of months between the partner's death (time 0 in Figure 1) and the time of the interview at around the time of his death—a clear and understandable consequence of non-participation in weeks immediately prior and right after the time of passing of the partner. Except for this discontinuity, however, the timing of death is fairly evenly distributed with respect to the pattern of survey participation.

[FIGURE 1 HERE]

[3] While SHARE is a biennial survey it might happen that the time between two consecutive waves is shorter than two years. This might be due to extensions of fieldwork in some years, different starting times or interviews with specific households taking place at different stages of survey waves.

In wave 7 of SHARE some of the participants received the regular panel questionnaire, while others, who did not participate in wave 3, were interviewed on their retrospective life history (*SHARE-Life* interview). The latter sample was additionally asked a subset of the regular questions, including the question on life satisfaction, but excluding questions used to construct measures of mental health. This results in small differences in the number of observations depending on the analyzed outcome.

Given the international nature of the data, to create the control group for the sample of widowed women we use a combination of exact and propensity score matching. The first, exact stage of matching is done by country. Within these country cells individuals are matched based on the propensity score for becoming a widow. In the estimation of the latter, we account for socio-demographic information (age, country, education, characteristics of the place of living, number of living children and grandchildren), for health status in childhood as well as for the pattern of survey participation. Additionally, since widowhood is strongly related to the characteristics of the partner prior to his death, we also control for the partner's age, education, self-reported health, and BMI category at the initial wave of observation, years of smoking, having siblings, and the age of his father (at death or at the time of the initial wave if the father was alive).[4] We apply the nearest neighbor propensity score matching with replacement within each country cell, conditional on common support.[5]

[4]Table S2 in the Supplementary Materials gives an overview of the balance between the widowed and control samples and the distribution of the propensity score of the matched samples of widowed and non-widowed individuals is presented in Figure S1.

[5]We tested several other matching approaches with additional characteristics for the exact stage with very little difference in the results. We therefore limit the exact stage only to country matching to minimize the loss of observations due to lack of common support.

Table 1 provides basic information on the number of widows by country, splitting the samples additionally into those whose partners died suddenly (as a result of an accident or following an illness which lasted less than a month) and those whose partners' illness lasted more than a month. Our results show that the process of adjusting to loss following a 'sudden' and 'non-sudden' death of a partner is significantly different. This distinction is informative and seems of particular importance currently, at the time when many people lose their partners due to unexpected death as a result of the COVID-19 pandemic.

[TABLE 1 HERE]

After the treatment and control samples are matched, we impute the timing of the 'placebo' deaths for non-widowed individuals to trace the path of outcomes with reference to the timing of this placebo treatment. We assign it so that the time between the 'principal' wave prior to and the second 'principal' wave after this placebo treatment is proportionally the same as for the matched widowed individual with respect to the actual death of her partner. In the final step we take the information on outcomes among the widowed and the control sample and examine it over time with respect to the timing of the actual or imputed (hypothetical) time of death of the partner (marked as time 0 in the figures). To allow for a flexible specification, we use the local polynomial regression and fit it in against the number of months prior to and after the partner's death (actual or imputed; $m_{i,t}$). The specification thus takes the form:

$$y_{i,t} = g(m_{i,t}) + v_i + \epsilon_{i,t},$$

where $g(.)$ is the local polynomial function fitted separately for (i) the non-widowed sample, (ii) the widowed sample before partner's death, and (iii) the widowed sample after

partner's death. Under the conditional independence assumption there should be no systematic differences in v_i between the widowed and non-widowed samples. The estimations are produced using the STATA built-in *lpoly* command with Epanechnikov kernel-weighted local polynomial smoothing at 60 points with a 0.9 bandwidth. Robustness tests using different numbers of smoothing points and bandwidths in the proximity of these values produce very similar results.

SHARE includes a number of unique modules that were collected in selected waves of the survey. One provides very detailed information on respondents' social networks—individuals with whom they "often discuss things that are important" (type of relationship, frequency of contact, how close one feels to this person). To be able to use detailed information on social networks, we further focus on the sample of women living in a couple at the time of wave 4 of the SHARE survey (when this module was implemented) with a partner who was observed at the same time (or during an earlier wave, provided the partner was still the same at the time of wave 4). From among these respondents, we look at the outcomes of those who were re-interviewed in wave 6 and who were 70 years old or older at that time, with some of them becoming widowed after the wave 4 interview. The non-widowed women in the estimation sample include those who continued to live with the same partner (and their partner was interviewed at the time of wave 6 or later). Table 2 provides descriptive statistics for this sub-sample, giving an overview of the distribution of outcomes in the regressions.

[TABLE 2 HERE]

2.2 Sample selection and descriptive statistics in the Time Use Surveys

The time-use surveys measure the amount of time people spend doing various activities during a day, including information on who they spend time with. Respondents complete a detailed written diary of their activities on the previous day. Such diaries are an effective means of capturing rich data on how people spend their time, their location throughout the day, and who they spend their time with (Juster and Stafford, 1991). We aggregate reported activities into five categories: home production, activities that others could perform for you (Reid, 1934); sleep; other personal activities; TV-watching; and other leisure (Hamermesh, 2019). Follow-up interviews provide additional demographic, economic, and social information about households and individuals. We use four time-use surveys conducted in France, (French Time Use Survey *Emploi du Temps* 2010 (French Data Archives for Social Sciences ADISP, 2010); Poland, Polish Time Use Survey *Budżet Czasu Ludności* 2013 (Polish Central Statistical Office, 2013); the U.K., United Kingdom Time Use Survey UKTUS, 2014-2015 (Gershuny, 2003; Gershuny and Sullivan, 2017), and the U.S., American Time Use Survey ATUS 2006-2008, 2010-2014, 2016 (Hofferth et al., 2020).

Table 3 summarizes general information on differences in time use between married and widowed individuals in each country using information for all women aged 70+. The sub-sample used in our analysis was restricted to those women who in addition to time-use information also provided details on other variables used in the regressions based on time use data, most importantly – life satisfaction. Table 4 presents descriptive statistics for these sub-samples in each country. Due to the questionnaire design and because some questions were only asked of sub-samples in France, the U.K., and the U.S., the sub-samples used for our analysis are much smaller than the full samples in Table 3.

[TABLE 3 HERE]

[TABLE 4 HERE]

2.3 Outcomes analyzed in the study

The primary outcome is the association between widowhood and well-being. Life satisfaction is a common measure of subjective well-being (Diener et al., 2018; Steptoe et al., 2015, 2015) and it has been reported in all surveys used in the analysis. Different surveys, however, applied different scales—in the SHARE survey and in the American and French Time Use Surveys an 11-point Cantril Ladder was used, an 8-point scale was implemented in the U.K. Time Use Survey, and a 5-point scale was applied in the Polish Time Use Survey.[6]

For regression analysis we compile a binary indicator of life satisfaction that designates about 2/3 of a specific sample as satisfied with life. Survey participants who are identified as satisfied with life scored 8 points or more on an 11-point scale in the SHARE survey and the American Time Use Survey, 7 points or more on an 11-point scale in the French Time Use Survey, 6 points or more on an 8-point scale in the U.K. Time Use Survey, and 4 points and more on a 5-point scale in the Polish Time Use Survey.

Apart from life satisfaction, SHARE collects several other indicators of well-being. We take advantage of measures of mental health which in SHARE are captured through the EURO-D scale of depression, an international scale developed specifically to evaluate symptoms of depression among older European populations (Guerra et al., 2015; Prince et al., 1999; Spahni et al., 2015). The scale is composed of 12 items. We use several items

[6] Table S3 in the Supplementary Material provides details on the exact construction of questions and answer options in all of these surveys.

from this scale and a binary indicator of the risk of depression, based on a threshold of four or more symptoms, as commonly utilized in the literature (Choi et al., 2013; Guerra et al., 2015; Richardson et al., 2020).

3. Results

We first analyze the development of widows' well-being before and after their partner's death with reference to several measures of mental health based on the EURO-D depression scale. Figure 2 presents their evolution: frequency of crying (Figure 2A); suicidal thoughts (Figure 2B); the total reported number of symptoms of depression (Figure 2C); and the likelihood of reporting four or more items, used to measure the risk of depression (Figure 2D). In each case the path is shown before and after time 0—the date of the partner's death and the matched date for controls—for three groups: non-sudden widows (blue dashed line), sudden widows (red dashed line), and controls (black dashed line).

Figure 2A shows the proportion of females crying in the last month. Among non-widowed controls, around 35% reported crying, with little variation over time. Among non-sudden widows this percentage is already significantly higher than among controls two years before widowhood, while among sudden widows it is not significantly different from the control group before widowhood. This proportion increases to over 70% crying after the partner's death for all widows. Moreover, the implications of losing one's partner are long-lasting: Two years after the death, around 60% of widows still reported crying in the previous month. Becoming widowed affects also other aspects of mental health, including feeling that one would "rather be dead" (Figure 2B). The number of symptoms of depression on the 12-symptom EURO-D scale (Figure 2C) and the likelihood of suffering

four or more symptoms of depression (Figure 2D) also increase upon widowhood in a similar manner.

[FIGURES 2A-D HERE]

Figure 3 presents the evolution of life satisfaction rated in the SHARE survey on a 10 to 0 scale, again with the time of the partner's death denoted as time 0. In Figure 3A, as in Figure 2, we differentiate between sudden and non-sudden widows. The dynamics of life satisfaction among the widowed sample before sudden widowhood closely matches that of the controls. Among non-sudden widows the match is initially very close, but, as in the case of tearfulness (Figure 2A), the level of life satisfaction begins to diverge from that of controls much earlier—already around three years before the death. The most likely causes of this relative decline are concerns about a partner's deteriorating condition and the burden of caring obligations (Schulz et al., 2001). Following the partner's death, widows unsurprisingly exhibit much reduced satisfaction with their lives. In both groups they evaluate their lives more favorably as time passes; but even after four-and-a-half years of widowhood their life satisfaction remains below that of controls. As late as three years following the death of their partner, non-sudden widows have recovered only 50% and sudden widows only 36% of the gap in life satisfaction.

