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Correlates of social and emotional loneliness in older people: evidence from an English community study

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Objectives: Loneliness is an important influence on quality of life in old age and has been conceptualised as consisting of two dimensions, social and emotional. This article describes analyses that sought to produce models of social and emotional loneliness in older people, using demographic, psychological and health, and social variables.
Method: Older people (aged 65+, $n = 1255$) from the Barnsley metropolitan area of the United Kingdom were recruited randomly from within a stratified sampling frame and received a questionnaire-based interview (response rate: 68.1%). The questionnaire contained items and scales on demographic, psychological and health, and social characteristics, and a validated measure of loneliness that assesses both social and emotional loneliness.
Results: Of the respondents, 7.7% were found to be severely or very severely lonely, while another 38.3% were moderately lonely. Social and emotional loneliness shared 19.36% variance. Being male, being widowed, low well-being, low self-esteem, low-income comfort, low contact with family, low contact with friends, low activity, low perceived community integration, and receipt of community care were significant predictors of social loneliness ($R = 0.50$, $R^2 = 0.25$, $F(18, 979) = 18.17$, $p < 0.001$). Being widowed, low well-being, low self-esteem, high activity restriction, low-income comfort, and non-receipt of informal care were significant predictors of emotional loneliness ($R = 0.55$, $R^2 = 0.30$, $F(18, 973) = 23.00$, $p < 0.001$).
Conclusion: This study provides further empirical support for the conceptual separation of emotional and social loneliness. Consequently, policy on loneliness in older people should be directed to developing a range of divergent intervention strategies if both emotional and social loneliness are to be reduced.

Keywords: loneliness; older adults; widowhood; well-being; intervention

Introduction

Loneliness in older people is a risk factor for reduced activity levels (Hawkley, Thisted, & Cacioppo, 2009; cf. Netz, Goldsmith, Shimony, Arnon, & Zeev, 2013), physical and mental health problems (for reviews, see Hawkley & Cacioppo, 2010; O'Luanaigh & Lawlor, 2008; Routasalo & Pitkala, 2003), and mortality (Iecovich, Jacobs, & Stessman, 2011; Luo, Hawkley, Waite, & Cacioppo, 2012; Perissinotto, Cenzer, & Covinsky, 2012). This article will identify correlates of social and emotional loneliness in old age, through an analysis of survey data on over 1000 older people living in a municipality in the north of England. Given the article's focus, the review of relevant research below for the most part will be limited to that carried out on samples of older people.

Conceptualising loneliness

Loneliness has been defined as 'a discrepancy between one's desired and achieved levels of social relations' (Perlman & Peplau, 1981, p. 32; see also Sermat, 1978). This discrepancy may concern the number of relationships or the intimacy of the relationships (Fokkema, Gierveld, & Dykstra, 2012; cf. Heylen, 2010).

In his seminal research on loneliness, Weiss (1973) suggested that loneliness has social and emotional dimensions. Social loneliness refers to the absence of an acceptable social network, that is, a wider circle of friends and acquaintances that can provide a sense of belonging, of companionship and of being a member of a community; whereas emotional loneliness refers to the absence of an attachment figure in one's life and someone to turn to. This perspective on loneliness is based on the assumption that different types of relationships serve different, more or less unique functions and are barely interchangeable (Dykstra & Fokkema, 2007).

Measuring loneliness

Despite the influence of Weiss' (1973) conceptualisation, loneliness is not always operationalised in terms of separate social and emotional dimensions, but often measured by a single item, for example, 'Do you feel lonely?' (Jylhä, 2004); 'Do you suffer from loneliness?' (Tilvis et al., 2012) and 'Are you ever bothered by feelings of loneliness?' (Dahlberg, Andersson, McKee, & Lennartsson, 2013). Several multi-item measures of loneliness have also been developed (for overviews, see O'Luanaigh & Lawlor,

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2008; Russell, 1982; see also Victor, Scambler, & Bond, 2009). The two most commonly used instruments for measuring loneliness in old age are the University of California, Los Angeles (UCLA) Loneliness Scale and the de Jong Gierveld Loneliness Scale (see Pinquart & Sörensen, 2001), although neither instrument was specifically developed for use in the older population (de Jong-Gierveld & Kamphuis, 1985; Russell, 1982).

The UCLA Loneliness Scale (Russell, 1982) was developed using samples of young people and college students, but has subsequently been found valid and reliable across a variety of populations including older people (Russell, 1996). In its original version, this scale consisted of 20 items and has subsequently been condensed to 11-item (Russell, 1982) and 3-item (Hughes, Waite, Hawkley, & Cacioppo, 2004) versions. The UCLA Loneliness Scale, despite its multi-item construction, shares with single item measures the characteristic of being unidimensional, restricting the representation of loneliness to a single or unitary phenomenon that varies in intensity rather than in nature (Russell, 1996).

