Loneliness, social isolation, and their discordance among older adults

Findings from The Irish Longitudinal Study on Ageing (TILDA)

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The Irish Longitudinal Study on Ageing

On behalf of the TILDA team

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Key Findings

- The absence of strong social supports in the form of loneliness and social isolation have been shown to be harmful to the wellbeing of older adults.
- Almost one third of adults aged 50+ in Ireland experienced emotional loneliness at least some of the time and 7.0% often felt lonely.
- Average loneliness scores on the University of California, Los Angeles Loneliness scale were low at 2.1 from a maximum of 10. Lower scores reflect less loneliness.
- Loneliness did not increase linearly with age but decreased from 50 years to 67 before increasing in older age.
- Participants aged 75 years and older were more likely than younger participants to report being moderately lonely.
- Lower levels of education and living alone were associated with higher levels of loneliness.
- Poor self-rated health, functional limitations, and chronic conditions were associated with higher levels of loneliness.
- Loneliness was associated with significantly poorer quality of life.
- More than three quarters (76.6%) of the loneliest third of older adults had clinically significant depressive symptomology when assessed using the Center for Epidemiologic Studies Depression Scale (CES-D).
- Using the Berkman-Syme Social Network Index (SNI), 21.9% of participants were in the most integrated group, 39.9% were moderately integrated, 29.6% were moderately isolated, and 8.6% were in the most isolated group.
- Average social isolation scores improved from the age of 50 years to 68 years before deteriorating in older age.
- Participants who had completed third level education (27.3%) were significantly more likely than those who had primary education only (15.2%) to be in the most socially integrated group.

- Participants from rural areas (6.5%) were less likely than those from Dublin City or County (10.4%) to be in the most isolated group.
- Older adults who lived alone had a higher risk of social isolation than those who lived with others.
- Social isolation was associated with poorer self-rated health, functional limitations, poorer quality of life, and depressive symptomology.
- The association between loneliness and depression was far stronger than the association between social isolation and depression.
- Using a measure of social asymmetry to categorise individuals according to the level of discrepancy between loneliness and social isolation showed that older adults who felt lonely despite a large social network size were most at risk of poor physical and psychological health. This group also had poorer quality of life and significantly more depressive symptoms.
- There was a small decrease in average UCLA loneliness scores over a six year period covering the first four Waves of TILDA data collection.
- There was no change in levels of social isolation over this six year period.
- The association between loneliness and depression may be due to the fact that depressive symptoms interfere with cognitive processes so that they negatively impact subjective assessments of the quantity and quality of social contacts and interactions.
- Loneliness and social isolation are not a necessary fact of the ageing process and recent efforts to alleviate these potentially damaging phenomena should be encouraged.
- There is a need to address both the subjective and objective features of loneliness in order to positively impact the wellbeing of older adults.

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1 Introduction

Social relationships are of fundamental importance as sources of support, reciprocity, and wellbeing. The absence of strong social supports in the form of loneliness and social isolation have been shown to be harmful to both physical and psychological wellbeing (1–3). Smaller social networks are also associated with early mortality, among older adults with or without limited everyday activities (4). Indeed, there is also an increasing body of research linking loneliness to excess mortality risk (5–10) with the associated mortality risk comparable to that of smoking and obesity (11). Conversely, strong social ties have been shown to protect individuals' from emotional distress, cognitive decline, and physical disability (1,12).

The issue of loneliness is not a new phenomenon. In 1947 a report chaired by Seebohm Rowntree reported that loneliness was a common and distressing feature of old age in post-war England (Rowntree 1947 cited in Harvey and Walsh 2016). In more recent years, the issue of loneliness, particularly among older adults has come to the fore. This is partly driven by the fact that an important consequence of population ageing has been the increasing number of older adults who live alone and a related increase in the prevalence of loneliness. Census of population statistics show that the number of adults aged 65 years and older who live alone increased from 136,295 in 2011 to 156,799 in 2016. This was an increase of 15% (15). It is estimated about 400,000 people in Ireland suffer from loneliness and The Irish Longitudinal Study on Ageing (TILDA) previously reported that more than 37% of people aged 50 and over felt lonely often or some of the time and that this figure rose to 45% after the age of 74.

Loneliness is now considered a critical issue for public health, and responses to increased concern about loneliness have included the establishment of a number of voluntary and community based organisations including ALONE (alone.ie). Also, in May 2019, the Minister of State for Mental Health Jim Daly, launched a €3 million mental health fund to assist community organisations combat loneliness. At the same time a Loneliness Taskforce was established in collaboration with ALONE to 'coordinate a response to the epidemic of loneliness and social isolation in Ireland' and '...increase awareness about the issue and to produce a set of recommendations for Government, state agencies and all

policy makers' (lonelinesstaskforce.com). Meanwhile, in the United Kingdom in 2018 the remit of the Junior Minister for Sport and Civil Society was expanded to include loneliness, a position now colloquially referred to as the 'Minister for Loneliness'.

Loneliness is a complex and multi-faceted concept. It is influenced by a wide range of factors ranging from individual characteristics to the local social environment. There are a number of comprehensive reviews available that identify the main associates of loneliness (3,16–18). Some of the main correlates of loneliness discussed in these reviews were older age; poor health; functional limitations; marital status; living alone; childlessness; low income, educational status, and socio-economic position (18). Importantly, loneliness is not a necessary feature of ageing. While some studies have found higher levels of loneliness in older age others have failed to confirm this association (3). Furthermore, it is generally accepted that any association between age and loneliness may be explained by other factors such as bereavement, declining health, and reduced opportunities for social contacts (3,17,18). A review by O'Luanaigh and Lawlor (2008) found that non-married men reported the highest levels of loneliness and found that bereavement was also a major risk factor. Furthermore, there is also some evidence that loneliness is related to personality type with a higher frequency of loneliness in individuals who had lower levels of extraversion and higher levels of neuroticism (19).

Internationally, a recent report from The Survey of Health, Ageing and Retirement in Europe (SHARE) found that older people who live alone have an increased risk of experiencing loneliness (12) and that loneliness plays an important role in the association between living alone and poor health (20).

In Ireland, previous research showed that social isolation was associated with older age, poorer health, rurality, and infrequent contact with friends (21). As well as individual level characteristics, socio-environmental factors such as barriers to outdoor social participation and mobility have also been found to be associated with loneliness and isolation (22). Access to transport may also be an important correlate (21) and data from TILDA has shown that older drivers are less lonely than non-drivers (23). Finally, while there is some evidence that having a pet protects against loneliness (24, 25), recent analysis of TILDA data did not find any association between pet ownership and loneliness (23).

Following a description of the methodology employed, this report is organised as follows: in Chapter 3 we describe loneliness among older adults in Ireland using the UCLA loneliness scale. We describe levels of loneliness and also examine differences in loneliness according to a number of socio-demographic characteristics.

This Chapter concludes with a description of the association between loneliness, health, and psychological wellbeing indicators.

Chapter 4 is focused on social integration and isolation measured using the Berkman-Syme Social Network Index (SNI) (26). In this Chapter we describe social isolation as it relates to socio-demographic characteristics and health and psychological wellbeing.

In Chapter 5, we use a measure of social asymmetry which is a combination of loneliness and social isolation and describe this measure as it relates to socio-demographic characteristics and health and psychological wellbeing.

In the final section (Chapter 6) we briefly describe patterns of change in loneliness and social isolation over a six year period during which there were four Waves of data collection time points. We also present separate analyses for different sub-groups. The report concludes with a discussion of the main findings.

2 Methodology

The Irish Longitudinal Study on Ageing (TILDA) is a prospective nationally representative study of community-dwelling older adults in the Republic of Ireland. Since 2009, TILDA has collected information every two years on all aspects of health, economic and social circumstances from community-dwelling people aged 50 and over. Participants were selected using multi-stage stratified random sampling whereby 640 geographical areas, stratified by socio-economic characteristics, were selected, followed by 40 households within each area. The Irish GeoDirectory listing of all residential addresses provided the sampling frame. The first Wave of data collection was conducted between October 2009 and July 2011 and a total of 8,504 participants were recruited. This represents 1 in 156 people aged 50 and over in Ireland.

TILDA collects data from participants in three ways: computer-assisted personal interview (CAPI) administered by trained social interviewers in the participants' own homes; a self-completion questionnaire (SCQ) completed privately by the participant and designed for the collection of more sensitive information such as alcohol use and relationships; and a health assessment carried out by research nurses at Waves 1 and 3. The fifth Wave of data collection was completed in December 2018 and TILDA will begin collecting data for Wave 6 in 2020. The response rate at Wave 1 was 62%.

To account for systematic differences in participation among different sub-groups and to ensure that any estimates derived from the sample are representative of the wider population, appropriate survey weights were applied to the data. These survey weights were estimated based on age, sex and educational attainment. Further details on all aspects of the methodology used in TILDA are available elsewhere (27–30).

Sample

The cross-sectional analyses (Chapters 3 to 5) were based on the first Wave of TILDA data. The sections on emotional loneliness and social asymmetry include 6,688 participants aged 50 years and older who completed the SCQ. The section on social isolation includes 8,174 participants who completed a CAPI survey. In order to examine whether emotional loneliness and social isolation have changed among TILDA participants during the first four Waves of data collection, we describe the results of a longitudinal analysis in Chapter 6. The sample included in this analysis include 3,695 participants who had a loneliness score at each of the four Waves and 4,699 participants for whom data on social isolation was available at each Wave.

Key Indicators

Loneliness is a complex construct with many definitions, it is therefore important that we clearly describe the different concepts of loneliness used in this report and also that we make clear the distinction between what are termed emotional loneliness and social isolation.

Emotional loneliness

Emotional loneliness is the subjective assessment of an individual's satisfaction with the quality of their social relationships and while most often considered the psychological embodiment of social isolation (8), can also be present among highly socially integrated individuals (31).

TILDA measured emotional (subjective) loneliness using a modified version of the University of California-Los Angeles (UCLA) Loneliness scale (32). This measurement tool consists of five items:

- How often do you feel you lack companionship?
- How often do you feel left out?
- How often do you feel isolated from others?
- How often do you feel in tune with the people around you?
- How often do you feel lonely?

Each question has three response options (hardly ever or never = 0, some of the time = 1, often = 2). Responses to the five items were summed, resulting in an overall score ranging from 0 (not lonely) to 10 (extremely lonely).

Social isolation

TILDA uses a measure of the size of an individual's social network to measure social isolation. The size of social networks was measured using the Berkman-Syme Social Network Index (SNI) (26). This index is scored on a 0-4 composite scale that captures four types of social connection: (1) marital status; (2) close ties with children, relatives and friends; (3) membership of a church group, and (4) membership of voluntary organisations. A score of 0-1 identifies individuals as 'most isolated', with a score of 4 indicating 'most integrated'. To aide their interpretability, these scores have been reversed so that higher scores indicate greater isolation.

Social asymmetry

Among the competing theories that aim to explain loneliness in later life, cognitive discrepancy theory states that loneliness stems from a mismatch between desired and actual frequency and quality of social interactions (33). To accurately capture this concept of cognitive discrepancy, requires that we derive a measure that takes account of both an individual's subjective feelings of loneliness and an objective measure of their social contacts. In doing so, we can address the fact that the relationship between loneliness and social integration is not always consistent – many individuals do not experience loneliness despite few social contacts while others may experience loneliness despite have many social ties (31,34). In fact, although people who are socially isolation do experience loneliness (18), the overlap between the objective size of individuals' social networks and the experience of loneliness tends to be weak (2,3,8,31).

Drawing on cognitive discrepancy theory, the measure we use here to combine subjective and objective loneliness was first proposed by McHugh et al. (2017). This measure is called social asymmetry. To calculate the social asymmetry of individuals, scores on both the loneliness and social isolation scales were first standardised and then standardised loneliness scores were subtracted from social isolation scores. These scores were then categorised according to whether they fell within or outside +/- 1 standard deviation of the mean of zero. By this method individuals whose scores fell one standard deviation above the mean were categorised as Discordant Susceptible as they were lonelier than expected given their level of social connectedness. Those whose scores fell one standard deviation below the mean were categorised as Discordant Robust meaning that they were less lonely than expected given their level of social connectedness. The third group consisted of participants who fell within +/-1 standard deviation which meant they were as lonely as expected given their level of social connectedness. Because this final group contained individuals who scores either high or low on both loneliness and social connectedness they were further divided into two groups.

Participants who scored higher than the median on the loneliness scale were categorised as Concordant High Lonely while those who scored below the median were in the Concordant Low Lonely group. In summary, the four groups arrived at were: Concordant high lonely (high loneliness, high isolation); Concordant low lonely (low loneliness, low isolation); Discordant susceptible (high loneliness, low isolation); and Discordant robust (low loneliness, high isolation).

