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The overlooked role of place attachment in loneliness: An investigation among old people

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ABSTRACT

The relationship people have with the place they live has an impact on loneliness. Feelings of connection, rootedness and meaning are seen as fundamental to the association between place attachment and loneliness. This article investigates whether a stronger attachment to place is associated with less loneliness, in addition to known predictors in the field of social integration and health. Place attachment has two dimensions, namely the personal identity of the individual in relation to the physical environment, and dependence, i.e. the functional or purposeful connections with an environment. Data were obtained from the Longitudinal Aging Study Amsterdam, with observations of 424 community-dwelling Dutch adults aged 74–96 years from 2018 to 2020. The measurement model of place attachment showed a high correlation between the two dimensions. The structural model showed that place attachment depended on neighborhood and residential characteristics, together with the number of neighborhood contacts. Place attachment did indeed coincide with less loneliness, with an effect size that was approximately equal to the difference between old people with and without a partner. In addition, loneliness was associated with a small number of neighborhood contacts, poor physical capacities and low mastery. We suggest that a broader conception of loneliness should be considered. For the prevention and alleviation of loneliness, frequent contact within close relationships is important. Attachment to place can, additionally, facilitate superficial social interactions within one's place. Moreover, it is important to feel connected to one's place.

1. Introduction

Research into the timeless condition of loneliness is characterized by a strong focus on social integration indicators, like partner status (de Jong Gierveld et al., 2018), network size (Dahlberg et al., 2022), strength of ties (Franssen et al., 2020), frequency of contact (Barjaková et al., 2023) and social support (Guthmuller, 2022). Understandably so, as loneliness is generally defined as the resulting feeling of unsatisfactory quality or quantity of personal relationships (Perlman and Peplau, 1981). However, recent scholarship has turned its eye to other, broader factors regarding the surrounding physical environment that shape loneliness (Franklin and Tranter, 2021; Schepers et al., 2025). We call this environment the 'place' where people spend most of their time, and we investigate whether place attachment is related to loneliness.

Research is starting to show that indeed the relation people have to places impacts loneliness: a stronger connection reduces loneliness (Fong et al., 2021). Literature makes mention of feelings of belonging, or rootedness and meaningfulness as mechanisms for the relation between place attachment and loneliness (Franklin and Tranter, 2021; Nyqvist et al., 2016; Prieto-Flores et al., 2011). Indeed, though belonging is often understood as being of a social nature and in that sense close to loneliness, belonging is a broader concept, entailing also connection to *place* beyond its social interpretation (Hagerty et al., 1992). We are particularly concerned with that notion in the current efforts and hence look at place attachment: an affective bond between a person and a spatially demarcated object (Lewicka, 2011; Rubinstein and Parmelee, 1992).

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Previous research is lacking in terms of the *precise* role of place attachment in relation to other, more traditional determinants of loneliness. Two studies tested bivariate relationships and found that greater neighborhood identification – a concept close to place attachment, but in those particular cases with more focus on the social embedding of the individual – was associated with less loneliness (Jaspal and Breakwell, 2022; Moyano-Díaz and Mendoza-Llanos, 2021). Prieto-Flores et al. (2011) found that a sense of belonging to the place of residence mediated between residential satisfaction and loneliness. Other studies combined different determinants of loneliness into one multivariate model finding that place attachment as well as neighborhood relations (Afshar et al., 2017) and respondent's children living in the city (Wen and Wang, 2009) were protective. In doing so, these studies disguise exactly *how* and in what order of process specific factors relate to loneliness and to one-and-other (for an exception, see Kemperman et al. (2019), who modelled loneliness as a predictor of place attachment). Moreover, studies often do not convincingly *theorize* on how specific relations would unfold (Bergefurt et al., 2019; Nyqvist et al., 2016; Weijs-Perrée et al., 2015), thereby hampering our actual *understanding* of how, why and for whom loneliness occurs. One line of thinking is that features of the built environment, such as walkability and green space, offer opportunities for informal social interaction, thereby combating loneliness (Lyu and Forsyth, 2022). Though this gives us some clues of how 'place' relates to loneliness, it still does not shed light on the role of place attachment for loneliness.

Furthermore, little research has been conducted into how place attachment influences loneliness among the oldest people, despite the higher incidence of loneliness among this group compared to young-old and younger people (Luhmann and Hawkley, 2016) and the importance of place attachment in old age (Gilleard et al., 2007; Mandal, 2016; Rowles, 1983; Rubinstein and Parmelee, 1992). For this last finding, different reasons are discussed. First, a life time of memories may be accumulated in a specific place, enhancing emotional attachment to it (Rowles, 1983). Second, following retirement and due to low energy levels and restricted mobility options, the home and its neighborhood are places in which a lot of time is spent, thereby reinforcing the relationship between place and old people (Buffel et al., 2014; Lager et al., 2021). Third, in a phase in life that is characterized by loss – of functional abilities, of social relationships and ultimately of life itself – the place in which old people live provides a sense of continuity, security and belonging (Lebrusán and Gómez, 2022). Hence, specifically place attachment can be an important protective factor against the high risk of loneliness in old age.

Next, we hope to advance understanding by gaining insight into what place attachment means for the two dimensions of loneliness: emotional and social. To the best of our knowledge, such an approach is yet to be undertaken. Emotional loneliness would stem from the loss or absence of a close attachment relationship, whereas social loneliness would testify to the lack of an engaging and supportive social network (Weiss, 1973). We do not formulate explicit hypotheses on these as we lack enough evidence to do so. We tentatively suggest place attachment might mean more for emotional loneliness, as, on face value, it seems to be closely linked to this deeper and profound way of connecting to the social world, fulfilling the fundamental human need to belong and be attached to other people (Baumeister and Leary, 1995). The dimension of social loneliness is, in comparison, more instrumental, and perhaps also shallower. We emphasize we are merely exploring whether such an approach would be meaningful, potentially laying ground for a more robust comprehension of loneliness and its relationship to place attachment.

Shortly, our aims are threefold. First, to shed more light on how place attachment relates to loneliness alongside more traditional predictors of loneliness such as social network characteristics. Second, to gain insight into how this relationship unfolds among old people and third, in a more exploratory fashion, how place attachment relates to the two dimensions of loneliness.

2. Theory of place attachment

It could be argued that the importance of attachment to a place as a protective factor against loneliness depends on the social relationships that old people have there. When people feel to belong to their place, they may associate their place with valuable contacts with neighbors and friends and family who live nearby. Conversely, connecting with their place can also stimulate contact with people who live there. As briefly touched upon in the introduction, in our study, we are interested in whether a broader conception of belonging, also entailing more physical aspects of the living environment, is relevant to loneliness. In the following we theoretically delve into the notion of place attachment, without it making explicit reference to social relationships. Next, we theorize place attachment as a mediating factor in the relationship between objective neighborhood and residential characteristics and loneliness. Lastly, we discuss some other important contributors to loneliness, like social network characteristics. Such an approach allows for more insight into what role place attachment might play for loneliness among old people, also *in addition to* social integration factors.

2.1. The concept of place attachment

Much has been written about place attachment, especially in environmental psychology, geography and sociology. Yet, unambiguous agreement on exactly what the concept means and entails, and how it relates to other concepts such as place belonging, sense of place, rootedness, and familiarity, still remains to be achieved (Anton and Lawrence, 2014; Lewicka, 2011; Peng et al., 2020). Drawing on an old and seminal definition of place attachment from Rubinstein and Parmelee (1992), we regard it as: "… a set of feelings about a geographic location that emotionally binds a person to that place" (p. 139). Research into place attachment has traditionally covered two dimensions: place identity and place dependence (Anton and Lawrence, 2014; Mihaylov and Perkins, 2013; Raymond et al., 2010; White et al., 2008). Proshansky (1978) initially introduced *place identity* as: "those dimensions of self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, feelings, values, goals, preferences, skills, and behavioral tendencies relevant to a specific environment" (p. 155). In other words: the feelings, emotions and symbolic connections to place that help shape who we are. Or, following in the footsteps of Lynd (1958), a sense of belonging some*where* is necessary to understand who we *are*. *Place dependency* is somewhat more tangible: it regards the functional or goal-directed connections to a setting (Shumaker and Taylor, 1983). It hence evaluates the extent to which a place facilitates people's needs – imagine the older person who values having services and amenities nearby, as long travel time is less doable in old age. This evaluation also acquires meaning in relation to the relative quality of comparable alternatives (Anton and Lawrence, 2014; White et al., 2008): to what extent is this the 'best place' to do the things I find important? We concur with this classical approach to place attachment for the current research and understand place attachment to entail two dimensions: place identity and place dependence.