The de Jong Gierveld Loneliness Scale (de Jong-Gierveld & Kamphuis, 1985), on the other hand, is an example of a multidimensional measure of loneliness. This instrument includes 11 items that resolve into social and emotional subscales, while a shortened version contains six items (de Jong Gierveld & Van Tilburg, 2006). The scale was developed with adults (Van Tilburg & de Leeuw, 1991) and has been validated for older people (e.g. de Jong Gierveld & Van Tilburg, 2010), and analyses have confirmed that the scale is appropriately regarded as bidimensional in samples of older people (van Baarsen, Snijders, Smit, & van Duijn, 2001), although the instrument can also be used to provide a single index of loneliness (de Jong Gierveld & Van Tilburg, 2006).

Correlates of loneliness

In recent decades, a substantial amount of research has concerned factors associated with loneliness in older people. Demographic characteristics associated with loneliness include, for example, being very old (see Dykstra, 2009; Jylhä, 2004; O'Luanaigh & Lawlor, 2008) and female gender (Aartsen & Jylhä, 2011; Cohen-Mansfield, Shmotkin, & Goldberg, 2009; Dykstra, Van Tilburg, & de Jong Gierveld, 2005; O'Luanaigh & Lawlor, 2008; Pinquart & Sörensen, 2001). Psychological factors, such as depression and anxiety, have been found to be associated with loneliness (Heikkinen & Kauppinen, 2011; O'Luanaigh & Lawlor, 2008), as have a variety of health conditions and problems (Aartsen & Jylhä, 2011; Cohen-Mansfield et al., 2009; O'Luanaigh & Lawlor, 2008; Tijhuis, de Jong Gierveld, Feskens, & Kromhout, 1999). Interpersonal and social correlates of loneliness include, for example, loss of partner (Aartsen & Jylhä, 2011; Dykstra et al., 2005), reduced social activities (cf. Aartsen & Jylhä, 2011; Newall et al., 2009), and an individual's poor evaluation of their neighbourhood (Scharf & de Jong Gierveld, 2008). The frequency, content, and meaning of social contacts are also important for loneliness (Ayalon, Shiovitz-Ezra, & Palgi, 2013; Victor et al., 2009). As people age and are confronted with health problems, social contacts may focus more on the need for support, as delivered by informal and/or formal caregivers, and people with larger social support networks have been found to be less likely to report loneliness (Dykstra & Fokkema, 2007).

Relatively little research on correlates of loneliness has distinguished between the social and emotional dimensions of loneliness (cf. Dykstra & Fokkema, 2007; Heylen, 2010), despite the fact that this distinction may be particularly relevant in the older population, as the probability of having an intimate attachment figure decreases with age (van Baarsen et al., 2001). Research that has addressed this distinction has found that factors diverge in their level of association with the two dimensions. For example, it has been found that being female, absence of partner, being widowed, limited contact with children and relatives, being a caregiver, low self-esteem, and low income are more highly correlated with emotional than social loneliness; while being male, living in a rural setting, few social contacts, small network size, lack of instrumental and emotional network support, and poor health are more highly correlated with social than emotional loneliness (Drennan et al., 2008; Dykstra & Fokkema, 2007; Dykstra & Gierveld, 2004; Green, Richardson, Lago, & Schatten-Jones, 2001; Heylen, 2010; Schnittger, Wherton, Prendergast, & Lawlor, 2011; van Baarsen et al., 2001).

The present study

As there is clear evidence from the literature that loneliness is linked to many factors, it would be advantageous for studies to examine a range of such factors so that the relative strengths of their associations with loneliness can be determined. Furthermore, since the suggested distinction between social and emotional loneliness is long established, it is important to identify any divergent patterns of association with other factors, as this would suggest separate forms of intervention may be required for the two dimensions.

This article reports analyses of data from the Barnsley Social Exclusion in Old Age Study, which set out to examine those factors related to social exclusion in older people. Social exclusion is a process whereby individuals are prevented from participating fully in society (Council of European Union, 2004). It is a multidimensional process, including dimensions of social relationships and social participation (see, e.g. Burchardt, Le Grand, & Piachaud, 2002; Levitas et al., 2007), and is thus conceptually linked to loneliness. Our analyses aim to determine which demographic, psychological and health, and social factors are associated with social and emotional loneliness.

Methods

Design and sampling frame

The study employed a cross-sectional survey design with a random sample drawn from a stratified sampling frame.

The study was carried out in the metropolitan area of Barnsley, selected as the study site since it encompasses both urban (largely post-industrial) and rural areas, allowing an analysis of the relationship between residential location and loneliness. To ensure adequate cell size at subgroup level for specific analyses, a sample of $n = 600$ for each of the two areas (i.e. $n = 1200$) was proposed, providing good statistical power for the analyses reported in this article. Sampling occurred from seven electoral wards with an urban/post-industrial profile, and from 16 electoral wards with a rural profile. Within each electoral ward, households (which included supported accommodation) were randomly selected via local electoral registers. With oversampling of households required in order to obtain sufficient participants, a total of 11,035 households were sampled.