Quality of life

TILDA used the 19- item self-report measurement, CASP-19, to assess quality of life (35, 36). This scale has been used in other longitudinal studies and has good psychometric properties (37). CASP-19 captures information on four domains of the quality of life of older adults. These domains, described in Table 1 are: Control, Autonomy, Self-realisation and Pleasure. The items included in CASP-19 consists of statements such as: I can do the things that I want to do, I look forward to each day, and I feel that life is full of opportunities. These statements are presented to participants in a self-completion questionnaire and they are asked to indicate how often (often, sometimes, not often, or never) they feel each statement applies to their life. Each item is scored from 0 to 3 and summed to give an overall score (range 0 to 57) with higher scores denoting better quality of life.

Table 1 CASP-19 Quality of Life domains

CASP-19 Quality of Life domains	
Control	The ability to actively participate in one's environment.
Autonomy	The right of the individual to be free from the unwanted interference of others.
Self-realisation	The fulfilment of one's potential.
Pleasure	The sense of happiness or enjoyment derived from engaging with life.

Depression

Depression symptoms were measured using the Center for Epidemiologic Studies Depression Scale (38). This 20-item scale was administered during the CAPI and was used to estimate the prevalence of depressive symptomology among TILDA participants. The CES-D measures the degree to which respondents have experienced a wide variety of depressive symptoms within the past week. Each of the 20 items is measured on a four point scale, ranging from zero to three, leading to a maximum score of 60. A score of 16 or higher is used to identify clinically significant (case level) depressive symptoms (39). Cut-offs are also available to identify sub-threshold depressive symptomology.

Using these cut-offs, moderate depressive symptomology was indicated by scores between 8 and 15 (40). In the cross-sectional analyses presented in Chapters 3 to 5, we report both the mean number of depressive symptoms recorded using the CES-D and depressive caseness. In the longitudinal analyses in Chapter 6, we describe the prevalence of severe (≥16 symptoms) and moderate depressive (8-15 symptoms) at each Wave of TILDA.

Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs)

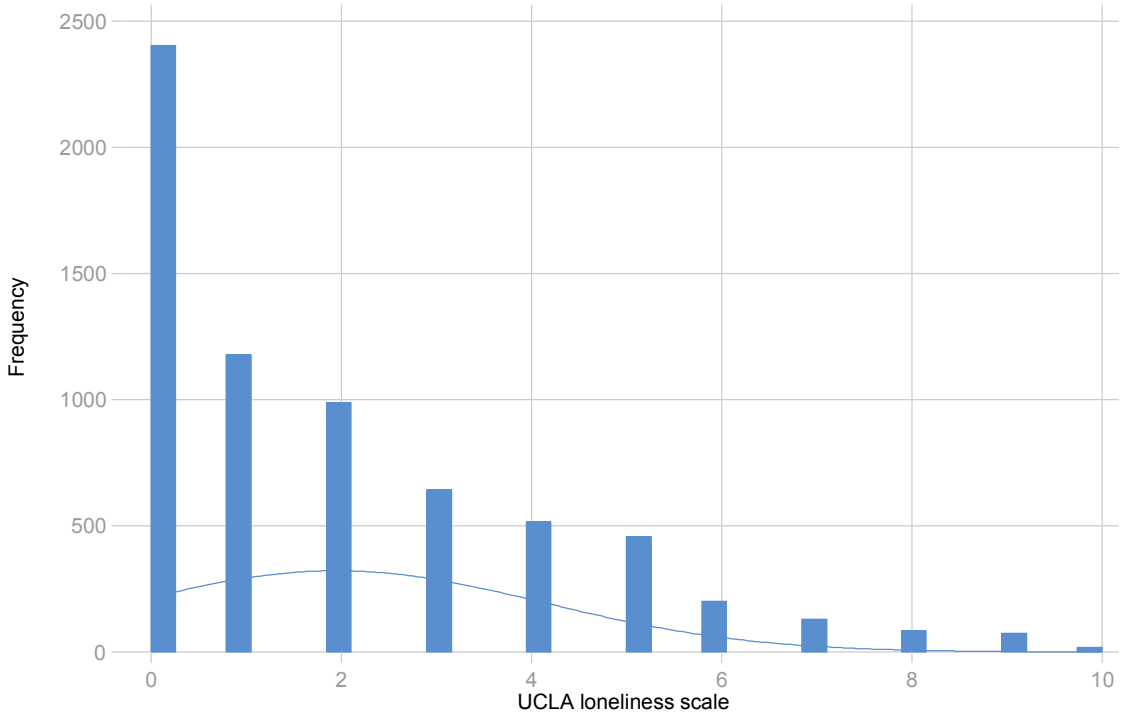
During CAPI interview, participants were asked if that had any difficulties carrying out a number of routine daily activities. ADLs refer to Activities of Daily Living. These are basic everyday tasks related to necessary personal care. The specific activities were: dressing, walking across a room, bathing or showering, eating, getting in or out of bed, and using the toilet. IADLs are instrumental activities of daily living and include tasks that are a necessary part of living independently in the community. The specific activities were: preparing meals, doing household chores, shopping, using the telephone, taking medications, and managing money.

3 Emotional Loneliness

Responses to the single question asked as part of the self-completion questionnaire ("How often do you feel lonely?"), showed that 62.5% (95% CI: 61.1-63.8) of older adults hardly ever or never felt lonely; 30.5% (95% CI: 29.2-31.8) felt lonely some of the time; and 7.0% (95% CI: 6.3-7.8) often felt lonely.

Figure 1 shows the distribution of loneliness across the range of possible UCLA loneliness scores. Based on this multi-item indicator, one third of older adults reported that they were not at all lonely (score of zero) and very few reported the highest levels of loneliness. The average loneliness score was 2.1 and the median was 1.0.

Figure 1 Distribution of UCLA loneliness scores

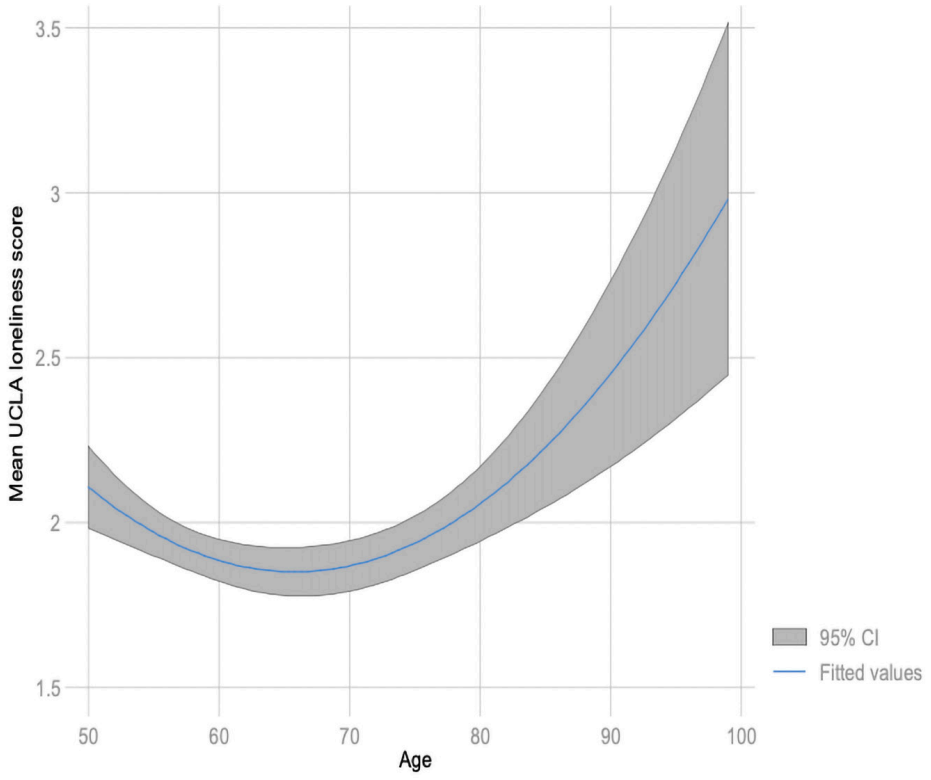


Because of the skewed distribution of UCLA loneliness scores, we divided the scores into tertiles (three groups). The first of these three groups includes the least lonely participants (33.4%, 95%CI: 32.2-34.8) who had a scores of zero on the UCLA loneliness scale. The middle group (32.9%, 95%CI: 31.6-34.1) scored either one or two, while the loneliest group (33.7%, 95%CI: 32.4-35.0) scored between three and ten.

3.1 Emotional loneliness and ageing

Figure 2 shows that there is a u-shaped association between emotional loneliness and age. Loneliness decreases between the ages of 50 and 67 before increasing in older age. The wider confidence intervals in older age are due to the fact that there are fewer respondents in the older age groups.

Figure 2 Average UCLA loneliness score by age with 95% confidence intervals



3.2 Socio-demographic characteristics by loneliness

Table 2 shows the distribution of the three levels of loneliness according to the socio-demographic characteristics of participants at Wave 1. There were no statistically significant differences between men and women in emotional loneliness scores. Participants aged 75 years and older were less likely than younger participants to report being in the least lonely group and significantly more likely to report being moderately lonely. For example 40.8% (95%CI: 37.4-44.2) of this oldest age group reported moderate

loneliness compared to 30.1% (95%CI: 28.5-31.7) of those aged 50 to 64 years. There was a clear education gradient. Older adults with higher levels of education were more likely to be in the least lonely group. There was also a strong association between living alone and loneliness – half of those who lived alone were in the most lonely group (50.0%, 95%CI: 47.1-52.8) compared to 28.3% (95%CI: 26.8-29.8) who lived with someone. Finally, there was no significant difference in loneliness according to whether participants lived in a rural or urban area of the country.

Table 2 Distribution of loneliness by key socio-demographic characteristics

	Least lonely		Moderately lonely		Most lonely		Number in sample
	%	95% CI	%	95% CI	%	95% CI	
Gender							
Male	34.4	(32.6,36.3)	32.7	(31.0,34.6)	32.8	(31.0,34.7)	3070
Female	32.5	(30.9,34.2)	33.0	(31.3,34.7)	34.5	(32.8,36.3)	3618
Age group							
50-64 years	35.3	(33.5,37.1)	30.1	(28.5,31.7)	34.6	(32.8,36.5)	3877
65-74 years	34.5	(32.2,36.8)	33.6	(31.4,36.0)	31.9	(29.6,34.3)	1796
75+ years	26.2	(23.4,29.3)	40.8	(37.4,44.2)	33.0	(29.8,36.3)	1015
Education							
Primary/none	28.8	(26.6,31.1)	35.1	(32.8,37.5)	36.1	(33.6,38.6)	1830
Secondary	33.9	(32.0,35.8)	33.2	(31.3,35.2)	32.9	(31.0,34.9)	2739
Third/higher	38.8	(36.4,41.2)	29.2	(27.2,31.3)	32.0	(29.8,34.3)	2117
Living status							
Lives alone	17.9	(15.9,20.1)	32.1	(29.5,34.9)	50.0	(47.1,52.8)	1384
Lives with others	38.6	(37.1,40.2)	33.1	(31.7,34.5)	28.3	(26.8,29.8)	5304
Location							
Dublin city or county	36.9	(34.2,39.8)	31.8	(29.3,34.4)	31.2	(28.8,33.8)	1619
Another town or city	31.6	(29.3,34.1)	32.4	(30.1,34.8)	36.0	(33.4,38.7)	1881
A rural area	32.6	(30.9,34.4)	33.8	(32.0,35.6)	33.5	(31.7,35.4)	3188
Total	33.4	(32.2,34.8)	32.9	(31.6,34.1)	33.7	(32.4,35.1)	6688

Figure 3 shows the percentage of participants in each of the three loneliness groups by age group and gender. Women aged 75 years and older were significantly more likely than women in younger age groups to report being moderately lonely.

