Dynamic analysis of loneliness and disability at older ages in Europe by gender

Pagan, Ricardo and Malo, Miguel

University of Malaga, Spain, University of Salamanca, Spain

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RICARDO PAGAN
University of Malaga (Spain)

MIGUEL ANGEL MALO
University of Salamanca (Spain)

Abstract:
In this article, we analyse loneliness trajectories for older people aged 50 or more in selected European countries by gender. We focus on the relationship between disability and disability trajectories and loneliness trajectories. We use three waves of the longitudinal SHARE database. We find that permanent loneliness is not generalised, but 31 per cent of older males and 44 per cent of females suffer from loneliness in at least one of the three waves. Disability increases loneliness persistence, especially for women. Improvements in disability decrease the risk of loneliness persistence, but this effect is smaller than for disability status and there are no clear differences by gender. The rankings of the country effects on loneliness persistence by gender provide only partial support, with Mediterranean and Eastern European countries having the highest persistence, while the lowest rates are found in Northern countries, as in the previous comparative literature on loneliness.

Keywords: Loneliness persistence; disability persistence; disability dynamics; aging; cross-national comparison

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Correspondence to:

Ricardo Pagan
Applied Economics Department
University of Malaga
Plaza de El Ejido s/n
29.071 Malaga (Spain)

Telephone: +34 952 132084
E-mail: rpr@uma.es

1. Introduction

The objective of this research consists in analysing the transitions into and out of loneliness attending to the importance of disability changes at older ages in Europe by gender at the international level. There is extensive literature analysing the relationship that exists between different variables and feelings of loneliness (Dykstra, 2009). From this point of departure, a new line of research has been developed taking into account a dynamic perspective to understand how and who leaves and enters into loneliness (Newall et al, 2014; Dahlberg et al, 2021). While static analyses on the prevalence of loneliness and the distribution by different socio-demographic variables are helpful to delimitate the problem, focusing on loneliness dynamics is useful for the design of social policies on how to prevent and reduce loneliness. In this research, we mainly focus on disability and disability changes and their relationship with loneliness dynamics. The prevalence of disability at older ages with differing degrees of severity is high and related to elevated levels of loneliness. For example, a report by the Jo Cox Loneliness Commission[1] concludes that more than half of people with disabilities in the UK experience higher levels of loneliness. However, to our knowledge, disability and disability trajectories are not usually considered in the analysis of loneliness trajectories or, at least, not as much as partner loss, limited social networks, self-perceived health or being depressed (Dhalberg et al, 2021).

Loneliness and age exhibit a non-linear relationship: levels are higher for young adults (late adolescence) and older people than for those who are middle-aged (Yang and Victor, 2011; Luhman and Hawkley, 2016; Barreto et al., 2021). There is also previous research analysing whether loneliness is more intense in individualistic countries than in collectivist ones (Yang and Victor, 2011; Lykes and Kemmelmeier, 2014; Barreto et al., 2021). Focusing on older people in Europe, recent research shows that loneliness does not affect all older people equally

[1] Available at https://www.sense.org.uk/support-us/campaign/loneliness/.

in all countries. It was found to be more common in Southern and Eastern European countries (in order of prevalence, Greece, Italy, France and Spain), compared to countries in Central and Northern Europe, such as Switzerland, Denmark, Sweden and Germany (Dykstra, 2009). In fact, among those over 65, the lowest rates of loneliness are found in Denmark and Sweden (Sundstrom et al., 2009). Therefore, there is more to consider than the traditional divide between countries that are culturally individualistic or collectivist in what concerns Europe (Dykstra, 2009). Nevertheless, we do not know anything about country differences in terms of the dynamics of loneliness along time. Thus, we provide a country ranking analysis in order to cover this caveat for the current international literature.

Our analysis will explicitly differentiate between men and women to take into account gender differences, as previous research has stressed the variation in the loneliness experience for women and men (Hawkley et al., 2016). Presumably, the relationship of disability and disability trajectories may differ for men and women, because of the well-known differences in the prevalence of disability by gender -see, for example, Merrill et al. (1997) or Leveille et al. (2000). At the same time, research on the experience of loneliness by gender reveals conflicting results, probably related to confounding variables (Aartsen and Jylha, 2011), although meta-analyses (such as Pinquart and Sörensen, 2001) find that women report higher levels of loneliness. When focusing on loneliness at older ages by gender at an international level in Europe, women report higher scores of loneliness (Vozikaki et al, 2018), especially in Southern and Central European countries (Fokkema et al, 2012; Vozikaki et al, 2018).

The database for our empirical analysis will be the *European Survey of Health, Aging and Retirement in Europe* (SHARE), for the years 2011, 2013 and 2015 -which correspond to waves 4, 5 and 6. This database has been widely used in previous research on loneliness (e.g. Angelini et al., 2011, 2012; Chatterji et al., 2015; Pagán 2011, 2012, 2013; Pagán et al., 2014; Pego, et al., 2018; Seidel et al., 2011; and Van Oyen et al., 2018). The main advantage of using this

multidisciplinary survey is that it includes a standardized variable on loneliness, the so-called R-UCLA. According to Peplau and Perlman (1982), loneliness can be defined as a negative feeling that occurs when a person's social needs do not correspond to their current levels of social relationships, in either quantity or quality. In other words, there is an imbalance between what one wants and what one has in terms of social relationships. The empirical challenge is defining this imbalance in an operative manner in a survey for individuals. The R-UCLA indicator provides a good solution to this challenge. This indicator is based on information related to intimate, relational and collective connectivity. These three elements are valued from 1 to 3, and this is summarized in the R-UCLA indicator. For first time, this indicator was included in the fourth wave of the SHARE (Malter and Börsch-Supan, 2013; Hughes et al., 2004). In addition, this survey includes harmonised information based on the same questionnaire about the socioeconomic, family, health, etc., of the population aged 50 and over, and for a large number of European countries. Our comparative analysis is based on 11 European countries: Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, Slovenia, Spain, Sweden, and Switzerland. This selection corresponds to available data on the loneliness variable, and being fully included in the three waves in order to define our different loneliness trajectories.

The remainder of the article is as follows. In the next section, we review the literature, focusing on the dynamics of loneliness. After that, we present the technical details of our data and methods, explaining the definition of loneliness trajectories and the econometric specification. We then present the results on the determinants of trajectories, focusing on the importance of disability, disability trajectories, and the rankings of countries by gender in terms of loneliness. Finally, a conclusions section closes the article.

2. The dynamics of loneliness in older adults: Review of the literature

Dykstra (2009) offers an excellent summary of the research on loneliness from a social perspective, focusing on how empirical evidence challenged previous conventional wisdom. First, loneliness increases with age among older people but not for all. This increase is mostly concentrated in those over 75-80 and is consistent with the non-linear U-shape association between age and loneliness identified in the literature (Pinquart and Sörensen, 2001). Second, country differences in loneliness do not fit well into the distinction of individualistic versus collectivist cultures. Traditionally, individualistic cultures have been associated with higher levels of loneliness, with the opposite occurring for collectivist countries. However, empirical evidence shows a more diverse picture, especially in Europe. In Southern European countries, usually associated with larger family and friendship networks, loneliness feelings are more prevalent than in Northern European countries, which have a more individualistic culture. In fact, the former Soviet countries in East-Central Europe display the largest prevalence of loneliness on the continent. Third, according to conventional wisdom we have moved towards more individualistic societies in the last decades with a simultaneous increase in ageism. Nevertheless, empirical evidence reveals no clear time trend. If anything, there is a decrease in loneliness. It is important to note that most of this empirical evidence on loneliness is cross-sectional or a time evolution of aggregate indicators, with a few exceptions which we will review a bit later on.