2.2. Environmental and residential characteristics, place attachment and loneliness

Research into loneliness reveals that characteristics of the (built) environment take its toll on loneliness. For instance, green space may potentially protect against loneliness (Astell-Burt et al., 2022), as well as length of residence in the neighborhood and satisfaction with amenities (van den Berg et al., 2016). Moreover, Kearns et al. (2015) report that those experiencing their neighborhood of higher quality, measured by antisocial behavior, collective efficacy and feeling safe, were less lonely. A similar association was found with regard to neighborhood deprivation among older adults (Victor and Pikhartova, 2020). We explore

whether these types of factors may in fact relate to loneliness *via* place attachment. Surely, how and where people live impacts place attachments. We therefore theorize about features of the environment and (personal) residential characteristics in relation to place attachment.

A first is the level of *urbanization*. Previous studies investigating the effect of population density in Europe do not unequivocally point in one direction regarding its effect on place attachment. Rural areas are generally regarded as demanding living contexts for (vulnerable) old people, because of declining local services, a lack of public transport and long distances to towns (Burholt et al., 2018; Wiles et al., 2020). However, in the general population, people who live in the countryside feel more attached to their place of residence than people who live in more urbanized areas (Anton and Lawrence, 2014; Buchecker and Frick, 2020; Lewicka, 2005; Mandal, 2016). Moreover, Belanche et al. (2021) find that this effect is stronger as one ages. Several reasons for this association have been elaborated. Though population change and the restructuring of rural areas make for ever more pluriform and heterogenous experiences in the countryside (Thissen and Droogleever Fortuijn, 2021), there is also evidence that the rural idyll is still alive among the older population. Rural places would then be positively valued because of its quietness, spaciousness (Haartsen et al., 2003) and landscape (Wiles et al., 2020), and the rural community would be depicted as supportive, neighborly and friendly (Burholt and Dobbs, 2012), with a relatively high sense of security and trust in people (Mandal, 2016). In addition, older people seem to value nature, which is generally more available in rural places, more than younger people (Haartsen et al., 2003; Puhakka et al., 2015). Literature also makes mention of how a sense of continuity, stability, tradition and belonging – important especially in later stages of life – are more easily found in rural than in urban places (Belanche et al., 2021). Especially in the Netherlands, where urban and rural areas are strongly interconnected and urban services oftentimes not far away (Thissen and Droogleever Fortuijn, 2021), the downsides of living in rural areas may carry less weight than might be the case in other countries.

Related to urbanization, but a factor in itself too, is the *socio-economic condition of the neighborhood* one resides. Based on common knowledge, it seems obvious that more deprived neighborhoods accompany lower levels of place attachment. Indeed, scholarship also points in that direction (Bailey et al., 2012; Gilleard et al., 2007). Deprived neighborhoods would suffer from lower levels of social connection and 'togetherness,' because of reduced trust, feelings of insecurity and higher crime rates (Bailey et al., 2012; Blokland, 2003). Qualitative studies into deprived urban neighborhoods have highlighted factors that impede place attachment specifically for older people: physical deterioration of buildings and infrastructure, lack of services, traffic congestion and poor neighborhood design (Buffel et al., 2013; Livingston et al., 2010; Scharf et al., 2003). Mobility limitations among the older population increase the weight of such factors, not only in urban but also in rural contexts: navigation of poorly maintained roads is even harder when older, and escaping the detrimental effects by getting out of the neighborhood, even for a day, are limited. Indeed, older people in deprived rural areas report lower levels of place attachment than others (Burholt and Naylor, 2005).

Length of residence was also found to be of importance for place attachment (Belanche et al., 2021; Casakin et al., 2015; Gieling et al., 2017). The literature provides us with mechanisms for this effect. First, long residence yields routines, familiarity and predictability in a place – making for comfort, security and belonging (Bailey et al., 2012; Gilleard et al., 2007; Rowles, 1983). Second, the unfolding of a life course and memories thereof are place bound, therefore spending longer times in a locality carries significance for place attachment (Burholt and Naylor, 2005). Rowles (1983) speaks in this context of 'autobiographical insideness,' which reflects the way in which a lifelong accumulation of experiences in a place can provide a sense of identity. This may particularly hold true for those *being born* and raised in the places they reside, as even childhood memories may be linked to these locales (Hay, 1998).

To summarize, we regard characteristics of place, i.e., the degree of urbanization, the socio-economic condition of the neighborhood and length of residence, of importance to both loneliness and place attachment, and therefore test whether place attachment could function as a mediator between these more objective characteristics and loneliness.

3. Other factors impacting loneliness

We aim to investigate the added value of place attachment to understanding loneliness, *in addition* to other, well known risk factors for loneliness. As *demographic characteristics* we include gender, age and educational level. Gender effects in loneliness are unconvincing: a meta-analysis concludes that across the life-span, mean levels of loneliness are similar for males and females (Maes et al., 2019). It may be noted though, that women are often widowed than men (Dykstra and de Jong Gierveld, 2004), which may be relevant in the relatively old population we research. Old adults are more lonely than younger ones, because a multitude of risk factors for loneliness accumulate in older age, such as widowhood, social network loss, and poor health (van Tilburg et al., 2018). Higher educational levels are associated with more diverse social networks, possibly because such diversity requires greater cognitive skills to develop and maintain relationships (Ajrouch et al., 2005).

For *social integration,* the more important and frequently contacted relationships nearby for social support, or geographically more distant, the lower the likelihood of loneliness (Barjaková et al., 2023; Sun and Schafer, 2023). Having a partner who knows your heart, who is emotionally close and you can share your life with is a major protection against feeling lonely (de Jong Gierveld et al., 2018). Involvement in social organizations and volunteer work offers the opportunity to maintain existing contacts and make new ones, thereby keeping loneliness at bay (de Jong Gierveld et al., 2018).

We include measures of *health and psychological resources*. Loneliness gets impacted by health, because it may hinder the development or maintenance of social ties: for instance because of mobility limitations or cognitive impairment (Barjaková et al., 2023). We also take into account *mastery*: the extent to which one feels they have control over their life. Mastery contributes to lower levels of loneliness through active coping to change the social situation, and passive coping by changing expectations regarding the social network (Ben-Zur, 2018).

4. Method

4.1. Respondents

Data were obtained from the Longitudinal Aging Study Amsterdam (LASA) (Hoogendijk et al., 2025). Samples of men and women born between 1908 and 1957 were taken from the population registers of three Dutch cities and six surrounding small municipalities in 1992, 2002 and 2012, with follow-up observations every three or four years. Irregularly there were additional data collections in the entire sample or in part of the sample. Data on place attachment and loneliness were collected in the fall of 2020 from respondents born in 1908–1945 (N = 424). Some respondents were interviewed at home or by telephone, others completed a paper or digital questionnaire. Additional data was taken from the preceding face-to-face interview at respondent's home in 2018–2019. In between, no one moved outside the municipality. See Fig. S1 in the Supplemental Material for sample sizes, attrition and selection across observations. When comparing participants who refused to participate (n = 119) with participants who did participate (n = 434) in the survey in the fall of 2020, we found virtually no evidence of bias due to self-selection with regard to the most important research variables (Table S1). Those with better cognitive functioning and higher mastery cooperated more often.

In 2020, their ages ranged from 74 to 96 (M = 81.3), and 53 % were women. 95 % were born in the Netherlands. The majority (59 %) was partnered, nine lived with another person in the household and 40 %

was living alone.

The LASA study has been conducted in line with the Declaration of Helsinki. LASA has received approval from the medical ethics committee of VU University Medical Centre (IRB numbers: 92/138, 2002/141, and 2012/361).

4.2. Instruments

Loneliness was measured by the 11-item De Jong Gierveld scale (de Jong Gierveld and Kamphuis, 1985). The scale has six negatively formulated items such as "I experience a sense of emptiness" indicating emotional loneliness and five positively formulated items such as "There are enough people I feel close to" indicating social loneliness. Responses were summed with "yes" and "more or less" counting as emotional lonely on the negatively formulated items, and "more or less" and "no" counting as social lonely on the positively formulated items. Reliability KR-20 was .80 and .77 respectively.