Figure 3 Distribution of loneliness by sex and age group

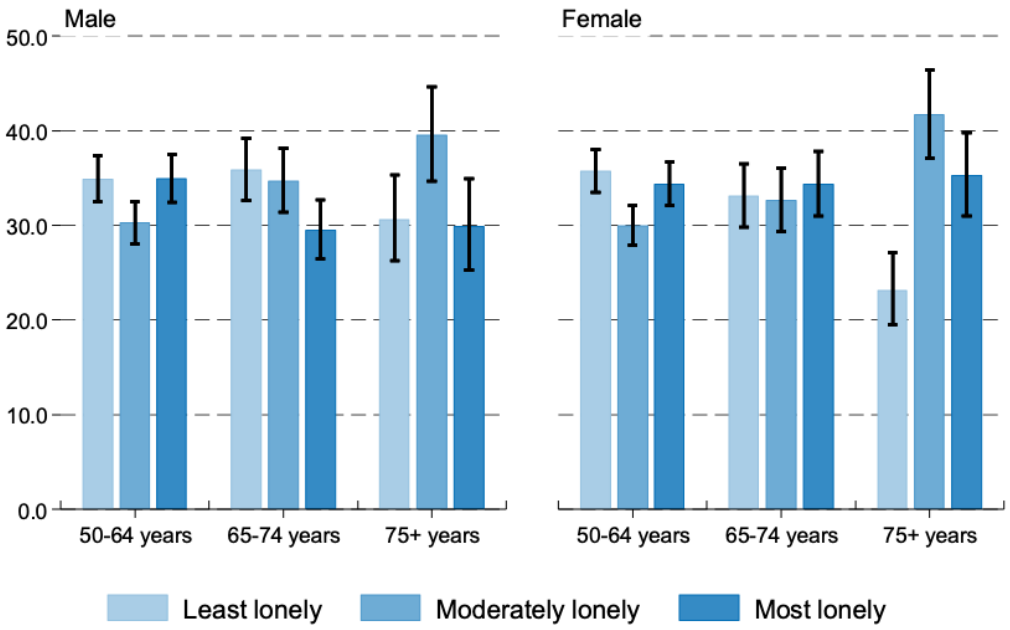
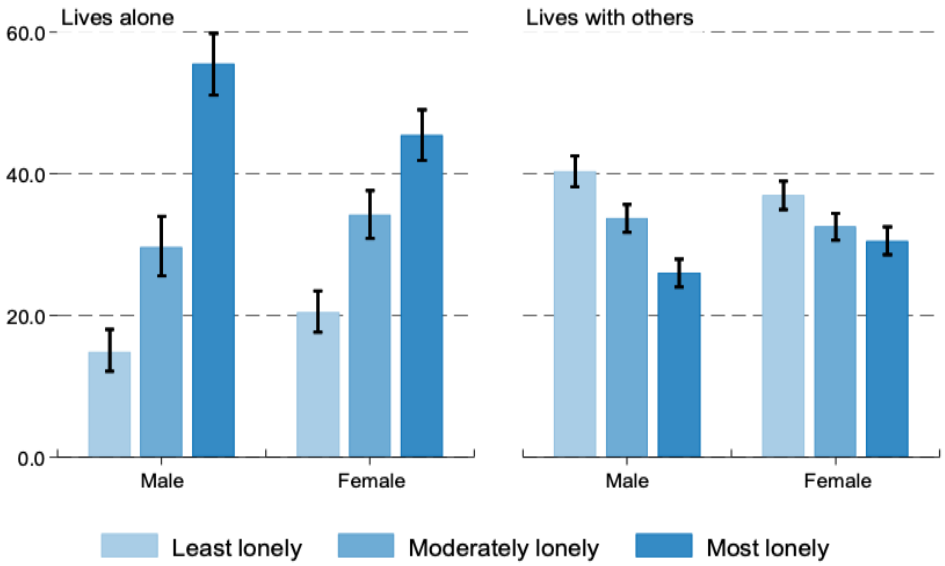


Figure 4 shows that living alone was associated with greater loneliness for both men and women. Furthermore, the effect of living alone on loneliness was stronger among men than women. Fifty six percent of men who lived alone (95% CI: 51.1-59.9) were in the most lonely group compared to 45.3% of women (95% CI: 41.9-49.1). Conversely, living with someone was associated with lower loneliness scores among both men and women.

Figure 4 Distribution of loneliness by sex and living status



3.3 Loneliness and indicators of health and psychological wellbeing

Table 3 shows the distribution of loneliness according to key indicators of health and psychological wellbeing. Better self-related health was strongly associated with less loneliness. For example, while over half (56.5%, 95%CI: 52.9-60.0) of the participants with fair or poor self-rated health were in the most lonely group, only one-in-four of those with excellent or very good self-rated health were in this group (24.8%, 95%CI: 23.3-26.5). Functional limitations, indicated by the presence of at least one ADL or IADL was also associated with increased loneliness. This was also true of chronic conditions with loneliness increasing as the number of reported conditions increased. At the extreme end of this, 40.4% (95%CI: 37.9-43.0) or participants with three or more chronic conditions were in the most lonely group compared to 29.8% (95%CI: 27.3-32.5) of those who had no chronic condition.

Loneliness was also associated with poorer quality of life, measured using the CASP-19 instrument described above. The average quality of life score among the least lonely group was 48.5 (95%CI: 48.2-48.7) compared to 38.1 (95%CI: 37.6-38.5) among the most lonely. This means that participants in the loneliest group had a quality of life score 21% lower than those in the least lonely group. There was a strong association between loneliness and both the number of depressive symptoms and clinical depression caseness. In terms of the number of depressive symptoms reported, participants in the most lonely group reported 9.9 symptoms on average (95% CI: 9.4-10.3) compared to 3.1 (95% CI: 2.9-3.3) symptoms reported by the least lonely group. This represents a more than threefold difference. These differences in the number of depressive symptoms reported by the different loneliness groups is reflected in the stark difference in depression prevalence between the groups. More than three quarters 76.6% (95%: 72.8-80.0) of the most lonely group were found to have clinically significant depressive symptoms compared to only 7.4% (95%: 5.5-10.0) of the least lonely group.

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[1] The chronic conditions reported were: incontinence, cataracts, glaucoma, age-related macular degeneration, lung disease, asthma, arthritis, osteoporosis, cancer, Parkinson's disease, ulcer, varicose ulcer, liver disease, thyroid, kidney disease, anaemia

Table 3 Distribution of loneliness by key health and psychological wellbeing indicators

	Least lonely		Moderately lonely		Most lonely		Number in sample
	%	95% CI	%	95% CI	%	95% CI	
Self-rated health							
Excellent/V. Good	40.4	(38.6,42.2)	34.8	(33.1,36.5)	24.8	(23.3,26.5)	3754
Good	29.4	(27.2,31.7)	32.8	(30.5,35.1)	37.8	(35.4,40.3)	1984
Fair/Poor	17.1	(14.8,19.8)	26.4	(23.4,29.6)	56.5	(52.9,60.0)	941
ADLs							
None	34.5	(33.1,35.9)	33.1	(31.8,34.5)	32.4	(31.0,33.8)	6149
At least one	22.6	(19.0,26.6)	30.0	(25.9,34.4)	47.5	(42.9,52.1)	539
IADLs							
None	34.9	(33.6,36.3)	33.0	(31.7,34.4)	32.0	(30.7,33.4)	6259
At least one	15.0	(11.7,19.0)	30.5	(26.0,35.5)	54.5	(49.4,59.5)	429
Chronic conditions							
None	37.5	(34.9,40.2)	32.7	(30.2,35.3)	29.8	(27.3,32.5)	1479
One	36.7	(34.3,39.1)	32.6	(30.3,35.1)	30.7	(28.3,33.2)	1889
Two	32.4	(30.0,34.9)	34.1	(31.5,36.7)	33.5	(30.9,36.2)	1561
Three or more	27.4	(25.1,29.8)	32.2	(29.8,34.7)	40.4	(37.9,43.0)	1759
CAPS-19 Quality of life							
Mean score	48.5	(48.2,48.7)	44.6	(44.3,44.9)	38.1	(37.6,38.5)	5790
CES-D depression score							
Mean score	3.1	(2.9,3.3)	4.9	(4.6,5.2)	9.9	(9.4,10.3)	6589
CES-D depression status							
None/mild	41.0	(39.4,42.6)	35.2	(33.8,36.8)	23.7	(22.4,25.2)	4864
Moderate	18.8	(16.3,21.6)	32.5	(29.5,35.6)	48.7	(45.4,52.0)	1143
Severe	7.4	(5.5,10.0)	16.0	(13.1,19.3)	76.6	(72.8,80.0)	582
Total	33.4	(32.2,34.8)	32.9	(31.6,34.1)	33.7	(32.4,35.1)	6688

4 Social Isolation

4.1 Social isolation and ageing

In this section, we describe the distribution of social isolation using the Berkman-Syme Social Network Index (SNI) (26) described earlier. As shown in Figure 5, 21.9% (95%CI: 20.7-23.2) of participants were in the most integrated group, 39.9% (95%CI: 38.6-41.1) were moderately integrated, 29.6% (95%CI: 28.3-31.0) were moderately isolated, and 8.6% (95%CI: 7.8-9.5) were in the most isolated group.

Figure 5 Distribution of Social Network Index (SNI) scores (reverse coded so that higher scores indicate more isolated)

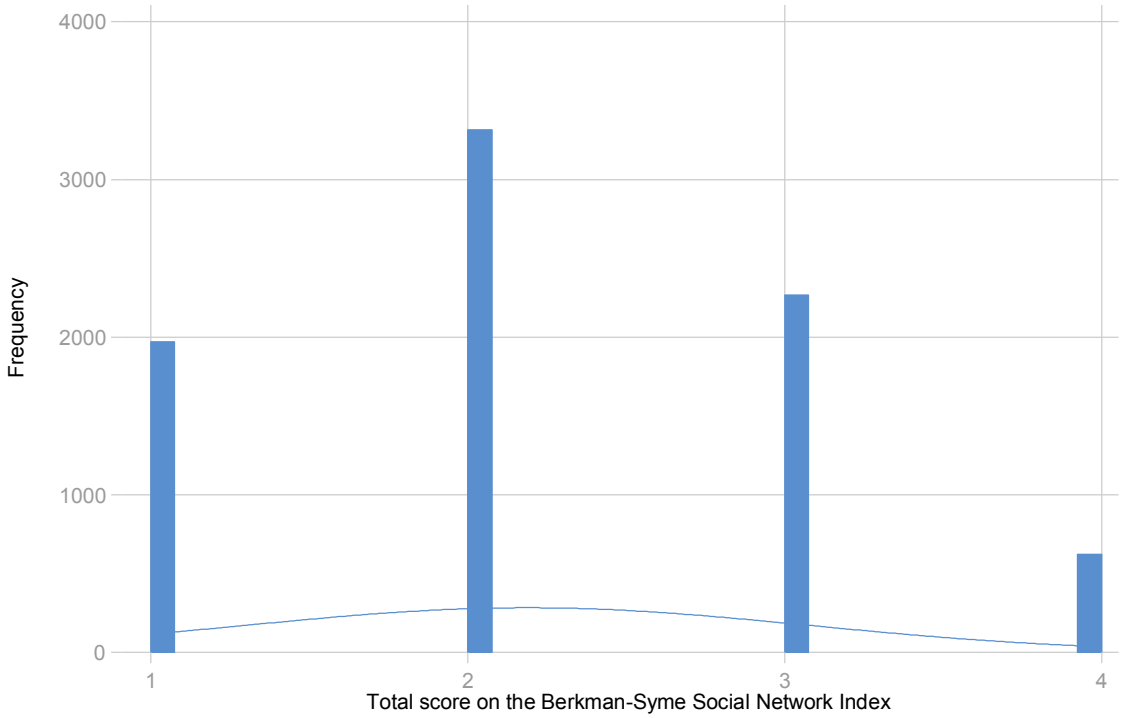
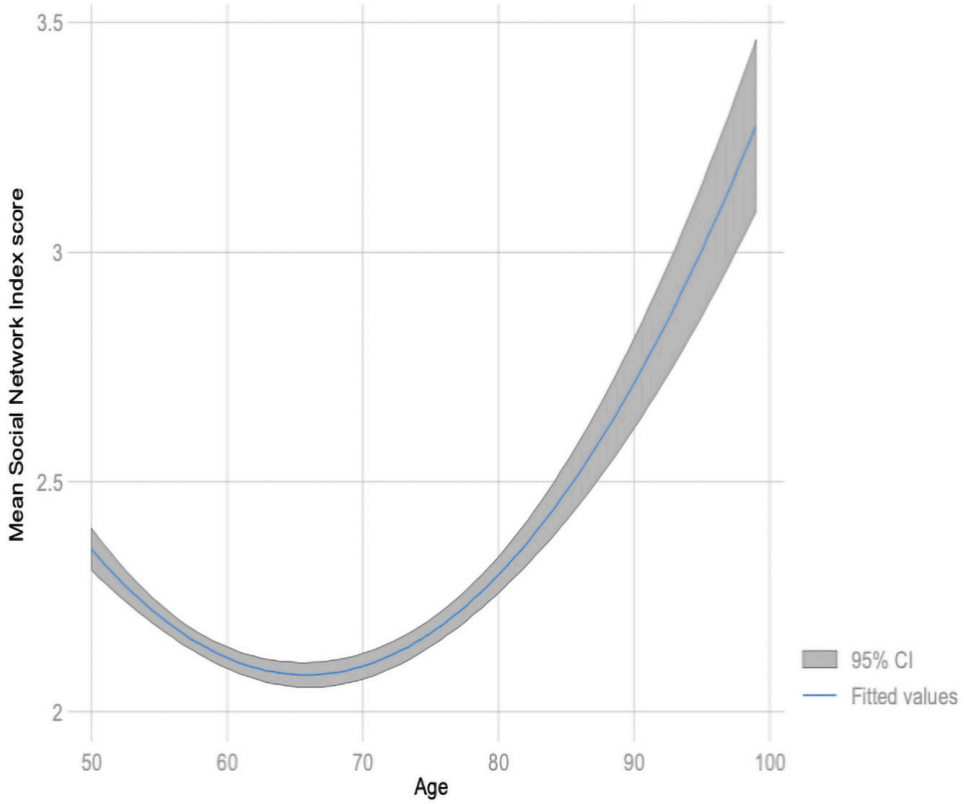


Figure 6 below shows that the association between social isolation and age follows a similar u-shaped distribution to that observed for loneliness (Figure 2). Average social isolation scores decrease from the age of 50 years to 68 years before increasing in older age.

