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The Effects of Neighbourhoods on Size of Social Network of the Elderly and Loneliness: A Multilevel Approach

Peter Moorer and Theo P. B. M. Suurmeijer

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Summary. Our goal was to find out how much influence neighbourhoods have on the size of the social network and loneliness of elderly people. The results show that the average size of the social network was 9, while the elderly had few feelings of loneliness. Neighbourhoods could at most explain 8 per cent of the size of social network and 6 per cent of loneliness. It is concluded that the elderly mostly have substantially sized social networks and few feelings of loneliness. Social networks and loneliness are probably more strongly related to the (psychological or social) characteristics of individuals and are hardly influenced by the characteristics of neighbourhoods.

Introduction

Both welfare professionals and the population younger than 65 years of age often claim that social isolation and loneliness among the elderly is a common phenomenon (Moroney, 1976; van der Maas, 1982; Moorer and Suurmeijer, 1991). Each time an elderly person dies unnoticed and is found in his or her house only after several days or weeks, this belief is reinforced. Moreover, they often have clear-cut and well-defined ideas concerning the neighbourhoods where loneliness among the elderly is more severe and social networks are smaller (Moorer and Suurmeijer, 1991).

It is well known that there often exists a definite spatial distribution of social-demographic and social-economic characteristics such as age, education and income. This seems to be true also for some psychological disorders, such as schizophrenia, sui-

cide and depression, with higher incidence rates in underprivileged areas of a city (Faris and Dunham, 1939; Timms, 1971; Ahlbrandt, 1984).

Local authorities want to know if they should concentrate their interventions on some specific neighbourhoods. Therefore, besides the theoretical interest, practical considerations are an important reason to investigate the relationship between loneliness, social network and neighbourhoods. Although loneliness and social isolation are not psychological disorders, they are often assumed to have a spatial distribution as well (Moorer and Suurmeijer, 1991). In a pilot study, we found that welfare professionals and local authorities in our pre-study were convinced that loneliness and size of social network are spatially distributed as a result of effects of the neighbourhood. Therefore,

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research on the complex relationships between neighbourhood, social network and loneliness is important. Multilevel analyses and theory can be used as an adequate approach to explore these convictions or assumptions.

Multilevel Theory and Analyses: Problems and Possibilities

There are many multilevel computer programmes, but unfortunately theories incorporating multilevel structures (multilevel theories) are not well developed (Bryk and Raudenbusch, 1992; Hox, 1994). Theoretically, it still remains unclear which aspects of school, neighbourhood or organisational structure influence behaviour, attitudes or school performance, and how the influences run.

Multilevel theory is developing in the field of education, but no general theory exists that links sociological or psychological concepts (such as social isolation, loneliness, subjective health or self-concept) to ecological concepts (such as population density or distribution, or the social climate of an area). One hardly finds theories that explain how the spatial distribution of psychosocial phenomena is caused by variations in individual characteristics or caused by spatial or ecological factors or both (Verdonk, 1979). For example, do depressive people live in certain areas because they have characteristics that predispose or induce them to live in these areas or do certain characteristics of areas elicit depression? Probably both are correct. The question should be how much of the depression is influenced by personal characteristics and how much is influenced by the characteristics of areas. The lack of multilevel theories generally means that assumptions are made on an *ad-hoc* basis.

Besides the lack of multilevel theory in urban sociology, the conceptualisation of the neighbourhood is also puzzling. One problem relates to the definition of 'neighbourhood' that should be used in order to obtain (theoretically) relevant results. According to

Verdonk (1979) a neighbourhood is theoretically defined if its social processes influence people. A neighbourhood may have signs and symbols that make inhabitants aware of their common social origins—for example, St Patrick's Day for Irish immigrants. According to Ross (1962), a neighbourhood is defined if both residents and non-residents give an area a name and a boundary, and if an area has "status-ascriptive functions in urban social relations" (p. 75). One's place of living may give a picture about one's social and economic origins: the 'Bronx' or 'Harlem' will create a different picture from 'Beverly Hills'. Timms takes a very different and more practical approach. As most researchers are dependent on census tracts, especially in the US, he argues that

to be useful ... the concept of ... the neighbourhood has to be related to the territorial subdivisions used by the local census authority (Timms, 1971, p. 39).

He does not take up the theoretical question of what constitutes a neighbourhood, but uses the census tracts, as they are available. In our study, we have chosen Ross's approach because we think that 'neighbourhood' can only have an influence if people ascribe meaning to a neighbourhood. This is only possible if people can name and identify neighbourhoods.