Place attachment items were selected from Raymond et al. (2010), and organized into the dimensions 'place identity' (four items) and 'place dependence' (three items; Table 1). Because neighborhood facilities can be important for old people, item 5 was added. Response categories were "no!," "no," "more or less," "yes" and "yes!"

Demographic characteristics. We included respondents' gender, chronological age at the day of data collection, and educational level in years (ranging from 5 = incomplete elementary schooling to 18 = completed higher education).

Social integration. Partner status identified whether someone was in a partnership. Network members were identified by name using the domain-contact method (van Tilburg, 1998). The following question was asked: "We would like to know who you have frequent contact with and who is important to you." Network members were identified by first name and initial. We counted the number of people who lived within 15 min of traveling time as neighborhood relationships; the others were geographically distant relationships. Respondents were asked if they were involved in one or more of twelve social organizations (e.g., the union, a sports organization, a choir). If they were involved in activities, they were asked how often (1 = almost never to 7 = daily). In addition to this social participation, they were also asked if they were active on boards or helped out with various activities, which was registered as volunteer work (0 = no, 1 = yes).

Table 1
Characteristics of place attachment items and loadings in the second-order factor model (N = 424).

		M	SD	Loadings on factors	
				One	Two
Place identity		2.6	.7		
1	I am very attached to X/Ik ben erg gehecht aan X	2.8	.9	.75	.75
2	I have a lot of fond memories about X/Ik heb veel goede herinneringen aan X	2.8	.8	.76	.76
3	X is very special to me/X is voor mij heel bijzonder	2.7	.8	.75	.75
4	I feel X is a part of me/Ik heb het gevoel dat X een deel van mij is	2.3	.9	.74	.74
Place dependence		2.5	.7		
5	I am very attached to the facilities in X/Ik ben erg gehecht aan de voorzieningen in X	2.5	.8	.63	.65
6	I get more satisfaction out of living in X than any other place/Ik krijg meer voldoening van het leven in X dan welke andere plaats dan ook	2.5	.9	.58	.59
7	No other place can compare to X/Geen enkele andere plaats is te vergelijken met X	2.0	.9	–	–
8	X is the best place for the activities I like to do/X is de beste plaats voor de activiteiten die ik graag doe	2.5	.8	.58	.60

Note. Range of item and scale scores 1–4. In the questionnaire, for X, the name of the municipality "and surrounding area" had been entered.

Health and psychological resources. Physical functioning was self-reported for seven activities of daily living, e.g., walking up and down fifteen steps (1 = cannot do it at all to 5 = no difficulties). Cronbach's alpha = .84. Cognitive functioning was measured by a shortened version of the Mini-Mental State Examination (0 = poor to 16 = excellent) (Folstein et al., 1975). Five items measured mastery (Pearlin and Schooler, 1978), with scores ranging 1–5 (alpha = .77).

Neighborhood and residential characteristics. The degree of urbanization is determined with the mean number of addresses per squared kilometer within a 1 km circle (den Dulk et al., 1992). The concentration of human activities is subsequently captured in an ordinal variable with five categories from 1 to 5. The average personal income (from labor, own business, income insurance or social services) of persons in a private household in a neighborhood reflects prosperity. Data are provided by Statistics Netherlands. Respondent's postal code served as the variable to match the neighborhood data from Statistics Netherlands. Respondents were asked how many years they had lived in this neighborhood or district. Based on the answer to the question in which municipality they were born and their residential address, it was determined whether they lived in their municipality of birth.

4.3. Procedure

For the measurement of place attachment we applied confirmatory factor analysis in Mplus (Muthén and Muthén, 2017). Because of the low frequency of responses in the lowest degree of agreement, we merged them with "no." Item scores were treated as having ordinal measurement levels; latent factors were continuous. We tested whether there was one or two factors underlying the items. To arrive at a fitting model, we excluded items with a high residual variance. To test the model fit, we used Chi^2/df, the comparative fit index (CFI), the Tucker-Lewis Index (TLI) and the root mean square error of approximation (RMSEA). $Chi^2/df < 3$, CFI and TLI $\geq .95$ and RMSEA $\leq .07$ indicate an acceptable model fit (Hooper et al., 2008). The model was estimated using the full information maximum likelihood method. We present standardized factor loadings herein. Scale scores were computed as the mean of item scores, with range 1–4.

The conceptual model of loneliness and place attachment is illustrated in Fig. S2. We assumed all variables influenced loneliness and that the evaluative assessment of place attachment depended on objective neighborhood and residential characteristics. The latter can therefore have both a direct and indirect effect on loneliness. The items on attachment to a place did not refer to local social ties. Therefore, no effects of social integration variables were expected on place attachment. The univariate distributions of variables were checked, and values with a frequency of less than five per cent were top- or bottom-coded. The bivariate correlations between explanatory variables and loneliness were investigated, after which the structural equation regression model was tested in Mplus. Explanatory variables were centered around the grand mean to facilitate interpretation of the coefficients. A multicollinearity test showed acceptable tolerances, with the lowest for place identity (.49) and place dependence (.51). We did not evaluate the TLI statistic for the structural model because parsimony is not an important criterion for exploratory purposes (Marsh and Hau, 1996).

5. Results

5.1. Dimensionality of place attachment

For the measurement of place attachment, the results of the confirmatory factor analysis indicated that item 7, "No other place can compare to …," had a high residual value in both the unidimensional and two-dimensional models, indicating a low correlation between the item and a latent factor. The item has therefore been removed. The modification indices suggested to add a correlated error between items 6 and 8. With these modifications, both models fitted. For the

unidimensional model Chi^2/df = 1.5, RMSEA = .035, CFI = .994, TLI = .990; alpha = .86. For the two-dimensional model Chi^2/df = 1.6, RMSEA = .037, CFI = .994, TLI = .989; alpha for place identity = .83 and for place dependence = .71. In line with these results, the correlation between the two subscales was high (r = .68). Because two dimensions are theoretically distinguished, we will continue our analysis with the two subscales as indicators of place attachment. Average scores were between "more or less" and "yes" (Table 1).

5.2. Description of the sample

Descriptives of variables are presented in Table 2. The average loneliness scores are well below the scale average. That so many old respondents were not lonely or only slightly lonely may be related to their social integration: more than half had a partner, on average they had more than 14 personal relationships, they engaged in a social activity every month, and almost half did volunteer work. They were in good physical and cognitive health. Older people in this generation often have a low level of education, which may be related to their lower average mastery. Due to the stratified sample, there is a good distribution according to degree of urbanization. The average income of local residents is more than twice the social minimum. Many respondents have lived in the neighborhood for decades, and a third live in their municipality of birth.

5.3. Regression of loneliness and place attachment

The structural equation model generally followed the conceptual model (Fig. S2) but with some adaptations. The latent concept place attachment was measured by place identity and place dependence. We removed the explanatory variable 'degree of urbanization' from the model because it was not significantly bivariately related to loneliness and place attachment (Table S2). The variables for 'number of years living in neighborhood' and 'living in municipality of birth' were bivariately only related to place attachment. The model's modification indices suggested adding an effect of the number of neighborhood relationships on place attachment. The adjusted model demonstrated a good fit (Chi^2/df = 2.0, RMSEA = .039, CFI = .973, TLI = .934). The modification indices of this model did not give cause to change the model. The path coefficients are presented in Table 3; significant paths are illustrated in Fig. 1.

Table 2
Descriptives of study variables (N = 424).

