DELINEATION OF THE SOCIAL NETWORK AND DIFFERENCES IN NETWORK SIZE

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There is a long-standing tradition in the field of gerontology of studying the social networks of the aged. Most studies focus on the support networks of the elderly and describe their personal networks by means of the supportive features of their relationships. Some studies define a social network as a set of persons with whom specific types of support are exchanged (Fischer, Jackson, Stueve, Gerson, Jones, & Baldassare, 1977; Wellman, 1981) or include relationships that are to some degree important to the focal person (Kahn & Antonucci, 1980). All these definitions narrow the study of social networks down to structures in which support is exchanged (Antonucci, 1985). However, individuals maintain many relationships in which very little if any support is exchanged. Social interaction can also be based on more or less institutionalized formal relationships, for example, those with relatives, co-workers, fellow members of organizations, and neighbours. Researchers who use these institutionalized relationships as their point of departure take living arrangements, household composition, marital status, and employment status as criteria for network membership (Berkman & Syme, 1979; Brody, Poulshock, and Masciocchi, 1978; Lin, 1982; Shanas, 1979).

Definitions based on the contents of relationships (exchange method), role relationships (role-relation method), or the affective value of relationships (affective method) will tap different parts of the total personal network (Broese van Groenou & Van Tilburg, forthcoming). The definition that is used depends on the research objectives. In our research program, we view the social networks of the elderly as interlocking structures in which supportive and non-supportive interactions both occur. As described in Chapter 1, the focus is on a multiplex system of partly overlapping sets of relationships in
which interactions take place a regular basis. This indicates to what degree
the elderly are socially involved and the number of relatives, friends, co-
workers, and so on with whom contact is maintained. In the second place,
attention is devoted to the support exchanged within these relationships, using
support as an indicator of how the networks function in daily living and
coping with important life events. This chapter describes the adopted network
delineation method and differences in network size, while Chapter 6 describes
the composition of the social networks, Chapter 7 focuses on the so-called
proximate network, and Chapter 8 considers the exchange of support within
the core network relationships.

Applied delineation method

Our main objective was to identify the networks that reflected the socially
active relationships of the elderly respondents in the core and outer layers
of the larger network. In choosing a method to identify the social networks,
several criteria were selected regarding who was to be included. First, the
network composition had to be as diverse as possible, implying that every
type of relationship deserved the same chance of inclusion in the network.
This criterion led to a domain-specific approach in the network identification,
using seven formal types of relationships (see below). A second objective was
to include all the network members with whom the elderly respondents had
regular contact, thus identifying their socially active relationships. However,
the aim was not to include everybody with whom they maintained contact.
To avoid including people with whom contact was regular by definition (such
as all colleagues and all members of the bridge club), the criterion of the
importance of the relationship was added. The elderly were requested to
nominate the network members with whom they had regular contact and who
were important to them. This enabled them, for example, to nominate the two
colleagues with whom contact was relatively close and to leave out others.

This domain-contact approach combines the different roles that an individual
plays in society, with contact frequency and importance of relationships as
criteria for identifying network members. The identification method was
derived from the method used in the study by Cochran, Larner, Riley,
Gunnarson, and Henderson (1990). Network members were identified in seven
domains of the network: household members (including the spouse), children
and their partners, other relatives, neighbours, persons from work or classes
(including voluntary work), members of organizations (e.g. athletic clubs,
church congregations, political parties), and others (friends, acquaintances). With respect to the domains, the question was posed: 'Name the persons (e.g. in your neighbourhood) with whom you are in touch regularly and who are important to you'. Only persons above the age of 18 could be nominated. A limit of 80 was set on the number of names to be mentioned. Information regarding the type of relationship, sex, and contact frequency was gathered on all the identified network members. Next, a maximum of twelve with the highest contact frequency were selected by the computer. For these 12 (or fewer, if fewer available) network members, information was gathered with respect to age, travelling time, duration of the relationship, employment status, marital status, and the exchange of instrumental and emotional support. In this chapter, we describe the type and sex of the network members and the contact frequency within the relationships. Network size is described and is given for respondents of different ages, for males and females, and for respondents in different types of living arrangements. The living arrangements are: three categories of living alone, namely unmarried, divorced or widowed, living with a partner or spouse (and possibly with others), living in a multi-person household, that is, with others without a partner or spouse, and institutionalized.