Participants

Potential participants were considered ineligible if they were under 65 years of age, or if their physical and/or mental health was too poor to allow them to complete an interview or respond to questions reliably; 59 individuals were excluded from the study as a result of the latter criterion. Only one older person was recruited per household, regardless of whether more than one older person resided at a given address. In total, 1255 older people participated in the study, of whom 6.5% were recruited from supported accommodation. The response rate was 68.1%, and did not differ significantly between urban and rural areas.

Materials

A questionnaire was developed that addressed a range of indicators of, and risk factors for, social exclusion. Items and instruments were selected on the basis of available information on reliability and validity in the older population, successful use in comparable studies, and, given the potential frailty of some respondents, instrument brevity. Where no suitable item or instrument was available for assessing a particular domain, item/scale development was carried out by the research team.

Loneliness was measured by the de Jong-Gierveld Loneliness Scale (de Jong-Gierveld & Kamphuis, 1985). This instrument has previously been used in comparable studies on social exclusion and is widely used in gerontological research in Europe. Respondents indicate the extent to which 11 statements apply to their situation and the way they feel now, with five items referring to social loneliness and six items referring to emotional loneliness. Response options were *yes*, *more or less*, and *no*, collapsed in accordance with instructions for the scale to provide a binary (0/1) item score (de Jong Gierveld & Van Tilburg, 1999; emotional loneliness, scale range 0–6, sample Cronbach $\alpha = 0.81$; social loneliness, scale range 0–5, sample Cronbach $\alpha = 0.76$).

The questionnaire contained standard items addressing *demographic characteristics*: age, gender, civil status (five response categories), years at current address, and education (six response categories).

Psychological and health factors were measured via a number of items and instruments. Self-rated health was assessed via the item: 'In general, would you say your health is...' measured on a five-point scale (*excellent* (1) to *very poor* (5); European Social Survey, 2004). Psychological well-being was measured using the World Health Organisation-5 Well-being Index (WHO-5; World Health Organization, 1998; scale range 0–25 (high score = high well-being); sample Cronbach $\alpha = 0.87$). For the measurement of self-esteem, the participants were asked to rate the statement: 'I have high self-esteem' on a scale with five response options, from *not very true of me* (1) to *very true of me* (5) (Robins, Hendin, & Trzesniewski, 2001). Functioning was measured via the Groningen Activity Restriction Scale (GARS; Kempen, Miedema, Ormel, & Molenaar, 1996), which consists of 18 items assessing (instrumental) activities of daily living; sample Cronbach $\alpha = 0.94$.

Finally, the category of *social factors* was measured via income discomfort, informal care receipt, formal care receipt, contacts with family and non-family, social activity, and perceptions of the local community.

Income discomfort was measured by the item 'Which of these descriptions comes closest to how you feel about your household's income nowadays?'. Response options range from 1 (*very comfortable on present income*) to 5 (*very difficult on present income*) (European Social Survey, 2004).

Informal caregiving was measured by the following item: 'Have you a friend or relative (including your partner or other people in your household) who relies on you to provide them with care or support for four hours per week or more?', response options *yes/no* (McKee et al., 2008). This item was adapted to produce an item to identify informal care receivers: 'Do you rely on a friend or relative (including your partner or other people in your household) to provide you with care or support for four hours per week or more?', response options *yes/no.*

Information on formal care receipt was gathered via items asking if the participant had, in the last month, received medical care, personal care (e.g. from a district nurse), or practical support (e.g. from social services, home help, warden); response categories for all items, *yes/no*.

For data on social contacts, a question asked: 'How often do you meet and spend time with any of the following people'. Independent responses (response category ranges from *daily* (1) to *yearly or less* (7)) were required for family members (six categories), neighbours, and friends (Stockholm University, 1998; The Institute for Fiscal Studies, n.d.).

Respondents were asked to what extent they agreed with each of the 13 statements about their local community, defined as 'within 20 minutes' walk or about a mile from home'. Example items are 'I feel really part of this area'; 'Vandalism and graffiti are a big problem in this area' (response scale from *strongly agree* (1) to *strongly disagree* (4) (Barnes, Blom, Cox, Lessof, & Walker, 2006; Office of the Deputy Prime Minister, 2006; Scharf, Phillipson, & Smith, 2004).

For data on activity, participants were asked to consider for 'how often, if at all, do you engage in the following activities?' and record a response for 20 different activities. Example activities are 'Go out for a meal'; 'Attend leisure activities (e.g. dancing, bingo or attend a social club)'; 'Tend to the garden or allotment' (response scale *several times a week* (6) to *never* (0)) (Stockholm University, 1998; The Institute for Fiscal Studies, n.d.).

Procedure

Upon selection, a household was sent a letter presenting the purpose of the study. An interviewer subsequently visited the address to establish whether anybody in the household was 65 years or older and, if so, whether this person was willing to participate in an interview. Each interview lasted on average 50 minutes. Seventy-eight per cent of the interviews were conducted alone with the interviewee, while the rest were carried out with the interviewee accompanied, usually by a family member.