	M	SD
Emotional loneliness (range 0–6) [a]	1.8	1.9
Social loneliness (range 0–5) [a]	1.2	1.5
Place identity (range 1–4) [a]	2.6	.7
Place dependence (range 1–4) [a]	2.5	.7
Female [b]	.53	
Age (range 74.9–96.7) [b]	81.3	4.6
Educational level (range 5–18) [c]	10.8	3.4
Number of neighborhood relationships (range 0–11) [d]	5.4	3.0
Number of geographically distant relationships (range 0–23) [d]	9.1	6.4
Having a partnership [a]	.59	
Social participation (range 0–6) [d]	3.0	2.3
Volunteering [d]	.43	
Physical functioning (range 1–5) [d]	4.5	.8
Cognitive functioning (range 12–16) [d]	15.0	1.2
Mastery (range 12–25) [d]	17.7	3.1
Degree of urbanization (range 1–5) [e]	3.2	1.4
Average income in neighborhood (x €1000) (range 18.5–74.7) [e]	27.4	6.1
Number of years living in neighborhood (range 0–81) [d]	31.5	18.3
Living in municipality of birth [f]	.34	

[a] Survey in fall of 2020.
[b] Based on information from the population register.
[c] Asked at the first observation in 1992 or 2002.
[d] Survey in 2018–2019.
[e] Data from Statistics Netherlands linked to the respondent's residential address in 2020.
[f] Combination of [c] and [e].
Sources of data:

Adding place attachment improved the explanatory model of loneliness. Respondents who scored high on place attachment were less emotionally and socially lonely than those who scored low. Calculated on the basis of non-standardized coefficients in Table 3, the effect sizes are a maximum of 2.0 loneliness points difference in a range of 0–6 and 1.7 points difference in a range of 0–5, respectively. To put that into perspective: the effect sizes of having a partner or not are 1.3 and .3 points, respectively. We also estimated a model without the effects of place attachment on loneliness (parameters are not shown). Compared to this model, the model with the place attachment effects had a higher explained variance in emotional and social loneliness of four and five percentage points respectively.

The results indicate that the degree of place attachment depended on neighborhood and residential characteristics, as well as social integration. Respondents with a high place attachment lived in neighborhoods with a higher average income, had lived in their neighborhood longer, more often lived in their municipality of birth than respondents with a low place attachment, and had more neighborhood relationships. Through mediation by place attachment, neighborhood and residential characteristics had standardized indirect effects between −.03 and −.04 on emotional and social loneliness. A greater number of neighborhood relationships was associated with less emotional loneliness (the indirect effect is −.05) and less social loneliness (−.05, in addition to the direct effect of −.13).

Respondents with a partner and high mastery were relatively less emotionally and socially lonely. Respondents with good physical functioning were relatively less emotionally lonely. The other respondent characteristics were not significantly related to loneliness in the multivariate model.

6. Discussion

The main aim and novelty of our study was to examine the role of place attachment, beyond other well-known risk factors, on emotional and social loneliness, among old people. Two of the most described and generally recognized dimensions of place attachment were distinguished: place identity and place dependence (Williams and Vaske, 2003). Both place identity and place dependence were related to emotional and social loneliness. Thereafter adding place attachment to the structural equation model considerably increased the explained variance in emotional and social loneliness, and the effect sizes were substantial. Place identity may create a sense of connectedness, shared meaning and purpose, which reduces the chance of loneliness. Also place dependence may serve as a meaningful buffer against loneliness. As people age they become frailer, which increases their needs for tangible aspects of their place – such as accessible transportation, healthcare services, and familiar social spaces – enabling them to 'age in place' (Cramm et al., 2018). Old people who score high on place dependence are likely to have daily routines, use local facilities, and engage in activities that offer social interaction (e.g., shopping at the same supermarket, visiting community centers, daily walk in the park). Even if those old people have few close and meaningful relationships, this familiar and supportive place may reduce feelings of loneliness by reinforcing a sense of safety, belonging and stability. The results indicate that attachment to a place is associated not only with less emotional loneliness, but also with less social loneliness. The emotional and tangible aspects in place identity and dependence, respectively, may have contributed to this. However, this distinction could not be seen empirically due to the strong correlation between the place attachment dimensions.

Place attachment is a generic feeling that can arise for various reasons. By including different types of independently measured objective

Table 3
Regression of loneliness and place attachment (N = 424).

	Emotional loneliness (range 0–6)			Social loneliness (range 0–5)		
	B	SE B	Beta	B	SE B	Beta
Intercept	1.83 [c]	.08		1.17 [c]	.07	
Female	−.34	.18	−.09	−.07	.15	−.02
Age (range 74.9–96.7)	.02	.02	.04	−.02	.02	−.07
Educational level (range 5–18)	−.02	.03	−.04	.04	.02	.10
Number of neighborhood relationships (range 0–11)	.01	.03	.01	−.06 [a]	.02	−.13
Number of geographically distant relationships (range 0–23)	.03	.01	.09	−.02	.01	−.09
Having a partnership	−1.31 [c]	.18	−.34	−.33 [a]	.15	−.11
Social participation (range 0–6)	−.03	.04	−.04	−.05	.03	−.07
Volunteering	.03	.19	.01	−.04	.16	−.01
Physical functioning (range 1–5)	−.27 [a]	.11	−.11	−.13	.10	−.07
Cognitive functioning (range 12–16)	−.12	.07	−.07	−.07	.06	−.05
Mastery (range 12–25)	−.13 [c]	.03	−.21	−.10 [c]	.02	−.21
Degree of urbanization (range 1–5)	–			–		
Average income in neighborhood (x €1000) (range 18.5–74.7)	−.01	.01	−.03	−.02	.01	−.07
Number of years living in neighborhood (range 0–81)	.00	.01	.03	.00	.00	.01
Living in municipality of birth	.33	.17	.08	.23	.15	.07
Place attachment (range 1–4)	−.68 [c]	.18	−.22	−.55 [c]	.14	−.23
R^2	.29			.19		

	Place attachment (range 1–4)		
	B	SE B	Beta
Number of neighborhood relationships (range 0–11)	.04 [c]	.01	.21
Average income in neighborhood (x €1000) (range 18.5–74.7)	.01 [a]	.01	.13
Number of years living in neighborhood (range 0–81)	.01 [c]	.00	.20
Living in municipality of birth	.19 [b]	.07	.14
R^2	.13		

Notes. Degree of urbanization excluded from the model. $Chi^2/df = 1.7$, RMSEA = .039, CFI = .973, TLI = .934. Emotional and social loneliness correlated .45. Place attachment was a latent variable and correlated .89 and .77 with place identity and place dependence, respectively.

[a] $p < .05$.
[b] $p < .01$.
[c] $p < .001$.

neighborhood aspects in our empirical model, we gained insight into the extent to which these are related to place attachment. We did not find differences in loneliness or in place attachment related to the degree of urbanization. Previous studies discussed above found associations in different directions. It is possible that these offset each other, resulting in a zero finding. It is also viable that many of the old people in our study have lived in their neighborhood for so long that they have become accustomed to the advantages and disadvantages of living in a particular place, and that the degree of urbanization is for this reason no longer relevant to their place attachment or loneliness.

Place attachment mediated the relationship between three neighborhood and residential characteristics and loneliness. As expected and in line with previous studies (Anton and Lawrence, 2014; Hernández et al., 2007; Raymond et al., 2010), place attachment is higher for those who have lived in their neighborhood for a longer period of time and for those who live in their municipality of birth. Place attachment is also higher when people live in neighborhoods with a higher average income. Neighborhoods with a high social status have more well-maintained facilities and better accessibility, which promotes the opportunities to build and maintain supportive relationships (Giles-Corti and Donovan, 2002; van Lenthe et al., 2005). Our study thus reveals that more 'objective' characteristics of one's residence and neighborhood can be understood as having an impact on loneliness, because of how these influence place attachment among old people. This finding broadens our understanding of loneliness among this age category and warrants further inquiry in these relationships. We encourage this research to be conducted among other age categories as well.

The distinction between neighborhood ties and other ties showed that a greater number of important and frequently contacted ties nearby, both directly and indirectly *via* place attachment, is associated with less loneliness. Previous research also indicates that social ties, especially those with people in the direct living environment, enhances place attachment (Lewicka, 2010). Relationships to friends and family in a particular locality, the emotional connections and shared history and concerns, all contribute to feelings of belonging and place attachment (Raymond et al., 2010). For old, less mobile people in particular, having a friend or sibling around the corner is a convincing reason to attach meaning and value to a place (Hillcoat-Nallétamby, 2014). Our findings confirm that the neighborhood is important for older people and that social contacts and involvement in the neighborhood are significant. Raymond et al. (2010) added this community context of family and friend bonding as a dimension of place attachment. Conceptually, we prefer to distinguish social integration in the neighborhood from place attachment.