As for disability, there is scant previous research focusing directly on the relationship of disabilities with loneliness. Rather, the literature has considered everyday competence instead of a general definition of disability. In these terms, it is clear that good levels of everyday competence facilitate social contact, thereby decreasing the risk of loneliness. In fact, Pinquart and Sörensen (2001) find in their meta-analysis that limitations in everyday competence is one of the key factors associated with loneliness. As for differences by gender, Aartsen and Jylhä (2011) consider the empirical evidence inconclusive, and that it is likely related to confounding

variables such as unequal distribution of risk factors by gender. Many times the differences by gender are rather small (Borys and Perlman, 1985; Maes et al, 2019), with males having slightly higher loneliness scores, although at the same time women more often admit to being alone in self-labelled loneliness (Borys and Perlman, 1985). Nevertheless, the meta-analysis by Pinquart and Sörensen (2001) finds that women report more intense feelings of loneliness, which seems related to the higher probability of being widowed for women, as they usually live longer. In fact, these authors explain that studies reporting higher loneliness levels for men are mostly based on students' samples, which are not suitable for predicting differences by gender among older adults. Therefore, the results reviewed by Pinquart and Sörensen (2001) give more support to women experiencing higher levels of loneliness than men do at older ages.

While there is extensive literature on loneliness and its correlation with different variables, there are fewer longitudinal studies on loneliness. This type research, however, has recently been expanding, probably due to the increasing availability of longitudinal data that includes loneliness scales (Newall et al, 2014). Dahlberg et al. (2021) present a systematic review of this line of research encompassing 34 studies. They observe that while these investigations examine a wide range of factors, only a few reveal a consistent association with loneliness time changes: not being married or partnered and partner loss; a limited social network; a low level of social activity; poor self-perceived health; and depression/a depressed state and increased depression.

In general, longitudinal research on loneliness finds that increasing loneliness occurs mostly for the very old, as in Tijhuis et al (1999) for those aged between 75 and 85 at the beginning of the 10-year analysed period, following the pattern observed by Dykstra (2009). Other key factors to understand loneliness changes and related to our research are: increasing disability or functional limitations (Jylhä, 2004; Warner et al. 2016; Hawkley and Kocherginsky, 2018), becoming a widow/widower (Dykstra et al, 2005; Aartsen and Jylhä, 2011), material deprivation (Myck et al, 2021), and changes in institutionalisation (Tijhuis et

al, 1999). In fact, changes in social and personal resources seem more important than their baseline levels for increasing loneliness (Aartsen and Jylhä, 2011).

In a similar vein, Hawkley and Kocherginsky (2017) find that those with fewer functional limitations (a proxy for disabilities) were less likely to become lonely. When considering changes in functional limitations Jylhä (2004), Warner et al. (2016), and Hawkley and Kocherginsky (2018) find that increasing functional limitations is one of the key variables that increases loneliness for older adults. In our research, we contribute to this literature explicitly including disability status and disability trajectories (i.e., changes in the disability status), following Gannon and Munley (2009) to define disability trajectories, as we explain in the next section.

We also add to this literature providing evidence on loneliness trajectories using three waves of the SHARE survey to build a comparative analysis of 11 European countries by gender. To our knowledge, there is no longitudinal research on loneliness that provides rankings of countries in terms of country effects on increasing loneliness. Although Myck et al (2021) use data from 13 countries of the SHARE survey to understand the change in loneliness between two waves of the survey, they do not go beyond introducing fixed effects by country in their estimations. In addition, we present this international comparative analysis of loneliness with separate analyses by gender. Therefore, it will be possible to check whether the different variables affecting disability trajectories have the same effects for men and women.

Data and methods

Database description

To carry out this study we use data taken from the Survey of Health, Ageing and Retirement in Europe (SHARE) for the years 2011, 2013 and 2015 (i.e. waves 4, 5 and 6). The SHARE has been widely used by other researchers and is a well-known dataset within the academic community. Overall, the SHARE is a large cross-national panel database that includes

information (harmonised and using a standard questionnaire for all European countries) for individuals aged 50 or over on health status, education, employment, social network and support, household composition, retirement, income, and financial transfers, among others. It began in 2004 and to date has conducted 480,000 in-depth interviews with 140,000 people from 28 European countries and Israel. Furthermore, it has a panel structure with biannual waves and includes ad-hoc modules on specific topics such as job episodes, political, economic, and societal environments, and COVID-19[2]. In our case, we use a sample of individuals aged 50 or over and for 11 European countries (Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, Slovenia, Spain, Sweden, and Switzerland). We have selected these countries according to the availability of data on our key variable (i.e. loneliness), and being fully included in the three waves (to define our different loneliness trajectories). As a result and after excluding those individuals with incomplete information, the final samples used in our estimation process for a balanced panel consist of 22,323 and 29,712 observations for males and females, respectively.

The definition of loneliness

Loneliness is a subjective and negative experience when feeling a mismatch between the quantity and quality of existing relationships with respect to some standard (Peplau and Perlman, 1982; Dykstra, 2009). Therefore, loneliness is always a subjective evaluation and depends on an individual standard about relationships with others (De Jong Gierveld and Van Tilburg, 2010). The first approaches to the study of loneliness measured it directly, that is, by asking about the personal feeling of loneliness. For example, the first two waves of the SHARE survey asked: *"How often have you felt lonely or lonely in the last week?"* This question was answered in the first wave of the SHARE on a scale of 1 to 4 according to the frequency of the

[2] A full description of the SHARE (methodology, questionnaires, samples, release dates, special datasets, data documentation, etc.) are available in the work of Börsch-Supan and Jürges (2005) and Malter and Börsch-Supan (2013, 2015, 2017), and at http://www.share-project.org (retrieved 30/08/2021).

sensation. In the second wave, the response was just binary -i.e. whether the person felt alone or not. This type of measurement is problematic. If the individual perceives loneliness as a stigma, the interviewee will give a false response as to having low levels of loneliness or not being alone at all (Crooker and Major, 1989; Victor et al. 2000, 2005).

To avoid this bias, information about loneliness is obtained in a more indirect way, by asking questions related to different dimensions of the subjective experience of loneliness and avoiding the words "loneliness", "single" or "alone" as much as possible. Probably the two most widely used indicators of this type are the De Jong Gierveld and the UCLA scales. The first one is an 11-item loneliness scale (De Jong Gierveld and Kamphuis, 1985; De Jong Gierveld and Van Tilburg, 1999) and is based on the distinction between social and emotional loneliness. For use in large surveys, there is a shorter version based on six items (De Jong Gierveld and Van Tilburg, 2010). The second one consists of 20 questions on the frequency of certain feelings related to some degree of loneliness (Hughes et al., 2004; Luo et al., 2012; Pikhartova et al., 2014; Steptoe et al., 2013; Shiovitz-Ezra, 2015; Wagner and Brandt, 2015; Niedzwiedz et al., 2016). In this case, the answers are on a scale of 1 to 4, depending on the intensity of these feelings. Later, this indicator was modified to facilitate responding in surveys, resulting in the indicator known as R-UCLA, with three elements valued on a scale of 1 to 3. These elements are related to intimate connectivity, relational connectivity and collective connectivity (collective identity and belonging to a group). The SHARE survey included the loneliness indicator R-UCLA for the first time in the fourth wave of the SHARE (Malter and Börsch-Supan , 2013; Hughes et al., 2004). Afterwards, it was also included in waves 5 and 6.[3]

[3] For comparisons between the De Jong Gierveld and UCLA scales, see, for example, De Jong Gierveld and Van Tilburg (2006) or Penning et al. (2014). For comparisons of both scales with other loneliness scales, see Cramer and Barry (1999).