Figure 6 Average Social Network Index (SNI) by age with 95% confidence intervals



4.2 Socio-demographic characteristics by social isolation

As shown in Table 4, similar levels of social isolation were reported by men and women. Participants aged 65 to 74 years were the most integrated (27.9%, 95% CI: 25.6-30.3). Participants who had completed third level education (27.3%, 95% CI: 25.1-29.6) were significantly more likely than those who had primary education only (15.2%, 95% CI: 13.4-17.2) to be in the most socially integrated group. Those with third level education were also the least likely to be in the most socially isolated group (5.8%, 95% CI: 4.7-7.2). Given that the SNI is a measure of the number of regular social contacts, it is unsurprising that participants who lived alone were more likely to be socially isolated. Even so, the difference was stark, with 22.0% (95% CI: 19.7-24.5) of those who lived alone in the most isolated category, compared to only 4.0% (95% CI: 3.3-4.7) of those who lived with someone. Finally, participants who lived in rural areas were significantly more likely to be in the most integrated group (24.2%, 95% CI: 22.6-26.0) than those from Dublin and surrounding areas (18.9, 95% CI: 16.3-21.7). Rural participants were also less likely than other groups to be in the most isolated category (6.5%, 95% CI: 5.5-7.7).

Table 4 Distribution of social isolation by key socio-demographic characteristics

	Most Integrated		Moderately Integrated		Moderately Isolated		Most Isolated		Number in sample
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	
Gender									
Male	23.7	(22.1,25.3)	38.4	(36.6,40.3)	30.1	(28.3,31.9)	7.8	(6.7,9.1)	3744
Female	20.3	(18.9,21.8)	41.2	(39.5,43.0)	29.2	(27.6,30.9)	9.3	(8.2,10.5)	4430
Age group									
50-64 years	21.3	(19.7,22.9)	38.3	(36.6,39.9)	31.1	(29.3,32.8)	9.4	(8.3,10.7)	4668
65-74 years	27.9	(25.6,30.3)	41.2	(38.7,43.7)	24.0	(21.8,26.5)	6.9	(5.6,8.5)	2164
75+ years	16.7	(14.2,19.6)	43.3	(39.9,46.7)	32.0	(28.8,35.3)	8.1	(6.5,10.1)	1342
Education									
Primary/ none	15.2	(13.4,17.2)	40.3	(37.9,42.8)	34.4	(32.0,36.8)	10.2	(8.7,11.8)	2504
Secondary	24.0	(22.2,25.8)	39.3	(37.4,41.3)	27.9	(26.1,29.9)	8.8	(7.5,10.2)	3263
Third/higher	27.3	(25.1,29.6)	40.5	(38.2,42.8)	26.3	(24.2,28.6)	5.8	(4.7,7.2)	2403
Living status									
Lives alone	0.0	(0.0,0.3)	34.4	(31.8,37.2)	43.5	(40.7,46.4)	22.0	(19.7,24.5)	1821
Lives with others	29.4	(27.9,31.0)	41.7	(40.3,43.2)	24.8	(23.4,26.4)	4.0	(3.3,4.7)	6353
Location									
Dublin city or county	18.9	(16.3,21.7)	40.3	(37.6,43.0)	30.4	(27.8,33.2)	10.4	(8.6,12.6)	1936
A rural area	24.2	(22.6,26.0)	41.7	(40.0,43.5)	27.6	(25.8,29.5)	6.5	(5.5,7.7)	3924
Total	21.9	(20.7,23.2)	39.9	(38.6,41.1)	29.6	(28.3,31.0)	8.6	(7.8,9.5)	8174

Overall, Figure 7 shows that the distribution of social isolation was similar between men and women and between different age groups. In each grouping, the smallest proportion were in the most isolated group while moderately integrated was most common category.

Figure 7 Distribution of social isolation by sex and age group

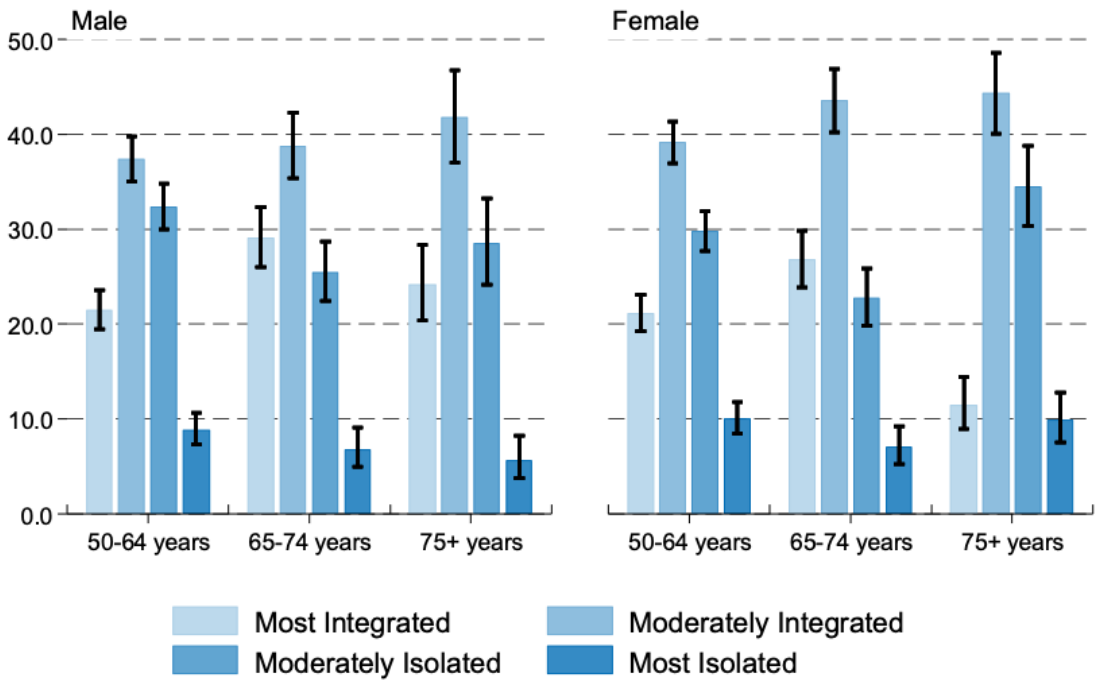
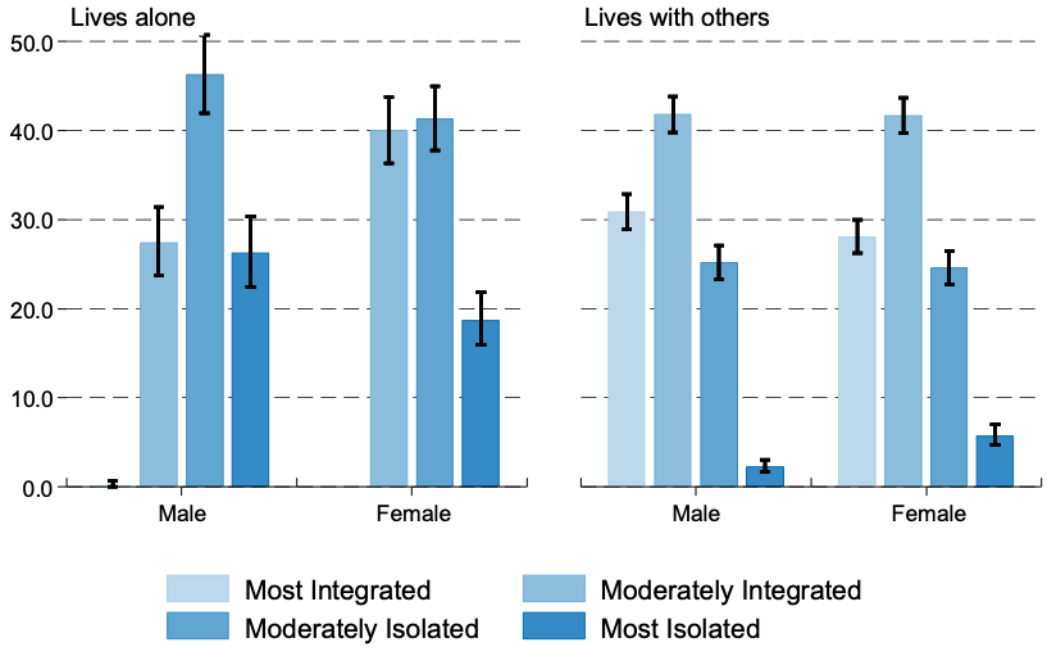


Figure 8 below shows some important differences in the levels of social isolation reported by men and women according to whether or not they live with somebody else. Of course, because of the way that social isolation has been measured no participants who live alone could be considered to be in the most integrated group. However, we did find noteworthy differences between men and women. Almost half of men who lived alone were moderately isolated (46.3%, 95% CI: 41.9-50.7) with the remainder evenly spread between the moderately integrated (27.4%, 95% CI: 23.7-31.4) and the most isolated group (26.2%, 95% CI: 22.4-30.4). Furthermore, women who lived alone were significantly less likely than men to be in the most isolated group (18.7% vs. 26.2%). Conversely, women who lived with others were significantly more likely than men who did so to be in the most isolated group (5.7% vs. 2.2%).

Figure 8 Distribution of social isolation by sex and living status



4.3 Social isolation and indicators of health and psychological wellbeing

Table 5 shows the distribution of social isolation according to key indicators of health and psychological wellbeing. Poorer self-rated health was associated with greater social isolation. For example, 16.2% (95% CI: 13.7-19.1) of participants with fair or poor self-rated health were in the most socially isolated group compared to 6.1% (95% CI: 5.2-7.2) of those with excellent or very good self-rated health. Functional limitations in the form of ADLs and IADLs were also associated with social isolation. However, there were no significant differences in social isolation according to the number of chronic conditions reported. More socially integrated participants reported better quality of life and fewer significantly depressive symptoms. In terms of clinically significant depressive symptomology, sever symptoms were more likely to be reported by the most isolated and least integrated participants.