Data analysis

Data were analysed using the IBM Statistical Package for Social Science (SPSS) version 21.0 for Windows.

For descriptive analysis, the five response categories for the item assessing civil status were resolved into three categories (*married or cohabiting*; *divorced or separated, never married*; *widowed*). For bivariate and multivariate analyses, these three categories were merged into two: *not widowed* (0) and *widowed* (1). The six response categories of the item assessing education were merged into two categories: *low education* (0) and *medium to high education* (1).

The two items assessing personal care and practical support were combined into a single measure of community care receipt: *no personal care or practical support* (0) and *either or both personal care and practical support* (1).

For the six items assessing family member contact, responses were re-coded as *less than weekly contact* (0) or *weekly contact or more* (1), and items summed to indicate overall level of contact (scores ranging from 0 to 6, high scores indicating high contact). For the two items assessing, neighbour and friends contact, responses were combined and re-coded for analysis as *no contact* (0), *at least twice weekly contact with friends <u>or</u> neighbours* (1), or *at least twice weekly contact with friends <u>and</u> neighbours* (2).

Scale development occurred for items on perception of the local community, utilising principle components analysis and reliability (Cronbach α) analyses with item trial removal. Two subscales of perceptions of the local community were developed: perceived community trust (three items, $\alpha = 0.68$) and perceived community integration (four items, $\alpha = 0.69$).

Finally, the items on activity were combined into a scale which provided a summative measure of activity ($\alpha = 0.79$).

Following descriptive analysis of the study variables, bivariate analysis was performed to identify associations between the dependent variables (DVs: social and emotional loneliness) and independent variables (IVs), level of significance set at $p < 0.05$. No adjustment to experimental alpha was made for multiple testing, and so note should be taken of the potential for inflated Type I error rate. Taking into account also the study's substantial sample size, significance tests should be interpreted cautiously and with consideration of effect size. Two models were developed using sequential multiple regression to determine prediction of, social and emotional loneliness from those IVs having significant bivariate association with either DVs. IVs were entered in blocks, order of entry determined by the main research questions: do psychological and health factors explain significant variance in loneliness once demographic factors are controlled for; and do social factors explain additional variance in loneliness once demographic, psychological and health factors have been considered. Thus, demographic factors were entered as the first block of IVs, followed by psychological and health variables as the second block, followed finally by social variables. Assumptions related to multivariate analysis, including normality, linearity, homoscedasticity of residuals, multicollinearity, and the influence of multivariate outliers, were examined and found to be met.

Results

Descriptive analyses

Participants' demographic characteristics are summarised in Table 1. The majority of participants was women ($n = 776$, 61.8%), with a substantial minority widowed ($n = 545$, 43.6%). Over two-thirds of the participants had a low level of education ($n = 931$, 74.2%), and the sample mean years at current address was just above 25.

Participants' responses on psychological and health items and scales are summarised in Table 2. Mean scores

Table 1. Participants' demographic characteristics.

Characteristic	(n), M (SD), range
Age	(1250), 75.7 (7.29), 65–101
Years at current address	(1251) 25.1 (17.2) 0–80
Place of residence	n (%)
Rural	628 (50.0)
Urban	627 (50.0)
Gender	
Women	776 (61.8)
Men	479 (38.2)
Marital status	
Married or cohabiting	557 (44.6)
Divorced or separated, never married	148 (11.8)
Widowed	545 (43.6)
Education level	
Low	931 (74.2)
Medium to high	324 (25.8)

Table 2. Participants' scores on psychological, health, and social variables.

Characteristic	
Psychological and health variables	(n), M (SD), range
WHO-5	(1243), 14.33 (6.41), 0–25
Self-esteem	(1250), 3.81 (1.05), 1–5
Self-rated (poor) health	(1237), 3.14 (0.91), 1–5
GARS	(1186), 25.47 (10.12), 18–72
Social variables	(n), M (SD), range
Income discomfort	(1241), 2.61 (0.84), 1–5
Family categories met weekly	(1214), 1.73 (1.16), 0–5
Non-family categories met twice weekly	(1247), 0.98 (0.78), 0–2
Activity	(1172), 22.42 (13.04), 0–71
Perceived community trust	(1240), 11.40 (1.89), 3–15
Perceived community integration	(1242), 15.62 (2.39), 4–20
Emotional loneliness	(1230), 1.62 (1.90), 0–6
Social loneliness	(1240), 1.47 (1.61), 0–5
	n (%)
Informal caregiving	
Yes	153 (12.3)
No	1095 (87.7)
Informal care receipt	
Yes	269 (21.5)
No	980 (78.5)
Receipt of medical care	
Yes	768 (61.3)
No	485 (38.7)
Receipt of community care	
Yes	176 (14.1)
No	1073 (85.9)

Note: WHO-5, World Health Organization-5 Well-Being Index; GARS, Groningen Activity Restriction Scale.

for both the WHO-5 and the single-item measure of self-esteem were above their respective scale mid-points, and while the mean score on the GARS was well below the scale mid-point (indicating low activity restriction), self-rated health was above the scale mid-point (indicative of poor health).