Therefore, the SHARE questionnaire for waves 4, 5 and 6 includes the following three questions:

- *How often do you feel that you lack company?* (MH034)
- *How often do you feel left out?* (MH035)
- *How often do you feel isolated from others?* (MH036)

For the three questions, the possible answers are "*Almost never or never*", "*Sometimes*", and "*Often*", coded with the values 1, 2, and 3, respectively. From this information, the R-UCLA loneliness indicator is calculated as the arithmetic mean of the responses obtained from the three previous responses (Russell, 1996). As a result, this summary indicator ranges between 1 (the lowest level of loneliness self-evaluated by the individual) and 3 (the highest one). This scale has been widely used and validated in other previous studies on loneliness (e.g. Hughes et al., 2004; Cacioppo et al. 2010; Vander Weele et al., 2011; Pikhartova et al., 2014; Hawkley et al., 2016; Lee and Cagle, 2017; and Pagan, 2020).

Trajectories of loneliness and disability, and other variables

Following Luhmann and Hawkley (2016), we have defined a continuous variable called "loneliness" as the mean value of the responses to these three questions. Then, we created a dichotomous variable called "lonely" that takes a value of 1 if the individual is lonely, and zero otherwise. To be considered as "lonely", we have followed the work of Hawkley and Kocherginsky (2018) and have imposed a frequency of the response "some of the time" for at least 2 items or "often" for at least 1 item, as well as a cut-off point of at least 1.5 points in our continuous variable "loneliness".

Using our variable "lonely" and the three waves available in the SHARE, we can construct four different loneliness trajectories as shown in Table 1. As noted earlier, this approach allows

us to look at loneliness as a dynamic perspective by differentiating transitory versus permanent loneliness.

[Table 1]

According to Table 1, we can distinguish a first trajectory called "Never" that includes all individuals who are not lonely in any wave (cases with the code: 000, where 0 means "Not lonely", and 1 "Being lonely"). In contrast, we can also identify those individuals who suffer from permanent loneliness, i.e. those being lonely in all waves (cases with the code 111 in Table 1). In addition, we also have two loneliness trajectories that represent transitory states of loneliness (but with different intensity), and have been defined as "One-off" (i.e. being lonely in just one wave), and "Two-off" (i.e. being lonely in two waves). The latter helps us distinguish individuals with more episodes of loneliness as compared to the loneliness trajectory "One-off", and thus being able to consider it as a different subgroup. For example, the case with the code "010" represents an individual who is not lonely in the first and third wave, but lonely in the second one, whereas the case with the code "011" indicates "not being lonely" in the first wave, followed by two waves "being lonely".

We have estimated "ordered probit models" (Greene, 2018) for the probability of being in each loneliness trajectory (breaking down the sample by gender status), wherein the ordered responses for our observed categorical variable, called "tra_i", is defined as follows:

$tra_i = 0$ if the individual "*i*" is observed in the loneliness trajectory "Never"

$tra_i = 1$ if the individual "*i*" is observed in the loneliness trajectory "One-off"

$tra_i = 2$ if the individual "*i*" is observed in the loneliness trajectory "Two-off"

$tra_i = 3$ if the individual "*i*" is observed in the loneliness trajectory "Always"

As for disability and disability trajectories, we use a definition of the disability status similar to Gannon and Munley (2009) and Pagan (2011). For disability status, we distinguish between four categories: non-disabled, non-limited disabled, moderate limited disabled, and

severe limited disabled. In the SHARE questionnaire (Health section), we have the following questions: "Do you have any long-term health problems, illness, disability or infirmity? (Yes/No)". Those who answer "Yes" can be defined as people with disabilities. In addition, the follow-up question, "For the past six months at least, to what extent have you been limited because of a health problem in activities people usually do? (Severely limited/Limited, but not severely/Not limited)" allows us to determine the degree of severity and limitation of the disability. The definition of changes in disability status between wave 4 and 6 is similar to that of Dykstra et al. (2005). Here, we use the previous disability status in both waves to consider three cases: the same, worse and better.

Estimation variables and country rankings

To estimate the ordered probit models on being located in one of the loneliness trajectories, we have included the following explanatory variables in our model, traditionally used in other empirical studies on loneliness (e.g. Hawkley et at., 2010; Nicolaisen and Thorsen, 2014; Luhmann and Hawkley, 2016; and Pagan, 2020). These are disability status (four categories: non-disabled, non-limited disabled, moderate limited disabled, and severe limited disabled); changes in disability status between wave 4 and 6 (three cases: the same, worse or better); age (i.e 50-64, 64-74, and 75 or over); marital status (i.e. married cohabitating, married living separated or divorced, never married, and widowed); educational level (i.e. primary, secondary, post-secondary and non-tertiary); household size, existence of children in the household, having been born in country of residence, labour status (5 groups: retired, unemployed, employee, civil-servant and self-employed); household income (in quintiles); location of residence (5 groups: living in a big city, suburbs of big city, large town, small town, and rural area); participation in activities at least once in the last month (we include 7 activities: participation in volunteer work, educational and training courses, sports, political activities, reading (books,

magazines, etc.), word or number games (crossword, puzzles, etc.), playing cards or similar games); and the year (wave) of interview.

From the econometric results and similar to Arezzo and Giudici (2017), we have also estimated the country effect on loneliness trajectories. To do this, we have first estimated linear regressions (OLS) from our model for the male and female samples. We have then calculated the linear predictions and residuals. Finally, we have run a linear regression using these estimated residuals on a set of dummy country variables (and excluding the constant). The outcome is a ranking of countries in increasing order of the likelihood to have a longer loneliness trajectory (i.e. more episodes of loneliness throughout our balanced panel). In addition, in the next descriptive section all results have been obtained using the sample weight available in the SHARE for the period analysed. Finally, we have used the statistical package STATA 16 to obtain all our descriptive and estimation results.

Results

Descriptive analysis

Table 2 shows the frequency distribution of our sample according to the loneliness trajectory (i.e. "Never", "One-off", "Two-off" and "Always") and breaking down the sample by gender (male *versus* female). In general and as we expected, we find a higher concentration of individuals in the first loneliness trajectory "Never". On average, 61.50% of all individuals do not have any loneliness episode in our 3-wave panel. In contrast, we find a clear decreasing trend in this percentage for the remaining loneliness trajectories. Namely, 20.51% for the trajectory "One-off", followed up by 10.97 and 7.02% for the trajectories "Two-off" and "Always", respectively. This finding means that the majority of the loneliness episodes are transitory (i.e. 31.48%= 20.51% + 10.97%), whereas the permanent episodes only represent 7.02% of all individuals. Jylhä (2014) found similar results with cross-sectional and

longitudinal data from Finland, ranging between 60 and 70 per cent of older people never feeling lonely.