We next study the drop in life satisfaction among various subgroups. Figure 3B shows that declines are larger among less-educated than more-educated widows, and that the magnitude of the decline is greater than the difference in life satisfaction between these groups before the partner's death. This comparison shows how dramatic the decline in well-being after a partner's loss is—given how strongly education differentiates people with respect to income, wealth, and health. Figure 3C demonstrates the differences in

experiencing widowhood between urban and rural areas and shows that the life satisfaction of widows residing in urban areas recovers more rapidly.

In Figure 3D the sample is divided based on the physical proximity and frequency of the woman's contact with children, which could be expected to be a decisive factor determining the evolution of widows' well-being. In this case we note two major results. On the one hand, the differences in life satisfaction before time 0 between future widows and controls are only statistically significant among those without children living close by. This may reflect the support which mothers receive from their nearby children in the last years before the death of the partner, thus reducing the negative impact on the mother's well-being. On the other hand, the drop in life satisfaction among widows who lived close to at least one of their children is greater than that of other widows; and, in addition, it recovers more slowly. This suggests that the existence and physical proximity of family members is not by itself sufficient to ameliorate the drop in well-being in widowhood.

[FIGURES 3A-D HERE]

What other factors might differentiate widows' well-being? The SHARE dataset collects information about the family relations of its respondents which, beyond simple enumeration of household or family members, also includes the strength of the relationship. Using the indicator of the number of people whom participants state that they "often discuss things that are important," we estimate regressions controlling also for such features as having at least one person in the social network, having the partner, a child, or a friend listed in it, and for satisfaction with the network.

Figure 4 presents widow-control differences in life satisfaction and feelings of loneliness in four specifications: the raw difference (specification S1); regressions adjusted for basic

demographics (specification S2); adjusted for the effect of respondents' nearby children (specification S3), and finally also adjusted for women's pre-widowhood social networks (specification S4). Confirming the findings of Figure 3D, differences in family circumstances or in the character of the social network cannot explain the effects of widowhood on life satisfaction—the estimated effects change only slightly between specifications S1 and S4. The second panel of Figure 4 shows further that feelings of loneliness in widowhood are also nearly independent of family circumstances and the broader pre-widowhood social network. The existence of these social relations and the differences in the size and nature of the social network thus have no explanatory power regarding the drop in life satisfaction upon widowhood.

[FIGURE 4 HERE]

To identify the conditions which are responsible for this drop we examine data showing how widows use their time compared to partnered women, taking advantage of the time-diary studies. As shown in Table 3, widows spend their time differently from otherwise identical partnered older women: they spend less time in home production, and more time on 'other leisure'. They can no longer spend time with their partners, which is the predominant category for those who continue to live in couples: over 50% in France, Poland, and the U.S. and almost 70% in the UK. In turn, widows spend much more time alone—an additional 40–60% in these countries compared to partnered women—and a little more with other people.

The time-use datasets employed here further allow for examining of how time use affects life satisfaction. The results are shown in Figure 5. We compare life satisfaction between partnered and widowed women, successively expanding the set of control variables, as in

Figure 4. For each country, the left-most point (specification S1) in Figure 5 shows the raw difference. The results from Poland and the U.S. closely mirror those in Figures 3 and 4. Differences in the U.K. and France are larger, although estimated less precisely, as the available samples from these two countries are smaller. Regressions adjusted for a large set of socio-demographic differences (specification S2) hardly reduce the estimated shortfall in widows' life satisfaction. Further extending the set of control variables shows that the differences in life satisfaction do not arise because widows spend time differently (specification S3). What matters is who the widow spends time with, as shown in specification S4. In these regressions, the differences in life satisfaction between widows and otherwise identical married older women are driven down to zero, with the exception of France, where the small sample size prevents precise estimation.

[FIGURE 5 HERE]

4. Conclusion

We show that widows' well-being, as reflected in their life satisfaction and indicators of their mental health, recovers only slowly after a significant drop upon their partner's passing (Lucas et al., 2003; Luhmann et al., 2012). This drop affects widows across different social groups and cannot be fully explained by variations in family circumstances (Cheng et al., 2014; Nakagawa and Hülür, 2021). Along several dimensions, widows' well-being remains lower than controls' even five years after the partner's death, and the recovery path is slower among those who lost their partners suddenly, which confirms slower adaptation to widowhood (Siflinger, 2017). Three years after the death of their partner, suddenly-widowed women recover only about a third of the gap in life satisfaction

relative to the control sample. We demonstrate that implications of widowhood cannot be explained by differences in family structure, proximity of children, or the size and nature of widows' social networks (Cheng et al., 2014; Jeon et al., 2013; Nakagawa and Hülür, 2021).

Time-use data from several European countries and the U.S. show that the key factor is that widows are alone substantially more than married older women. Socio-demographic characteristics, family circumstances, their social network before being widowed, and the types of their daily activities do not reduce the shortfall in life satisfaction. Their greater time spent alone is the sole identifiable cause, one that persists for many years (Utz et al., 2014; Yang and Gu, 2021). Spending time alone is reflected in reported feelings of loneliness (Figure 4) and is likely to worsen mental health (Figure 2).

Our findings suggest that the key aspect to understanding lower well-being in widowhood is being alone and that reduced well-being among surviving partners persists far beyond the initial months of widowhood. While it is difficult to imagine a time more sensitive than during the mourning for a partner (Bennett and Soulsby, 2012; Stahl and Schulz, 2014), through careful policies reducing time spent alone and facilitating greater active social interaction with family members and other people, widows' well-being could be increased (Nakagomi et al., 2020), and the time during widowhood when they are dissatisfied with their lives could be shortened. The inevitable drop in well-being among widows generally and especially those who lost their partners to the COVID-19 pandemic could be limited if they were not left to face widowhood alone.

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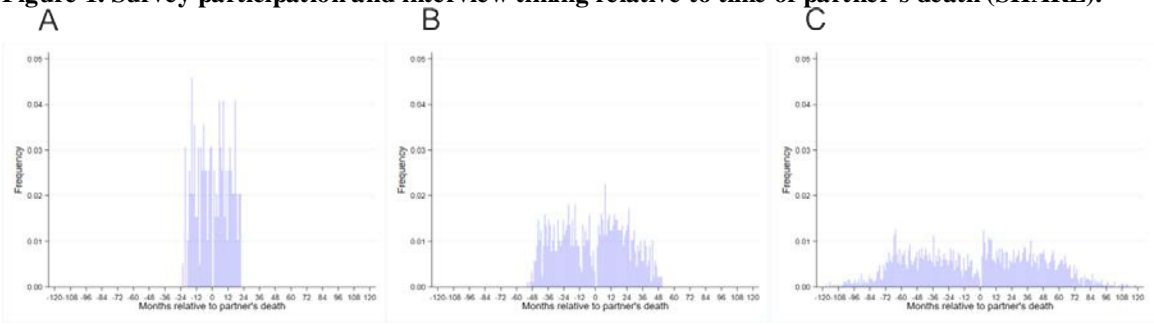
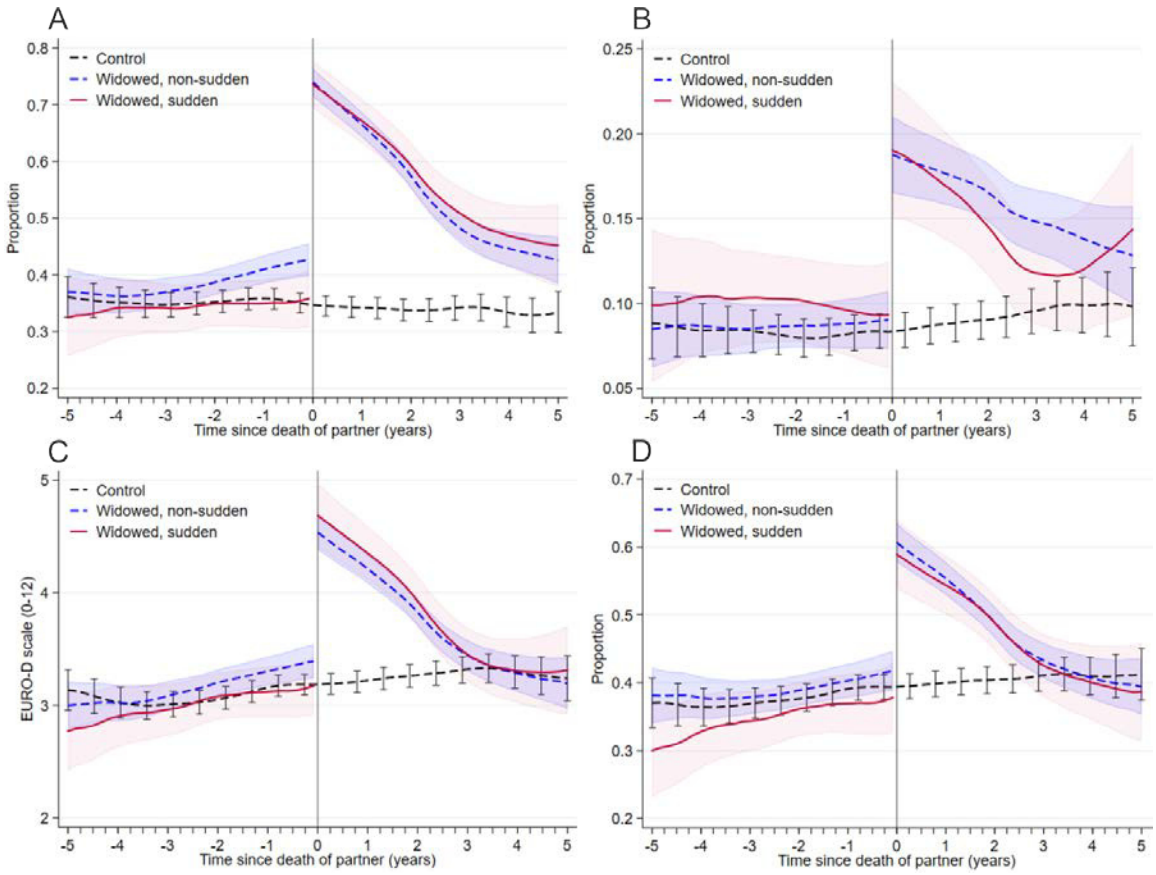
Figures

Figure 1. Survey participation and interview timing relative to time of partner's death (SHARE).