Mean scores for emotional loneliness and social loneliness were both below their respective scale mid-points, indicating low levels of loneliness (see Table 2). This can also be seen when loneliness was expressed as a categorical combined variable: for our sample, 661 (54.0%) were categorised as not lonely, 469 (38.3%) as moderately lonely, 61 (5.0%) as severely lonely, and 33 (2.7%) as very severely lonely.

Bivariate analyses

Bivariate analyses are presented in Table 3. All of the demographic variables were significantly associated with at least one of the two measures of loneliness, with being widowed the variable with the highest association with both social loneliness ($r = 0.09$, $p < 0.05$) and emotional loneliness ($r = 0.26$, $p < 0.001$). Similarly, all psychological and health variables were significantly associated with both measures of loneliness, with the WHO-5 having the strongest association with both social loneliness ($r = -0.27$, $p < 0.001$) and emotional loneliness ($r = -0.42$,

$p < 0.001$). Of the social variables, neither caregiving nor receipt of medical care was significantly associated with either measure of loneliness; these two variables were not entered into the multivariate models. Of the remaining social variables, perceived community integration had the strongest association with social loneliness ($r = -0.33$, $p < 0.001$), while activity had the strongest association with emotional loneliness ($r = -0.31$, $p < 0.001$).

Considering the correlations among the IVs, there were several substantial associations. Among the demographic characteristics, being widowed was associated with age ($r = 0.42$, $p < 0.001$). There were strong associations among all the psychological and health variables, the strongest being between the WHO-5 and the self-rated (poor) health ($r = -0.56$, $p < 0.001$). Among the social variables, the strongest association was between perceived community trust and perceived community integration ($r = 0.53$, $p < 0.001$). Considering the correlations between variables within different categories, strong associations were found between the GARS and activity ($r = -0.49$, $p < 0.001$) and between the GARS and being a care receiver ($r = 0.51$, $p < 0.001$). Finally, there was a significant correlation between social loneliness and emotional loneliness ($r = 0.44$, $p < 0.001$).

Multivariate analyses

Table 4 displays the unstandardised regression coefficients (B), standard error of B, and the standardised regression coefficients (β) after the entry of all IVs in the model predicting social loneliness. Due to listwise deletion of missing values and the deletion of 10 outliers (Mahalanobis distance < 0.001), model $n = 998$. R was significantly different from zero at the end of each step. After Step 3, with all IVs in the equation, $R = 0.50$, $F(18, 979) = 18.17$, $p < 0.001$.

After Step 1, with demographic characteristics included, $R^2 = 0.019$, $F_{inc}(6, 991) = 3.22$, $p = 0.004$. After Step 2, with psychological and health variables added, $R^2 = 0.119$, $F_{inc}(4, 987) = 27.98$, $p < 0.001$. After Step 3, with social variables added, $R^2 = 0.250$, $F_{inc}(8, 979) = 21.46$, $p < 0.001$. Thus, there was a significant increment in R^2 at each step in the model.

Ten IVs were significant in the final model of social loneliness: gender ($sr^2 = 0.01$), widowhood ($sr^2 < 0.01$), WHO-5 ($sr^2 = 0.01$), self-esteem ($sr^2 < 0.01$), income discomfort ($sr^2 = 0.01$), number of family categories met weekly ($sr^2 = 0.03$), number of non-family members met twice weekly ($sr^2 = 0.01$), activity ($sr^2 < 0.01$), perceived community integration ($sr^2 = 0.03$), and receipt of community care ($sr^2 < 0.01$).

Comparison of the analyses in Tables 3 and 4 indicates that, while gender had a non-significant association with social loneliness at the bivariate level ($r = -0.05$), in the multivariate model this association was significant ($\beta = -0.12$), indicating the presence of a suppressor variable. Through trial runs of the first block of variables with rotated variable removal, widowhood was identified as the variable mostly responsible for the suppression effect; with widowhood removed from the model, the beta

Table 3. Associations between demographic, psychological, health and social variables and loneliness.