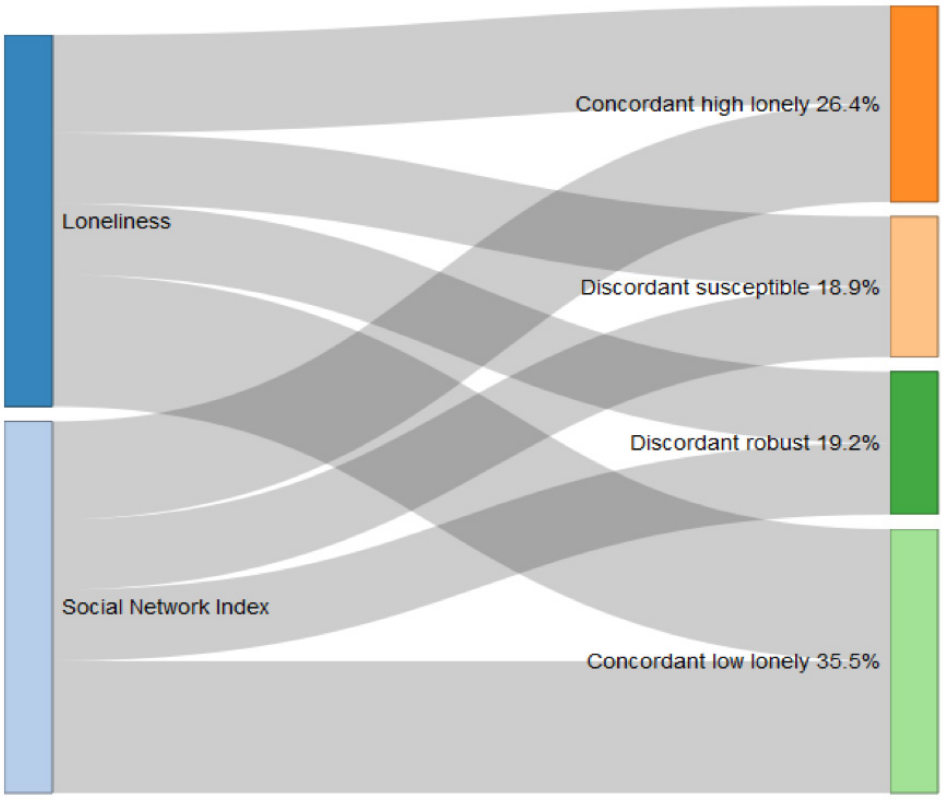
Table 5 Distribution of social isolation by key health and psychological wellbeing indicators

	Most Integrated		Moderately Integrated		Moderately Isolated		Most Isolated		Number in sample
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	
Self-rated health									
Excellent/V. Good	25.9	(24.3,27.5)	40.2	(38.5,42.0)	27.8	(26.1,29.5)	6.1	(5.2,7.2)	4459
Good	20.2	(18.4,22.2)	40.7	(38.5,42.9)	30.3	(28.0,32.6)	8.9	(7.4,10.6)	2441
Fair/Poor	11.8	(10.0,13.8)	37.3	(34.0,40.7)	34.7	(31.5,38.1)	16.2	(13.7,19.1)	1260
ADLs									
None	22.6	(21.4,24.0)	40.2	(38.8,41.5)	29.1	(27.8,30.5)	8.0	(7.2,9.0)	7475
At least one	14.7	(12.0,17.8)	36.8	(32.4,41.3)	34.5	(30.2,39.0)	14.1	(10.8,18.2)	699
IADLs									
None	23.0	(21.7,24.3)	40.4	(39.1,41.8)	28.6	(27.3,30.0)	8.0	(7.1,8.9)	7575
At least one	9.7	(7.4,12.6)	33.3	(28.9,38.1)	41.1	(36.3,46.0)	15.9	(12.4,20.3)	599
Chronic conditions									
None	22.3	(20.1,24.7)	37.5	(35.0,40.1)	31.9	(29.2,34.6)	8.3	(6.6,10.3)	1838
One	23.9	(21.8,26.0)	40.9	(38.6,43.3)	27.7	(25.5,30.1)	7.5	(6.2,9.1)	2288
Two	21.2	(19.2,23.4)	41.4	(38.9,43.9)	29.0	(26.5,31.6)	8.4	(6.8,10.3)	1894
Three or more	20.2	(18.2,22.4)	39.5	(37.1,42.0)	30.2	(27.9,32.6)	10.1	(8.6,11.8)	2154
CAPS-19 Quality of life									
Mean score	45.8	(45.5,46.2)	44.5	(44.2,44.9)	42.5	(42.0,43.0)	40.0	(38.9,41.1)	7146
CES-D depression score									
Mean score	4.4	(4.1,4.8)	5.4	(5.1,5.7)	7.0	(6.6,7.5)	9.5	(8.5,10.5)	8070
CES-D depression status									
None/mild	24.6	(23.2,26.1)	41.3	(39.8,42.9)	27.7	(26.2,29.3)	6.3	(5.5,7.2)	5851
Moderate	16.9	(14.8,19.2)	41.1	(38.2,44.0)	30.6	(27.9,33.5)	11.4	(9.3,14.0)	1416
Severe	13.2	(10.8,16.1)	28.4	(24.7,32.5)	41.2	(36.8,45.7)	17.2	(13.8,21.2)	776
Total	21.9	(20.7,23.2)	39.9	(38.6,41.1)	29.6	(28.3,31.0)	8.6	(7.8,9.5)	8174

5 Social Asymmetry

As described above, social asymmetry captures the degree of overlap or discordance between subjective feelings of (emotional) loneliness and objective social network size (social isolation). In short, this construct allows us to distinguish between individuals who may not feel lonely despite a small social network and vice versa. By employing this method we can distinguish four distinct groups. The first is those who score high on both loneliness and social isolation. This is the concordant high lonely group and consists of 26.4% (95%CI: 25.2-27.6) of older adults. The second group is the concordant low lonely group which included 35.6% (95%CI: 34.2-36.9) of older adults. This group are socially integrated and not lonely. The third groups includes participants who report feeling lonely, despite being comparatively socially integrated. This group is named the discordant susceptible group and includes 18.9% (95%CI: 17.8-20.0) of participants. The final group, the discordant robust group, includes 19.2% (95%CI: 18.1-20.4) of participants who did not feel lonely, despite having a comparatively small social network (Figure 9).

Figure 9 Social asymmetry categories



5.1 Socio-demographic characteristics by social asymmetry

Similar to loneliness and social isolation, there was no difference between men and women in terms of their social asymmetry (Table 6). The oldest age group, those aged 75 years and older were significantly more likely than younger age groups to be concordant high lonely (33.1%, 95% CI: 30.0-36.4). They were also significantly less likely than those aged 65 to 74 years to be in the concordant low lonely group (31.9%, 95% CI: 28.8-35.1). Older adults who had completed third level education were less likely than those with primary education to be concordant high lonely (23.3%, 95% CI: 21.3-25.5) and more likely than them to be concordant low lonely (39.6%, 95% CI: 37.3-41.9). Older adults who lived alone were significantly more likely to be concordant high lonely (39.7%, 95% CI: 37.0-42.5) and less likely to be concordant low lonely (13.3%, 95% CI: 11.4-15.6). Older adults who lived alone were also significantly more likely to than those who lived with others to be in the discordant robust group (30.4%, 95% CI: 27.8-33.2) which includes participants who did not report feelings of loneliness, despite having a comparatively small social network. Finally, a significantly higher proportion of older adults who lived in Dublin City County were in the discordant robust group (23.1%, 95% CI: 20.6-25.7) compared to those living in rural areas (16.4%, 95% CI: 14.9-18.1).

Table 6 Distribution of social asymmetry by key demographic characteristics

	Most Integrated		Moderately Integrated		Moderately Isolated		Most Isolated		Number in sample
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	
Gender									
Male	25.2	(23.6,26.9)	36.6	(34.8,38.5)	18.7	(17.2,20.2)	19.5	(17.9,21.2)	3070
Female	27.5	(25.9,29.2)	34.5	(32.8,36.2)	19.1	(17.7,20.5)	19.0	(17.4,20.6)	3618
Age group									
50-64 years	25.1	(23.5,26.7)	34.7	(33.0,36.4)	19.1	(17.7,20.5)	21.2	(19.7,22.7)	3877
65-74 years	24.3	(22.2,26.6)	40.6	(38.1,43.2)	19.7	(17.8,21.8)	15.3	(13.5,17.4)	1796
75+ years	33.1	(30.0,36.4)	31.9	(28.8,35.1)	17.1	(14.8,19.7)	17.9	(15.3,20.8)	1015
Education									
Primary/ none	31.0	(28.8,33.2)	29.7	(27.5,32.1)	18.2	(16.4,20.1)	21.1	(19.0,23.4)	1830
Secondary	24.8	(23.1,26.6)	37.4	(35.5,39.4)	18.7	(17.2,20.3)	19.1	(17.5,20.8)	2739
Third/higher	23.3	(21.3,25.5)	39.6	(37.3,41.9)	20.3	(18.4,22.2)	16.8	(15.0,18.8)	2117
Living status									
Lives alone	39.7	(37.0,42.5)	13.3	(11.4,15.4)	16.6	(14.5,18.8)	30.4	(27.8,33.2)	1384
Lives with others	21.9	(20.6,23.2)	43.0	(41.3,44.6)	19.6	(18.4,20.9)	15.5	(14.3,16.7)	5304
Location									
Dublin city or county	23.9	(21.5,26.4)	36.7	(33.7,39.8)	16.3	(14.5,18.3)	23.1	(20.6,25.7)	1619
Another town or city	28.7	(26.6,30.9)	33.0	(30.6,35.5)	18.3	(16.3,20.4)	20.0	(18.1,22.1)	1881
A rural area	26.2	(24.5,28.0)	36.6	(34.8,38.5)	20.8	(19.3,22.4)	16.4	(14.9,18.1)	3188
Total	26.4	(25.2,27.6)	35.6	(34.2,36.9)	18.9	(17.8,20.0)	19.2	(18.1,20.4)	6688

Figure 10 shows that the distribution of these groups are largely similar across age groups and gender. Overall, the largest proportion of participants aged less than 75 years were located in the concordant low group, and were thus neither lonely nor socially isolated. However, the largest proportion of women aged 75 and older were found in the concordant high lonely group (34.7%, 95% CI: 30.3-39.3).

Figure 10 Distribution of social asymmetry by sex and age group

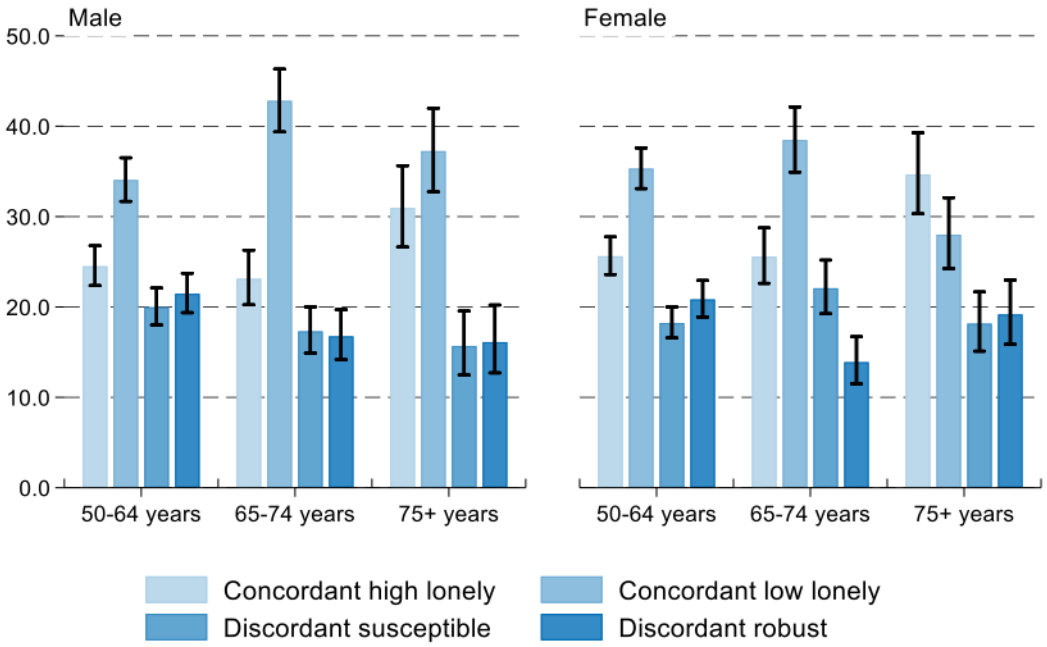
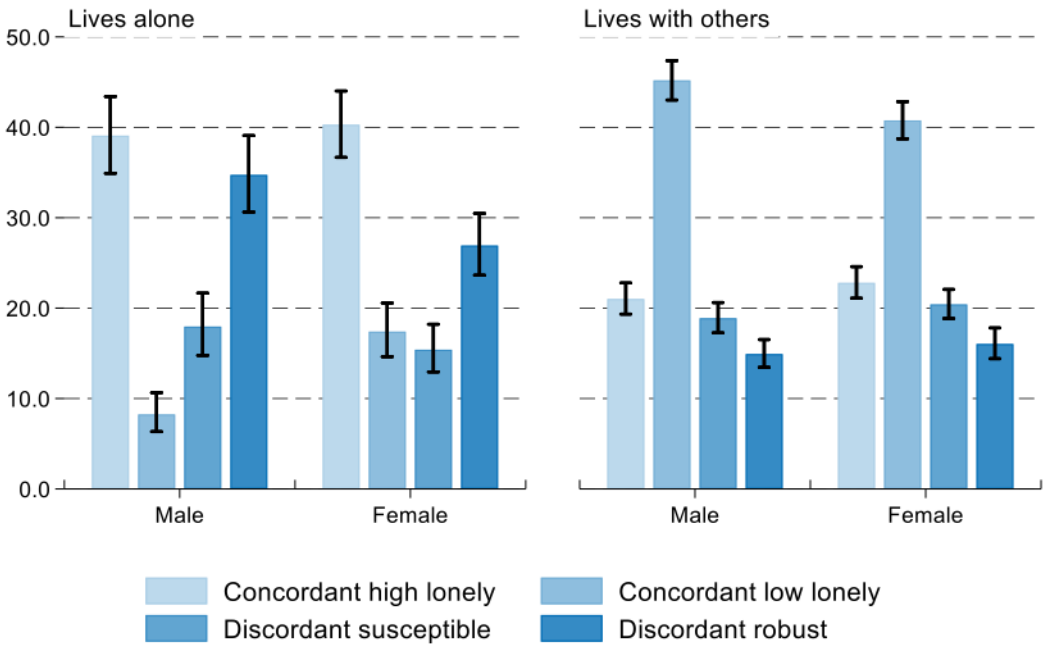


Figure 11 shows the percentage of older adults in each of the social asymmetry groups broken down by gender and living status. While the pattern among men and women was the same among those who lived with others, there were clear differences between men and women who lived alone. For example, women who lived alone were significantly more likely than men to be in the concordant low lonely group (17.4% vs. 8.2%) while men who lived alone were significantly more likely than women to be in the discordant robust group (34.7% vs. 26.9%).