The items for place identity and place dependence were selected from the scale for place attachment developed by Raymond et al. (2010). These items have been proven to be reliable and valid (Boley et al., 2021; Iversen and Dugstad, 2024; Magalhães and Calheiros, 2015; Prayitno et al., 2021). However, to better align with our specific sample of old people, one item for place dependence was added. In addition, confirmatory factor analysis led to the removal of another item and the inclusion of a correlated error between two items. Such contextual adjustments, while retaining the construct structure, are common and justified, because it cannot be assumed that a scale for place attachment is valid and reliable for all populations and settings (Wynveen et al., 2017).

After these adjustments, the two-dimensional model fitted the data well. However, the dimensions of place identity and place dependence appeared to be strongly correlated. This suggests that attachment to a place in late life is a holistic experience rather than the sum of separate components. There are reasons why a strong correlation between the dimensions of place identity and place dependence is probably more prominent among old people – our study population – than among younger people. Old people are generally less inclined to change their place of residence than younger generations (de Jong et al., 2022) and the tendency to 'age in place' increases with age (de Jong, 2022). In

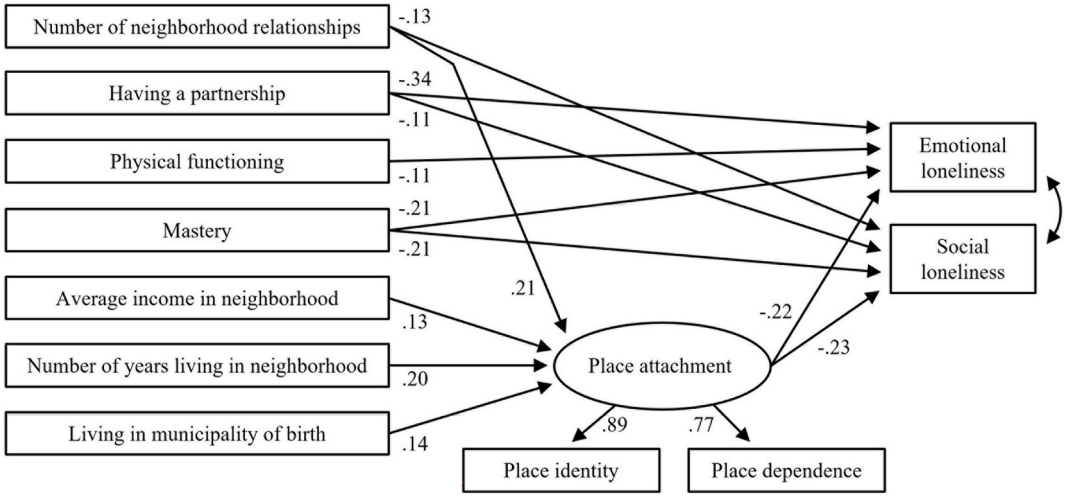

Fig. 1. Significant standardized path coefficients for the structural equation model predicting place attachment and loneliness.

addition, mobility and health problems limit the ability of old people to venture outside their place. As their radius of action shrinks, they spend more time at their place and rely on familiar routines (Lager et al., 2021). This makes it more difficult for old people than for younger people to envision having the same opportunities for services, activities, facilities, and social connections elsewhere – a feature of place dependence. Their strong dependence on their place can deepen their emotional attachment, reinforcing symbolic ties and strengthening their sense of belonging to the community, thereby blurring the line between place identity and place dependence.

Our results are best understood in the context of limitations. Firstly, the study was cross-sectional in design and we are unable to establish causality from the data. Other causal directions are also possible, for example for the relationship between health and loneliness. Studies have provided evidence for bidirectional associations (Phillips et al., 2023; Yin et al., 2019). Poor health can lead to increased loneliness due to reduced mobility and social participation, while loneliness itself may adversely impact health (Hajek and König, 2020; Ong et al., 2016). The relationship between place attachment and loneliness may also appear in reverse order (Friesinger et al., 2022; Kemperman et al., 2019). Lonely people often withdraw from local activities. This can result in them seeing their environment as a place without connections, weakening their emotional bond with place. Moreover, loneliness can reinforce the belief that another place would offer better opportunities for socializing, causing people to see their current place as a source of their loneliness and increasing their desire to move (Gillespie and Fokkema, 2024). Another relationship in which a reverse effect could occur is that between social ties at their place and place attachment. Research suggests that higher place attachment could also increase the number of social ties (Dallago et al., 2009). Nevertheless, we think that the directions in which we have theorized the relationships are plausible.

Secondly, the demarcation of 'place' that we chose merits discussion. Defining an unambiguous geographical unit with wording that is understandable to the respondents proved to be a challenge. Ultimately, in the survey we opted for the name of the municipality "and its surroundings." It can be questioned whether this geographical unit was too broad, particularly in relation to place identity. For example, residents of large cities may identify more strongly with their district rather than the city as a whole (Lewicka, 2010). Additionally, compared to other countries, the Netherlands has relatively few municipalities, and in recent decades many small municipalities have merged into larger administrative units (de Ceuninck et al., 2010; Ekamper and Vermeulen, 2023). These newly formed municipalities often cover a large geographical area, sometimes encompassing significant cultural and religious differences (Ekamper and Vermeulen, 2023; Stoffelen and Groote, 2024; Terlouw, 2016). Place identity, measured by items focusing on the municipality and surrounding area, is probably weaker for residents of the municipalities that have merged. In hindsight, it might have been preferable to investigate which geographical unit older adults identify with beforehand. However, that would be at the expense of comparability between respondents, and would not be practical in a paper-and-pencil questionnaire.

The overall main finding is that place attachment is an additional factor for understanding differences in loneliness among old people. This insight suggests that the conventional conceptualization of loneliness – as found in the pioneering work of Weiss (1973), Perlman and Peplau (1981), and Baumeister and Leary (1995) – may need to be elaborated. Rather than being primarily related to the absence of intimate ties or a lack of meaningful ties with a wider group of people, our findings suggest that place attachment facilitates a more extensive form of embeddedness. On the one hand, this embedding can be formed by superficial but frequent social interactions through a person's place. These routine, low-threshold encounters – such as brief exchanges with neighbors, shopkeepers, or service providers – may foster a sense of safety, belonging and stability (Soenen, 2006). On the other hand, this embedding can go beyond social dynamics, suggesting that how people relate to the actual, perhaps physical fabric of places, can help against loneliness. These perspectives open an intriguing avenue for further exploration, particularly warranting additional research to better understand the multifaceted ways in which built and natural environments can prevent loneliness (Bower et al., 2023).

CRediT authorship contribution statement

Theo G. van Tilburg: Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Jolien Klok:** Writing – original draft, Conceptualization. **Tineke Fokkema:** Writing – original draft, Conceptualization.

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Declaration of competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.healthplace.2025.103529.

Data availability

The data underlying this article is available upon request (https://lasa-vu.nl/en/request-data/). A replication packet with the code is available online (https://osf.io/yq72t/).

References

Afshar, P.F., Foroughan, M., Vedadhir, A., Tabatabaei, M.G., 2017. The effects of place attachment on social well-being in older adults. Educ. Gerontol. 43 (1), 45–51. https://doi.org/10.1080/03601277.2016.1260910.

Ajrouch, K.J., Blandon, A.Y., Antonucci, T.C., 2005. Social networks among men and women: the effects of age and socioeconomic status. J. Gerontol. 60B (6), S311–S317. https://doi.org/10.1093/geronb/60.6.S311.

Anton, C.E., Lawrence, C., 2014. Home is where the heart is: the effect of place of residence on place attachment and community participation. J. Environ. Psychol. 40, 451–461. https://doi.org/10.1016/j.jenvp.2014.10.007.

Astell-Burt, T., Hartig, T., Putra, I.G.N.E., Walsan, R., Dendup, T., Feng, X., 2022. Green space and loneliness: a systematic review with theoretical and methodological guidance for future research. Sci. Total Environ. 847, 157521. https://doi.org/10.1016/j.scitotenv.2022.157521.

Bailey, N., Ade, K., Livingston, M., 2012. Place attachment in deprived neighbourhoods: the impacts of population turnover and social mix. Hous. Stud. 27 (2), 208–231. https://doi.org/10.1080/02673037.2012.632620.

Barjaková, M., Garnero, A., d'Hombres, B., 2023. Risk factors for loneliness: a literature review. Soc. Sci. Med. 334, 116163. https://doi.org/10.1016/j.socscimed.2023.116163.