Source: own calculations based on SHARE data.
Note: Number of months between the first and the last interview in the survey (sample used for the analysis of life satisfaction): (A) 0-24 months: 98 observations. (B) 25-60 months: 441 observations. (C) More than 60 months: 2537 observations. Negative values represent time before the death of partner; positive values – the months after the death of partner.

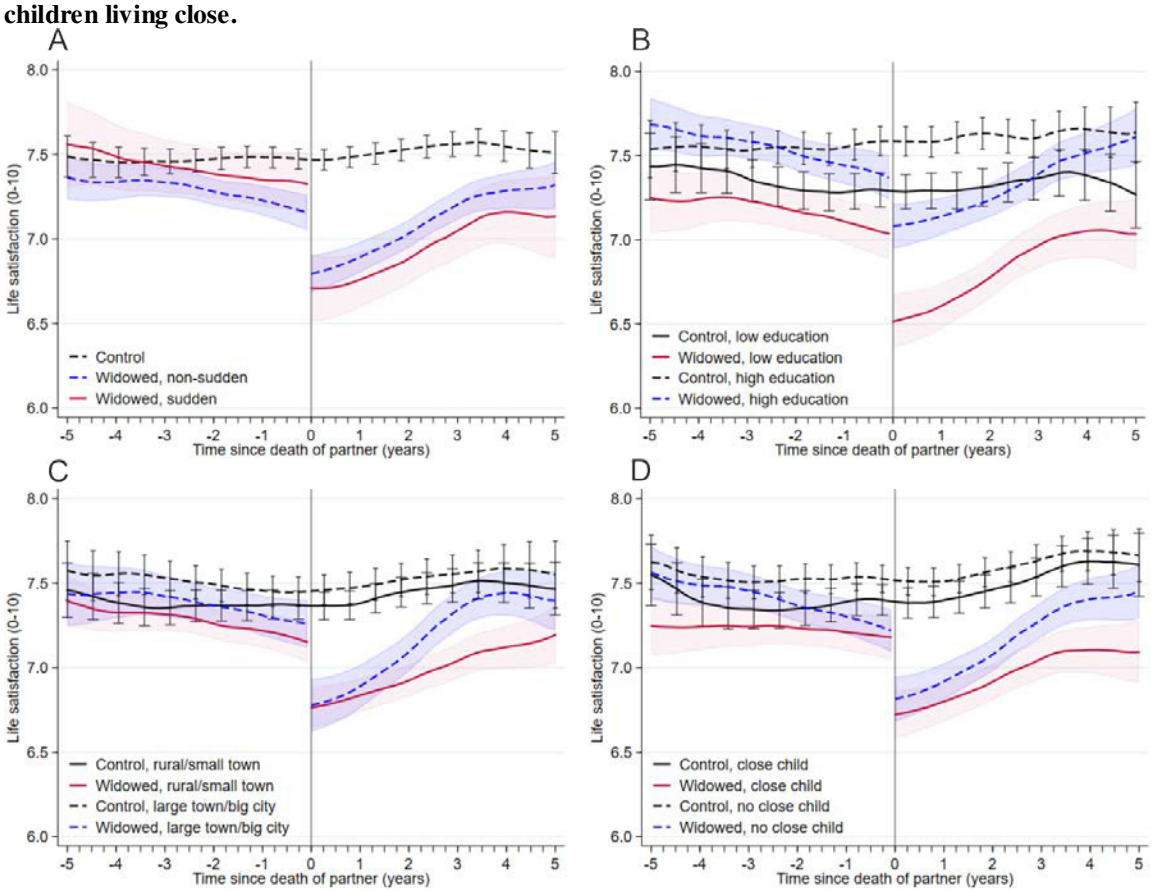
Figure 2. Depressive symptoms before and after partner's death. In the last month: (A) "cried at all"; (B) "felt that would rather be dead". EURO-D depression scale: (C) Number of symptoms (0-12); (D) Depression risk (4+ symptoms).



Source: own calculations based on SHARE data.

Note: Number of individuals for control/non-sudden/sudden samples = A: 2288/1725/563; B: 2284/1722/562, C, D: 2258/1704/554. Each individual is observed at least twice—before and after partner's death (actual or imputed for controls).

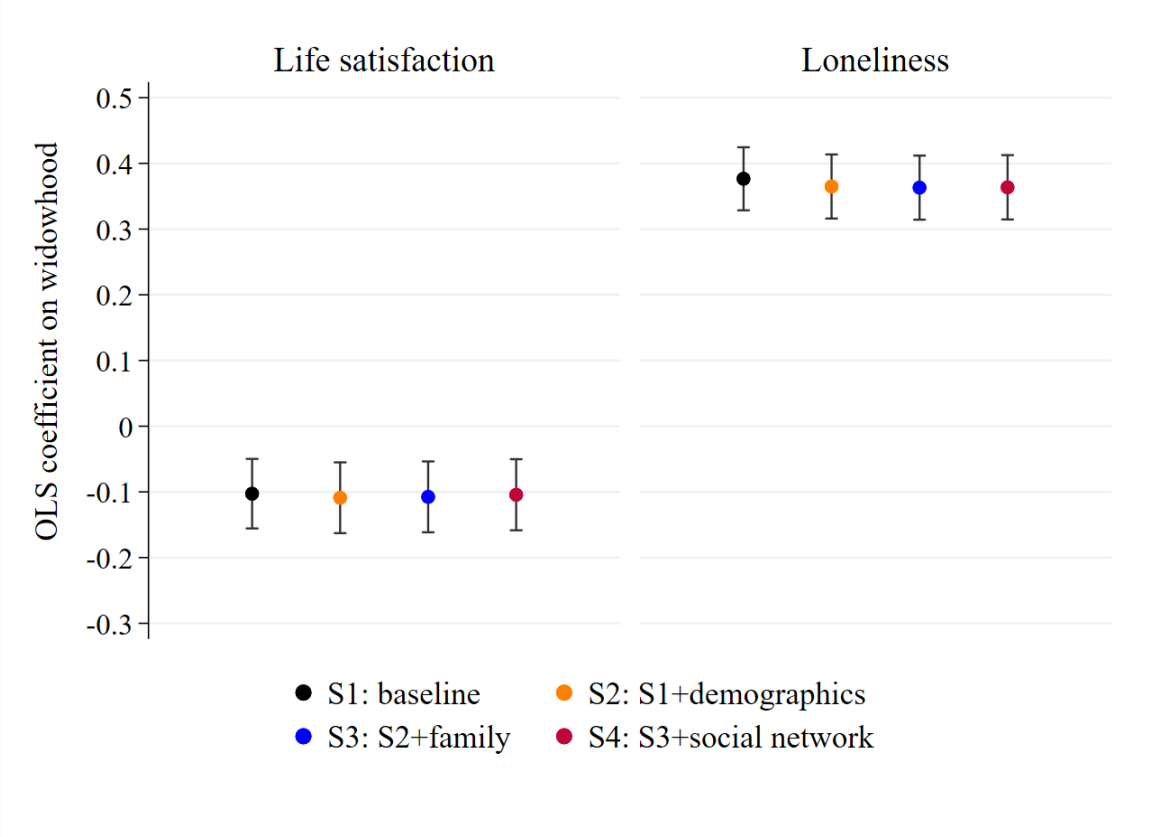
Figure 3. Life satisfaction before and after partner's death. (A) Widows due to sudden and non-sudden death. (B) Widows by education status. (C) Widows by residence status. (D) Widows with and without children living close.



Source: own calculations based on SHARE data.