Another problem, directly related to the former one, has to do with the delineation of a neighbourhood. Preferably the delineation should be based upon the theoretical point of departure. However, as Timms (1971) has indicated, many researchers must rely on data gathered by local authorities to achieve their own purposes, which may and often do differ from those of researchers. Local authorities use their own classifications (delineation method) which may be based on different combinations of social, demographic or geographical information, such as mean income, population distribution or natural boundaries (rivers, railroads etc.). A purely geographical classification may lead to a much larger census tract than one based solely upon social or demographic infor-

mation. Ross and Verdonk only want to look for classifications which, as said before, are based on social processes in neighbourhoods, while Timms does not bother about the classification, but will use the one available. It would be preferable if all types of classification coincided, but usually they do not. When using data from local authorities, one has to evaluate how useful a specific classification may be in answering a specific research question.

From our former analysis (Moorer and Suurmeijer, 1992), neighbourhoods appeared to have different mean values for loneliness and size of social network. However, it was not clear whether this was a consequence of the distribution of personal characteristics or a direct effect of the districts. Therefore, the present study was designed, among other things, to investigate how much variance could be explained by neighbourhoods, using a multilevel approach. If a neighbourhood effect could be demonstrated, could the variance in size of social network and loneliness be explained by certain characteristics of the neighbourhood?

Theoretical Considerations

Although the literature does not contain many ideas about the effects of neighbourhoods on loneliness or the size of social network, we propose the following aspects of neighbourhoods to have an influence on loneliness and the size of social network:

- (1) the proportion of elderly in the neighbourhood;
- (2) neighbourhood crime rates; and
- (3) the number of activities in the neighbourhood for elderly people.

In the next paragraphs, we will explain how and why these aspects of the neighbourhood could possibly affect feelings of loneliness and the size of the social network.

Proportion of the elderly in the neighbourhood. As far as the social isolation and loneliness of the elderly are concerned, one particular characteristic of neighbourhoods

might be directly important for both feelings of loneliness and the size of the social networks—namely, the proportion of elderly in a neighbourhood. Loneliness is assumed to be influenced by the size of one's social network (de Jong-Gierveld, 1984). The size of the social network could be related to the proportion of elderly in a neighbourhood. A higher proportion of elderly in a neighbourhood makes the likelihood of making and meeting friends greater and would create the opportunity to have a larger and (more) satisfying social network. Having a social network within the neighbourhood may be especially important for the elderly as they frequently suffer from loss of mobility and are confined to their neighbourhood (Ahlbrandt, 1984). However, although a higher proportion of elderly enhances the probability of meeting other elderly, elderly may neither need nor desire to develop, maintain or enlarge their social network in the neighbourhood where they live at the moment. In their life, they may already have established a satisfactory set of relationships and may focus their attention on friends they already have or on family, especially their children and siblings. Therefore, the proportion of elderly living in a neighbourhood may be of minor or no importance to the size of the social network and loneliness of elderly—perhaps even the contrary may be the case. If this way of reasoning is correct and, furthermore, if we assume that part of the elderly move from one area to another because of housing, their social contacts in the area might remain below average.

Reported crimes against the elderly. Reports on crime against the elderly in neighbourhoods may presumably influence the feelings of insecurity among elderly people. When TV and newspapers report another violent attack against an (elderly) person in a neighbourhood, other (elderly) people may also develop feelings of an increased risk of being violently attacked. However, reports on crime in the media may be biased towards neighbourhoods that are generally seen as having a high crime rate and may produce a

picture different from police reports on crime. Different distributions of reported crime rates would result in different distributions of feelings of insecurity. In previous analyses, we found that elderly persons who have more feelings of insecurity also have more feelings of loneliness than elderly persons who have fewer feelings of insecurity. An explanation for this finding may be that a feeling of insecurity results in a tendency to stay at home and not to visit friends or to undertake social activities. As a result, the social network will decline, because some members of the social network will find the relationship to be unbalanced and will leave the network of the target elderly. Feelings of insecurity may also make an elderly person ask other people to come to his or her home rather than go to them.

Depending on the composition of the social network, it may decline or remain stable. If a social network comprises relatively many family members, the elderly person may more often be visited than vice versa. However, compared with other (not family) network members, they will not be greatly concerned by this unbalance in the relationship. Therefore, in our research group, we may expect only moderate effects, as the generations in our study generally had larger next-of-kin networks. It is well known that families in the first half of this century in the Netherlands were quite large (Kooy, 1977).