Baumeister, R.F., Leary, M.R., 1995. The need to belong: desire for interpersonal attachments as a fundamental human motivation. Psychol. Bull. 117 (3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497.

Belanche, D., Casaló, L.V., Rubio, M.Á., 2021. Local place identity: a comparison between residents of rural and urban communities. J. Rural Stud. 82, 242–252. https://doi.org/10.1016/j.jrurstud.2021.01.003.

Ben-Zur, H., 2018. The association of mastery with loneliness: an integrative review. J. Indiv. Differ. 39 (4). https://doi.org/10.1027/1614-0001/a000269.

Bergefurt, L., Kemperman, A., van den Berg, P., Borgers, A., van der Waerden, P., Oosterhuis, G., Hommel, M., 2019. Loneliness and life satisfaction explained by public-space use and mobility patterns. Int. J. Environ. Res. Publ. Health 16 (21), 4282. https://www.mdpi.com/1660-4601/16/21/4282.

Blokland, T., 2003. Ethnic complexity: routes to discriminatory repertoires in an inner-city neighbourhood. Ethn. Racial Stud. 26 (1), 1–24. https://doi.org/10.1080/0141987002000025252.

Boley, B.B., Strzelecka, M., Yeager, E.P., Ribeiro, M.A., Aleshinloye, K.D., Woosnam, K. M., Mimbs, B.P., 2021. Measuring place attachment with the Abbreviated Place Attachment Scale (APAS). J. Environ. Psychol. 74, 101577. https://doi.org/10.1016/j.jenvp.2021.101577.

Bower, M., Kent, J., Patulny, R., Green, O., McGrath, L., Teesson, L., Jamalishahni, T., Sandison, H., Rugel, E., 2023. The impact of the built environment on loneliness: a systematic review and narrative synthesis. Health Place 79, 102962. https://doi.org/10.1016/j.healthplace.2022.102962.

Buchecker, M., Frick, J., 2020. The implications of urbanization for inhabitants' relationship to their residential environment. Sustainability 12 (4), 1624. https://doi.org/10.3390/su12041624.

Buffel, T., de Donder, L., Phillipson, C., de Witte, N., Sarah, D., Verté, D., 2014. Place attachment among older adults living in four communities in Flanders, Belgium. Hous. Stud. 29 (6), 800–822. https://doi.org/10.1080/02673037.2014.898741.

Buffel, T., Phillipson, C., Scharf, T., 2013. Experiences of neighbourhood exclusion and inclusion among older people living in deprived inner-city areas in Belgium and England. Ageing Soc. 33 (1), 89–109. https://doi.org/10.1017/S0144686X12000542.

Burholt, V., Dobbs, C., 2012. Research on rural ageing: where have we got to and where are we going in Europe? J. Rural Stud. 28 (4), 432–446. https://doi.org/10.1016/j.jrurstud.2012.01.009.

Burholt, V., Foscarini-Craggs, P., Winter, B., 2018. Rural ageing and equality. In: Westwood, S. (Ed.), Ageing, Diversity and Equality. Routledge, pp. 311–328. https://doi.org/10.4324/9781315226835-25.

Burholt, V., Naylor, D., 2005. The relationship between rural community type and attachment to place for older people living in North Wales, UK. Eur. J. Ageing 2 (2), 109–119. https://doi.org/10.1007/s10433-005-0028-3.

Casakin, H., Hernández, B., Ruiz, C., 2015. Place attachment and place identity in Israeli cities: the influence of city size. Cities 42, 224–230. https://doi.org/10.1016/j.cities.2014.07.007.

Cramm, J.M., van Dijk, H.M., Nieboer, A.P., 2018. The creation of age-friendly environments is especially important to frail older people. Ageing Soc. 38 (4), 700–720. https://doi.org/10.1017/S0144686X16001240.

Dahlberg, L., McKee, K.J., Frank, A., Naseer, M., 2022. A systematic review of longitudinal risk factors for loneliness in older adults. Aging Ment. Health 26 (2), 225–249. https://doi.org/10.1080/13607863.2021.1876638.

Dallago, L., Perkins, D.D., Santinello, M., Boyce, W., Molcho, M., Morgan, A., 2009. Adolescent place attachment, social capital, and perceived safety: a comparison of 13 countries. Am. J. Community Psychol. 44 (1–2), 148–160. https://doi.org/10.1007/s10464-009-9250-z.

de Ceuninck, K., Herwig, R., Kristof, S., Valcke, T., 2010. Municipal amalgamations in the low countries: same problems, different solutions. Local Gov. Stud. 36 (6), 803–822. https://doi.org/10.1080/03003930.2010.522082.

de Jong Gierveld, J., Kamphuis, F.H., 1985. The development of a Rasch-type loneliness-scale. Appl. Psychol. Meas. 9 (3), 289–299. https://doi.org/10.1177/014662168500900307.

de Jong Gierveld, J., van Tilburg, T.G., Dykstra, P.A., 2018. New ways of theorizing and conducting research in the field of loneliness and social isolation. In: Vangelisti, A.L., Perlman, D. (Eds.), The Cambridge Handbook of Personal Relationships. Cambridge University Press, pp. 391–404. https://doi.org/10.1017/9781316417867.031.

de Jong, P.A., 2022. Later-life migration in the Netherlands: propensity to move and residential mobility. J. Aging Environ. 36 (1), 16–39. https://doi.org/10.1080/26892618.2020.1858384.

de Jong, P.A., Rouwendal, J., Brouwer, A., 2022. Staying put out of choice or constraint? The residential choice behaviour of Dutch older adults. Popul. Space Place 28 (4), e2553. https://doi.org/10.1002/psp.2553.

den Dulk, C.J., van de Stadt, H., Vliegen, J.M., 1992. Een nieuwe maatstaf voor stedelijkheid: de omgevingsadressendichtheid [A new measure for degree of urbanisation: the address density of the surrounding area]. Maandstat. Bevolk. 40 (July), 14–27.

Dykstra, P.A., de Jong Gierveld, J., 2004. Gender and marital-history differences in emotional and social loneliness among Dutch older adults. Canad. J. Aging-Revue Canadienne du Vieillissement 23 (2), 141–155. https://doi.org/10.1353/cja.2004.0018.

Ekamper, P., Vermeulen, W., 2023. Van Beesel tot Voorne aan Zee: twee eeuwen gemeentegrenswijzigingen [two centuries of municipal boundary changes]. Demos, bulletin over bevolking en samenleving 39 (1), 1–4. https://publ.nidi.nl/demos/2023/demos-39-01-ekamper.pdf.

Folstein, M.F., Folstein, S.E., McHugh, P.R., 1975. 'Mini-Mental State': a practical method for grading the cognitive state of patients for the clinician. J. Psychiatr. Res. 12 (3), 189–198. https://doi.org/10.1016/0022-3956(75)90026-6.

Fong, P., Cruwys, T., Robinson, S.L., Haslam, S.A., Haslam, C., Mance, P.L., Fisher, C.L., 2021. Evidence that loneliness can be reduced by a whole-of-community intervention to increase neighbourhood identification. Soc. Sci. Med. 277, 113909. https://doi.org/10.1016/j.socscimed.2021.113909.

Franklin, A., Tranter, B., 2021. Loneliness and the cultural, spatial, temporal and generational bases of belonging. Aust. J. Psychol. 73 (1), 57–69. https://doi.org/10.1080/00049530.2020.1837007.

Franssen, T., Stijnen, M., Hamers, F., Schneider, F., 2020. Age differences in demographic, social and health-related factors associated with loneliness across the adult life span (19–65 years): a cross-sectional study in the Netherlands. BMC Public Health 20 (1), 1118. https://doi.org/10.1186/s12889-020-09208-0.

Friesinger, J.G., Haugland, S.H., Vederhus, J.-K., 2022. The significance of the social and material environment to place attachment and quality of life: findings from a large population-based health survey. Health Qual. Life Outcome 20 (1), 135. https://doi.org/10.1186/s12955-022-02045-2.

Gieling, J., Vermeij, L., Haartsen, T., 2017. Beyond the local-newcomer divide: village attachment in the era of mobilities. J. Rural Stud. 55, 237–247. https://doi.org/10.1016/j.jrurstud.2017.08.015.