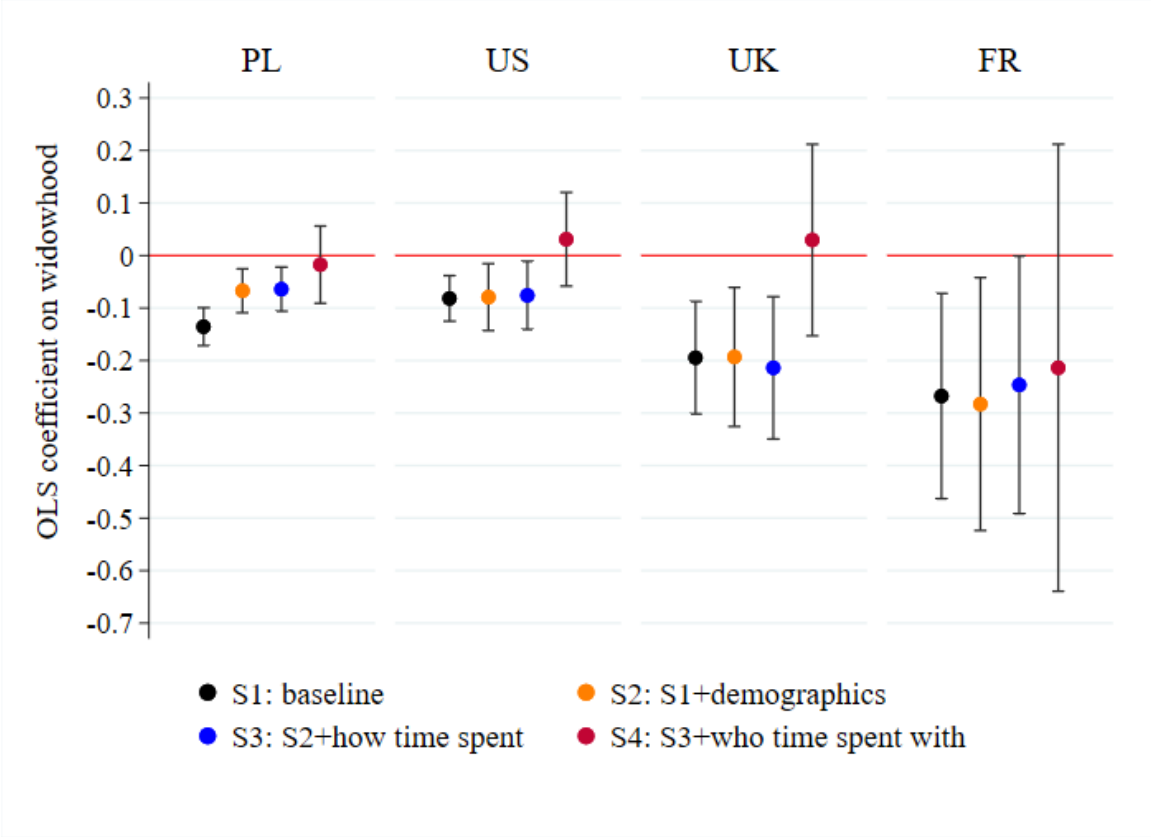
Note: Life satisfaction on a 10-0 scale. (B) Low education: no education, primary education or still in school; high education: upper secondary education or higher; lower secondary education left out. (C) Rural/small town: rural areas and small towns. (D) Close child: one or more in same household/building or less than 1 km away, contacts at least once weekly. Number of individuals in the samples sequenced as in the legends = A: 2814/2142/672; B: 1042/1065/1227/1188; C: 1530/1590/1275/1215; D: 1290/1333/1506/1463. Each individual is observed at least twice—before and after partner's death (actual or imputed for controls).

Figure 4. Widowhood, life satisfaction, and loneliness: family and the social network in the SHARE survey.



Source: own calculations based on SHARE data.
Note: OLS regressions on widowhood indicator (coefficients with 95% confidence intervals). Life satisfaction=1 if ≥8 on a 10-0 scale. Loneliness=1 if felt lonely often or some of the time. Specifications 1-4 include country controls, Specifications 2-4 add interview month, age, education, health, residence, home ownership; Specifications 3-4 add number of children, contact/distance to children; Specification 4 adds social network. Complete results of the regressions in all specifications are available in Tables S4-S5 in the Supplementary Material. Number of individuals = 3056.

Figure 5. Time use and life satisfaction in Poland, the U.S., the U.K. and France.



Source: own calculations based on Polish (2013), American (2012-2013), United Kingdom (2014-2015), French (2010) Time Use Survey data.

Note: OLS regressions on widowhood indicator (coefficients with 95% confidence intervals). Life satisfaction=1 if ≥4 on a 5-1 scale (PL), ≥8 on a 10-0 scale (U.S), ≥6 on a 7-1 scale (U.K.), and ≥7 on a 10-0 scale (FR). Specifications 2-4 add date and weekday of interview, age, education, income, and some additional controls depending on country; Specifications 3-4 add time spent in each activity; Specification 4 adds who with the time was spent. Complete results of the regressions in all specifications are available in Tables S6-S9 in the Supplementary Material. Number of observations in the PL/U.S./U.K./FR sample = 5291/888/276/206. Countries ordered according to the size of the sample and respectively CIs.

Tables

Table 1. Final matched sample of widows (SHARE).

	Sample for mental health analysis				Sample for life satisfaction analysis			
	Number of widows in sample		Average time (months) between partner's death and..		Number of widows in sample		Average time (months) between partner's death and..	
Country	*Non-sudden*	*Sudden*	..initial obs.	..final obs.	*Non-sudden*	*Sudden*	..initial obs.	..final obs.
Austria	81	26	51.44	50.93	113	33	53.04	40.31
Belgium	147	35	62.22	56.38	162	36	61.35	51.61
Croatia	..	..	..	..	16	13	8.69	11.79
Czech Republic	139	54	40.77	45.81	179	68	42.13	39.86
Denmark	105	28	63.77	53.02	122	33	61.33	47.92
Estonia	139	55	28.71	42.45	222	89	41.25	31.51
France	126	30	62.04	55.73	152	33	61.75	47.39
Germany	81	27	60.30	49.18	114	34	55.41	39.06
Greece	80	67	86.47	53.87	101	77	79.44	48.51
Israel	92	21	56.48	62.34	119	21	63.46	52.74
Italy	171	57	72.75	48.91	197	63	68.91	45.94
Luxembourg	4	1	11.20	27.20	18	2	20.55	19.50
Netherlands	72	27	45.75	48.63	72	27	45.94	48.42
Poland	105	36	58.91	52.07	107	37	59.19	51.35
Portugal	17	5	26.64	55.23	43	10	46.66	36.36
Slovenia	29	7	23.89	39.36	81	18	35.49	24.03
Spain	215	68	60.64	51.42	303	88	57.39	44.91
Sweden	134	26	70.12	64.77	153	28	66.96	61.65
Switzerland	54	20	59.11	46.62	66	26	58.65	38.79
Total	1791	590	57.84	51.76	2340	736	56.20	43.95

Source: own calculations based on SHARE data.

Note: Since in wave 7 mental health outcomes were not collected from all participants, we use different samples of widows for the analyses focused on these outcomes and for the analyses focused on life satisfaction. For each of these samples we also conduct a separate matching procedure using different gross samples of partnered women, as described in the text. Countries in the table are ordered alphabetically. Two other countries collected data in at least two waves of SHARE but were not taken into account in the analysis: Hungary and Ireland. In Hungary data was collected in waves 4 and 7, however due to the long interval between them a relatively small proportion of respondents from wave 4 participated in the latter wave. Ireland participated only in waves 2 and 3, and in the latter collected only life history information.

Table 2. Descriptive statistics of the sub-sample in the social network analysis (SHARE).

	n = 3056	
Marital status in latter wave (%)		
- Widowed	316	(10.3%)
- Other	2740	(89.7%)
Life satisfaction (10-0 scale) in latter wave (%)		
- Satisfied (8-10 points)	1984	(64.9%)
- Not satisfied (0-7 points)	1072	(35.1%)
Loneliness in latter wave (%)		
- Feeling lonely often or some of the time	785	(25.7%)
- Feeling lonely hardly ever or never	2271	(74.3%)
Mean age in latter wave (SD)	76.15	(4.58)
Education (%)		
- Primary or less	1026	(33.6%)
- Secondary and post-secondary non-tertiary	1504	(49.2%)
- Tertiary	493	(16.1%)
- Other	33	(1.1%)
Area of living in initial wave (%)		
- A big city	436	(14.3%)
- The suburbs or outskirts of a big city	274	(9.0%)
- A large town	476	(15.6%)
- A small town	782	(25.6%)
- A rural area or village	1088	(35.6%)
House ownership in initial wave (%)		
- Owner	2493	(81.6%)
- Member of a cooperative	57	(1.9%)
- Tenant or subtenant	279	(9.1%)
- Rent free	227	(7.4%)
Self-reported health in initial wave (%)		
- Excellent	121	(4.0%)
- Very good	386	(12.6%)
- Good	1102	(36.1%)
- Fair	1064	(34.8%)
- Poor	383	(12.5%)
Number of children alive in initial wave (%)		
- No children	138	(4.5%)
- 1 child	503	(16.5%)
- 2 children	1272	(41.6%)
- 3+ children	1143	(37.4%)
Distance and freq. of contact with child. in initial wave (%)		
- No children	138	(4.5%)
- Same household	467	(15.3%)
- Same building or less than 1km and contact every day	619	(20.3%)
- Between 1-5km and contact every day	213	(7.0%)
- Less than 5km and contact less often	640	(20.9%)
- Further than 5km and contact every day	229	(7.5%)
- Further than 5km and contact more than once a week	418	(13.7%)
- Further than 5km and contact less often	332	(10.9%)
Size of the social network in initial wave (%)		
- Empty	44	(1.4%)
- 1-7 people	3012	(98.6%)
Partner named in social network in initial wave (%)		
- Yes	2128	(69.6%)
- No	928	(30.4%)
Child named in social network in initial wave (%)		
- Yes	1695	(55.5%)
- No	1361	(44.5%)
Friend named in social network in initial wave (%)		
- Yes	618	(20.2%)
- No	2438	(79.8%)
Satisfaction with social network (10-0 scale) in initial wave (%)		
- Satisfied (10 points)	1422	(46.5%)
- Not satisfied (0-9 points)	1634	(53.5%)

Source: own calculations based on SHARE data.

Table 3. Time use: widows compared to married women.