Figure 11 Distribution of social asymmetry by sex and living status



5.2 Social asymmetry and indicators of health and psychological wellbeing

Table 7 shows the percentage of older adults within each social asymmetry group according to key indicators of health and psychological wellbeing. Older adults with fair or poor self-rated health (36.5%, 95% CI: 33.3-39.8) were significantly more likely than those with good (27.8%, 95% CI: 25.7-30.1) or excellent or very good self-rated health (22.6%, 95% CI: 22.2-24.2) to be both lonely and socially isolated. Conversely, those with better self-rated health were more likely to be in the concordant low lonely group. Fair or poor self-rated health was also associated with an increased likelihood of being in the discordant susceptible group (27.4%, 95% CI: 24.5-30.5). Participants with one or more ADLs were more likely than those with no ADLs to be in the concordant high lonely group (32.3%, 95% CI: 28.1-36.9) and the discordant susceptible group (23.7%, 95% CI: 20.1-27.8). They were also less likely to be in the concordant low lonely group (25.0%, 95% CI: 21.3-29.1). The presence of IADLs was similarly associated with a greater likelihood of being in the concordant high lonely group (39.7% vs. 25.3%) and a decreased likelihood of being in the concordant low lonely group (37.1% vs. 16.6%). Compared to older adults who reported no chronic conditions, those who had three or more (30.6%, 95% CI: 28.3-33.0) were significantly less likely to be concordant low lonely. The highest quality of life score was observed among participants in the concordant low lonely group (47.7, 95% CI: 47.4-47.9) followed by the discordant robust group (45.5, 95% CI: 44.9-46.0). Participants in the discordant susceptible group had the lowest average quality of life score (38.2, 95%

CI: 37.6-38.8). Finally, there was a strong association between social asymmetry and depressive symptoms. The highest number of depressive symptoms was found among participants in the discordant susceptible group (9.5, 95% CI: 8.8-10.1) followed by the concordant high lonely (7.7, 95% CI: 7.3-8.2). These two groups were also the most likely to have severe depressive symptoms.

Table 7 Distribution of social asymmetry by key health and psychological wellbeing indicators

	Most Integrated		Moderately Integrated		Moderately Isolated		Most Isolated		Number in sample
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	
Self-rated health									
Excellent/V. Good	22.6	(21.2,24.2)	42.8	(41.0,44.7)	15.0	(13.8,16.4)	19.5	(18.0,21.0)	3754
Good	27.8	(25.7,30.1)	31.2	(29.0,33.5)	21.4	(19.5,23.5)	19.5	(17.5,21.7)	1984
Fair/Poor	36.5	(33.3,39.8)	18.4	(16.0,21.1)	27.4	(24.5,30.5)	17.7	(15.0,20.8)	941
ADLs									
None	25.8	(24.6,27.1)	36.5	(35.1,38.0)	18.4	(17.3,19.5)	19.3	(18.1,20.5)	6149
At least one	32.3	(28.1,36.9)	25.0	(21.3,29.1)	23.7	(20.1,27.8)	18.9	(15.2,23.3)	539
IADLs									
None	25.3	(24.1,26.5)	37.1	(35.7,38.5)	18.5	(17.5,19.7)	19.1	(17.9,20.3)	6259
At least one	39.7	(34.9,44.8)	16.6	(13.5,20.3)	23.0	(18.9,27.6)	20.7	(16.6,25.4)	429
Chronic conditions									
None	25.0	(22.5,27.7)	37.2	(34.4,40.1)	16.2	(14.4,18.3)	21.6	(19.2,24.1)	1479
One	23.6	(21.7,25.6)	38.3	(35.8,40.9)	19.0	(17.1,21.0)	19.1	(17.1,21.3)	1889
Two	27.5	(25.1,30.1)	36.2	(33.7,38.8)	18.3	(16.2,20.5)	18.0	(16.0,20.2)	1561
Three or more	29.4	(27.1,31.9)	30.6	(28.3,33.0)	21.6	(19.6,23.6)	18.4	(16.4,20.6)	1759
CAPS-19 Quality of life									
Mean score	41.0	(40.5,41.4)	47.7	(47.4,47.9)	38.2	(37.6,38.8)	45.5	(44.9,46.0)	5790
CES-D depression score									
Mean score	7.7	(7.3,8.2)	3.4	(3.1,3.6)	9.5	(8.8,10.1)	4.9	(4.5,5.3)	6589
CES-D depression status									
None/mild	22.3	(21.1,23.6)	42.9	(41.3,44.6)	14.2	(13.1,15.4)	20.5	(19.2,22.0)	4864
Moderate	36.3	(33.2,39.5)	21.7	(19.2,24.4)	24.3	(21.8,26.9)	17.8	(15.3,20.6)	1143
Severe	38.5	(34.4,42.6)	9.7	(7.6,12.5)	41.2	(37.0,45.6)	10.6	(8.0,13.7)	582
Total	26.4	(25.2,27.6)	35.5	(34.2,36.9)	18.9	(17.8,20.0)	19.2	(18.1,20.4)	6688

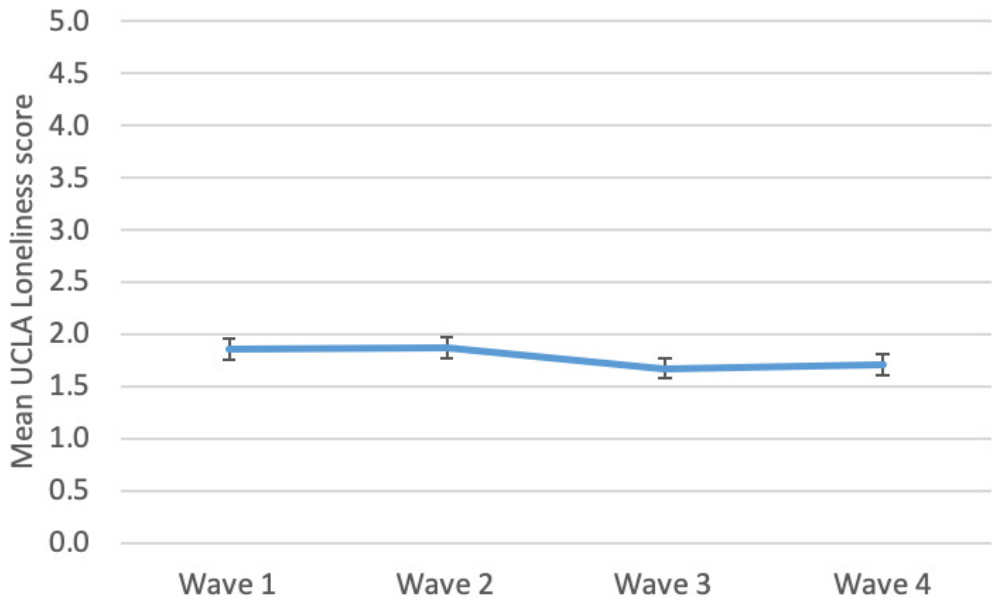
6 Change In Loneliness Over Time

6.1 Emotional loneliness over time

In this Chapter we describe change in both loneliness and social isolation over a six year period from Wave 1 of TILDA (2009/2011) to Wave 4 (2016). The sample consists of participants with a social loneliness score at each of the four Waves of data collection (n=3,695). In doing so, we describe the levels of loneliness and social isolation at four time points and also describe these patterns by gender and whether participants live alone or with others. Furthermore we explore whether changes in loneliness over time differed according to self-rated health and depressive symptoms at baseline (Wave 1).

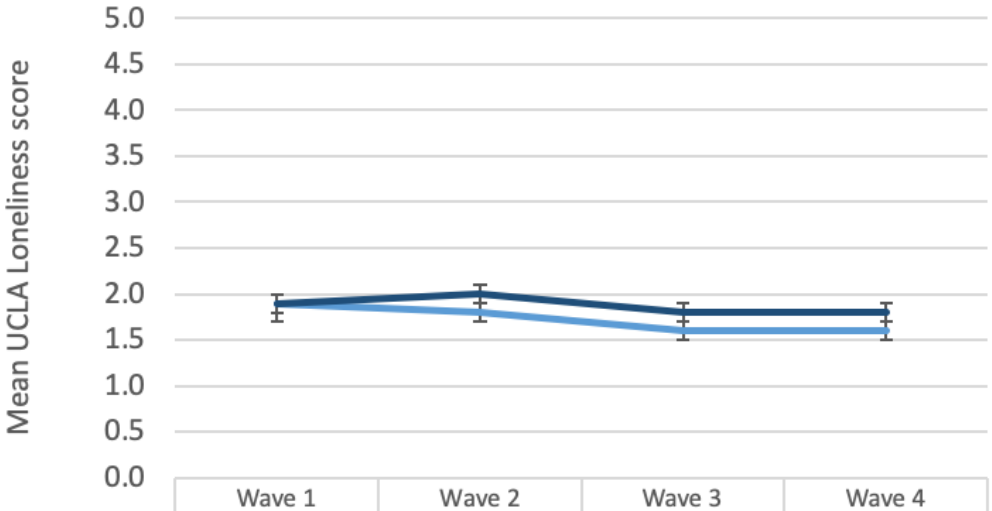
Figure 12 shows that there was a small decrease in average UCLA loneliness scores from 1.9 (95% CI: 1.8-2.0) at Wave 1 to 1.7 (95% CI: 1.6-1.8) at Wave 4.

Figure 12 Average UCLA loneliness score at each Wave



Similar patterns of change in loneliness over time were observed for men and women. Figure 13 shows that women reported higher levels of loneliness at Wave 2 and 3. Loneliness scores decreased among men from 1.9 (95% CI: 1.7-2.0) at Wave 1 to 1.6 (95% CI: 1.5-1.7) at Wave 4. There was no significant change in the loneliness scores of women across the Waves.

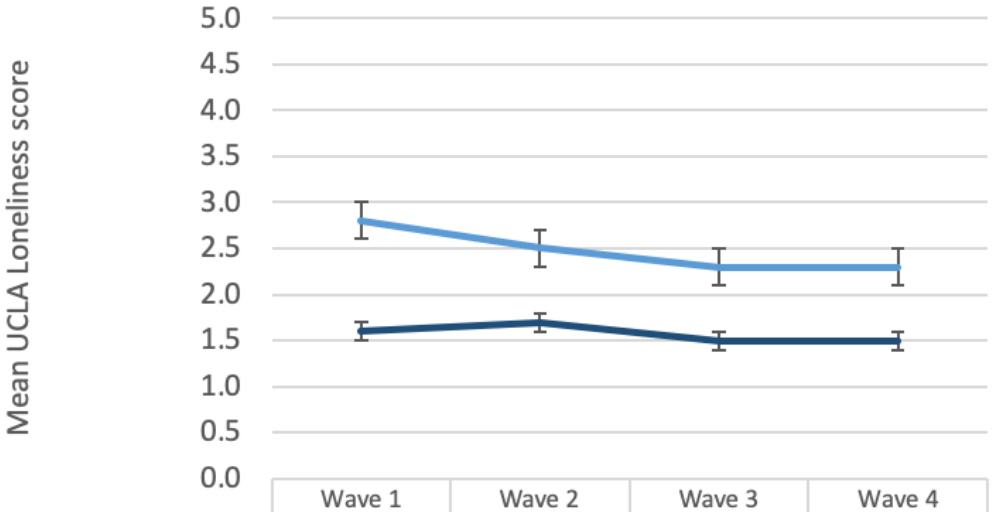
Figure 13 Average UCLA loneliness score at each Wave by gender



	Wave 1	Wave 2	Wave 3	Wave 4
Men	1.9	1.8	1.6	1.6
Women	1.9	2.0	1.8	1.8

Figure 14 shows that participants who lived alone at baseline had significantly higher levels of loneliness at each Wave of data collection. Furthermore, loneliness decreased over time among participants who lived alone and those who lived with others at baseline. This reduction was greatest among those who lived alone at baseline with average scores decreasing from 2.8 (95% CI: 2.6-3.0) at Wave 1 to 2.3 (95% CI: 2.1-2.5) at Wave 4.