We find the same pattern for males and females, but we detect some differences in terms of the magnitude of these percentages in each loneliness trajectory. According to a test of equality of percentages, we find a higher number of males located in the trajectory "Never" as compared to that found for the female sample (68.29% *versus* 55.88%, i.e. a differential of 12.41 percentage points in favour of males). In contrast, the opposite result is found for the remaining loneliness trajectories. For example, 8.68% of females are found to be always lonely for all waves, whereas only 5.02% is found for males. Looking at the transitory loneliness trajectories (i.e. "One-off" and "Two-off"), we observe that the total sum of both trajectories is higher for females as compared to that for males (35.44% *versus* 26.68%). Additionally, we find a significant differential in favour of females for the loneliness trajectory "Two-off", i.e. 5.52 percentage points.

[Table 2]

As for the individual's disability status, Table 3 shows the distribution of our loneliness trajectories taking into account the change in his/her disability status between waves 4 and 6. As noted earlier, we distinguish three cases:

a) The "same" disability status in waves 4 and 6.
b) A "worse" disability status, that is, an increase in the limitations to performing daily activities because of a health problem lasting at least 6 months (e.g. from moderate limited disability in wave 4 to severe limited disability in wave 6).
c) A "better" disability status, that is, a reduction in limitations to carrying out daily activities (e.g. from moderate limited disability to non-disabled).

We find that the percentage of males and females with a deterioration in their disability status (i.e. worse category) is significantly greater in all our loneliness trajectories than that found for those with the same disability status in waves 4 and 6 (our reference in this table). This is in line with Jylhä (2004), who found that increasing disability is behind the rise in loneliness for older adults, together with weakening social integration. In addition, we observe that for males these percentages increase as loneliness becomes more persistent (i.e. higher trajectories). For example, the percentage of those who reduced their disability status between wave 4 and 6 was 37.17% in the first loneliness trajectory "Never", whereas this percentage goes up to 40.84% in the trajectory "Always". In contrast, this outcome is not found for the female sample (it remains around 37% along all trajectories). Finally, we also find a significant percentage for males and females for the "better" group as compared to the "same" group (reference) for the loneliness trajectory "Never" (32.92 and 32.59%, respectively).

[Table 3]

Previous studies have found a significant relationship between gender and age in terms of loneliness (e.g. Koenig and Abrams, 1999; Yang and Victor, 2011; Nicolaisen and Thorsen, 2014; Luhmann and Hawkley, 2016; and Bareto et al., 2021). To shed further light on our loneliness trajectories within our 3-year balanced panel, once again we have calculated the distribution of these trajectories by age and gender. According to Table 4 and in line with the existing empirical evidence, we find that ageing reduces the likelihood to be found in the trajectory "Never". For males, this reduction goes from 71.78% for those individuals aged 50-64 to 57.78% for those aged 75 or more (i.e. a drop of 14 percentage points, whereas for females these percentages vary from 61.03% to 45.02%, respectively (i.e. a drop of 16.01 percentage points, and slightly higher than that previously found for males). In addition and after using a test of equality of percentages for this trajectory "Never", we detect that males have higher percentages in all age groups as compared to females, i.e. the percentage of males aged 50 or

more who have never suffered from a loneliness episode within our panel is relatively higher that that found for their female counterparts. This decreasing trend in the loneliness trajectory "Never" both for males and females is compensated by increases in the rest of trajectories as age increases. For example, the percentage of males and females found in the transitory loneliness trajectories, "One-off" and "Two-off", increases with age, and they are all always higher for females than for males in all age groups. Finally, the prevalence of the loneliness trajectory "Always" (permanently lonely) increases with age (and once again is higher among females compared to males), and with significant percentages for those individuals aged 75 or more (7.6 and 13.83% for males and females, respectively).

[Table 4]

As noted earlier, one of the main advantages of using the SHARE is the availability of harmonised data for a set of European countries which allows us to carry out comparative studies on a same phenomenon or variable (in our case loneliness). Looking at the previous literature on country differences in loneliness, Reher (2008) observed that Central and Northern Europe are characterized by weak family links (wherein individualistic values tend to dominate), whereas the Mediterranean is distinguished by strong family ties (wherein collectivistic values predominate). In the same vein, Dykstra (2009) found that loneliness is more common in Southern European countries (in order of prevalence, Greece, Italy, France and Spain) as compared to Northern and Central European countries such as Switzerland, Denmark, Sweden and Germany. In fact, among those individuals over 65, the lowest prevalence of loneliness is found in Denmark and Sweden (Sundström et al., 2007). Table 5 shows the distribution of the four loneliness trajectories by country of residence (i.e. 11 European countries) and gender. For males, we find the highest percentages for the loneliness trajectory "Never" in Austria (81.52%), Denmark (81.03%), and Switzerland (80.14%), whereas the lowest ones are in Czech Republic (48.84%), Italy (57.40%), and Belgium

(63.56%). For females, we find results similar to those found for males, with Denmark (79.71%), Switzerland (76%), and Austria (73.52%) at the top of the ranking, and Italy (35.11%), Czech Republic (42.52%), and Belgium (54.46%) in the last positions.

[Table 5]

On the other hand, the European countries with the highest percentages of individuals being fully lonely in all waves, i.e. "Always", are Italy (8.09 and 15.68% for males and females, respectively), Belgium (6.51 and 10.52% for males and females, respectively), and Czech Republic (6.3 and 9.71% for males and females, respectively). With regard to the transitory loneliness trajectories, we find higher percentages of "One-off" in Czech Republic with 31.06% (26.66%) of males (females), followed by Italy with 23.55% (29.74%) of males (females), and Belgium with 21.04% (22.52%) of males (females). A similar pattern is found for the loneliness trajectory "Two-off". Furthermore, Austria, Denmark, and Switzerland are the countries with the lowest rates of transitory loneliness for both males and females. Once again, it is worthwhile mentioning the gender differences by country in terms of loneliness trajectories. For example, the gender gap is significantly high for the loneliness trajectory "Never" in Italy (57.4 *versus* 35.11) and Spain (76.79 *versus* 58.4) in favour of males, and for the trajectory "Always" once again in Italy (8.09 *versus* 15.68) and Sweden (2.67 *versus* 9.79).

Overall, all these findings reveal the need to take into account these country-level differences in loneliness, and order our European countries into different subsamples or groups that reflect the dichotomy between "individualistic countries" *versus* "family-oriented countries" (Fokkema et al., 2012). This analysis may also help increase our understanding on the variations in the levels of wellbeing reported by older people and the importance of enacting different public health policies aimed at boosting this group's quality of life (Hansen and Slagsvold, 2016). At first glance, the general pattern follows conventional wisdom: higher loneliness (here, loneliness persistence) for Southern and Eastern countries and lower for

Northern countries. However, there are countries that do not fit this pattern, such as Spain and Sweden. We will come back to the international comparison in the econometric analysis, estimating a ranking of country effects on loneliness persistence by gender.

Econometric analysis

Table 6 shows the predicted probabilities for the reference person and the marginal effects calculated from the ordered probit regressions on loneliness persistence by gender. The original coefficients of these probits are shown in Table A.1 of the Appendix. In general, the results related to disability are as expected. Any type of disability decreases the probability of having a loneliness trajectory labelled as 'Never' (Pr=0 in Table 6). The marginal effects seem somewhat more intense for females but they are quite similar. Considering the other loneliness trajectories, when there are increasing severity or limitations related to disability for males, the marginal effects are larger. In other words, when increasing the severity of disability, the probabilities of suffering loneliness trajectories with more loneliness clearly increase. For example, males with a moderate disability have an increase of 1.4 percentage points (pp) in the probability of being alone in one wave, 3.9 pp in the probability of being alone in two waves, and 5.4 pp in the probability of being alone in three waves. In addition, males with a severe limited disability experience an increase of 0.3 pp, 7.7 pp, and 14.4 pp, respectively. For females the effects are similar, although sometimes slightly larger, with the exception of a small negative effect for severely limited disabled women suffering loneliness in just one wave -a decrease in this probability of 1.1 pp. While for females all disability categories were statistically significant, for males, in the results of non-limited disabled people, the coefficients are not significant -as shown in Table A.1.