Respondents

In 1992, face-to-face interviews were conducted with 4,494 respondents. They constituted a stratified random sample of men and women born in the years 1903 to 1937. The random sample was taken from the registers of 11 municipalities: the city of Amsterdam and two rural communities in the west, one city and two rural communities in the south, and one city and four rural communities in the east of the Netherlands. The response was 61.7%. The data were collected by 88 interviewers.

The average age of the respondents was 72.8. Most were living in their own homes: 1,298 (28.9%) were not married and lived alone, 2,582 (57.5%) lived with a partner, and 206 (4.6%) lived in another kind of multi-person household. Finally, 351 (7.8%) lived in an institution of some sort, such as a nursing home, home for the aged, psychiatric hospital, or shelter for the homeless.
In this chapter, we confine ourselves to the 4,059 respondents (1,985 men and 2,074 women) who provided information about their social network. Data are missing from: 345 respondents with serious health problems who participated in a short version of the questionnaire, 37 respondents with whom the interview was terminated before the section on the network delineation, 33 refused to participate in the network delineation, and 20 respondents in whose case there were technical problems with the interview program.

Characteristics of nominated relationships

As noted above, one of the aims of applying our method in this study was to delineate networks with a wide variety of types of relationships. Relationship type is an important characteristic because it can grant insight into the kinds of provisions available (Dykstra, 1990). The respondents who participated in the network delineation nominated a total of 54,522 network members. Table 5.1 shows the types of relationships in the seven domains that were the basis of our delineation method. This table shows that, as intended, the delineated networks were composed of different types of relationships. Of the relationships in the network (partner relationships excluded), 59.4% were with kin. Children were nominated the most frequently, followed by sons-in-law and daughters-in-law, brothers-in-law and sisters-in-law, and siblings. Somewhat surprising is the large number of cousins, nieces, and nephews. Of non-kin relationships, neighbours were nominated most frequently, followed by friends, fellow members of organizations, acquaintances, and (former) colleagues. One should bear in mind that once someone was nominated, for example, in the domain of (other) family members, the respondent could not mention his or her name again, for example, in the domains of neighbours or friends. Therefore, the first domains had a greater chance to generate network members than the later ones.

A second aim of our method was to identify relationships with a relatively high contact frequency. We measured the contact frequency on an ordinal scale with eight response categories: ‘never or almost never’, ‘yearly or less often’, ‘a few times a year’, ‘once a month’, ‘once every two weeks’, ‘once a week’, ‘a few times a week’, and ‘daily’. For the present analysis, the scale was converted into number of days a year. The mean was 84 days (SD = 110), indicating that, on average, the contact frequency was between once every two weeks and once a week.
Table 5.1. Types of relationships (N = 54,521; N of networks = 4,059)