Giles-Corti, B., Donovan, R.J., 2002. Socioeconomic status differences in recreational physical activity levels and real and perceived access to a supportive physical environment. Prev. Med. 35 (6), 601–611. https://doi.org/10.1006/pmed.2002.1115.

Gilleard, C., Hyde, M., Higgs, P., 2007. Community and communication in the third age: the impact of internet and cell phone use on attachment to place in later life in England. J. Gerontol. B Psychol. Sci. Soc. Sci. 62 (4), S276–S283. https://doi.org/10.1093/geronb/62.4.S276.

Gillespie, B.J., Fokkema, T., 2024. Life events, social conditions and residential mobility among older adults. Popul. Space Place 30 (3), e2706. https://doi.org/10.1002/psp.2706.

Guthmuller, S., 2022. Loneliness among older adults in Europe: the relative importance of early and later life conditions. PLoS One 17 (5), e0267562. https://doi.org/10.1371/journal.pone.0267562.

Haartsen, T., Huigen, P.P.P., Groote, P., 2003. Rural areas in the Netherlands. Tijdschr. Econ. Soc. Geogr. 94 (1), 129–136. https://doi.org/10.1111/1467-9663.00243.

Hagerty, B.M.K., Lynch-Sauer, J., Patusky, K.L., Bouwsema, M., Collier, P., 1992. Sense of belonging: a vital mental health concept. Arch. Psychiatr. Nurs. 6 (3), 172–177. https://doi.org/10.1016/0883-9417(92)90028-H.

Hajek, A., König, H.-H., 2020. Which factors contribute to loneliness among older Europeans? Findings from the survey of health, ageing and retirement in Europe: determinants of loneliness. Arch. Gerontol. Geriatr. 89, 104080. https://doi.org/10.1016/j.archger.2020.104080.

Hay, R., 1998. Sense of place in developmental context. J. Environ. Psychol. 18 (1), 5–29. https://doi.org/10.1006/jevp.1997.0060.

Hernández, B., Carmen Hidalgo, M., Salazar-Laplace, M.E., Hess, S., 2007. Place attachment and place identity in natives and non-natives. J. Environ. Psychol. 27 (4), 310–319. https://doi.org/10.1016/j.jenvp.2007.06.003.