[Table 6]

Attending to changes in the disability status from the first to last observed wave, we have significant coefficients only for those improving in their disability status, either males or

females (Table A.1). Accordingly, those males (females) improving their disability status have a probability of never being alone 1.8 pp (1.2 pp) larger (smaller), and a lower probability of being alone in one, two or three waves, for both genders, although the effect is slightly larger for males. In any case, all the aforementioned negative effects are lower than 1 pp.

Therefore, we find that disability status is an important variable for understanding the probability of loneliness persistence, which is roughly coincident with the results of the systematic review by Dahlberg et al (2021), who showed that different studies found an association between limitations in activities of daily living (ADL) and instrumental activities of daily living (IADL) and loneliness risk. Nevertheless, Dahlberg et al (2021) also insist that sometimes this relationship is found in bivariate analyses but not in multivariate ones, and they consider that the evidence for this association is consistent for ADL but not for IADL. According to our results, disability status is more important (in terms of the size of the effects) than changes in the disability status along time, especially for those severely limited disabled suffering loneliness in all waves (Pr=3 columns in Table 6). This is contrary to the results found by some authors, such as Aartsen and Jylhä (2011), who determined that baseline characteristics were less important for understanding the onset of loneliness than changes in some key variables, for example increased physical disabilities. The reasons behind this discrepancy may be a different definition of disabilities (here, our definition is broader covering more than physical disabilities), but also a very different time span. While Aartsen and Jylhä (2011) cover 28 years, we have three waves of the SHARE -i.e., six years. Probably when considering a much longer period, the baseline characteristics will be much less important than when using a relatively shorter period. This opens the door to a future line of research analysing whether the length of the analysed period affects the importance of baseline and changing characteristics.

Finally, our results also show that disability dynamics decrease loneliness persistence only when disability becomes less limiting or less severe. This is a complementary result with respect

to Jylhä (2004) or Aartsen and Jylhä (2011), who showed that increasing disability increased loneliness.

Ageing variables are not significant in any case. Conventional wisdom emphasised that ageing increased loneliness (Dykstra, 2009), but longitudinal analyses have highlighted that loneliness increases with age not because of age per se, but because of increasing disability and decreasing social integration (Jylhä, 2004). Therefore, we should expect small or no significant effects of age intervals in our estimations, as we have found. Regarding marital status, we find that those never married and widows/widowers suffer more loneliness persistence -decreasing marginal effects of the probability of never suffering loneliness and increasing marginal effects on the probability of suffering loneliness during more and more waves. The size of the effects is quite similar for both genders, although for women all marital statuses of living alone are statistically significant. This is in line with the fact that women usually report more loneliness (Aartsen and Jylhä, 2011), but with lower differences between genders in our case of loneliness persistence than in other longitudinal studies, where becoming widowed was crucial to increase in loneliness (Dahlberg et al, 2021), especially for women (Aartsen and Jylhä, 2011).

Education beyond the primary level protects again loneliness persistence and this effect increases with educational level and is especially stronger for women. For example, for women, having post-secondary and tertiary education levels increases the probability of never suffering loneliness in 8.2 pp and 8.6 pp respectively with regard to having only a primary level of education. The same educational levels decrease the probability of suffering loneliness in the three waves 3.4 pp, also for women. For men, the larger effects are for the post-secondary level, while for women the effects for post-secondary and tertiary levels are very similar. As for household size, when its size is two or more the probability of not suffering loneliness in any wave increases and the probability of suffering loneliness in one, two or three waves decreases, for both genders, although all these effects are usually larger for men. In any case, the effects

are quite similar for all sizes with respect to one-person households. The existence of children in the household is not significant for either males or females, showing that for those over 50 the household size is more important than the household type to understand the determinants of loneliness persistence.

Being born in the country of residence is not significant for either men or women. It is likely that immigrants who remain in the host country when they are aged 50 or more have developed long-term social relationships providing similar results in terms of loneliness and loneliness persistence with respect to native-born residents. The main differences are captured by the other covariates included in the estimation. The results of the labour status are as expected. Those working experience lower levels of loneliness persistence. The results are not very different by gender, but they are a bit stronger for men in some cases, such as for self-employment. The cases for the unemployed are even worse than for those who are retired. This result is obtained for men, while for women the coefficients are smaller and not statistically significant. Unemployed men have a probability of never suffering loneliness that is 6.2 pp lower than those who are retired, and the probability of suffering loneliness persistence increases with the number of waves that they are alone, ranging from 1 pp to 2.9 pp. Myck et al. (2021) report similar results: working affects the probability of suffering loneliness at cross-section estimations and decreases the probability of becoming lonely, although this effect is not significant for entering into severe loneliness.

Household income protects against loneliness persistence for men beyond the second quintile, but for women only for the fifth quintile (the highest). For men, in general, protection against loneliness persistence increases with the quintile, but it is not clearly monotonic. For example, the effects of being in the second quantile are not larger than for the first quintile. In general, these results are in line with those obtained by Myck et al. (2021), who find a similar relationship of the quintiles of material deprivation with increasing loneliness between two

waves of the SHARE, although they do not present different estimations by gender. With regard to the location of residence, only living in a large town for males shows significant effects and they are as expected, increasing the risk of suffering loneliness persistence. As for participation in social activities, only volunteer and charity work and three activities related to recreational activities ("Sports, social and other kind of club activities", "Reading books, magazines or newspapers", and "Playing cards or games such as chess") are statistically significant for both genders, and as expected according to social capital literature for bridging activities (Pagán, 2016; Arezzo and Giudici, 2017): they protect from loneliness persistence.

Country rankings

The conventional wisdom about international differences in loneliness was that people in individualistic societies are lonelier than in collectivist societies or in societies with strong family ties (Dykstra, 2009). However, the empirical evidence in Europe contradicts this easy pattern. In fact, there is a sort of North-South divide showing that loneliness is usually higher in Mediterranean countries than in Northern (mainly Scandinavian) countries, when the first group is viewed as countries having strong family ties and the second as individualistic. Eastern European countries are also among those with the highest loneliness levels (Fokkema et al, 2012; Yang and Victor, 2011), showing higher levels of loneliness in countries with a collectivistic culture with respect to individualistic societies (Lykes and Kemmelmeier, 2014). The higher loneliness levels in Southern and Central Europe is largely associated to not being married, economic deprivation and poor health (Fokkema et al., 2012).

While most of this literature compares aggregated indicators of loneliness by country and estimates how different variables determine the loneliness level by country, here we adopt a different empirical strategy. As we explained in the data and methods section, we estimate an ordered probit regression on the different loneliness trajectories with country fixed effects, and then we recover the country fixed effects to elaborate a ranking of countries. Therefore, what

we have is the effect of living in each country on the persistence of loneliness, ceteris paribus. In addition, we have different estimations for males and females, and, therefore, we have different rankings by gender (see Table A.1).