<table>
<thead>
<tr>
<th>domain and type</th>
<th>N</th>
<th>domain and type</th>
<th>N</th>
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</thead>
<tbody>
<tr>
<td>household members</td>
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<td></td>
<td></td>
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<tr>
<td>partner or spouse</td>
<td>2467</td>
<td>neighbour</td>
<td>6700</td>
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<tr>
<td>son or daughter</td>
<td>693</td>
<td>former neighbour</td>
<td>78</td>
</tr>
<tr>
<td>brother or sister</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>grandson or granddaughter</td>
<td>17</td>
<td>contacts through work and classes</td>
<td></td>
</tr>
<tr>
<td>friend</td>
<td>6</td>
<td>colleague (including former colleague)</td>
<td>2369</td>
</tr>
<tr>
<td>other</td>
<td>52</td>
<td>colleague and spouse’s colleague</td>
<td>998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>volunteer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>fellow student</td>
<td>115</td>
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<tr>
<td>children</td>
<td></td>
<td>members of organizations (e.g. church)</td>
<td></td>
</tr>
<tr>
<td>son or daughter</td>
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<td></td>
<td></td>
</tr>
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<td>parent</td>
<td>256</td>
<td>‘other’ relationships</td>
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<td>father-in-law, mother-in-law</td>
<td>206</td>
<td>friend</td>
<td>5455</td>
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<td>brother or sister</td>
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<td>acquaintance</td>
<td>2369</td>
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<td>brother-in-law, sister-in-law</td>
<td>5323</td>
<td>a person one meets on the street</td>
<td>5</td>
</tr>
<tr>
<td>grandson or granddaughter</td>
<td>1573</td>
<td>general practitioner or clergyman</td>
<td>6</td>
</tr>
<tr>
<td>cousin, niece or nephew</td>
<td>3146</td>
<td>helper</td>
<td>38</td>
</tr>
<tr>
<td>uncle or aunt</td>
<td>314</td>
<td>partner/spouse, not in the household</td>
<td>106</td>
</tr>
<tr>
<td>other</td>
<td>267</td>
<td>other</td>
<td>86</td>
</tr>
</tbody>
</table>

There were more females than males in the networks, respectively 54.6 and 45.4%. Of the 54,522 relationships, 55.6% were same-sex relationships (30.6% between a female respondent and a female network member, and 25.1% between a male respondent and a male network member), and 44.4% were cross-sex relationships (20.3% between a female respondent and a male network member, and 24.1% between a male respondent and a female network member).

Evaluation of the delineation criteria

As intended, the nominated relationships were a selection: not all existing ties were mentioned, only the ones the respondents felt met the criteria. This is evident from the analyses of the contact frequency with children and siblings. As was noted in Chapter 3, early in the interview the respondents reported
the names of all their surviving children and siblings. This served as a way to compare those who were part of the network with those who were not; 76.7% of the children and 38.5% of the siblings were network members. We can assume that the respondents not only made a selection from the pool of their children, but also from the pool of all their relationships.

The mean contact frequency per year with the children in the network (145 days) differed from the contact frequency with the other children (64 days; \( t_{(5003.1)} = 35.4, p < .001 \)), and the mean contact frequency with the siblings in the network (57 days) differed from the contact frequency with the other siblings (20 days; \( t_{(6134.7)} = 24.4, p < .001 \)). These data clearly show that, at least for the relationship categories of children and siblings, on average, the contact frequency was higher with those who were in the network than with those who were not. A second conclusion might be that the respondents selected, at least partly, on the basis of the criterion of regular contact.

Though network members appear to have been selected according to the specified criteria, we do not wish to suggest that the criteria were uniformly interpreted. For example, analyses of the contact frequency indicated a wide variability in the interpretation of ‘regular contact’. In 0.2% of the 54,522 relationships this was never, and in 1.0% this was yearly or less often. To assess whether these differences had any implications for our findings, we examined the association between network size and contact frequency. The rationale for doing so was that the conclusions from a study showing that infrequent contacts are most often part of a small network are quite different from conclusions that demonstrate the opposite. In the former case, infrequent contacts are over-rated and of central importance; in the latter, they can more easily be replaced. Our results indicated that infrequent relationships were more often referred to by the respondents with large networks than by the respondents with small ones \( (r = .21) \). These differences were reflected in the mean contact frequency with network members: the correlation between mean contact frequency and network size was -.39. This indicates that, on average, the network size of elderly respondents with large networks is ‘over-estimated’. Network size can be corrected by taking into account relationships with persons contacted at least once a month only. The correlation between this network size and the original measure, i.e. the number of relationships that were referred to, was .92, indicating that these two measurements tapped approximately the same phenomenon. In other words, the observed variability in the interpretation of the selection criterion ‘regular contact’ does not appear to have any repercussions for the substantive analyses.
Description of network size

Network size is one of the most important characteristics of a network. Firstly, network size is an indicator of the degree of socializing. Secondly, it is an indicator of the potential instrumental and emotional support. In other words, the larger a network is, the more social support it can generate to the anchor.