Amount and types of activities in neighbourhoods. The amount and diversity of activities open to the elderly in a neighbourhood may be important in establishing social relationships. More activities for elderly people imply a better chance of meeting other people with similar interests, to compare values and interests and, as a result, to get involved in and to develop more permanent social relationships. The diversity of activities may attract different types of elderly persons. Some may be more interested in cultural activities, while others may be interested in sports. Sharing an activity means that one has similar interests. In all these cases, the size of

social network can be enlarged and loneliness may be prevented or reduced. In one of our former analyses, we found that participation in activities was related to a significantly larger social network and less feeling of loneliness (Moorer and Suurmeijer, 1992). However, one may wonder whether having a larger social network or 'participating in activities in the neighbourhood' could be a reflection of some underlying factor—for example, being a more active elderly person. Moreover, this supposed relationship between 'activities' and 'proportion of elderly' rests upon the same assumption as the previous one—namely, that elderly persons may want to enlarge their social network. As mentioned before, this may not be true: therefore, the amount and diversity of activities may have no effect whatsoever. Besides, the elderly may chose activities they are interested in for the activities themselves and not because of the additional possibility of meeting people.

Material and Methods

Samples, Data Collection and Measures

For this project, data had to be collected at two different levels—namely, from neighbourhoods and from individuals. At the level of individuals, a sample has been drawn from the total population of elderly in the city of Groningen (see below); at the level of neighbourhoods, data collection has been more elaborate.

Data collection at the individual level. From the total population of elderly people of 66 years of age and older in the city of Groningen (population = 170 000) in the north of The Netherlands, we randomly selected a sample of 1211 elderly persons. Twenty-seven per cent ($N = 332$) refused to co-operate, while another 10 per cent ($N = 116$) was lost mainly due to chronic illness, dementia or 'not accessible'. This left us with a sample of 723. It is difficult to assess whether the non-response was related to loneliness or

size of social network. However, we think that this is not the case for three reasons:

- (1) Some of those who refused to co-operate told the interviewer that they had no time to spend participating in the interview; this may be considered as an indication that some of those who refused were not lonely at all, but led a very active and social life.
- (2) In one neighbourhood in one flat there had been an organised action not to participate in our study. Such an action would not have been possible if these people had been isolated.
- (3) The elderly who participated were very glad to see someone to talk to and often spent some of the little money they had to buy sweets and drinks for our interviewers.

The mean age of our respondents was 74.6 years (standard deviation = 6.3), 63 per cent were women and 50 per cent were married. The percentage of women and men in our sample exactly matched the distribution of women and men in the city of Groningen in 1991 (Moorer and Suurmeijer, 1991, *Dienst Informatie en Administratie*, 1991).

Data collection at the neighbourhood level. The local authorities of the city of Groningen provided a delineation method in accord with our choice of Ross' theoretical definition of a neighbourhood. In the city of Groningen, all areas are well named and delineated and most of these areas will give residents of Groningen (and even non-residents) information about the background of an inhabitant of a certain area. The city of Groningen has 27 different and well-named districts. Each year, the Municipal Agency for Information and Administration produces extensive statistical information for each district. The statistical information contains data about the distribution of sex, age, religion, etc. and cross-classifications for each district (*Dienst Informatie en Administratie*, 1991).

For this study, neighbourhoods were se-

lected only if they fulfilled two different criteria:

- (1) A neighbourhood was included in our study only if at least 10 persons from that neighbourhood were present in our sample.
- (2) The neighbourhood had to be a residential area—not an industrial or an educational area (university-campus). This restriction was made because the social structures of these areas are completely different from those found in residential areas. The university campus and the industrial areas do not have shops or activity centres and in many ways are rural in nature and can not be seen as neighbourhoods within a city.

Based on these criteria, 22 of the 27 neighbourhoods remained in the analyses (see Table 1).

The proportion of elderly (66+) in the neighbourhoods ranged from 3–50 per cent with an average of 15 per cent (see Table 1). The neighbourhood having the highest percentage was not included in the analyses, as this neighbourhood is very sparsely populated. Therefore, the range used in this study is between 5 and 28 per cent.

The sizes of the areas in the city of Groningen are quite different. The largest one is Euvelgunne with 1723.1 ha and the smallest is De Oosterpoort. The largest one has not been included in the analyses as it includes a very large industrial area and two small towns that have been swallowed by the city of Groningen.