We show the country rankings by gender in Figure 1. They are somewhat similar in the extremes: Austria and Denmark are among the countries with the lowest fixed effect, while the Czech Republic, Italy and Belgium are the countries with the highest fixed effect. At first glance, the relative positions of the Czech Republic and Italy would confirm that Eastern and Southern European countries are related to higher loneliness levels (here, a higher loneliness persistence), and the low position of Denmark would confirm the lower levels for Northern countries. However, we also see Spain with just the second lowest rank for males and in the middle for females, in other words, a very different position with respect to Italy. In addition, Sweden is in a low-middle position for males and a high-middle position for females.

[Figure 1]

Therefore, the country effects on loneliness persistence do not closely follow the patterns of the previous literature for aggregate loneliness levels, although there are some 'typical' countries of Southern, Northern and Eastern countries in the extremes of the rankings for both genders in line with the European pattern of high, low and high effects, respectively. As a novelty, the results by gender are not coincident, but at the extremes are rather similar. In general, we must be cautious when extending the comparative results obtained from past literature on loneliness to the loneliness dynamics.

Conclusions

In this article, we have analysed the persistence of loneliness for older adults in some European countries by gender. We use an especially suitable database for this objective, such as the SHARE, specifically three waves of this international survey with information about loneliness with the R-UCLA indicator, disability and the rest of variables considered in our analysis. At a

descriptive level, we show that loneliness in the three considered waves is experienced by 5 per cent of males and 8.7 per cent of women aged 50 or more in Europe (Table 2). Therefore, the full persistence of loneliness is not generalised among older people (Jylhä, 2004), but 31 per cent of older males and 44 per cent of older women report suffering from loneliness in at least one of the three waves, which covers a period of 6 years. By gender, we find that women present higher levels of loneliness in cross-section data, but also when considering loneliness persistence.

We find that disability and disability trajectories are related to higher loneliness persistence. More limitations and more severity increase the risk of loneliness persistence and decreases the probability of never feeling alone. Regarding disability trajectories, when there is an improvement in disability across time, loneliness persistence decreases. Comparing the size of the different effects of disability, the disability status is more important in understanding loneliness persistence than changes in disability status. This conflicts with some previous literature (Aartsen and Jylhä, 2011). However, when there is a very long period (28 years in Aartsen and Jylhä, 2011), we should expect that baseline characteristics will not be important and will be replaced by changes in these characteristics. Using much shorter periods (such as six years in the current research), baseline characteristics will be equally or more important than changing characteristics, as we find for disability. This opens the door to future research on the role of the length of the time to understand the determinants of loneliness persistence.

We have used the econometric estimations (ordered probit models with fixed effects by country) to estimate country rankings of loneliness persistence by gender. These rankings capture the isolated effect of the country on loneliness persistence, which is a novelty in the research on loneliness. Our rankings are only partially in line with previous results. We find that some Southern (Italy) and Eastern (Czech Republic) countries have the highest effect on loneliness persistence and a typical Northern country such as Denmark has low positions in the

rankings. These results are in line with the recent comparative literature on loneliness (Dykstra, 2009). However, we also find that another Southern country such as Spain has very different positions than Italy in the rankings, and the same holds for Sweden with respect to Denmark, with the positions of these two countries being markedly different by gender. Beyond the methodological differences in our estimation of the country rankings, we consider that we likely need to enrich the previous explanations of loneliness variation by country considering that international variation in loneliness persistence is not the same as in the case of loneliness levels.

We also find that living alone, educational level, working, income inequality and regular participation in some social activities have an important effect on loneliness persistence, while others, such as ageing itself, children in the household, being born in the country of residence, almost any location of residence and participation in educational activities or political activities do not. The result of the non-importance of ageing is coincident with Jylhä (2004), who also finds that ageing is not related to an increase in loneliness but rather to problems correlated with ageing, such as losing a partner or having a disability.

Finally, we consider that an important implication for social policy of these results is not merely focusing on target groups defined by age, but on the characteristics (for example, disabilities) and some changing characteristics (for example, being widowed), and not merely considering any type of participation in social activities equally effective to prevent loneliness persistence. Our results also support adjusting some social interventions by gender, with different emphasis on specific variables. For example, living alone seems riskier for females in terms of loneliness persistence, while losing a job has a greater effect for males.

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Table 1. Loneliness trajectories for a 3-wave period (SHARE waves 4, 5 and 6).

Type of loneliness trajectory	Definition	Cases
0= Never	Not lonely in any wave	000
1= One-off	Be lonely in just one wave	100
		010
		001
2= Two-off	Be lonely in two waves	110
		101
		011
3= Always	Be lonely all waves	111

Note: 0= Not lonely, 1= Be lonely.
Source: Survey of Health, Ageing and Retirement in Europe, SHARE (waves 4, 5 and 6).

Table 2. Distribution of loneliness trajectories (%) by gender.

Type of loneliness trajectory	All	Males	Females
Never	61.50	68.29*	55.88
One-off	20.51	18.73*	21.97
Two-off	10.97	7.95*	13.47
Always	7.02	5.02*	8.68
TOTAL	100	100	100

Note: Weighted data. Individuals aged 50 or over. *Difference between males and females is significant at $P < 0.05$. Number of observations: 62,487 (27,183 males+ 35,304 females).
Source: Survey of Health, Ageing and Retirement in Europe, SHARE (waves 4, 5 and 6).

Table 3. Distribution of loneliness trajectories (%) by change in disability status (i.e. worse, the same and better) and gender.

Type of loneliness trajectory	Males				Females			
	Change in disability status				Change in disability status			
	Worse	**Same**	**Better**	TOTAL	**Worse**	**Same**	**Better**	TOTAL
Never	37.17*	29.91	32.92*	100	37.53*	29.88	32.59*	100
One-off	38.86*	29.67	31.47	100	37.58*	30.31	32.11	100
Two-off	40.44*	28.80	30.77	100	37.20*	30.62	32.17	100
Always	40.84*	28.47	30.69	100	37.29*	31.09	31.62	100

Note: Weighted data. Individuals aged 50 or over. *Difference between the category "same" and the others is significant at $P < 0.05$. Number of observations: 62,487 (27,183 males+ 35,304 females).
Source: Survey of Health, Ageing and Retirement in Europe, SHARE (waves 4, 5 and 6).

Table 4. Distribution of loneliness trajectories (%) by age groups and gender.

Type of loneliness trajectory	Males			Females		
	50-64	**65-74**	**75+**	**50-64**	**65-74**	**75+**
Never	71.78*	69.56*	57.78*	61.03	56.96	45.02
One-off	17.09*	18.60*	22.97*	20.28	22.16	24.89
Two-off	6.66*	7.61*	11.65*	12.78	12.20	16.26
Always	4.47*	4.23*	7.60*	5.90	8.67	13.83
TOTAL	100	100	100	100	100	100

Note: Weighted data. Individuals aged 50 or over. *Difference between males and females is significant at $P < 0.05$. Number of observations: 62,487 (27,183 males+ 35,304 females).
Source: Survey of Health, Ageing and Retirement in Europe, SHARE (waves 4, 5 and 6).

Table 5. Distribution of loneliness trajectories (%) by country of residence and gender.