	Polish Time Use Survey		American Time Use Survey (ATUS)		United Kingdom Time Use Survey (UKTUS)		French Time Use Survey	
	Mean	**(s.e.)**	**Mean**	**(s.e.)**	**Mean**	**(s.e.)**	**Mean**	**(s.e.)**
How time is spent: difference in time spent per week (hours):								
- Home production	-5.16	(0.71)	-5.78	(0.67)	-2.22	(1.45)	-4.66	(1.06)
- Sleep	0.92	(0.49)	1.30	(0.50)	-2.13	(1.07)	0.38	(0.95)
- Other personal	-0.31	(0.33)	-0.18	(0.40)	-0.71	(0.90)	-3.16	(0.75)
- TV watching	0.59	(0.56)	3.05	(0.73)	-1.00	(1.56)	1.55	(1.02)
- Other leisure	3.96	(0.66)	1.60	(0.77)	6.04	(1.52)	5.89	(1.06)
Who time is spent with: difference in proportion of time spent (%):								
- With spouse	-53.04	(5.05)	-50.67	(5.55)	-68.52	(23.15)	-55.09	(7.02)
- Alone	37.93	(5.76)	36.95	(6.58)	57.67	(29.81)	38.18	(10.00)
- With others	15.11	(3.80)	13.72	(4.07)	10.85	(28.25)	16.91	(6.38)
Number of observations (diaries)	5291		4124		634		2174	
Number of individuals	2668		4124		634		1093	

Source: own calculations based on American, French, Polish and United Kingdom Time Use Survey data.
Note: Samples include all women aged 70+ for whom necessary control variables were available. Differences controlling for year and month of interview, age, education, and income. For Polish Time Use Survey 2013 controlling also for day of the week, region, size of city, immigrant status, and income squared, and, if available, diaries from two different days included per person. For ATUS data controlling also for census region, rural location, immigrant status, race/ethnicity and health status, and computed on observations from years 2006-2008, 2010-2014, 2016 for which all control information is available. For French Time Use Survey 2010 controlling also for region, size of city, income squared, general health, type of home ownership, and, if available, diaries from two different days included per person. For UKTUS data computed for years 2014-2015.

Table 4. Time Use Survey sub-samples: descriptive statistics.

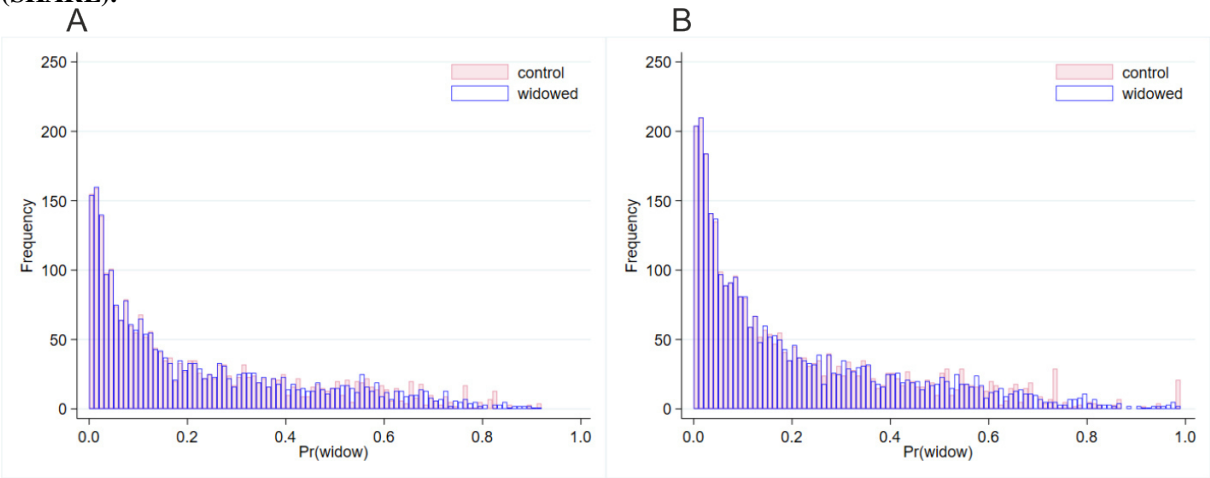
	Polish Time Use Survey		American Time Use Survey (ATUS)		United Kingdom Time Use Survey (UKTUS)		French Time Use Survey	
Number of individuals	2668		888		276		103	
Marital status (%):								
- Widowed	1897	(71.1%)	462	(52.0%)	129	(46.6%)	52	(50.5%)
- Other	771	(28.9%)	426	(48.0%)	147	(53.4%)	51	(49.5%)
Life satisfaction (%):								
- Satisfied	1889	(70.8%)	599	(67.4%)	192	(69.7%)	73	(71.1%)
- Not satisfied	779	(29.2%)	289	(32.6%)	84	(30.3%)	30	(28.9%)
Mean age (SD)	77.10	(5.30)	77.26	(4.54)	77.34	(5.18)	78.64	(5.77)
Mean family income per year (SD)	19092 PLN	(8570 PLN)	$41075	($36430)	£28978	(£75087)	16236 EUR	(6865 EUR)
Number of diaries	5291		888		276		206	
Mean time (hours/day) spent on (SD):								
- Home production	4.47	(2.39)	4.04	(3.01)	5.30	(2.36)	4.33	(2.34)
- Sleep	9.60	(1.57)	9.06	(2.09)	8.74	(1.80)	8.93	(1.80)
- Other personal	2.98	(1.09)	2.23	(1.52)	3.27	(1.33)	3.73	(1.66)
- TV watching	3.14	(1.86)	4.22	(3.16)	3.14	(2.36)	2.68	(1.83)
- Other leisure	3.82	(2.26)	4.45	(3.29)	3.55	(2.36)	4.33	(2.01)
Mean time (hours/day) spent (SD):								
- Alone	9.73	(4.05)	7.93	(4.81)	10.18	(8.46)	7.99	(4.84)
- With others (non-spouse)	2.40	(2.74)	1.98	(3.00)	3.73	(6.99)	1.94	(2.89)
- With spouse (married only)	7.84	(3.58)	6.42	(4.23)	15.28	(6.64)	8.42	(3.52)

Source: own calculations based on Polish (2013), American (2012-2013), United Kingdom (2014-2015), French (2010) Time Use Survey data.

Note: 'Satisfied with life' = 1 if >3 on a 5-1 scale in the Polish Time Use Survey, >7 on a 10-0 life satisfaction scale in the ATUS, >5 on a 7-1 scale in the UKTUS, and >6 on a 10-0 scale in the French Time Use Survey. Life satisfaction in ATUS was collected only in years 2012-2013; in UKTUS and French Time Use Survey it was collected only for a subsample of participants.

Supplementary material

Figure S1. Matching widowed and non-widowed individuals: distribution of the propensity score (SHARE).



Source: own calculations based on SHARE data.
Note: (A) Sample for the analysis of mental health outcomes: 2381 control/widowed observations. (B) Sample for the analysis of life satisfaction: 3076 control/widowed observations.

Table S1. Overall number of interviews in waves 1-7 of SHARE across countries.

Country	Wave1	Wave 2		Wave 3		Wave 4		Wave 5		Wave 6		Wave 7		
	Main	Main	EOL	SHARE-Life	EOL	Main	EOL	Main	EOL	Main	EOL	Main	SHARE-Life	EOL
Austria	1563	1197	36	999	50	5247	45	4378	178	3397	158	483	2723	179
Germany	2995	2628	52	1919	68	1619	54	5751	31	4412	99	836	2985	126
Sweden	3049	2796	63	1961	101	1969	182	4556	189	3906	176	1066	2131	151
Netherlands	2968	2683	49	2258	83	2789	61	4168	85	0	0	0	0	0
Spain	2316	2423	97	2271	138	3727	142	6693	268	5623	425	1280	3431	432
Italy	2552	2984	52	2528	92	3570	92	4745	152	5311	240	1570	3001	237
France	3122	2990	59	2500	112	5850	101	4506	144	3947	123	1143	2188	191
Denmark	1706	2630	50	2144	91	2287	121	4146	133	3733	181	1284	1962	164
Greece	2897	3412	50	3092	145	0	0	0	0	4928	350	1911	1161	272
Switzerland	997	1498	14	1324	26	3786	39	3049	65	2803	93	754	1648	86
Belgium	3810	3227	40	2865	104	5322	91	5637	152	5815	227	1567	3335	205
Israel	2449	2447	164	0	0	0	0	2599	195	2035	155	0	2132	124
Czech Rep.	0	2736	0	1817	67	5526	81	5640	223	4856	324	921	3298	293
Poland	0	2466	0	1939	94	1733	165	0	0	1826	195	1144	3559	113
Ireland	0	1035	0	855	36	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	0	0	1610	0	1564	18	0	1254	35
Hungary	0	0	0	0	0	3072	0	0	0	0	0	0	1538	300
Portugal	0	0	0	0	0	2013	0	0	0	1674	116	0	1282	88
Slovenia	0	0	0	0	0	2748	0	2958	52	4223	122	0	3691	191
Estonia	0	0	0	0	0	6863	0	5752	331	5638	368	0	5116	376
Croatia	0	0	0	0	0	0	0	0	0	2495	0	0	2408	101
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	2035	0
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	1998	0
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	1233	0
Finland	0	0	0	0	0	0	0	0	0	0	0	0	2007	0
Latvia	0	0	0	0	0	0	0	0	0	0	0	0	1734	0
Malta	0	0	0	0	0	0	0	0	0	0	0	0	1261	0
Romania	0	0	0	0	0	0	0	0	0	0	0	0	2114	0
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0	2077	0
Total	30424	37152	726	28472	1207	58121	1174	66188	2198	68186	3370	13959	63302	3664

Source: own compilation based on SHARE data.

Note: Main – regular interview; EOL – *end-of-life* interview conducted for a deceased participant from previous wave(s); SHARE-Life – an interview capturing participant's life history. Participants in wave 7 are split between regular interviews (main) and SHARE-Life interviews. Countries ordered based on their first participation and SHARE ordering scheme.