In Figure 1, the average income per household for each neighbourhood in 1994 is given. No earlier data were available, but the differences between 1991 and 1994 are not very great. As can be seen from Figure 1, not all data concerning the city of Groningen are available in the desired format. For four neighbourhoods (Centrum, Hoogkerk, Beijum and Lewenborg), only data for smaller areas can be presented graphically. For these neighbourhoods, data had to be collected on crime rates, the proportion of elderly persons in the neighbourhood population and activi-

Table 1. Number of inhabitants and elderly persons, the percentage of the elderly and the size of the neighbourhoods of the city of Groningen, as of 1 January 1991

Neighbourhood	Inhabitants	Elderly	Percentage elderly	Area (ha)
1 Centrum	13 708	1 167	9	168.59
2 Oosterpark	10 764	1 961	18	195.68
3 Korreweg	4 579	556	12	57.37
4 Indische buurt	8 437	837	10	71.53
5 De Hoogte	3 556	404	11	57.92
6 Oranjebuurt	5 756	525	9	68.49
7 Schildersbuurt	7 657	810	11	76.56
8 De Weijert	11 177	2 420	22	258.35
9 Coendersborg	7 089	1 489	21	197.33
10 Euvelgunne [†]	1 677	153	9	1 723.19
11 Oosterpoort	4 291	331	8	41.87
12 Hereweg	4 919	856	17	73.53
13 Zeeheldenbuurt	3 408	461	14	54.45
14 Stadspark	3 886	911	23	346.07
15 Corpus den Hoorn	7 823	2 229	28	320.47
16 Oosterhoogebrug	5 712	323	6	296.39
17 Leeuwenborg	11 327	536	5	156.02
18 Noorddijk [†]	525	57	11	309.38
19 Bovenstreek [†]	4	2	50	134.85
20 Beijum [†]	14 689	458	3	215.32
21 Noorderhoogebrug	379	35	9	765.44
22 Selwerd	8 420	1 638	19	98.11
23 Paddepoel	9 791	2 460	25	122.09
24 Vinkhuizen	11 447	1 676	15	236.44
25 Hoogkerk	7 326	779	11	1 201.49
26 Dorkwerd [†]	329	35	11	727.97
27 Universitycomplex [†]	12	2	17	303.53
Total	168 688	23 111	15	8 278.44

[†] Neighbourhoods not in analysis.

ties in the neighbourhood. These data had to come from different sources.

- (1) The data about the population came from the Municipal Agency for Information and Administration (see above).
- (2) The information on reported crime from local newspapers.
- (3) The information on activities came from the society for the well-being of the elderly in the city of Groningen (Stichting WING).

Measures

Measures at the individual level. Loneliness was measured with the loneliness scale as

used by de Jong-Gierveld (de Jong-Gierveld and Kamphuis, 1985; Moorer and Suurmeijer, 1993). The loneliness scale contains 11 Likert-items (score 1–5), which are dichotomised (scores 0 and 1) to obtain total scale scores running from 0 to 11 (de Jong-Gierveld and van Tilburg, 1999). A score of 0 indicates ‘no loneliness’, while a score of 11 indicates ‘very lonely’ (see the Appendix for further details).

The size of the social network was assessed with a shortened version of the ‘social network delineation questionnaire’ (Euridess, 1990; van Sonderen, 1991). This network delineation was based on the ‘role relational approach’. In our research, respondents could name a maximum of 19 persons.