A) Males

Type of loneliness trajectory	Austria	Denmark	Switzerland	Spain	Sweden	Slovenia	France	Germany	Belgium	Italy	Czech Republic
Never	81.52	81.03	80.14	76.79	73.48	68.84	68.75	65.87	63.56	57.40	48.84
One-off	11.65	11.15	12.93	15.39	17.09	20.40	18.13	19.60	21.04	23.55	31.06
Two-off	4.17	4.43	4.88	4.99	6.76	8.47	7.43	9.71	8.89	10.97	13.80
Always	2.65	3.39	2.05	2.83	2.67	2.29	5.69	4.82	6.51	8.09	6.30
TOTAL	100	100	100	100	100	100	100	100	100	100	100

B) Females

Type of loneliness trajectory	Austria	Denmark	Switzerland	Spain	Sweden	Slovenia	France	Germany	Belgium	Italy	Czech Republic
Never	73.52	79.71	76.00	58.40	61.57	65.51	57.52	64.71	54.46	35.11	42.52
One-off	15.83	12.13	13.30	22.69	18.99	16.84	20.55	18.40	22.64	29.74	26.66
Two-off	7.19	4.47	7.19	11.88	9.64	13.04	14.03	10.82	12.37	19.48	21.11
Always	3.45	3.69	3.51	7.04	9.79	4.61	7.91	6.07	10.52	15.68	9.71
TOTAL	100	100	100	100	100	100	100	100	100	100	100

Note: Weighted data. Individuals aged 50 or over. Number of observations: 62,487 (27,183 males+ 35,304 females).
Source: Survey of Health, Ageing and Retirement in Europe, SHARE (waves 4, 5 and 6).

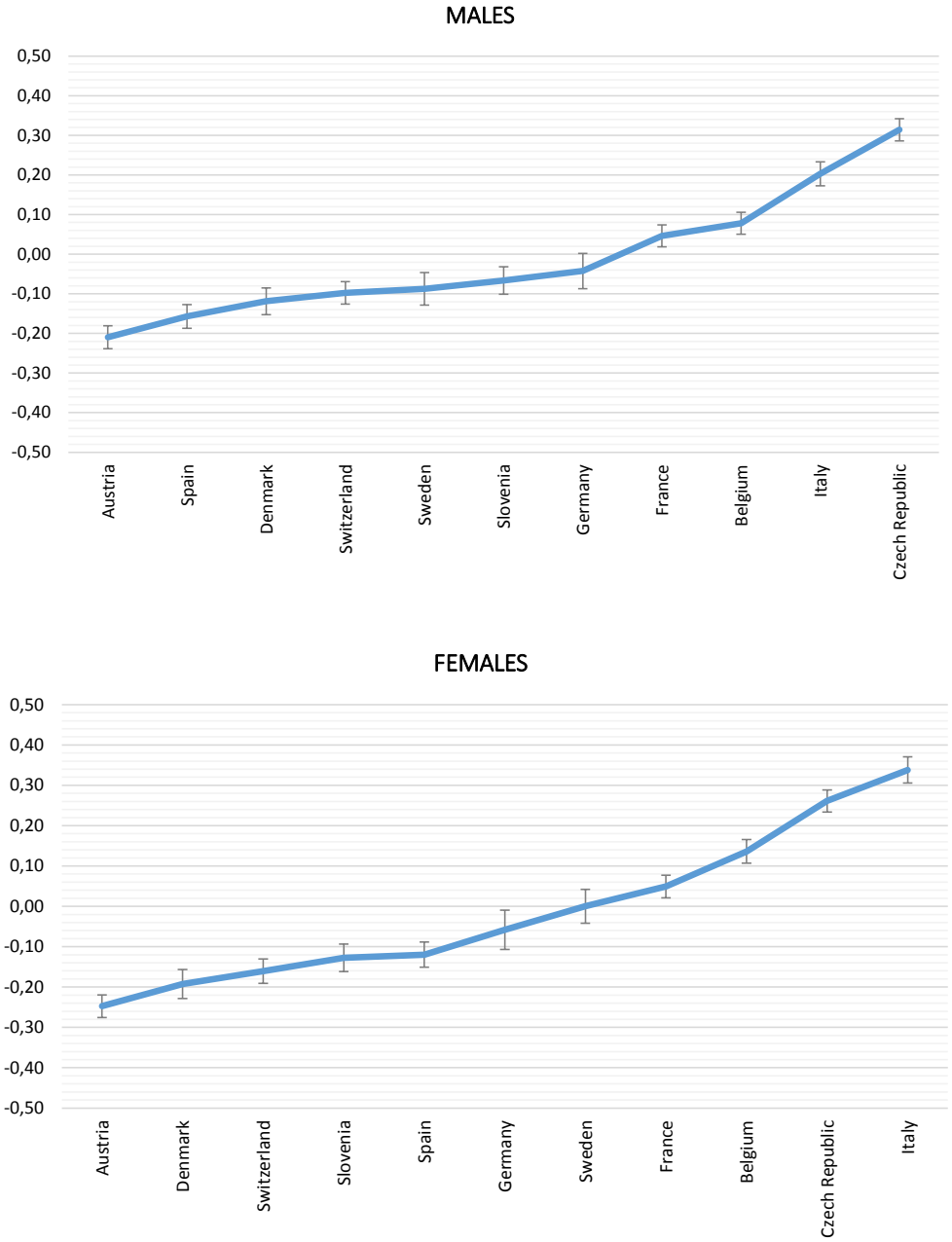
Table 6. Predicted probabilities and marginal effects.

	Males				Females			
	Pr=0	*Pr=1*	*Pr=2*	*Pr=3*	*Pr=0*	*Pr=1*	*Pr=2*	*Pr=3*
Predicted probabilities for reference person	0.480	0.276	0.151	0.093	0.464	0.253	0.173	0.110
Disability status								
Non-disabled (*ref.*)	-	-	-	-	-	-	-	-
Non-limited disabled	-0.005	0.001	0.002	0.002	-0.023	0.003	0.009	0.011
Moderate limited disabled	-0.106	0.014	0.039	0.054	-0.110	0.007	0.040	0.062
Severe limited disabled	-0.224	0.003	0.077	0.144	-0.229	-0.011	0.075	0.164
Change in disability status (wave 4 → wave 6)								
Same (*ref.*)	-	-	-	-	-	-	-	-
Worse	-0.008	0.002	0.003	0.003	-0.004	0.001	0.002	0.002
Better	0.018	-0.004	-0.006	-0.007	0.012	-0.002	-0.004	-0.005
Age group								
50-64 (*ref.*)	-	-	-	-	-	-	-	-
64-74	0.023	-0.005	-0.008	-0.009	0.025	-0.004	-0.009	-0.011
75+	-0.037	0.006	0.014	0.017	0.033	-0.006	-0.013	-0.015
Marital status								
Married cohabiting with partner (*ref.)*	-	-	-	-	-	-	-	-
Married living separated spouse or divorced	-0.072	0.011	0.027	0.034	-0.120	0.007	0.044	0.070
Never married	-0.109	0.014	0.040	0.055	-0.123	0.007	0.045	0.071
Widowed	-0.149	0.013	0.054	0.082	-0.135	0.006	0.049	0.080
Educational level								
Primary (*ref.*)	-	-	-	-	-	-	-	-
Secondary	0.009	-0.002	-0.003	-0.004	0.069	-0.013	-0.026	-0.029
Post-secondary and non-tertiary	0.114	-0.033	-0.041	-0.039	0.082	-0.016	-0.031	-0.034
Tertiary	0.021	-0.005	-0.008	-0.009	0.086	-0.017	-0.032	-0.034
Household size								
1 (*ref.*)	-	-	-	-	-	-	-	-
2	0.135	-0.040	-0.049	-0.045	0.047	-0.009	-0.018	-0.020
3	0.115	-0.033	-0.042	-0.040	0.025	-0.004	-0.010	-0.011
4 o more	0.107	-0.031	-0.039	-0.038	0.049	-0.009	-0.019	-0.021
Existence of children in the household	-0.003	0.001	0.001	0.001	0.019	-0.003	-0.007	-0.009
Born in country of residence	0.062	-0.016	-0.023	-0.023	0.007	-0.001	-0.003	-0.003
Labour status								
Retired (*ref.*)	-	-	-	-	-	-	-	-
Unemployed	-0.062	0.010	0.023	0.029	-0.017	0.002	0.006	0.008
Employee	0.046	-0.011	-0.017	-0.018	0.043	-0.008	-0.017	-0.019
Civil servant	0.021	-0.005	-0.008	-0.009	0.082	-0.017	-0.031	-0.033
Self-employed	0.100	-0.028	-0.036	-0.036	0.070	-0.014	-0.027	-0.029
Household income								
Quintile 1 (*ref.*)	-	-	-	-	-	-	-	-
Quintile 2	0.044	-0.011	-0.016	-0.017	-0.007	0.001	0.003	0.003
Quintile 3	0.039	-0.009	-0.014	-0.016	0.004	-0.001	-0.002	-0.002
Quintile 4	0.053	-0.013	-0.019	-0.020	0.001	0.000	0.000	0.000
Quintile 5	0.054	-0.014	-0.020	-0.021	0.046	-0.008	-0.018	-0.020
Location of residence								
Big city (*ref.*)	-	-	-	-	-	-	-	-
Suburbs of big city	-0.010	0.002	0.004	0.004	0.000	0.000	0.000	0.000
Large town	-0.034	0.006	0.012	0.015	-0.008	0.001	0.003	0.004
Small town	0.012	-0.002	-0.004	-0.005	-0.002	0.000	0.001	0.001
Rural area	0.025	-0.006	-0.009	-0.010	0.003	0.000	-0.001	-0.002
Participation in activities at least once a month								
Voluntary and charity work	0.055	-0.014	-0.020	-0.021	0.055	-0.010	-0.021	-0.024
Educational and training courses	-0.010	0.002	0.004	0.004	-0.010	0.001	0.004	0.005
Sports, social and other kind of club activities	0.069	-0.018	-0.025	-0.026	0.072	-0.014	-0.028	-0.030
Political activities	-0.023	0.004	0.008	0.010	-0.011	0.002	0.004	0.005
Read books, magazines or newspapers	0.057	-0.014	-0.021	-0.022	0.107	-0.023	-0.041	-0.042
Word or number games crossword, puzzles, etc.	-0.022	0.004	0.008	0.010	0.010	-0.002	-0.004	-0.005