The 4,059 respondents who participated in the network delineation procedure nominated 54,522 network members, which was an average of 13.4 ($SD = 9.4$). (If we weight the data to make them as representative of the Dutch population as possible, the mean is 14.3 and $SD = 9.7$). There was a wide variation around the mean, as is illustrated in Figure 5.1. Fifteen respondents did not nominate any network members at all, and 87 respondents nominated only one. On the other hand, some respondents nominated a large number of network members, with a maximum of 77.

![Figure 5.1. Frequency of the network size](image)
Differences in network size

The networks of males and females were about equal in size ($t_{(4057)} = .44, p = .66$). For males the mean was 13.5 ($SD = 9.6$) and for females 13.4 ($SD = 9.3$). Bivariate analyses showed significant differences according to living arrangements ($F_{(4007,5)} = 37.5, p < .001$) and age cohort ($F_{(4052,6)} = 37.6, p < .001$). On average, the respondents living with a partner had the largest networks (14.9), and the institutionalized respondents had the smallest (8.2). There were also differences between the respondents in the different age cohorts, with the lowest mean network size (9.4) for the oldest (85-89) and the highest (16.6) for the youngest (55-59).

The links between sex and living arrangement are well-known (older women are more likely to be living alone than are older men) as are those between age and living arrangement (those living with their spouses tend to be younger than the widowed living alone). In our sample, however, as the results of the adopted stratification procedure, there is no link between sex and age. To check for the links between sex, living arrangement and age, a multivariate analysis (ANOVA) was performed, whereby the distinctions with respect to sex and living arrangements were combined into a single twelve-category variable (males and females in each of the six living arrangement categories). Figure 5.2 shows the mean network size for the respondents living alone (unmarried, divorced, or widowed), living with their partner or spouse, living in a multi-person household without a partner, and living in a home for the aged or a nursing home, for males and females separately and controlled for differences in birth year ($F_{(3934,11)} = 9.1, p < .001$).

Figure 5.2 shows that the networks of the respondents who lived with a spouse or partner were the largest. There was no difference between the males (mean network size 14.5) and females (mean 14.3) in this category. The smallest networks were found for males who lived alone and were unmarried (mean 7.8) or divorced (mean 9.2) or lived in a multi-person household without a partner (mean 9.9). In the middle were the unmarried and divorced females who lived alone (means 12.1 and 10.6, respectively), males and females who were institutionalized (means 10.8 and 10.2 for males and females, respectively), females in a multi-person household (mean 12.8), and males and females who lived alone and were widowed (means 12.0 and 13.3, respectively). The small number of respondents who are married and are living separated from their spouse, living in a psychiatric hospital or a shelter for the homeless were excluded from the analysis.
Delineation of the social network

Figure 5.2. Mean network size by living arrangements and sex, controlled for age

Figure 5.3 shows the mean network size for the respondents of different birth cohorts. The youngest respondents had the highest mean (16.3), the oldest the lowest (10.4), and the mean network size decreased almost linearly with age ($F_{(393,6)} = 19.7, p < .001$). There was no significant interaction effect with the network size of sex and living arrangements on the one hand, or age on the other ($F_{(393,61)} = 53.4, p = .99$).