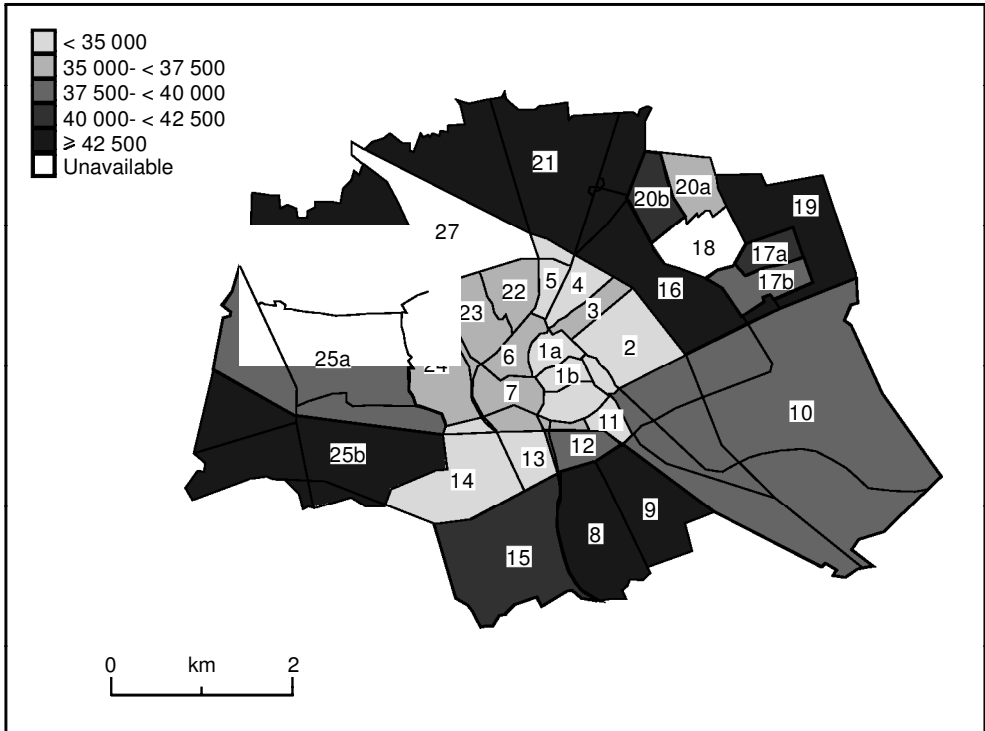


Figure 1. Average household income (in guilders) in the neighbourhoods of Groningen, 1994.

Notes: The numbers refer to the numbers in Table 1; letters indicate that local authority data are only available for the separate parts of certain neighbourhoods (thus, for example, 25a and 25b = neighbourhood 25 in the analyses); 2DFL \approx US\$1.

Measures at the neighbourhood level. The proportion of elderly persons was obtained directly from the information of the Municipal Agency for Information and Administration. For the measurement of reported crime rates in a neighbourhood, the data were obtained from two local and freely distributed newspapers. All the articles about criminal activities against people (robbery, burglary and rape) in the previous year were recorded for each neighbourhood. From the association for the well-being of the elderly in the city of Groningen, we obtained information on how many and what kind of activities this association provided in each of the neighbourhoods of Groningen.

Analysis

Multilevel analysis was used because it is designed to analyse data with a hierarchical

data structure—as, for example, in educational and organisational research. Hierarchical linear models avoid some problems such as aggregation bias, mis-estimated precision and the ‘unit of analysis’ problem of the traditional analytical models like regression or ANACOVA (Bryk and Raudenbusch, 1992). For the multilevel analysis, we used the programme VARCL (Longford, 1988).

Analyses in a multilevel framework follow a specific order of analysis. Decisions on each subsequent step depend on both statistical and theoretical criteria. The first analysis in the multilevel framework is always the calculation of the intraclass correlation. The intraclass correlation gives an estimate of the degree of variance in the individuals that can be explained by the effects of classrooms, schools or neighbourhoods. As such, it is a very rigorous analysis: when the intraclass correlation is very low or non-

significant, there is very little point in attempting any further analysis within this framework. Of course, the collection and analysis of data on crime rates, activities and the proportion of elderly persons in a neighbourhood makes sense only if a significant intraclass correlation can be found. The model to estimate in this case is:

Level 1:

$$Y = \beta_0 + \varepsilon_{ij} \quad (1)$$

Level 2:

$$\beta_0 = \gamma_0 + \eta_j \quad (2)$$

Given our goal, the second analysis would be to expand the model for (2) into:

Level 2:

$$\beta_0 = \gamma_0 + \gamma_1 \times x_1 + \gamma_2 \times x_2 + \gamma_3 \times x_3 + \eta_j \quad (2b)$$

where, x_1 = the proportion of elderly persons in the population of a neighbourhood; x_2 = the amount of reported crime in a neighbourhood; and x_3 = the number of organised activities in a neighbourhood, while equation (1) would remain the same. For our goal, we are interested in the significance of γ_1 , γ_2 and γ_3 . Non-significant effects would be eliminated from the model.

In the third stage, our analysis would be expanded to include individual effects. Previous analyses have shown which variables to include in the model for loneliness or size of social network (Moorer and Suurmeijer, 1992).

The models would become:

Level 1:

$$Y = \beta_0 + \beta_1 \times age + \beta_2 (sex) + \dots + \varepsilon_{ij} \quad (1a)$$

Level 2:

$$\beta_0 = \gamma + \gamma_1 \times x_1 + \gamma_2 \times x_2 + \gamma_3 \times X_3 + \eta_j \quad (2b)$$

but only the significant effects would be kept in the model.