	Social loneliness		Emotional loneliness	
Variable	r	p	r	p
Age	0.06	0.051	0.13	0.000
Length of residence at current address	−0.02	0.453	−0.06	0.041
(Urban) area of residence	0.00	0.929	0.08	0.006
(Female) gender	−0.05	0.055	0.06	0.033
Widowed	0.09	0.022	0.26	0.000
(Medium to high) education	−0.02	0.583	−0.10	0.000
WHO-5	−0.27	0.000	−0.42	0.000
Self-esteem	−0.23	0.000	−0.32	0.000
Self-rated (poor health)	0.18	0.000	0.28	0.000
GARS	0.20	0.000	0.31	0.000
Income discomfort	0.17	0.000	0.21	0.000
Family categories met weekly	−0.23	0.000	−0.08	0.005
Non-family categories met twice weekly	−0.20	0.000	−0.15	0.000
Activity	−0.23	0.000	−0.31	0.000
Perceived community trust	−0.23	0.000	−0.16	0.000
Perceived community integration	−0.33	0.000	−0.22	0.000
Informal caregiver	0.01	0.616	−0.02	0.494
Informal care receiver	0.07	0.010	0.09	0.001
Receipt of medical care	0.01	0.664	0.04	0.157
Receipt of community care	0.08	0.004	0.11	0.000

Note: WHO-5, World Health Organization-5 Well-Being Index; GARS, Groningen Activity Restriction Scale.

weight for the association between gender and social loneliness was $\beta = -0.06$.

Table 5 displays the unstandardised regression coefficients (B), standard error of B, and the standardised regression coefficients (β) after entry of all IVs in the model predicting emotional loneliness. Due to listwise deletion of missing values, and the deletion of 10 outliers (Mahalanobis distance < 0.001), model $n = 992$. R was significantly different from zero at the end of each step.

Table 4. Sequential multiple regression of social loneliness: final model statistics ($n = 998$).

Variable	B	SE B	β
Age	−0.00	0.008	−0.02
Length of residence at current address	0.00	0.003	0.01
(Urban) area of residence	−0.09	0.098	−0.03
(Female) gender	−0.37	0.094	−0.12*
Widowed	0.23	0.102	0.07*
(Medium to high) education	0.12	0.115	0.03
WHO-5	−0.04	0.010	−0.17*
Self-esteem	−0.11	0.051	−0.07*
Self-rated (poor health)	−0.04	0.066	−0.02
GARS	0.00	0.007	0.00
Income discomfort	0.17	0.058	0.09*
Family categories met weekly	−0.24	0.39	−0.18*
Non-family categories met twice weekly	−0.20	0.059	−0.10*
Activity	−0.011	0.005	−0.09*
Perceived community trust	−0.05	0.030	−0.06
Perceived community integration	−0.14	0.024	−0.19*
Informal care receiver	0.03	0.13	0.01
Receipt of community care	0.27	0.138	0.06*

Note: WHO-5, World Health Organization-5 Well-Being Index; GARS, Groningen Activity Restriction Scale.
$R^2 = 0.019$ for Step 1; $\Delta R^2 = 0.100$ for Step 2; $\Delta R^2 = 0.131$ for Step 3.
*$p < 0.05$.

After Step 3, with all IVs in the equation, $R = 0.55$, $F(18,973) = 23.00$, $p < 0.001$.

After Step 1, with demographic characteristics included, $R^2 = 0.061$, $F_{inc}(6, 985) = 11.75$, $p < 0.001$. After Step 2, with psychological and health variables added, $R^2 = 0.261$, $F_{inc}(4, 981) = 67.63$, $p < 0.001$. After Step 3, with social variables added, $R^2 = 0.298$, $F_{inc}(8, 973) = 5.19$, $p < 0.001$. Thus, there was a significant increment in R^2 at each step in the model.

Six IVs were significant in the final model of emotional loneliness: widowhood ($sr^2 < 0.03$), WHO-5 ($sr^2 = 0.04$), self-esteem ($sr^2 = 0.01$), the GARS ($sr^2 = 0.01$), income discomfort ($sr^2 = 0.01$), and informal care receipt ($sr^2 < 0.01$).

Comparison of the analyses in Tables 3 and 5 indicates that, while gender had a significant positive relationship with emotional loneliness at the bivariate level ($r = 0.06$), in the multivariate model this association was non-significant but negative ($\beta = -0.06$), indicating the presence of a suppressor variable. Through trial runs of the first block of variables with rotated variable removal, widowhood was identified as the variable mostly responsible for the suppression effect; with widowhood removed from the model, the beta weight for the association between gender and social loneliness was $\beta = 0.04$.

Discussion

Main findings

Our analyses produced significant models of both social and emotional loneliness, using a range of demographic, psychological and health, and social variables. For social loneliness, demographic characteristics explained 2% of variance, psychological and health factors a further 10%, and social factors an additional 13%. For emotional loneliness, demographic characteristics explained 7% of

Table 5. Sequential multiple regression of emotional loneliness: final model statistics ($n = 992$).