Table S2. Balancing table for final matched samples for the analysis of mental health outcomes and the analysis of life satisfaction (SHARE).

	Sample for Figures 2A-D				Sample for Figures 3A-D			
	Mean value control	**Mean value widowed**	**t**	**p**	**Mean value control**	**Mean value widowed**	**t**	**p**
Time btw. before/after interview	41.03	41.49	-0.66	0.51	38.48	39.23	-1.28	0.20
Age (initial wave)	69.84	70.19	-1.41	0.16	70.31	70.56	-1.15	0.25
Education:								
- Primary or less	0.41	0.41	-0.06	0.95	0.39	0.40	-0.52	0.60
- Secondary and post-secondary non-tertiary	0.46	0.46	-0.20	0.84	0.47	0.47	-0.49	0.63
- Tertiary	0.11	0.11	-0.05	0.96	0.12	0.12	0.94	0.35
- Other	0.02	0.02	1.22	0.22	0.02	0.01	1.66	0.10
Country:								
- Austria	0.04	0.04	0.00	1.00	0.05	0.05	0.00	1.00
- Germany	0.05	0.05	0.00	1.00	0.05	0.05	0.00	1.00
- Sweden	0.07	0.07	0.00	1.00	0.06	0.06	0.00	1.00
- Netherlands	0.04	0.04	0.00	1.00	0.03	0.03	0.00	1.00
- Spain	0.11	0.11	0.00	1.00	0.12	0.12	0.00	1.00
- Italy	0.10	0.10	0.00	1.00	0.08	0.08	0.00	1.00
- France	0.06	0.06	0.00	1.00	0.06	0.06	0.00	1.00
- Denmark	0.06	0.06	0.00	1.00	0.05	0.05	0.00	1.00
- Greece	0.06	0.06	0.00	1.00	0.06	0.06	0.00	1.00
- Switzerland	0.03	0.03	0.00	1.00	0.03	0.03	0.00	1.00
- Belgium	0.08	0.08	0.00	1.00	0.06	0.06	0.00	1.00
- Israel	0.05	0.05	0.00	1.00	0.05	0.05	0.00	1.00
- Czech Republic	0.08	0.08	0.00	1.00	0.08	0.08	0.00	1.00
- Poland	0.06	0.06	0.00	1.00	0.05	0.05	0.00	1.00
- Luxembourg	0.00	0.00	0.00	1.00	0.01	0.01	0.00	1.00
- Portugal	0.01	0.01	0.00	1.00	0.02	0.02	0.00	1.00
- Slovenia	0.02	0.02	0.00	1.00	0.03	0.03	0.00	1.00
- Estonia	0.08	0.08	0.00	1.00	0.10	0.10	0.00	1.00
- Croatia	..	..	..	..	0.01	0.01	0.00	1.00
Initial interview wave:								
- Wave 1	0.12	0.12	-0.09	0.93	0.09	0.09	-0.35	0.72
- Wave 2	0.29	0.29	0.29	0.77	0.22	0.23	-0.92	0.36
- Wave 4	0.23	0.23	-0.41	0.68	0.18	0.19	-0.78	0.43
- Wave 5	0.25	0.25	-0.50	0.62	0.23	0.23	0.09	0.93
- Wave 6	0.11	0.11	0.93	0.35	0.26	0.26	1.70	0.09
Area of living (initial wave):								
- A big city	0.16	0.16	0.20	0.85	0.17	0.17	0.37	0.71
- Suburbs or a large town	0.28	0.28	-0.16	0.87	0.25	0.26	-1.43	0.15
- A small town or rural	0.55	0.55	-0.03	0.98	0.57	0.56	1.00	0.32
- Missing	0.01	0.01	0.19	0.85	0.01	0.01	-0.16	0.87
Place of living (initial wave):								
- A farm house	0.08	0.07	0.06	0.96	0.09	0.09	0.32	0.75
- 1-2 family house free-stand./row	0.57	0.57	0.06	0.95	0.55	0.55	0.08	0.94
- A bldg with 3-8 flats	0.13	0.13	-0.13	0.90	0.13	0.13	-0.19	0.85
- A bldg with 9+ flats, up to 9 floors	0.18	0.19	-0.41	0.68	0.19	0.19	-0.81	0.42
- A high-rise with 9+ floors	0.03	0.03	1.01	0.31	0.03	0.03	0.95	0.34
- Missing	0.01	0.01	-0.15	0.88	0.01	0.01	0.89	0.38
Number of children alive (initial wave):								
- No children	0.05	0.05	0.00	1.00	0.05	0.05	0.80	0.42
- 1 child	0.18	0.17	0.91	0.36	0.18	0.18	-0.27	0.79
- 2 children	0.36	0.39	-2.09	0.04	0.37	0.39	-1.86	0.06
- 3+ children	0.41	0.39	1.36	0.17	0.40	0.38	1.70	0.09
Number of grandchildren (initial wave):								
- No grandchildren	0.17	0.17	0.19	0.85	0.16	0.16	-0.77	0.44
- 1 grandchild	0.09	0.10	-0.68	0.49	0.09	0.10	-1.45	0.15
- 2 grandchildren	0.17	0.15	1.65	0.10	0.17	0.16	1.62	0.11
- 3+ grandchildren	0.57	0.58	-0.91	0.36	0.58	0.58	0.31	0.76
Age at first birth:								
- First child at age <25	0.52	0.52	-0.12	0.91	0.55	0.53	1.46	0.14
- First child at age 25+	0.40	0.40	-0.03	0.98	0.38	0.39	-1.60	0.11

- Ever had children, age unknown	0.04	0.04	0.15	0.88	0.03	0.04	-0.76	0.45
- Never had any children	0.04	0.04	0.23	0.82	0.04	0.04	0.98	0.33
Respondent's health in childhood								
- Excellent/very good	0.64	0.63	1.20	0.23	0.61	0.61	0.63	0.53
- Good	0.27	0.27	-0.49	0.62	0.29	0.28	0.17	0.87
- Fair	0.07	0.07	-1.31	0.19	0.08	0.08	-0.70	0.48
- Poor	0.02	0.02	0.19	0.85	0.02	0.03	-0.81	0.42
- Health varied a great deal	0.00	0.01	-0.63	0.53	0.00	0.00	-0.20	0.84
Respondent had a psychiatric problem as a child	0.01	0.01	0.27	0.78	0.01	0.01	-0.92	0.36
Partner's age (initial wave)	73.77	74.04	-1.05	0.29	74.27	74.42	-0.66	0.51
Partner's education:								
- Primary or less	0.38	0.38	-0.27	0.79	0.36	0.37	-0.34	0.73
- Secondary and post-secondary non-tertiary	0.45	0.45	-0.03	0.98	0.46	0.47	-0.64	0.52
- Tertiary	0.14	0.15	-0.46	0.65	0.15	0.14	0.33	0.74
- Other	0.03	0.02	2.02	0.04	0.03	0.02	2.52	0.01
Partner's health (initial wave):								
- Excellent	0.02	0.02	-0.59	0.55	0.02	0.02	-0.18	0.86
- Very good	0.08	0.07	1.94	0.05	0.06	0.06	-0.65	0.52
- Good	0.21	0.21	0.07	0.94	0.20	0.20	-1.19	0.23
- Fair	0.33	0.34	-0.71	0.48	0.35	0.34	0.83	0.41
- Poor	0.35	0.35	-0.27	0.78	0.38	0.37	0.45	0.65
- Missing	0.01	0.01	0.20	0.84	0.01	0.01	0.54	0.59
Partner's BMI category (initial wave):								
- Underweight	0.01	0.02	-0.59	0.56	0.02	0.02	0.55	0.58
- Normal weight	0.39	0.38	0.62	0.53	0.36	0.38	-1.61	0.11
- Overweight	0.40	0.42	-1.18	0.24	0.42	0.41	0.31	0.76
- Obese	0.18	0.17	0.57	0.57	0.18	0.17	0.96	0.34
- Missing	0.02	0.01	1.09	0.28	0.02	0.02	1.27	0.20
Partner's smoking behavior (initial wave):								
- Never smoked	0.31	0.32	-0.41	0.68	0.33	0.33	0.19	0.85
- Smoked up to 16 years	0.09	0.10	-1.13	0.26	0.10	0.10	-0.08	0.93
- Smoked 16-30 years	0.16	0.17	-1.09	0.27	0.16	0.16	-1.27	0.20
- Smoked over 30 years	0.41	0.39	1.51	0.13	0.38	0.39	-0.42	0.67
- Missing	0.03	0.02	1.24	0.22	0.03	0.02	3.78	0.00
Partner never had siblings	0.11	0.10	0.24	0.81	0.11	0.10	0.58	0.56
Partner's father's alive or age at death:								
- Dead age <50	0.10	0.10	0.87	0.39	0.08	0.09	-2.18	0.03
- Dead age 50-60	0.10	0.10	0.75	0.45	0.10	0.09	0.87	0.38
- Dead age 60-64	0.08	0.07	0.44	0.66	0.09	0.08	1.26	0.21
- Dead age 65-79	0.37	0.36	0.42	0.67	0.38	0.36	1.43	0.15
- Dead age 80-84	0.14	0.14	0.00	1.00	0.12	0.14	-1.37	0.17
- Dead age 85-89	0.08	0.09	-1.02	0.31	0.08	0.09	-0.95	0.34
- Dead age 90+	0.05	0.06	-1.80	0.07	0.06	0.06	0.16	0.87
- Dead unknown age	0.04	0.04	-0.73	0.47	0.05	0.05	0.11	0.91
- Alive	0.02	0.02	0.11	0.91	0.02	0.02	-0.10	0.92
- Missing	0.02	0.02	0.20	0.84	0.02	0.02	0.00	1.00
Partner had been diagnosed before age 45 with:								
- High blood pressure	0.06	0.06	1.09	0.27	0.05	0.06	-0.79	0.43
- Stroke	0.00	0.00	-0.22	0.83	0.01	0.00	0.73	0.46
- Diabetes	0.02	0.02	0.53	0.59	0.02	0.02	-0.10	0.92
- Stomach or duodenal ulcer	0.03	0.03	-0.81	0.42	0.04	0.04	0.41	0.68
- Hip fracture	0.00	0.00	-1.73	0.08	0.00	0.00	-0.66	0.51
- Arthritis	0.03	0.03	0.00	1.00	0.03	0.03	-0.55	0.59
Observations	2381	2381			3076	3076		

Source: own calculations based on SHARE data.