If we had sufficient theoretical information, one might also want to model cross-level effects; meaning one would model β_1 to β_n from equation (1a) in the same way that one modelled β_0 in equation (2b). All of the parameters in Y could also be modelled in a multilevel way, but the theoretical implications would be rather strange in some cases and very hard to grasp in others. In general, it would mean that the strength of the effect would be different depending on the neighbourhood one lived in. In an extreme case, it would mean that if someone moved, his parameter would change. This is not very likely to be in accord with theoretical psychological knowledge.

Results

The average size of the social network was 9 (standard deviation = 4.6), while the smallest size in a neighbourhood was 7.1 and the largest 15.0 (see Table 2 for results for each neighbourhood). Some 9 per cent of the respondents had a social network with 3 or less persons, while 16 per cent had a social network with 4 or less persons.

The average loneliness score was 2.6 (standard deviation = 2.9), while the lowest score in the neighbourhoods was 0—but for only one respondent—and the highest score in a neighbourhood was 4.6 (see Table 2 for results for each neighbourhood). This means that the elderly in the city of Groningen, on average, felt only a little lonely. Using the criteria of Bosma (1988), we found that 9 per cent of the elderly could be described as 'very lonely' (scores 8–11) and 19 per cent as 'moderately lonely' (scores 4–7). The correlation between loneliness and the size of social network was -0.35: the smaller the size of the social network, the more lonely the elderly were.

In order to assess the direct neighbourhood effects, in multilevel research one always has to estimate the intraclass correlation coefficient before doing any other analysis (see section on Methods). Very low or non-significant intraclass coefficients mean that all the possible direct effects of school,

Table 2. Loneliness, size of social network and number of respondents in each neighbourhood

Neighbourhood	Loneliness score after de Jong-Gierveld		Size of social network		Number of respondents
	Mean	Standard deviation	Mean	Standard deviation	
Centrum	2.1	2.7	8.2	3.8	53
Oosterpark	3.2	3.2	9.8	4.6	51
Korreweg	1.6	2.2	9.5	3.9	25
Indische buurt	2.7	2.8	7.2	3.4	19
De hoogte	2.8	2.7	8.2	3.6	13
Oranjebuurt	1.9	2.4	9.2	4.1	29
Schildersbuurt	2.4	2.5	10.1	4.6	32
De weijert	2.4	2.7	11.5	5.4	62
Coendersborg	1.4	2.2	10.4	5.0	41
Euvelgunne [†]	0.9	1.1	10.6	3.4	9
Oosterpoort	3.3	2.8	7.1	3.7	15
Hereweg	3.1	3.4	8.5	5.1	17
Zeeheldenbuurt	2.4	3.4	9.3	3.3	12
Stadspark	2.2	2.8	8.1	3.6	25
Corpus den hoorn	2.4	2.6	11.1	5.6	64
Oosterhoogebrug	4.1	3.7	8.9	4.6	15
Leeuwenborg	4.6	3.4	6.0	3.6	27
Noorddijk [†]	0.0		13.0		1
Beijum [†]	1.7	3.6	7.3	3.1	9
Noorderhoogebrug [†]	2.5	3.5	11.5	0.7	2
Selwerd	2.5	2.8	8.4	4.7	42
Paddepoel	3.2	3.3	8.1	4.0	74
Vinkhuizen	3.6	3.1	6.8	3.9	43
Hoogkerk	1.6	2.1	6.9	3.9	34
Dorkwerd [†]	1.0	1.4	15.0	5.7	2
Total	2.6	2.9	9.0	4.6	716

[†] Neighbourhood not included in analyses.

neighbourhood or group on the dependent variable are negligible. Cross-level effects may still be possible. The intraclass correlation coefficient “measures the proportion of variance in the outcome that is between the Level-2 units” (Bryk and Raudenbusch, 1992, p. 18). The intraclass correlation is defined as:

$$\rho = \tau_{00}/\tau_{00} + \sigma^2$$

where, σ^2 represents the within-group variability (or level-1 variability) and τ_{00} represents the between-group variability (or level-2 variability).

From our analysis, it appeared that the intraclass correlation for loneliness was 0.06 (see Table 3), which means that 6 per cent of

the variation might be accounted for by variables at the neighbourhood level. The intraclass correlation for size of social network was $1.58/(1.58 + 19.00) = 0.08$ (see Table 4) which means that some 8 per cent of the variation could be accounted for by variables at the neighbourhood level.