Hillcoat-Nallétamby, S., 2014. The meaning of "independence" for older people in different residential settings. J. Gerontol.: Series B 69 (3), 419–430. https://doi.org/10.1093/geronb/gbu008.
Hoogendijk, E.O., van Schoor, N.M., Qi, Y., Visser, M., Swinkels, J.C., Broese van Groenou, M.I., Kok, A.A.L., Holwerda, T.J., Pasman, H.R.W., Onwuteaka-Philipsen, B.D., Remmelzwaal, S., van Ingen, E., van Tilburg, T.G., van Haaster, A.-C., van der Horst, M., Poppelaars, J., Deeg, D.J.H., Huisman, M., 2025. The Longitudinal Aging Study Amsterdam: design and cohort update 2025. Eur. J. Epidemiol. https://doi.org/10.1007/s10654-025-01238-5.
Hooper, D., Coughlan, J., Mullen, M.R., 2008. Structural equation modelling: guidelines for determining model fit. Electron. J. Bus. Res. Methods 6 (1), 53–60. https://doi.org/10.21427/d7cf7r.
Iversen, E.K., Dugstad, A., 2024. Spatial dimensions in stated preference valuation: the role of place attachment. Land Use Policy 136, 106971. https://doi.org/10.1016/j.landusepol.2023.106971.
Jaspal, R., Breakwell, G.M., 2022. Socio-economic inequalities in social network, loneliness and mental health during the COVID-19 pandemic. Int. J. Soc. Psychiatr. 68 (1), 155–165. https://doi.org/10.1177/0020764020976694.
Kearns, A., Whitley, E., Tannahill, C., Ellaway, A., 2015. 'Lonesome town'? Is loneliness associated with the residential environment, including housing and neighborhood factors? J. Community Psychol. 43 (7), 849–867. https://doi.org/10.1002/jcop.21711.
Kemperman, A., van den Berg, P.E.W., Weijs-Perrée, M., Uijtdewillegen, K., 2019. Loneliness of older adults: social network and the living environment. Int. J. Environ. Res. Publ. Health 16 (3), 406. https://doi.org/10.3390/ijerph16030406.
Lager, D.R., van Hoven, B., Huigen, P.P.P., 2021. Neighbourhood walks as place-making in later life. Soc. Cult. Geogr. 22 (8), 1080–1098. https://doi.org/10.1080/14649365.2019.1672777.
Lebrusán, I., Gómez, M.V., 2022. The importance of place attachment in the understanding of ageing and place: "the stones know me". Int. J. Environ. Res. Publ. Health 19 (24), 17052. https://doi.org/10.3390/ijerph192417052.
Lewicka, M., 2005. Ways to make people active: the role of place attachment, cultural capital, and neighborhood ties. J. Environ. Psychol. 25 (4), 381–395. https://doi.org/10.1016/j.jenvp.2005.10.004.
Lewicka, M., 2010. What makes neighborhood different from home and city? Effects of place scale on place attachment. J. Environ. Psychol. 30 (1), 35–51. https://doi.org/10.1016/j.jenvp.2009.05.004.
Lewicka, M., 2011. Place attachment: how far have we come in the last 40 years? J. Environ. Psychol. 31 (3), 207–230. https://doi.org/10.1016/j.jenvp.2010.10.001.
Livingston, M., Bailey, N., Kearns, A., 2010. Neighbourhood attachment in deprived areas: evidence from the north of England. J. Hous. Built Environ. 25 (4), 409–427. https://doi.org/10.1007/s10901-010-9196-3.
Luhmann, M., Hawkley, L.C., 2016. Age differences in loneliness from late adolescence to oldest old age. Dev. Psychol. 52 (6), 943–959. https://doi.org/10.1037/dev0000117.
Lynd, H.M., 1958. On Shame and the Search for Identity. Routledge. https://doi.org/10.4324/9781315010236.
Lyu, Y., Forsyth, A., 2022. Planning, aging, and loneliness: reviewing evidence about built environment effects. J. Plann. Lit. 37 (1), 28–48. https://doi.org/10.1177/08854122211035131.
Maes, M., Qualter, P., Vanhalst, J., van den Noortgate, W., Goossens, L., 2019. Gender differences in loneliness across the lifespan: a meta-analysis. Eur. J. Pers. 33 (6), 642–654. https://doi.org/10.1002/per.2220.
Magalhães, E., Calheiros, M.M., 2015. Psychometric properties of the Portuguese version of place attachment scale for youth in residential care. Psicothema 27 (1), 65–73. https://doi.org/10.7334/psicothema2014.40.
Mandal, A., 2016. Size and type of places, geographical region, satisfaction with life, age, sex and place attachment. Pol. Psychol. Bull. 47 (1), 159–169. https://doi.org/10.1515/ppb-2016-0018.
Marsh, H.W., Hau, K.-T., 1996. Assessing goodness of fit: is parsimony always desirable? J. Exp. Educ. 64 (4), 364–390. https://doi.org/10.1080/00220973.1996.10806604.
Mihaylov, N., Perkins, D.D., 2013. Community place attachment and its role in social capital development. In: Manzo, L.C., Devine-Wright, P. (Eds.), Place Attachment: Advances in Theory, Methods and Applications. Routledge, pp. 62–74. https://doi.org/10.4324/9780203757765.
Moyano-Díaz, E., Mendoza-Llanos, R., 2021. Membership, neighborhood social identification, well-being, and health for the elderly in Chile. Front. Psychol. 11, 608482. https://doi.org/10.3389/fpsyg.2020.608482.
Muthén, L.K., Muthén, B., 2017. Mplus user's guide: statistical analysis with latent variables. https://www.statmodel.com/download/usersguide/MplusUserGuideVer_8.pdf.
Nyqvist, F., Victor, C.R., Forsman, A.K., Cattan, M., 2016. The association between social capital and loneliness in different age groups: a population-based study in Western Finland. BMC Public Health 16 (1), 1–8. https://doi.org/10.1186/s12889-016-3248-x.
Ong, A.D., Uchino, B.N., Wethington, E., 2016. Loneliness and health in older adults: a mini-review and synthesis. Gerontology 62 (4), 443–449. https://doi.org/10.1159/000441651.
Pearlin, L.I., Schooler, C., 1978. The structure of coping. J. Health Soc. Behav. 19 (1), 2–21. https://doi.org/10.2307/2136319.
Peng, J., Strijker, D., Wu, Q., 2020. Place identity: how far have we come in exploring its meanings? Front. Psychol. 11, 294. https://doi.org/10.3389/fpsyg.2020.00294.
Perlman, D., Peplau, L.A., 1981. Toward a social psychology of loneliness. In: Gilmour, R., Duck, S.W. (Eds.), Personal Relationships in Disorder. Academic, pp. 31–56. https://peplau.psych.ucla.edu/wp-content/uploads/sites/141/2017/07/perlman-peplau-81.pdf.
Phillips, D.M., Finkel, D., Petkus, A.J., Muñoz, E., Pahlen, S., Johnson, W., Reynolds, C. A., Pedersen, N., 2023. Longitudinal analyses indicate bidirectional associations between loneliness and health. Aging Ment. Health 27 (6), 1217–1225. https://doi.org/10.1080/13607863.2022.2087210.
Prayitno, G., Dinanti, D., Hidayana, I.I., Nugraha, A.T., 2021. Place attachment and agricultural land conversion for sustainable agriculture in Indonesia. Heliyon 7 (7), e07546. https://doi.org/10.1016/j.heliyon.2021.e07546.
Prieto-Flores, M.-E., Fernandez-Mayoralas, G., Forjaz, M.J., Rojo-Perez, F., Martinez-Martin, P., 2011. Residential satisfaction, sense of belonging and loneliness among older adults living in the community and in care facilities. Health Place 17 (6), 1183–1190. https://doi.org/10.1016/j.healthplace.2011.08.012.
Proshansky, H.M., 1978. The city and self-identity. Environ. Behav. 10 (2), 147–169. https://doi.org/10.1177/0013916578102002.
Puhakka, R., Jaana, P., Karisto, A., 2015. Spatial practises and preferences of older and younger people: findings from the Finnish studies. J. Soc. Work. Pract. 29 (1), 69–83. https://doi.org/10.1080/02650533.2014.993948.
Raymond, C.M., Brown, G., Weber, D., 2010. The measurement of place attachment: personal, community, and environmental connections. J. Environ. Psychol. 30 (4), 422–434. https://doi.org/10.1016/j.jenvp.2010.08.002.
Rowles, G.D., 1983. Place and personal identity in old age: observations from Appalachia. J. Environ. Psychol. 3 (4), 299–313. https://doi.org/10.1016/S0272-4944(83)80033-4.
Rubinstein, R.I., Parmelee, P.A., 1992. Attachment to place and the representation of the life course by the elderly. In: Altman, I., Low, S.M. (Eds.), Place Attachment. Springer US, pp. 139–163. https://doi.org/10.1007/978-1-4684-8753-4_7.
Scharf, T., Phillipson, C., Smith, A., 2003. Older people's perceptions of the neighbourhood: evidence from socially deprived urban areas. Sociol. Res. Online 8 (4). https://doi.org/10.5153/sro.867.
Schepers, W., Gryp, D., Häussermann, F., Heylen, L., Van Regenmortel, T., De Witte, J., 2025. The relation between physical and social neighbourhood characteristics and loneliness. A systematic review. Health Place 94, 103491. https://doi.org/10.1016/j.healthplace.2025.103491.
Shumaker, S.A., Taylor, R.B., 1983. Toward a clarification of people-place relationships: a model of attachment to place. In: Fiemer, N.R., Celler, E.S. (Eds.), Environmental Psychology: Directions and Perspectives, 2. Praeger, pp. 219–251.
Soenen, R., 2006. Het kleine ontmoeten: over het sociale karakter van de stad [The brief encounter: on the social character of the city]. Garant.
Stoffelen, A., Groote, P., 2024. Strategic coupling of administrative rationality and cultural imaginaries in municipal amalgamations. Polit. Geogr. 115, 103227. https://doi.org/10.1016/j.polgeo.2024.103227.
Sun, H., Schafer, M.H., 2023. Distance in disconnection: the varied impact of core network losses on loneliness among older Europeans. J. Gerontol.: Series B 78 (11), 1917–1926. https://doi.org/10.1093/geronb/gbad124.
Terlouw, K., 2016. Territorial changes and changing identities: how spatial identities are used in the up-scaling of local government in the Netherlands. Local Gov. Stud. 42 (6), 938–957. https://doi.org/10.1080/03003930.2016.1186652.
Thissen, F., Droogleever Fortuijn, J., 2021. 'The village as a coat': changes in the person-environment fit for older people in a rural area in the Netherlands. J. Rural Stud. 87, 431–443. https://doi.org/10.1016/j.jrurstud.2020.07.001.
van den Berg, P.E.W., Kemperman, A., de Kleijn, B., Borgers, A., 2016. Ageing and loneliness: the role of mobility and the built environment. Travel Behav. Soc. 5, 48–55. https://doi.org/10.1016/j.tbs.2015.03.001.
van Lenthe, F.J., Brug, J., Mackenbach, J.P., 2005. Neighbourhood inequalities in physical inactivity: the role of neighbourhood attractiveness, proximity to local facilities and safety in the Netherlands. Soc. Sci. Med. 60 (4), 763–775. https://doi.org/10.1016/j.socscimed.2004.06.013.
van Tilburg, T.G., 1998. Losing and gaining in old age: changes in personal network size and social support in a four-year longitudinal study. J. Gerontol.: Series B 53B, S313–S323. https://doi.org/10.1093/geronb/53B.6.S313.
van Tilburg, T.G., Iedema, J., Klok, J., 2018. Veranderingen in eenzaamheid in de tweede levenshelft [Changes in loneliness in the second half of life]. In: van Campen, C., Vonk, F., van Tilburg, T.G. (Eds.), Kwetsbaar En Eenzaam? Risico's En Bescherming in De Ouder Wordende Bevolking. Sociaal en Cultureel Planbureau, pp. 46–53. https://www.scp.nl/publicaties/publicaties/2018/06/15/kwetsbaar-en-eenzaam.
Victor, C.R., Pikhartova, J., 2020. Lonely places or lonely people? Investigating the relationship between loneliness and place of residence. BMC Public Health 20 (1), 778. https://doi.org/10.1186/s12889-020-08703-8.
Weijs-Perrée, M., van den Berg, P.E.W., Arentze, T.A., Kemperman, A., 2015. Factors influencing social satisfaction and loneliness: a path analysis. J. Transport Geogr. 45, 24–31. https://doi.org/10.1016/j.jtrangeo.2015.04.004.
Weiss, R.S., 1973. Loneliness: the Experience of Emotional and Social Isolation. MIT Press.
Wen, M., Wang, G., 2009. Demographic, psychological, and social environmental factors of loneliness and satisfaction among rural-to-urban migrants in Shanghai, China. Int. J. Comp. Sociol. 50 (2), 155–182. https://doi.org/10.1177/0020715208101597.
White, D.D., Virden, R.J., van Riper, C.J., 2008. Effects of place identity, place dependence, and experience-use history on perceptions of recreation impacts in a natural setting. Environ. Manag. 42 (4), 647–657. https://doi.org/10.1007/s00267-008-9143-1.
Wiles, J., Kearns, R., Bates, L., 2020. Rural ageing in place and place attachment. In: Skinner, M., Winterton, R., Walsh, K. (Eds.), Rural Gerontology. Routledge, pp. 175–187. https://doi.org/10.4324/9781003019435.

Williams, D.R., Vaske, J.J., 2003. The measurement of place attachment: validity and generalizability of a psychometric approach. For. Sci. 49 (6), 830–840. https://doi.org/10.1093/forestscience/49.6.830.

Wynveen, C.J., Schneider, I.E., Cottrell, S., Arnberger, A., Schlueter, A.C., von Ruschkowski, E., 2017. Comparing the validity and reliability of place attachment across cultures. Soc. Nat. Resour. 30 (11), 1389–1403. https://doi.org/10.1080/08941920.2017.1295499.

Yin, J., Lassale, C., Steptoe, A., Cadar, D., 2019. Exploring the bidirectional associations between loneliness and cognitive functioning over 10 years: the English Longitudinal Study of Ageing. Int. J. Epidemiol. 48 (6), 1937–1948. https://doi.org/10.1093/ije/dyz085.