Variable	B	SE B	β
Age	−0.00	0.009	−0.01
Length of residence at current address	−0.00	0.003	−0.03
(Urban) area of residence	0.06	0.114	0.02
(Female) gender	−0.22	0.110	−0.06
Widowed	0.79	0.118	0.21*
(Medium to high) education	0.05	0.134	0.01
WHO-5 well-being	−0.08	0.011	−0.28*
Self-esteem	−0.21	0.059	−0.11*
Self-rated (poor health)	−0.01	0.076	−0.01
GARS	0.02	0.008	0.11*
Income discomfort	0.17	0.067	0.07*
Family categories met weekly	−0.09	0.046	−0.06
Non-family categories met twice weekly	−0.11	0.069	−0.05
Activity	−0.01	0.006	−0.06
Perceived community trust	−0.07	0.035	−0.07
Perceived community integration	−0.04	0.027	−0.04
Informal care receiver	−0.33	0.152	−0.07*
Receipt of community care	0.27	0.161	0.05

Note: WHO-5, World Health Organization-5 Well-Being Index; GARS, Groningen Activity Restriction Scale.
$R^2 = 0.067$ for Step 1; $\Delta R^2 = 0.202$ for Step 2; $\Delta R^2 = 0.030$ for Step 3.
*$p < 0.05$.

variance, psychological and health factors a further 20%, and social factors an additional 3%. Thus, the decision to utilise a broad range of predictor variables in the analyses was justified for both dimensions of loneliness. The models for the two dimensions demonstrated considerable divergence, with social factors explaining the most variance in social loneliness, and psychological and health factors explaining the most variance in emotional loneliness. Looking at individual variables that were significant within the two models also supports a notion of divergence between social and emotional loneliness; while some predictor variables were significant in both models (notably widowhood, WHO-5, self-esteem, and income discomfort), other variables were significant in only one of the two models. For social loneliness, gender, number of family categories met weekly, number of non-family members met twice weekly, activity, perceived community integration, and receipt of community care were all significant; for emotional loneliness, GARS and informal care receipt were significant.

Taken together with the finding that social and emotional loneliness shared only 19.4% variance, our results confirm that loneliness should not be considered unidimensional, and that there is good psychometric evidence that social and emotional loneliness are related but divergent constructs.

Important correlates of loneliness

Widowhood explained 1% unique variance in social loneliness, and 3% unique variance in emotional loneliness. The relationship between widowhood and emotional loneliness is consistent with Weiss' (1973)

conceptualisation and has been confirmed in previous research (Drennan et al., 2008; Dykstra & Fokkema, 2007). However, the relationship between widowhood and social loneliness is not suggested by Weiss' work. Our finding supports other research indicating that a marital partner is important both as an intimate attachment and for facilitating involvement with a wider circle of acquaintances (Dykstra & Gierveld, 2004).

In our analyses, well-being, as measured by the WHO-5, was even more important for loneliness than widowhood and explained 1% unique variance in social loneliness and 4% unique variance in emotional loneliness. Another psychological factor, self-esteem, was also associated with both dimensions of loneliness. Loneliness in old age, especially emotional loneliness, has previously been found to correlate with self-esteem (van Baarsen et al., 2001; cf. Schoenmakers, Van Tilburg, & Fokkema, 2012) as well as other psychological factors including life satisfaction (Golden et al., 2009; Mhaolain et al., 2012). One should be careful, though, not to overestimate the importance of personal and psychological factors relative to social factors when considering loneliness, as this might lend support to intervention strategies that address the individual only and not the individual's context (cf. de Jong Gierveld, 1987). However, in our analyses only one social factor was associated with both dimensions of loneliness: income discomfort. The perception of insufficient income may prevent people from participating in activities and act as a barrier to the use of commercial social opportunities and paid services, as well as reduce the individual's capacity to return support provided by others (Pinquart & Sörensen, 2001; see also Andersson, 1998).

Previous research has produced contradictory findings concerning the link between gender and loneliness (Routasalo & Pitkala, 2003). In some studies, women have higher levels of loneliness than men (e.g. Aartsen & Jylhä, 2011; Cohen-Mansfield et al., 2009; Dykstra et al., 2005; O'Luanaigh & Lawlor, 2008; Pinquart & Sörensen, 2001), which has sometimes been explained by the greater prevalence of widowhood in women (Dahlberg et al., 2013; Drennan et al., 2008; Victor, Scambler, Marston, Bond, & Bowling, 2006). However, research looking at social and emotional loneliness separately have found that men tend to be more socially and less emotionally lonely than women (Dykstra & Fokkema, 2007; Dykstra & Gierveld, 2004; Green et al., 2001). In our study, at the bivariate level being female was significantly associated with emotional loneliness while being male was just below significance for its association with social loneliness. However, in our multivariate analyses, the association between being female and emotional loneliness was not significant and the direction of the association was reversed, whereas the association between being male and social loneliness was significant; such differences between bivariate and multivariate associations primarily due to the presence of widowhood in the multivariate analyses as established through *post hoc* examination. These findings indicate once again the importance of examining social and emotional loneliness separately, and also of not placing too much emphasis on associations found between

loneliness and single variables examined in isolation. Our study suggests widowhood to be more relevant than gender as an explanatory factor for loneliness. It may be more enlightening for research to look at differences in the experience of loneliness and the situation leading to loneliness among older women and men than to point at differences in their reported levels (see Dahlberg et al., 2013).