Both intraclass correlations were not

Table 3. Intraclass correlation for loneliness

Parameter	Value
τ_{00}	0.37
σ^2	8.20
$\rho = \tau_{00}/\tau_{00} + \sigma^2 = 0.37/(0.37 + 8.20) = 0.06$	

Table 4. Intraclass correlation for size of social network

Parameter	Value
τ_{00}	1.58
σ^2	19.00
$\rho = \tau_{00}/\tau_{00} + \sigma^2 = 1.58/(1.58 + 19.00) = 0.06$	

significantly different from zero. Consequently, as stated before, no further multi-level analyses were done and should not be done. As the effects were not statistically significant, we do not present the estimates of effect of the proportion of elderly persons in a neighbourhood, 'reported crime' or 'activities in the neighbourhood' on loneliness or size of social network, because it makes no sense to present non-significant parameters from an overfitted model.

We might have undertaken a cross-level effects analysis, but we could not think of any possible cross-level effect between the variable at the level of the neighbourhood and of the respondents. Results of one-level analyses, which have been carried out before (Moorer and Suurmeijer, 1992), will be discussed briefly in the next section.

Discussion

On average, the loneliness score of the elderly was fairly low. According to Köning-Zahn *et al.* (1994), this score would mean 'moderately lonely', while according to Bosma (1988) the score would mean 'not lonely'. The average score was certainly lower than was expected on the basis of a pilot research project (Moorer and Suurmeijer, 1991). The present results are almost identical with the results of other studies of loneliness among the elderly in the Netherlands (Bosma, 1988; Aben *et al.*, 1989; Klüter, 1989). The idea that most elderly people are lonely is, apparently, a firmly held but ill-founded belief among welfare professionals, local authorities and politicians, and the public.

The mean size of the social network of the

elderly was 9 persons. Knipscheer (1980) found a mean size of social network for the elderly of 10.5, while Tjihuis *et al.* (1992) found that elderly had on average 6.6 'good' friends. Results concerning the size of social networks are difficult to compare, as different methods (role-relational, exchange and affective approach) will yield different results.

The effects of the neighbourhood on loneliness and the size of the social network were quite small. At most, only 6 per cent of the variance of loneliness and 8 per cent of the variance in the size of the social network could be explained by the characteristics of the neighbourhoods. The possibilities of selection bias and other causes that may have influenced our findings will be addressed later on in this section.

In our research, we found only a small effect of neighbourhoods on the total size of the social network. Naafs (1989) found that the average size of the network of the same age-group within a neighbourhood was related to the percentage of elderly persons living in a neighbourhood. In areas with a high percentage of elderly persons, the size of the same-age-group network within the neighbourhood was bigger than in low-percentage areas. This latter finding was, however, counterbalanced by relationships with elderly persons outside the neighbourhood. The average total size of the same-age-group network was the same for elderly from high-percentage and low-percentage same-age-group areas. So, the total size of the social network was not explained by the percentage of elderly persons living in a neighbourhood, but the local average size of the same-age-group network was.

Recently, comparable results have been found for loneliness in a study of loneliness in homes for the elderly in the province of Friesland in the Netherlands (van Linschoten *et al.*, 1998) and in a study of regions and neighbourhoods in the Netherlands (Broese van Groenou *et al.*, 1999). Van Linschoten *et al.*, (1998) found that about 6 per cent of the feelings of loneliness could be explained by the characteristics of homes for the elderly,

while Broese van Groenou *et al.* (1999) found that about 0.7 per cent of the feelings of loneliness could be explained by characteristics of the regions or neighbourhoods. This seems to indicate that loneliness for the most part is an individual experience probably more influenced by person-bound characteristics than by neighbourhood characteristics.

From our former one-level multivariate analysis (Moorer and Suurmeijer, 1992, pp. 69–76) in which person-bound characteristics were directly related to size of social network and loneliness, it appeared that

- (1) No differences existed in the average loneliness and size of social network for men and women.
- (2) The average loneliness was less for married and never-married elderly and higher for widowed and divorced elderly, while the size of the social network was greater for married elderly and lower for never-married, widowed and divorced elderly.
- (3) A better subjective mental health was related to less loneliness.
- (4) A higher income was related to a larger social network.
- (5) Social companionship (assessed with the Social Support Questionnaire for Transactions—see Suurmeijer *et al.*, 1995) had a negative relationship with loneliness and a positive relationship with size of a social network: more social companionship was related to less loneliness and a larger social network.