Note: Missing categories - due to different item non-response between variables employed in the matching procedure, we used a separate, additional category to account for missing information in each case.

Table S3. Information on specific survey questions analyzed in the paper.

Measure	Survey, wave	Question text
EURO-D depression scale (1 means having a specific symptom, 0 otherwise)	SHARE, waves 1-2, 4-7	What are your hopes for the future? 0. Any hopes mentioned 1. No hopes mentioned In the last month, have you felt that you would rather be dead? 1. Any mention of suicidal feelings or wishing to be dead 0. No such feelings Do you tend to blame yourself or feel guilty about anything? 1. Obvious excessive guilt or self-blame 0. No such feelings Have you had trouble sleeping recently? 1. Trouble with sleep or recent change in pattern 0. No trouble sleeping In the last month, what is your interest in things? 1. Less interest than usual mentioned 0. No mention of loss of interest Have you been irritable recently? 1. Yes 0. No What has your appetite been like? 1. Diminution in desire for food 0. No diminution in desire for food In the last month, have you had too little energy to do the things you wanted to do? 1. Yes 0. No How is your concentration? For example, can you concentrate on a television programme, film or radio programme? 1. Difficulty in concentrating on entertainment 0. No such difficulty mentioned Can you concentrate on something you read? 1. Difficulty in concentrating on reading 0. No such difficulty mentioned What have you enjoyed doing recently? 1. Fails to mention any enjoyable activity 0. Mentions any enjoyment from activity In the last month, have you cried at all? 1. Yes 0. No
Life satisfaction	SHARE, wave 1*	How satisfied are you with your life in general? 1. Very satisfied 2. Somewhat satisfied 3. Somewhat dissatisfied 4. Very dissatisfied
	SHARE, waves 2, 4-7	On a scale from 0 to 10 where 0 means completely dissatisfied and 10 means completely satisfied, how satisfied are you with your life?
	American Time Use Survey 2012-2013	Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?
	French Time Use Survey 2010	All things considered, how satisfied would you say you are with your current life in general? Please rate your feelings using a scale of 1 to 10 where 1 means "Very dissatisfied" and 10 means "Very satisfied".
	Polish Time Use Survey 2013	How satisfied are you with your life in general? On a scale of 5-1 (very dissatisfied – very satisfied).
	United Kingdom Time Use Survey 2014-2015	How dissatisfied or satisfied would you say you are with your life overall? On a scale of 7-0
Loneliness	SHARE, wave 6	How much of the time do you feel lonely 1. Often 2. Some of the time 3. Hardly ever or never

Source: Own compilation based on questionnaires from SHARE survey and American, French, Polish and United Kingdom Time Use Surveys.

Note: * These answers were translated into the 10-0 scale based on comparable sample proportions. 'Very satisfied': 10-9, 'Somewhat satisfied': 8-7, 'Somewhat dissatisfied': 6-4 and 'Very dissatisfied': 3 or less.

Table S4. Results of the OLS regression on indicator of life satisfaction (SHARE).

	Specification 1		Specification 2		Specification 3		Specification 4	
	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)
Widow	-0.1027	(0.0270)	-0.1089	(0.0275)	-0.1076	(0.0275)	-0.1043	(0.0276)
Age (ref: 70-74)								
- 75-79			0.0308	(0.0189)	0.0282	(0.0189)	0.0305	(0.0189)
- 80-84			0.0847	(0.0245)	0.0819	(0.0245)	0.0831	(0.0245)
- 85+			0.0639	(0.0395)	0.0621	(0.0396)	0.0654	(0.0396)
Education (ref: Primary or less)								
- Secondary and post-secondary non-tertiary			0.0356	(0.0190)	0.0376	(0.0194)	0.0363	(0.0194)
- Tertiary			0.0285	(0.0260)	0.0287	(0.0266)	0.0212	(0.0267)
- Other			0.0828	(0.0804)	0.0809	(0.0805)	0.0795	(0.0803)
Area of living (ref: A rural area)								
- A big city			-0.0136	(0.0270)	-0.0057	(0.0273)	-0.0067	(0.0273)
- Suburbs			0.0311	(0.0311)	0.0373	(0.0313)	0.0359	(0.0312)
- A large town			0.0006	(0.0255)	0.0035	(0.0258)	0.0054	(0.0258)
- A small town			0.0566	(0.0215)	0.0561	(0.0216)	0.0581	(0.0216)
House ownership (ref: Owner)								
- Member of a cooperative			0.0981	(0.0618)	0.0944	(0.0619)	0.0874	(0.0618)
- Tenant			0.0157	(0.0301)	0.0146	(0.0302)	0.0118	(0.0302)
- Subtenant			0.1602	(0.1441)	0.1639	(0.1442)	0.1636	(0.1440)
- Rent free			0.0438	(0.0320)	0.0419	(0.0322)	0.0406	(0.0321)
Health (ref: Poor)								
- Excellent			0.4442	(0.0483)	0.4426	(0.0486)	0.4275	(0.0486)
- Very good			0.4279	(0.0338)	0.4234	(0.0339)	0.4165	(0.0339)
- Good			0.3340	(0.0274)	0.3327	(0.0275)	0.3304	(0.0275)
- Fair			0.1657	(0.0272)	0.1682	(0.0272)	0.1665	(0.0272)
Number of children alive (ref: No children)								
- 1 child					-0.0287	(0.0487)	-0.0206	(0.0498)
- 2 children					-0.0090	(0.0458)	0.0001	(0.0471)
- 3+ children					0.0208	(0.0453)	0.0297	(0.0467)
Distance and frequency of contact with children (ref: Same household)								
- Same building or less than 1km and contact every day					0.0271	(0.0280)	0.0217	(0.0280)
- Between 1-5km and contact every day					0.0134	(0.0380)	0.0085	(0.0380)
- Less than 5km and contact less often					0.0359	(0.0283)	0.0385	(0.0283)
- Further than 5km and contact every day					-0.0229	(0.0373)	-0.0252	(0.0373)
- Further than 5km and contact more than once a week					0.0436	(0.0318)	0.0421	(0.0317)
- Further than 5km and contact less often					-0.0090	(0.0339)	-0.0099	(0.0342)
Characteristics of the social network (SN, dummies)*:								
Empty SN							0.0821	(0.0713)
Partner in SN							0.0517	(0.0188)
Child in SN							-0.0062	(0.0177)
Friend in SN							0.0425	(0.0211)
Satisfied with SN							0.0457	(0.0169)
Constant	0.7403	(0.0447)	0.2783	(0.0478)	0.2614	(0.0614)	0.1904	(0.0637)
N	3056		3056		3056		3056	
R^2	0.1092		0.1085		0.1120		0.1176	

Source: own calculations based on SHARE data.

Notes: 'Satisfied with life' = 1 if >7 on a 10-0 scale. In addition to variables listed in the Table, Specifications 1-4 control for country, and Specifications 2-4 for month of interview. * SN – social network.

Table S5. Results of the OLS regression on indicator of feeling lonely (SHARE).

	Specification 1		Specification 2		Specification 3		Specification 4	
	Coeff.	(s.e.)	Coeff.	(s.e.)	Coeff.	(s.e.)	Coeff.	(s.e.)
Widow	0.3766	(0.0245)	0.3648	(0.0249)	0.3631	(0.0249)	0.3636	(0.0250)
Age (ref: 70-74)								
- 75-79			0.0240	(0.0171)	0.0242	(0.0171)	0.0227	(0.0171)
- 80-84			-0.0068	(0.0221)	-0.0081	(0.0222)	-0.0076	(0.0222)
- 85+			0.0241	(0.0357)	0.0179	(0.0358)	0.0164	(0.0358)
Education (ref: Primary or less)								
- Secondary and post-secondary non-tertiary			-0.1125	(0.0171)	-0.1154	(0.0175)	-0.1151	(0.0176)
- Tertiary			-0.1211	(0.0235)	-0.1235	(0.0240)	-0.1218	(0.0242)
- Other			0.0026	(0.0727)	0.0035	(0.0727)	0.0083	(0.0727)
Area of living (ref: A rural area)								
- A big city			0.0379	(0.0244)	0.0361	(0.0247)	0.0354	(0.0247)
- Suburbs			0.0048	(0.0282)	0.0016	(0.0283)	0.0033	(0.0283)
- A large town			0.0032	(0.0231)	0.0026	(0.0233)	0.0017	(0.0233)
- A small town			-0.0189	(0.0195)	-0.0170	(0.0195)	-0.0169	(0.0196)
House ownership (ref: Owner)								
- Member of a cooperative			-0.0901	(0.0559)	-0.0985	(0.0560)	-0.0933	(0.0559)
- Tenant			-0.0362	(0.0272)	-0.0409	(0.0273)	-0.0405	(0.0273)
- Subtenant			0.0347	(0.1303)	0.0258	(0.1304)	0.0176	(0.1303)
- Rent free			0.0334	(0.0289)	0.0430	(0.0291)	0.0448	(0.0291)
Health (ref: Poor)								
- Excellent			-0.2648	(0.0437)	-0.2690	(0.0439)	-0.2576	(0.0440)
- Very good			-0.1702	(0.0306)	-0.1742	(0.0307)	-0.1706	(0.0307)
- Good			-0.1527	(0.0248)	-0.1568	(0.0249)	-0.1567	(0.0249)
- Fair			-0.0649	(0.0246)	-0.0660	(0.0246)	-0.0658	(0.0246)
Number of children alive (ref: No children)								
- 1 child					-0.0283	(0.0440)	-0.0297	(0.0451)
- 2 children					-0.0411	(0.0414)	-0.0416	(0.0426)
- 3+ children					-0.0276	(0.0410)	-0.0284	(0.0423)
Distance and frequency of contact with children (ref: Same household)								
- Same building or less than 1km and contact every day					-0.0588	(0.0253)	-0.0566	(0.0253)
- Between 1-5km and contact every day					-0.0350	(0.0344)	-0.0328	(0.0344)
- Less than 5km and contact less often					0.0039	(0.0256)	-0.0001	(0.0256)
- Further than 5km and contact every day					0.0153	(0.0337)	0.0145	(0.0338)
- Further than 5km and contact more than once a week					-0.0331	(0.0287)	-0.0341	(0.0287)
- Further than 5km and contact less often					0.0147	(0.0307)	0.0121	(0.0310)
Characteristics of the social network (SN, dummies)*:								
Empty SN							0.0328	(0.0645)
Partner in SN							-0.0277	(0.0170)
Child in SN							-0.0013	(0.0160)
Friend in SN							0.0015	(0.0191)
Satisfied with SN							-0.0439	(0.0153)
Constant	0.0992	(0.0405)	0.3493	(0.0432)	0.3997	(0.0555)	0.4476	(0.0576)
N	3056		3056		3056		3056	
R^2	0.1266		0.1296		0.1341		0.1380	