Policy implications

There have been efforts to alleviate loneliness, especially as manifested in social isolation, but only a minority of interventions have been thoroughly evaluated with the use of sound methodologies, and social and emotional loneliness have rarely been distinguished (Andersson, 1998; Cattan, White, Bond, & Learmouth, 2005; Findlay, 2003; O'Luanaigh & Lawlor, 2008). We found that low levels of contact with family and friends and low levels of activity were uniquely associated with social loneliness (for a review, see Routasalo & Pitkala, 2003; see also Dykstra & Fokkema, 2007), as were low perceived community integration and receipt of community care. With regard to perceived community integration, our finding echoes those of Dykstra and Gierveld (2004) who found that social embeddedness was more important for social than emotional loneliness, and supports other work where perceived togetherness was found to explain loneliness (Tiikkainen & Heikkinen, 2005).

We also found more problems with functioning (as measured by GARS) and non-receipt of informal care were uniquely associated with higher levels of emotional loneliness. A correlation between loneliness and physical functioning has been found in previous research (Routasalo & Pitkala, 2003; cf. O'Luanaigh & Lawlor, 2008) as has a correlation between loneliness and reduced physical activity (Netz et al., 2013). Physical functioning has been found to correlate with both social and emotional loneliness, albeit more strongly with social than emotional loneliness (Dykstra & Gierveld, 2004). With regard to receipt of informal care, other work has suggested that supportive personal relations reduce emotional loneliness (van Baarsen, 2002) and that social support affects social loneliness directly and emotional loneliness indirectly (Schnittger et al., 2011).

It is true that we obtained a small effect size for several of the significant IVs in our models of social and emotional loneliness, and so there should be a note of caution regarding the certainty with which practical implications for real-world action might be taken from our findings. Taken collectively, however, our findings strongly suggest that interventions to prevent and reduce loneliness in older people need to be designed with regard to the nature of loneliness (cf. O'Luanaigh & Lawlor, 2008; Schnittger et al., 2011). Donaldson and Watson (1996) argue that there should be an agenda for the development of specific nursing assessment tools to measure loneliness in older people with health problems. Our finding that receipt of community care is associated with higher social loneliness would underline the importance of a holistic assessment of needs for older people in

receipt of formal support that addresses loneliness and that seeks to facilitate social contacts and increase activity levels, rather than focusing only on the need of practical and task-oriented support. Interventions to address emotional loneliness might specifically examine the informal care and support network and its potential to facilitate functioning and sustain emotionally meaningful relationships. Finally, our findings suggest that interventions to reduce loneliness generically should particularly target the widowed, examine financial concerns, and promote activities that have the potential to raise well-being and self-esteem.

Study limitations

Unfortunately, there is a general lack of longitudinal studies in the research of loneliness in old age (cf. Victor & Bowling, 2012), and a limitation of this study is its cross-sectional design, which means that it cannot determine the causal direction of the association between loneliness and its identified correlates. For example, it is possible that low well-being may be both a cause of and an outcome of loneliness.

This study achieved a high response rate in comparison to other social exclusion research undertaken in deprived areas. Still, the study was carried out in a limited geographical area, and findings more closely related to community characteristics, such as community trust and integration, cannot be generalised to the entire older population in the United Kingdom. This highlights the importance of both research based on national samples and research in different environmental settings (cf. Scharf, Phillipson, & Smith, 2005).

Whereas one of the strengths of the current study is its breadth of scope when examining potential correlates of loneliness, a criticism could be made that the potential for interactive effects of these correlates on loneliness is insufficiently explored. However, the extant literature on loneliness does not offer much theoretical justification for hypothesising many interactive effects. The exception to this rule is the suggested interaction between widowhood and gender, which we examined through analysis of the suppressor effects found in the multivariate analyses.

Finally, the amount of variance explained in both social and emotional loneliness was, although significant, rather small. A reason for this could be the level of skew in the respondents' scores on the scales. As indicated by our descriptive analyses, both as a unidimensional categorical variable and as separate interval scales, responses on the de Jong Gierveld Loneliness Scale tended to be highly concentrated at the low end of the continuum. Our findings are reflected in other research that has employed this scale (e.g. Newall et al., 2009; Scharf & de Jong Gierveld, 2008; Tijhuis et al., 1999; van Baarsen et al., 2001; Wilson et al., 2007): the evidence is overwhelming that the scale is a poor instrument for discriminating low levels of loneliness. This is an impediment for its use in identifying individuals with incipient loneliness, that is, low but detectable and meaningful levels, which is important for effective preventive intervention.

Conclusions

This study provides valuable insights into psychological, health, and social factors that are associated with social and emotional loneliness. Although there have been a number of studies on loneliness, only a minority have differentiated between social and emotional dimensions. The divergence in the models of social and emotional loneliness produced by this study confirms the importance of distinguishing between these dimensions as an essential first step before effective intervention policy and strategies can be developed.

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