If these results on differences in network size are combined, we can conclude that there are large differences, with the lowest average network size (6.2) for the oldest males who were unmarried and living alone, and the highest average network size (17.8) for the youngest males living with a partner. However, the explained variance is only 7.7%, indicating that there are large differences within the various categories. Of the explained variance, 2.3% can be attributed exclusively to the effects of sex and living arrangements, and 2.7% to the effects of age.
Comparison with results of other studies

We feel it is important to examine the results of our method in the perspective of the results of other delineation methods, such as the affective or the exchange method. In evaluating the mean network size in our study, one should bear in mind that the number of network members depends on the delineation method that is used. Using data from four specific samples of Dutch adults, Van Sonderen, Ormel, Brilman, & Linden van den Heuvel (1990) demonstrated that three different delineation methods produced different network sizes, with means ranging from 9.0 for the role-relation approach, via 12.9 for the affective approach, to 20.7 for the exchange approach. Note that a specific method can have several applications. For example, studies using the exchange method, which is a method derived from McCallister and Fischer (1978), can use different numbers of name-generating questions (ranging from 6 to 20) and can set different maximum numbers of names to be mentioned in response to each question (ranging from five to

![Figure 5.3. Mean network size by age, controlled for living arrangements and sex](image-url)
The more questions that are used and the higher the maximum per question, the more names can be generated.

The average number of 13.4 that we found is about equal to the number Morgan, Neal, and Carder (1994) found in their study of older widows. Morgan used the affective method derived from the study by Kahn and Antonucci (1981), and asked about kin and non-kin separately. In the original study, Kahn, Wethington, and Ingersoll-Dayton (1987) found an average network size of 8.9. In six other studies using the affective method, with samples not specifically of the aged, the mean network size varied from 3.0 to 6.7 (Milardo, 1992). The average number we found was lower than the number Van Tilburg (1992) found in his study of retiring men (mean 20.0), using 20 exchange questions. In the study of Dutch adults by Van der Poel (1993), the exchange procedure resulted in a smaller network with an average size of 9.6. In the study by Mugfold and Kendig (1986), the exchange procedure resulted in an average of 6.6 for Australian elderly. In five other studies, with samples not specifically of the aged, using the exchange method, mean network sizes between 10.1 and 21.8 were reported (Milardo, 1992).

The study by Van Sonderen et al. (1990) showed that three different delineation methods not only produced different network sizes, but also large differences with respect to network composition. These differences pertained to the number of people in the categories of in-laws, friends, acquaintances, neighbours, and work-related relationships. The affective delineation method produced a particularly large percentage of kin relationships. In his review of six studies on the networks of adults using this method, Milardo (1992) reported percentages between 48 and 67. In the networks of the elderly in the study by Morgan, Schuster, and Butler (1991), the percentage was even higher: 78. In general, the exchange method produces lower percentages of kin. Mugfold and Kendig (1986) reported 65% and Van der Poel (1993) reported 53% kin relationships. The networks of adults in the large study by Tijhuis (1994) consisted of an average of 41% relatives. Reviewing five studies of adults using the exchange method, Milardo (1992) reported percentages between 19 and 48.

Reviewing the network size and percentage of kin resulting from our method—with two delineation criteria being regular and important contact— we can conclude that for both of these aspects, our study is about in the middle of a large number of Dutch and foreign studies on adults and older adults for which reports are available.
The small effect of age on network size in our study was in keeping with the results of other studies using samples of the elderly. Earlier studies revealed mixed results on the association between age and network size (Knipscheer, 1993; Schulz & Rau, 1985). In some studies (e.g. Morgan, 1988), a smaller network was found for the oldest than for the youngest elderly, and in other studies (e.g. Antonucci & Akiyama, 1987; Wenger, 1984), no age-related differences were observed. However, most of these studies, like ours, were cross-sectional, and thus not designed to examine changes in network size across time. For the studies that were designed longitudinally (e.g. Van Tilburg, 1992; Wenger, 1986), the relatively short interval between the measurements and the small sample size made it difficult to review the magnitude of the changes in network size.

Summary

Networks were delineated using the domain-contact approach. Seven domains of contact were distinguished. Respondents were asked to refer to persons in these domains with whom they had regular and important contact. We delineated networks with a wide variety of types of relationships and relatively high contact frequency. The nominated relationships were a selection: not all the respondents’ relationships were mentioned, only the ones they felt met the criteria.

Network size is the total number of network members. The networks of males and females were about equal in size. Differences in network size according to living arrangement and age cohort were observed.

References