Brooks-Gunn *et al.* (1993) found that the influence of neighbourhoods on young children was substantial, but that the influence on adolescents was less. From our results, it may be inferred that the trend, noticed by Brooks-Gunn *et al.* (1993), seemed to continue into older age. As people grow older, the influence of neighbourhoods may be very slight. Why? A possible explanation could be that the personality of older (mature) people might be fully developed and less susceptible to external influences—i.e. neighbourhoods. A social network will have been built up

during one's life. Later in life, the network will change because of death of members within one's social network. Loneliness may also have been established earlier in life and may continue in the rest of life, maybe because the partner has died in former years.

How is it that welfare professionals often have the impression that some neighbourhoods show more loneliness and smaller social networks than others? It is very likely that the impression will be based on the 'availability heuristic' (Nisbett and Ross, 1980). Welfare professionals are very likely to see only the elderly who have problems, such as ill-health (physical or psychological). Help from the social network may not be able to solve these problems, so the elderly requesting help might already have a smaller social network and may have more feelings of loneliness. Welfare professionals are likely to generalise these findings to the whole population of elderly persons, thus overestimating the total number of lonely and isolated elderly. In neighbourhoods with more elderly people, they will also meet lonelier or socially isolated elderly persons. From these absolute numbers of lonely and isolated people, welfare professionals may infer that loneliness is more common in some neighbourhoods than in others (Moroney, 1976; Nisbett and Ross, 1980).

Although the results showed little or no effect from neighbourhoods on loneliness and the size of a social network, researchers still have to be careful when selecting neighbourhoods for research. The general tendency of our results indicated that the effects of the neighbourhoods may be very small, but this may not be the case for a specific neighbourhood or studies in another setting. Our results may be due to a variety of different reasons:

- (1) Neighbourhoods in Groningen (and the Netherlands in general) may be much more similar to each other than those in other countries (see below).
- (2) The neighbourhood may be too large a context for the elderly. As Ahlbrandt (1984) mentions, elderly people are less

mobile and therefore the context that influences them may be smaller than that of a whole neighbourhood.

- (3) Non-response may have distorted our results. Although we think it has not played a major part in our research, especially lonely people may have decided not to participate in our research.
- (4) Neighbourhoods may not have a major impact on loneliness and on the size of the social networks of the elderly.

The differences between neighbourhoods in the Netherlands are usually not extreme: in the Netherlands, there are hardly any ghettos and local authorities control the distribution of rental housing. Differences may be much larger in, for example, the US or the UK. In these countries, a multilevel analysis may show significant intraclass correlations. This remains a question open to international comparative research.

As mentioned in the results section, on average, neighbourhood had no significant effects on loneliness and size of social network. However, this does not mean that no effects are present in individual neighbourhoods. Possible effects may be masked when the (interaction of) effects are different for different neighbourhoods: effects may cancel each other out. Maybe the effects of a high crime rate or a low level of activities may cancel out the effect of a high proportion of elderly persons in a neighbourhood.

Although we might have tried to use these neighbourhood and individual factors in an analysis, we did not pursue this, as we would have had to model effects that would have been theoretically or statistically ill-founded.

The present results may perhaps be somewhat disappointing for local authorities wishing to have clear-cut and easy-to-collect information that can help in selecting neighbourhoods in which to start social intervention programmes. For the size of social network and loneliness, no such information can be given. Loneliness and size of a social network may be mostly related to individual characteristics. Focusing on a specific group

of people may leave another group in need of help.

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Appendix

We shall continue with a set of statements. These statements were made by individuals who had previously shared their experiences with us. Please indicate for each of the 11 statements, the extent to which they apply to your situation, the way you feel now. Please, circle the appropriate answer.

- (1) There is always someone I can talk to about my day-to-day problems.
- (2) I miss having a really close friend.
- (3) I experience a general sense of emptiness.
- (4) There are plenty of people I can lean on when I have problems.
- (5) I miss the pleasure of company of others.
- (6) I find my circle of friends and acquaintances too limited.
- (7) There are many people I can trust completely.
- (8) There are enough people I feel close to.
- (9) I miss having people around.
- (10) I often feel rejected.
- (11) I can call my friends whenever I need them.

The responses for five categories in our research were: yes!; yes; more or less; no; no! In order to calculate a score, the items (1), (4), (7), (8) and (11) have to be reversed as these items are formulated in the opposite order.

In the procedure as indicated in the manuals, the score can be calculated by counting the scores 1, 2 and 3 for each of the 11 items, after the items formulated in opposite order have been recoded. This will result in a score ranging from 0 to 11. For further details, see de Jong-Gierveld and van Tilberg (1999).