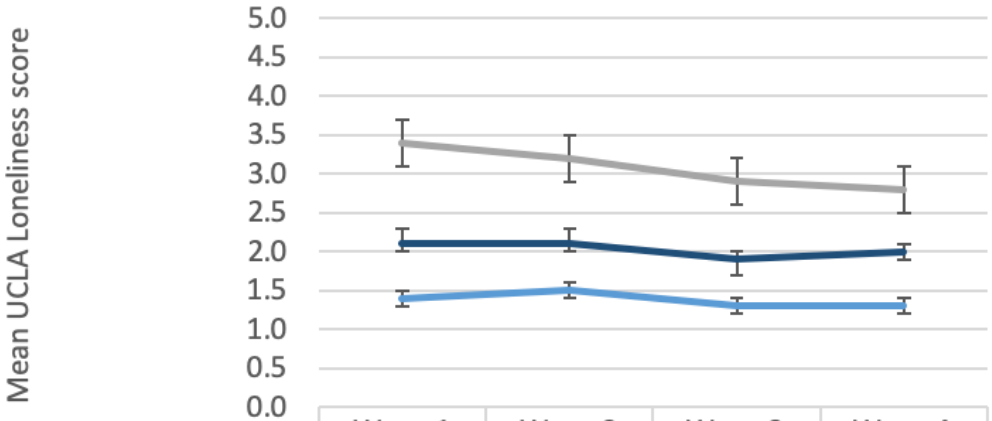
Figure 14 Average UCLA loneliness score at each Wave by living status



	Wave 1	Wave 2	Wave 3	Wave 4
Lives alone	2.8	2.5	2.3	2.3
Lives with others	1.6	1.7	1.5	1.5

Figure 15 shows change in loneliness scores over time according to self-rated health at Wave 1. There was a clear health gradient observed at each Wave with higher levels of loneliness reported by participants in poorer health at baseline. While levels of loneliness did not decrease over time among the healthier groups, there was a reduction in loneliness among participants with fair or poor health at baseline. Amon this group, average loneliness scores decreased from 3.4 (95% CI: 3.1-3.7) at Wave 1 to 2.8 (95% CI: 2.5-3.0) at Wave 4.

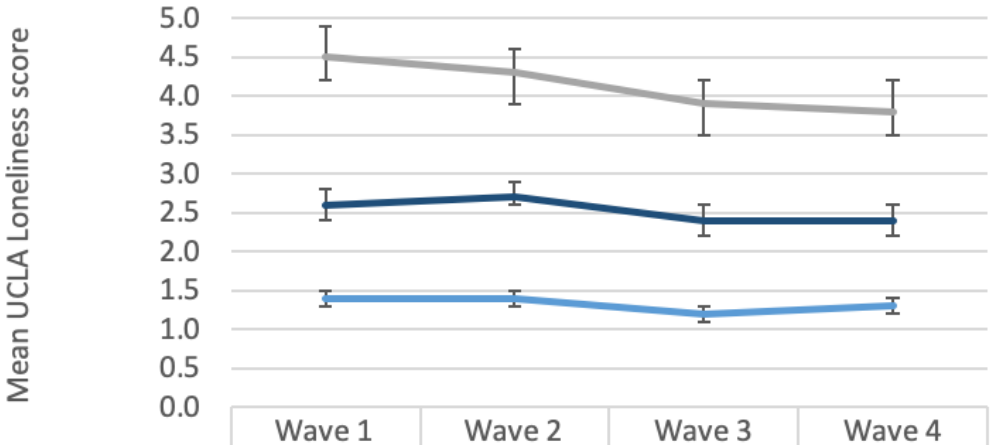
Figure 15 Average UCLA loneliness score at each Wave by baseline (Wave 1) self-rated health



	Wave 1	Wave 2	Wave 3	Wave 4
Excellent/V.Good	1.4	1.5	1.3	1.3
Good	2.1	2.1	1.9	2.0
Fair/Poor	3.4	3.2	2.9	2.8

Finally, we examined whether there was any association between baseline depressive symptomology and differences in UCLA loneliness scores across the first four Waves of data. As described in the methodology, severe depression symptomology was indicated by a score ≥16 on the CES-D scale while scores between 8 and 15 were indicative of moderate depressive symptomology. Figure 16 shows that emotional loneliness was highest at each Wave among participants who had severe depressive symptoms, followed by those with moderate depressive symptoms. The largest decrease in loneliness was observed among participants who had severe depressive symptoms at Wave 1. Across the four Waves, the average loneliness score of this group decreased from 4.5 (95% CI: 4.2-4.9) to 3.8 (95% CI: 3.6-4.2). This was still significantly higher than the participants with fewer depressive symptoms (Figure 16).

Figure 16 Average UCLA loneliness score at each Wave by baseline (Wave 1) depressive symptoms

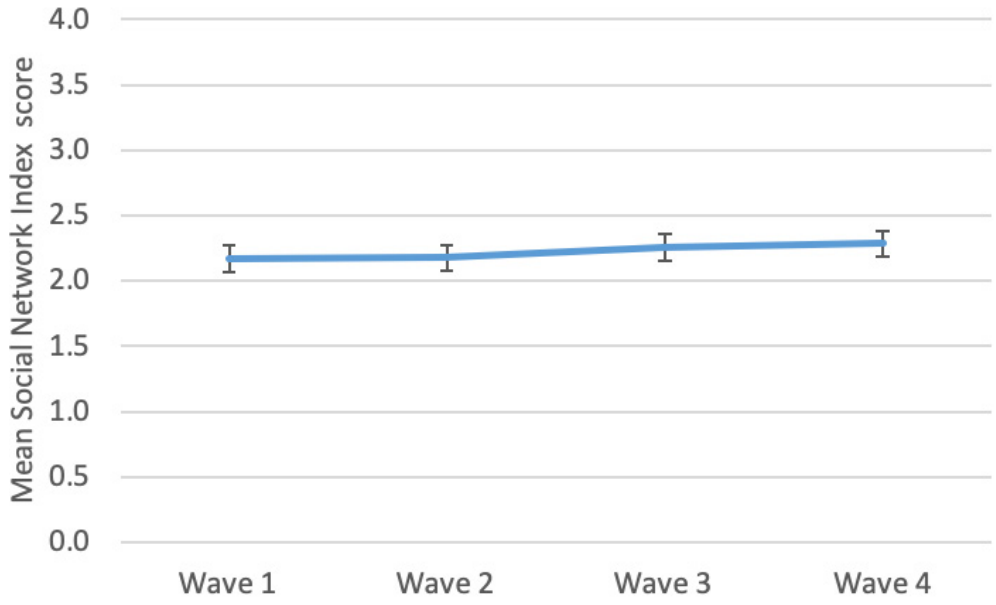


	Wave 1	Wave 2	Wave 3	Wave 4
None/mild	1.4	1.4	1.2	1.3
Moderate	2.6	2.7	2.4	2.4
Severe	4.5	4.3	3.9	3.8

6.2 Social isolation over time

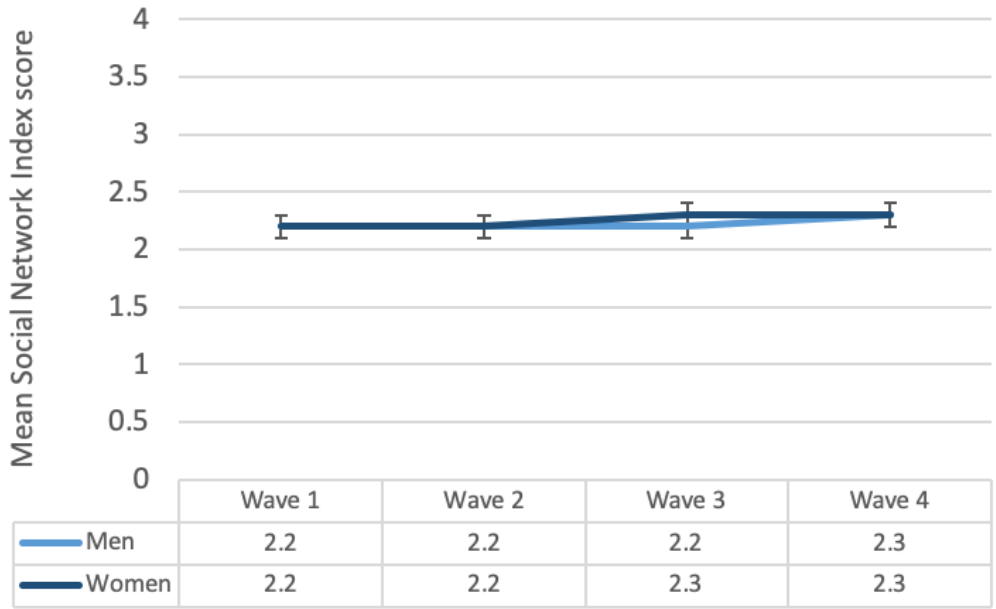
The sample included in this section consists of participants with a social isolation score at each of the four Waves of data collection (n=4,699). Figure 17 shows that there was no significant change in social isolation as measured by average SNI scores.

Figure 17 Average Social Network Index score at each Wave



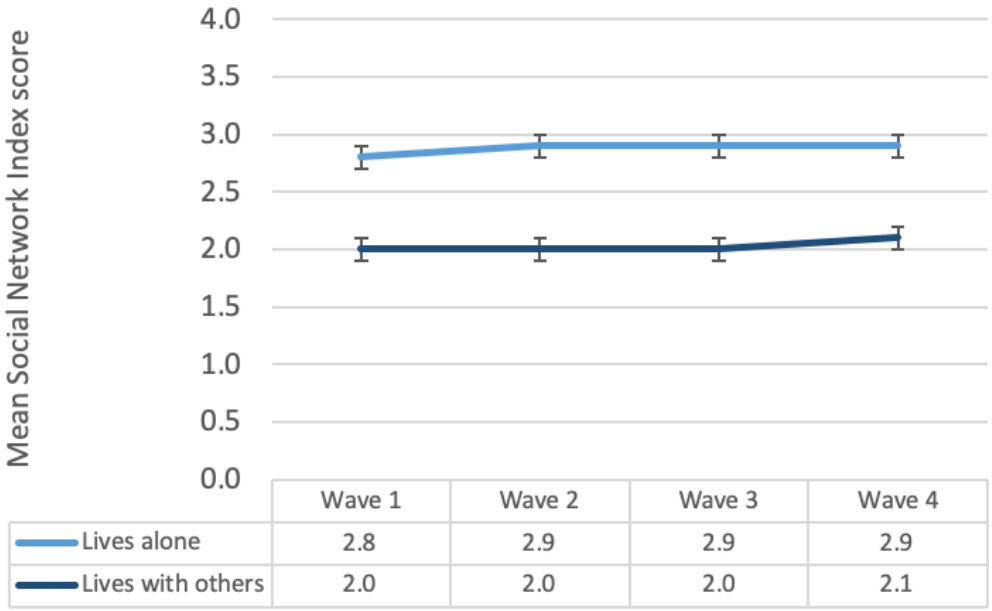
In terms of gender, we found that was no difference in SNI scores between men and women and furthermore social network sizes did not change for either men or women over the first four Waves of TILDA (Figure 18).

Figure 18 Average Social Network Index score at each Wave by gender



We showed previously that older adults who lived alone were more socially isolated than those who lived with others. As shown in Figure 19, this pattern was apparent at each time point and there was no significant change in SNI scores over time for either of these groups.