Played cards or games such as chess	0.044	-0.010	-0.016	-0.017	0.073	-0.015	-0.028	-0.030

Source: Appendix Table A.1.

Figure 1. Ranking by country



Source: Own calculations from Appendix Table A.1.

APPENDIX

Table A.1 Ordered probit regressions on "*persistence in loneliness*".

	Males			Females		
	Mean	*Coeff.*	*SE*	*Mean*	*Coeff.*	*SE*
Disability status						
Non-disabled (*ref.*)	0.537	-	-	0.511	-	-
Non-limited disabled	0.145	0.013	0.033	0.126	0.057 **	0.028
Moderate limited disabled	0.222	0.271 ***	0.040	0.257	0.284 ***	0.039
Severe limited disabled	0.095	0.606 ***	0.037	0.106	0.631 ***	0.054
Change in disability status (wave 4 → wave 6)						
Same (*ref.*)	0.334	-	-		-	-
Worse	0.338	0.020	0.013		0.011	0.010
Better	0.328	-0.044 ***	0.007		-0.029 ***	0.004
Age group						
50-64 (*ref.*)	0.421	-	-	0.452	-	-
64-74	0.358	-0.058	0.044	0.337	-0.062	0.042
75+	0.221	0.093	0.060	0.211	-0.082	0.069
Marital status						
Married cohabiting with partner (*ref.)*	0.829	-	-	0.641	-	-
Married living separated spouse or divorced	0.016	0.183	0.118	0.021	0.312 ***	0.078
Never married	0.087	0.278 ***	0.066	0.121	0.319 ***	0.025
Widowed	0.068	0.387 ***	0.085	0.217	0.353 ***	0.039
Educational level						
Primary (*ref.*)	0.179	-	-	0.249	-	-
Secondary	0.535	-0.022	0.082	0.521	-0.172 ***	0.065
Post-secondary and non-tertiary	0.039	-0.288 ***	0.103	0.029	-0.205 *	0.110
Tertiary	0.247	-0.053	0.085	0.201	-0.215 ***	0.067
Household size						
1 (*ref.*)	0.114	-	-	0.267	-	-
2	0.634	-0.342 ***	0.059	0.539	-0.118 ***	0.047
3	0.152	-0.290 ***	0.079	0.124	-0.064	0.078
4 o more	0.100	-0.270 ***	0.083	0.069	-0.122 *	0.069
Existence of children in the household	0.309	0.007	0.045	0.295	-0.049	0.054
Born in country of residence	0.930	-0.155	0.103	0.926	-0.018	0.062
Labour status						
Retired (*ref.*)	0.721	-	-	0.771	-	-
Unemployed	0.027	0.156 *	0.081	0.021	0.042	0.063
Employee	0.149	-0.116 *	0.060	0.122	-0.108 *	0.063
Civil servant	0.049	-0.053	0.085	0.061	-0.205 **	0.088
Self-employed	0.053	-0.252 ***	0.095	0.024	-0.177 *	0.100
Household income						
Quintile 1 (*ref.*)	0.124	-	-	0.224	-	-
Quintile 2	0.186	-0.109 ***	0.031	0.218	0.017	0.026
Quintile 3	0.229	-0.099 ***	0.028	0.201	-0.011	0.034
Quintile 4	0.234	-0.132 ***	0.043	0.188	-0.002	0.047
Quintile 5	0.227	-0.136 ***	0.051	0.168	-0.116 ***	0.047
Location of residence						
Big city (*ref.*)	0.106	-	-	0.114	-	-
Suburbs of big city	0.109	0.026	0.074	0.110	0.001	0.073
Large town	0.142	0.085	0.063	0.149	0.021	0.079
Small town	0.260	-0.030	0.085	0.258	0.006	0.096
Rural area	0.382	-0.062	0.088	0.369	-0.008	0.075
Participation in activities at least once a month						
Voluntary and charity work	0.171	-0.139 *	0.078	0.156	-0.138 ***	0.046
Educational and training courses	0.051	0.026	0.047	0.077	0.026	0.035
Sports, social and other kind of club activities	0.317	-0.173 ***	0.042	0.272	-0.181 ***	0.043
Political activities	0.070	0.058	0.053	0.035	0.028	0.073
Read books, magazines or newspapers	0.747	-0.142 **	0.058	0.787	-0.268 ***	0.063

Word or number games crossword, puzzles, etc.	0.381	0.056	0.058	0.517	-0.026	0.048
Played cards or games such as chess	0.293	-0.110 **	0.053	0.282	-0.184 ***	0.041
μ1		-0.049	0.137		-0.090	0.106
μ2		0.693 ***	0.149		0.575 ***	0.103
μ3		1.319 ***	0.161		1.234 ***	0.109
Number of observations		22,323			29,712	
Pseudo R^2		0.057			0.060	

Note: Individuals aged 50 or more. Standard errors are robust. *** p<0.01, ** p<0.05, * p<0.1.
Source: Survey of Health, Ageing and Retirement in Europe, SHARE (waves 4, 5 and 6).