Source: own calculations based on SHARE data.

Notes: 'Feeling lonely' if indicated experiencing loneliness often or some of the time. In addition to variables listed in the Table, Specifications 1-4 control for country, and Specifications 2-4 for month of interview. * SN – social network.

Table S6. Life satisfaction, time use and widowhood in Poland.

Dependent variable: indicator for life satisfaction higher than 3 on the 5-1 scale	Specification 1		Specification 2		Specification 3		Specification 4	
	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)
Widow	-0.1355	(0.0184)	-0.0672	(0.0213)	-0.0641	(0.0214)	-0.0174	(0.0375)
Age:								
- 70-74 (omitted group)								
- 75-79			-0.0113	(0.0227)	-0.0019	(0.0226)	-0.0022	(0.0226)
- 80-84			0.0040	(0.0273)	0.0230	(0.0272)	0.0235	(0.0271)
- 85+			-0.0182	(0.0366)	0.0105	(0.0367)	0.0119	(0.0367)
Time spent (hours/day) on:								
- Home production					-0.0020	(0.0044)	-0.0026	(0.0045)
- Sleep					-0.0295	(0.0066)	-0.0352	(0.0073)
- Other personal					-0.0122	(0.0081)	-0.0125	(0.0081)
- TV watching					-0.0147	(0.0053)	-0.0159	(0.0054)
- Other leisure (omitted category)								
Time spent (hours/day):								
- Alone							-0.0051	(0.0038)
- With others (non-spouse)							-0.0081	(0.0045)
Constant:	0.8120	(0.0138)	0.4698	(0.0736)	0.8752	(0.1196)	0.9734	(0.1316)
Number of observations (diaries)	5291		5291		5291		5291	
R-squared (adj.)	0.0186		0.0571		0.0671		0.0680	

Source: own calculations based on Polish Time Use Survey 2013.

Note: Non-working widows. In addition to variables listed in the Table, Specifications 2-4 control for: when interview conducted (month and day of the week), region, size of city, immigrant status, education, equivalized income, and equivalized income squared. Time measured in hours per day. If available, diaries from two different days included per person. Standard errors clustered at individual level.

Table S7. Life satisfaction, time use and widowhood in the U.S.

Dependent variable: indicator for life satisfaction higher than 7 on the 10-0 scale	Specification 1		Specification 2		Specification 3		Specification 4	
	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)
Widow	-0.0817	(0.0314)	-0.0793	(0.0325)	-0.0759	(0.0331)	0.0309	(0.0455)
Age:								
- 70-74 (omitted group)								
- 75-79			0.0205	(0.0397)	0.0175	(0.0397)	0.0163	(0.0395)
- 80-84			0.0007	(0.0416)	-0.0051	(0.0417)	-0.0041	(0.0416)
- 85+			0.0340	(0.0499)	0.0219	(0.0501)	0.0180	(0.0500)
White (non-Hispanic)			0.0148	(0.0426)	0.0119	(0.0427)	0.0051	(0.0425)
Immigrant			0.0851	(0.0575)	0.0907	(0.0576)	0.0815	(0.0573)
Time spent (hours/day) on:								
- Home production					-0.0022	(0.0060)	0.0004	(0.0061)
- Sleep					-0.0006	(0.0078)	-0.0110	(0.0084)
- Other personal					0.0302	(0.0107)	0.0221	(0.0110)
- TV watching					0.0008	(0.0058)	0.0008	(0.0060)
- Other leisure (omitted category)								
Time spent (hours/day):								
- Alone							-0.0157	(0.0045)
- With others (non-spouse)							-0.0142	(0.0064)
Constant:	0.7169	(0.0226)	0.8383	(0.1043)	0.7863	(0.1401)	0.9779	(0.1503)
Number of observations	888		888		888		888	
R-squared (adj.)	0.0065		0.1196		0.1253		0.1359	

Source: own calculations based on American Time Use Survey 2012-2013.

Note: Non-working widows. In addition to variables listed in the Table, Specifications 2-4 control for: when interview conducted (year, month and day of the week), Census region, rural location, immigrant status, race/ethnicity, education, general health, and income. Time measured in hours per day. Life satisfaction in ATUS was collected only in years 2012-2013.

Table S8. Life satisfaction, time use and widowhood in the U.K.

Dependent variable: indicator for life satisfaction higher than 5 on the 7-1 scale	Specification 1		Specification 2		Specification 3		Specification 4	
	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)
Widow	-0.1946	(0.0544)	-0.1932	(0.0672)	-0.2139	(0.0688)	0.0295	(0.0926)
Age:								
- 70-74 (omitted group)								
- 75-79			0.0753	(0.1112)	0.0602	(0.1125)	0.1158	(0.1103)
- 80-84			0.0608	(0.1116)	0.0564	(0.1132)	0.0382	(0.1096)
- 85+			0.0263	(0.1159)	0.0384	(0.1170)	0.0512	(0.1130)
Time spent (hours/day) on:								
- Home production					-0.0058	(0.0154)	-0.0108	(0.0151)
- Sleep					-0.0279	(0.0193)	-0.0353	(0.0188)
- Other personal					-0.0152	(0.0236)	-0.0153	(0.0230)
- TV watching					-0.0192	(0.0152)	-0.0253	(0.0147)
- Other leisure (omitted category)								
Time spent (hours/day):								
- Alone							-0.0150	(0.0050)
- With others (non-spouse)							-0.0199	(0.0046)
Constant:	0.7882	(0.0371)	0.0213	(0.3881)	0.3772	(0.4758)	0.4724	(0.4640)
Number of observations	276		276		276		276	
R-squared (adj.)	0.0412		0.1096		0.1075		0.1701	

Source: own calculations based on United Kingdom Time Use Survey 2014-2015.
Note: In addition to variables listed in the Table, Specifications 2-4 control for: month of interview, education, and income. Time measured in hours per day. Life satisfaction in UKTUS was collected only for a subsample of participants.

Table S9. Life satisfaction, time use and widowhood in France.

Dependent variable: indicator for life satisfaction higher than 6 on the 10-0 scale	Specification 1		Specification 2		Specification 3		Specification 4	
	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)	Coefficient	(s.e.)
Widow	-0.2677	(0.0986)	-0.2828	(0.1215)	-0.2464	(0.1237)	-0.2137	(0.2147)
Age:								
- 70-74 (omitted group)								
- 75-79			0.0986	(0.1194)	0.1189	(0.1175)	0.1118	(0.1175)
- 80-84			0.1692	(0.1316)	0.2112	(0.1365)	0.1974	(0.1389)
- 85+			-0.0584	(0.1400)	-0.0291	(0.1412)	-0.0338	(0.1352)
Time spent (hours/day) on:								
- Home production					-0.0264	(0.0177)	-0.0277	(0.0183)
- Sleep					0.0056	(0.0240)	0.0014	(0.0290)
- Other personal					-0.0067	(0.0241)	-0.0060	(0.0242)
- TV watching					-0.0594	(0.0227)	-0.0664	(0.0259)
- Other leisure (omitted category)								
Time spent (hours/day):								
- Alone							-0.0009	(0.0157)
- With others (non-spouse)							-0.0120	(0.0223)
Constant:	0.8419	(0.0505)	0.2374	(0.6454)	0.7988	(0.7043)	0.8453	(0.7394)
Number of observations (diaries)	206		206		206		206	
R-squared (adj.)	0.0864		0.5735		0.6028		0.6044	

Source: own calculations based on French Time Use Survey 2010.

Note: Non-working widows. In addition to variables listed in the Table, Specifications 2-4 control for: when interview conducted (month and day of the week), region, size of city, education, equivalized income, equivalized income squared, general health, and type of home ownership. Time measured in hours per day. If available, diaries from two different days included per person. Standard errors clustered at individual level. Life satisfaction in French Time Use Survey was collected only for a subsample of participants.

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