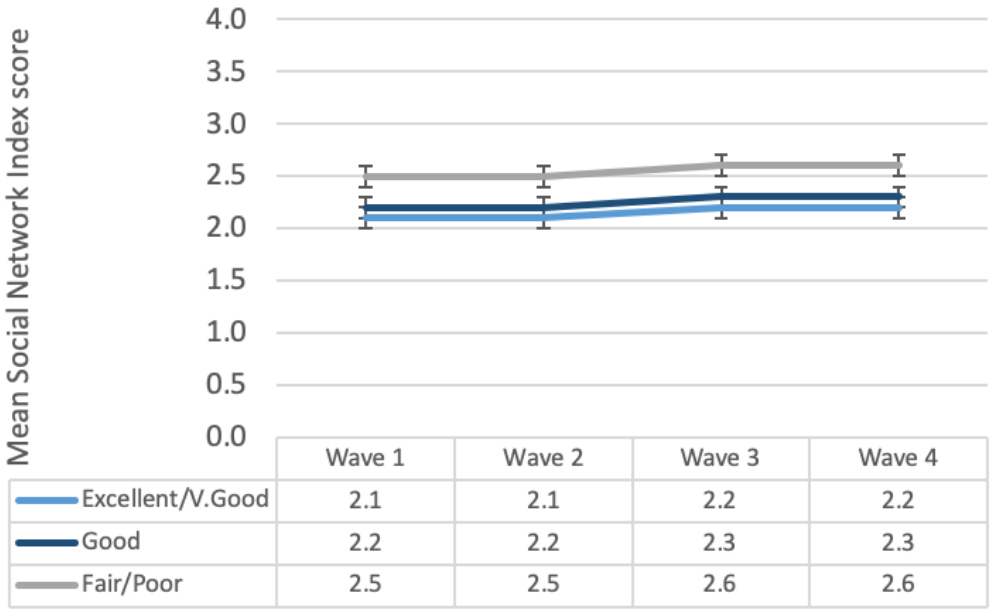
Figure 19 Average Social Network Index score at each Wave by living status



	Wave 1	Wave 2	Wave 3	Wave 4
Lives alone	2.8	2.9	2.9	2.9
Lives with others	2.0	2.0	2.0	2.1

Social isolation was highest among participants who considered their health as fair or poor, followed by good, and excellent or very good. It is noteworthy that these differences were larger for social isolation than emotional loneliness. Figure 20 also shows that there was no association between self-rated health and change in SNI scores over time.

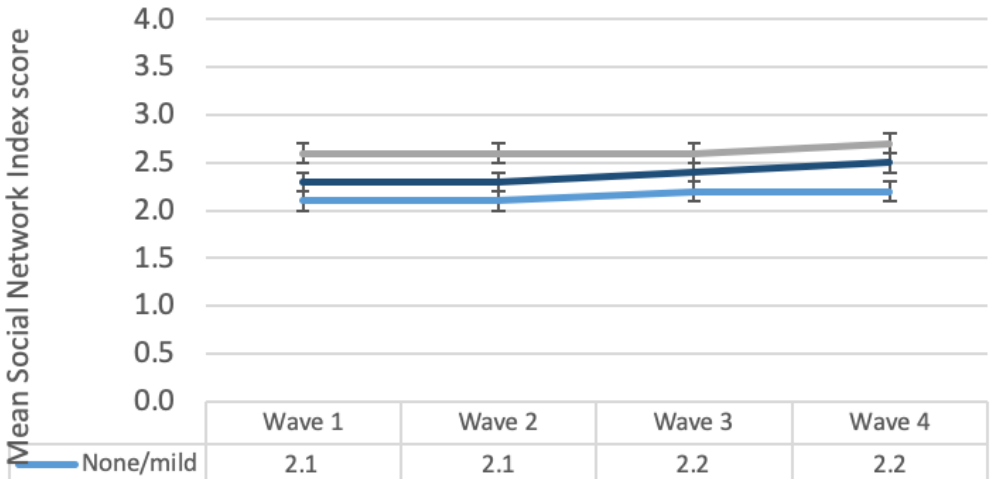
Figure 20 Average Social Network Index score at each Wave by baseline (Wave 1) self-rated health



	Wave 1	Wave 2	Wave 3	Wave 4
Excellent/V.Good	2.1	2.1	2.2	2.2
Good	2.2	2.2	2.3	2.3
Fair/Poor	2.5	2.5	2.6	2.6

Finally we examined whether there was any change in SNI scores according to base line depressive symptomology (Figure 21). As with the other sub-group analysis described in this section, there was no significant change observed. Furthermore, depressive caseness, indicated by a score ≥ 16 on the CES-D scale, was associated with greater social isolation at each time point.

Figure 21 Average Social Network Index score at each Wave by baseline (Wave 1) depressive symptoms



	Wave 1	Wave 2	Wave 3	Wave 4
None/mild	2.1	2.1	2.2	2.2
Moderate	2.3	2.3	2.4	2.5
Severe	2.6	2.6	2.6	2.7

7 Discussion

Strong social ties have long been known to be integral to human wellbeing. Given its import, it is not surprising that the objective absence of social ties and subjective dissatisfaction with the quality and quantity of social contacts is detrimental to wellbeing. A substantial body of research exists that shows the negative impacts of loneliness on both physical and psychological wellbeing (1,2) and more recently, excess mortality risk (8).

A significant challenge to the study of loneliness is its' complex nature which makes measurement difficult. In order to overcome this obstacle it is important that we clearly distinguish between two independent yet related features of loneliness. The first is called subjective or emotional loneliness and refers to the subjective, experienced dissatisfaction with the quantity and quality of social contacts (1). The second concept refers to the objective and quantifiable size of an individual's social network. In this report, we used the UCLA loneliness scale (32) to measure the former and the Berkman-Syme Social Network Index to measure the latter (26). Informed by cognitive discrepancy theory (33), we have also included a measure of social asymmetry (31) which allowed us to categorise individuals according to their levels of both emotional loneliness and social isolation. This categorisation also enables us to better capture the extent of discrepancies between emotional loneliness and social isolation.

In Chapter 3, we used the UCLA loneliness scale (32) to describe the levels of emotional loneliness experienced by community-dwelling adults aged 50 years and older according to a number of socio-demographic characteristics. We also examined the association between loneliness and a number of indicators of health and psychological wellbeing.

While a majority of older adults report rarely or never feeling lonely, a sizeable minority did feel lonely at least some of the time. This was reflected in the low average loneliness scores reported using the UCLA loneliness scale. Importantly, loneliness was not merely a linear function of age. Instead, loneliness decreased among participants between the ages of 50 and 67 before becoming more common at older age. This is similar to findings from the English Longitudinal Study of Ageing (41:300). While similar loneliness scores were observed among men and women, we did identify important differences by other

socio-demographic characteristics. Older age groups were more likely to experience loneliness, as were participants with lower levels of educational attainment and those who lived alone. Furthermore, men who lived alone were significantly more likely than women in the same situation to experience high levels of loneliness. This may be because women who live alone have stronger familial or social ties or alternatively that their assessment of the quality and quantity of these ties is more positive. These findings are similar to those reported previously both internationally (for example, Routasalo and Pitkala 2003) and in Ireland (21). These findings can inform policy interventions by identifying groups who are particularly at risk. Also, while public discussions of loneliness often focuses on the experience of loneliness among rural adults, we found no statistically significant differences between urban and rural participants.

Loneliness was also associated with a number of health related indicators, such as self-rated health, functional limitations, and experience of chronic illness. There was also a clear correlation between quality of life and loneliness with significantly lower quality of life observed among the loneliest participants. There was a particularly strong relationship between depressive symptomology and loneliness. It was not possible in this report to establish whether feelings of loneliness lead to depressive symptoms or vice versa. However, previous research suggests that depressive symptoms may interfere with cognitive processes and thus have a negative impact on an individual's subjective assessment of the quantity and quality of their social contacts and interactions (1). Future longitudinal research may shed further light on the direction of these complex reciprocal relationships.

Chapter 4 of this report focused on the issue of social isolation based on scores on the Berkman-Syme Social Network Index (26). We found that less than one-in-ten participants were in the most isolated group which consisted of individuals who reported a maximum of one social tie.

Similar to loneliness, we found that social isolation did not increase linearly with age. However, we did again find clear difference in the levels of social isolation according to a number of socio-demographic characteristics. Unlike emotional loneliness, there were no significant differences in social isolation between different age groups. This suggests that the size of older adults' social networks may be more stable over time that levels of emotional loneliness. As with emotional loneliness, social isolation was also highest among participants with lower levels of educational attainment.

Men who lived alone were more socially isolated than women, yet, men who lived with others were less likely than women who lived with others to be in the most socially

isolated group. Taken together, these two findings suggest that men are more reliant than women on familial ties, or at least close ties with those whom they live, than women who it appears may have greater recourse to social networks beyond the home.

While there was no difference in the level of emotional loneliness experienced by participants who lived in rural or urban areas, we did find that participants who lived in rural areas were significantly more likely to be in the most integrated group and least likely to be in the most isolated category. While public discourse on the topic of loneliness and isolation often emphasise the vulnerability of rural populations to loneliness and isolation, our analysis shows that the prevalence of loneliness is similar and older adults who live in urban centres may in fact be at a greater risk of social isolation. While some but not all of this difference may be explained by greater involvement in church (42), this does not fully explain the difference. Another factor may be the greater reliance of rural older adults on traditional networks based on family, kinship, and church compared to those in urban centres who draw more on informal but more diverse networks (43,44).

The experience of social isolation was also associated with poorer self-rated health, functional limitations, lower quality of life, and increased depressive symptomology. However, the strength of these associations tended to be weaker for social isolation than emotional loneliness which suggests that these associations may be driven more by psychological or cognitive factors. Differences in the magnitude of these relationships also support the earlier contention proposed by Burholt and Scharf (2014) that cognitive processes may explain the deleterious effect of loneliness on health.

In Chapter 5, we moved from an examination of emotional loneliness and social isolation as distinct albeit related concepts to explicitly considering their interaction. Following the lead of McHugh et al. (2017), we used a measure of social asymmetry which captures the discrepancy between emotional loneliness and social isolation.

While there were no gender differences overall, women aged 50 to 64 years or 75+ years were significantly more likely to be in the discordant robust group than women aged 65 to 74 years. That is, they experienced low levels of loneliness despite a comparatively small social network size. This suggests that the connection between social network size and loneliness is stronger among this age group.

Fair or poor self-rated health was associated with an increased likelihood of being in the discordant susceptible group (that is, low social isolation and high emotional loneliness). This suggests that older adults in poor health may not be able to interact with their social network in the way they would like and this mismatch results in increased feelings

of loneliness. This has important implications for policy formulation as it shows that opportunities for fruitful social interactions may suffer as physical health declines in older age.

There was a clear relationship between social asymmetry and quality of life with quality of life highest among participants in the discordant robust group and lowest in the discordant susceptible group. This suggests that a person's perception of their social connections is an important feature of quality of life and that a sense of loneliness despite a comparatively large social network is particularly damaging to an individual's wellbeing. Similarly, the highest level of depressive symptomology was observed among the discordant susceptible group. These findings lend further credence to the contention that the most important pathway between loneliness and poor psychosocial wellbeing is through cognitive processes.

Finally, we briefly examined change in emotional loneliness and social isolation over time. Here we found that while emotional loneliness decreased slightly over time, the size of participants social networks (social isolation) did not - people's subjective assessment of loneliness may alter slightly but the objective level of social isolation did not change over the Waves of the study. While more in-depth longitudinal research is needed to better understand changes over time in emotional loneliness and social isolation, these findings suggest that social network sizes was quite stable over this six year period. It also appears that older adults may adapt their assessments of their social relationships (emotional loneliness) in accordance with changes in their lives that may impact the quality and quantity of their social contacts. Another potential explanation for the patter of change observed here is related to the study design. While TILDA participants are two years older at each Wave of data collection, those who have participated at each Wave tend to be healthier on average than those who have dropped out of the study between Waves. This is known as a survivor effect. Our inclusion of only participants who participated in each of the first four Waves of data collection in our longitudinal analyses means that our estimates of change may be subject to survivor effect, that is, those who were part of the study across Waves may be healthier on average than those who dropped out of the study. One consequence of this may be that the changes we observed in levels of emotional loneliness may be more positive than is the case in the wider population.

In summary, we have shown that while most older adults report low levels of emotional loneliness and social isolation, there are important differences between different groups. Those who have lower levels of educational attainment, and those who live alone are particularly vulnerable to emotional loneliness and social isolation.

We also found that both emotional loneliness and social isolation were associated with poorer physical and psychological wellbeing, as well as quality of life. These differences were particularly stark in relation to emotional loneliness, measured using the UCLA loneliness scale. When analysed in tandem in the form of social asymmetry, we found that susceptibility to emotional loneliness, even when accompanied by strong social integration, was the most deleterious to wellbeing among older adults.

Conclusion

We have shown here that loneliness and social isolation are not a necessary fact of the ageing process and recent efforts to alleviate these potentially damaging phenomena should be encouraged. This is particularly important in light of the growing body of evidence that loneliness is damaging to quality of life and wellbeing among older adults. Importantly, we have also demonstrated a method by which both emotional loneliness and social isolation can be considered in conjunction with each other so that we can account for discrepancies between the two concepts. These discrepancies are important as they suggest that a one-size-fits-all approach to local or national policy interventions may not work. Instead, there is a need to address both the subjective and objective features of loneliness in order to positively impact the wellbeing of older adults. This research also highlights the need for healthcare professionals to consider loneliness during clinical assessments of their patients. Clinical interventions may also benefit from the application of social prescribing, whereby clinical staff refer their patients to non-clinical community groups and services. This provides a practical example of how the social, as well as physical, needs of older adults may be met. Finally, in order for researchers to support these efforts, it is critically important that attempts to better understand the mechanisms linking loneliness and poor outcomes are encouraged and adequately supported.

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