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## Original Article

# Diversity in Older Adults' Care Networks: The Added Value of Individual Beliefs and Social Network Proximity

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## Abstract

**Objectives:** Policy reforms in long-term care require an increased share of informal caregivers in elderly care. This may be more feasible for older adults who (believe they) can organize the care themselves and have a local social network. This study describes care network types, how they vary in the share of informal caregivers, and examines associations with characteristics of community-dwelling older adults, including individual beliefs and network proximity.

**Method:** Latent class analyses were applied to a subsample of older care receivers ( $N = 491$ ) from the Longitudinal Aging Study Amsterdam, in order to identify homogeneous subgroups of people with similar care networks. Multinomial regression analysis explored associations between network type and care receiver characteristics.

**Results:** Privately paid, coresidential, large informal, and publicly paid care network types were distinguished. Variation in informal care appeared mostly related to health, partner status, income, and proximity of children. Proximity of other potential informal caregivers did not affect the network type. Perceived control of care was highest in the privately paid network.

**Discussion:** The results suggest that local (non-)kin could be mobilized more often in coresidential networks. Increasing informal or alternative care in publicly paid networks is less likely, due to limited social and financial resources.

**Keywords:** Care network—Formal caregivers—Individual beliefs—Informal caregivers—Long-term care—Social network proximity

In the light of population aging and rising public health care costs, many welfare states are reducing publicly provided care arrangements. Due to increased thresholds for the allocation of institutional care and formal home care, older adults with greater health problems are living independently for longer with increased reliance on informal care (i.e., care provided within a social relationship; Koehly, Ashida, Schafer, & Ludden, 2015; Pavolini & Ranci, 2008). The opportunities for care provision by close kin have decreased however, as the labor participation rate of women has increased, households have become smaller and children nowadays live farther away from their parents. Hence, to sustain long-term

care and avoid overburdening informal caregivers, older adults may opt to mobilize care from multiple informal caregivers in the neighborhood, possibly supplemented with formal care (i.e., care provided as part of a paid profession, either privately or publicly funded). The building of a large informal care network requires that older adults are willing and capable of actively engaging social network members as caregivers. This raises the question of how individual beliefs and social resources of older adults are associated with the share of informal caregivers in their care networks.

Care networks are defined as the collection of individuals who provide support because of seniors' long-term health

problems or functional limitations (Keating, Otfinowski, Wenger, Fast, & Derksen, 2003). To date, detailed information on the size and composition of care networks of community-dwelling older adults is lacking. In part this is due to the fact that most studies merely distinguish between the use of no care, formal care only, informal care only, or mixed forms of care (e.g., Bonsang, 2009; Motel-Klingebiel, Tesch-Roemer, & Von Kondratowitz, 2005). They often disregard the degree to which care networks contain mixes of different types of informal and formal caregivers. The first aim of our study is to obtain an insight into care network types and how the share of informal care differs across the network types. This will help understand which older adults may be at risk of a lack of care, as the consequences of the cutbacks on publicly provided care may vary in different types of care networks.

This study draws on data on a sample of Dutch community-dwelling older adults collected in 2011–2012. As the composition of care networks is related to the availability of publicly provided care, we shortly describe the Dutch long-term care context. During the period of observation, care was provided in two domains. The first concern domestic services and social care, such as day treatment, housing adaptations, or meals on wheels facilities, which were (in part) paid for and organized by local authorities. The second concern professional home care (personal care, nursing care) and institutional care, which were covered by long-term care insurance and regulated by the national government. Over the past decade, national and local governments increasingly encouraged older adults to continue living at home, arrange their own care, and mobilize informal caregivers (Da Roit, 2012; Schenk, Dykstra, Maas, & Van Gaalen, 2014). This contributed to more older adults using both informal and formal care over time (Swinkels, Suanet, Deeg, & Broese van Groenou, 2015), but also raises the question who will be able to increase their use of informal care in the near future. Two characteristics of older adults seem in particular important regarding the current austerity measures: their (perceived) capabilities to arrange their own care and the proximity of various types of social network members. The second aim of the study is to relate care network types to these and other individual determinants of care use.

### Care Network Types

Only a few studies have explored the diversity of caregiver network types (Broese van Groenou, Jacobs, Zwart-Older, & Deeg, 2016; Keating & Dosman, 2009). Despite using different samples in different countries, both studies showed that older adults with coresiding spouses and/or children at home less often received formal care and had fewer informal caregivers around them, whereas older adults with friends and no coresiding close kin tended to have larger informal networks. Our development of a network typology will include the presence of multiple caregiver types, leading to comprehensive network types (Litwin, 1998).

We will provide a detailed description of which combinations of different types of informal and formal caregivers occur and of the variation in care intensity as measured by number of hours of care and the kind of tasks performed. In order to enhance the likelihood that multiple types of caregivers are identified, we use information on care provided in a variety of tasks: domestic activities, personal care, nursing care, administrative tasks, and transportation. Our first research question is “What are the care network types of Dutch community-dwelling older adults and how do these types vary in their share of informal care?”

### Factors Associated with Network Types

The older adults' individual characteristics included in this study are based on three different dimensions of care use, as described in the behavioral model of health services use (Andersen & Newman 2005). The “predisposing” factors describe the individual attitudes, norms, and values regarding the use of formal and informal care. In most research, predisposing factors are merely indicated by general characteristics such as gender, age, and socioeconomic status (Babitsch, Gohl, & von Lengerke, 2012), and limited attention is given to specific attitudes and preferences (Bliesner, Roberto, & Singh, 2001; Bradley et al., 2002). As we are specifically interested in the older adults' perceived capabilities to involve informal caregivers, we extend these general indicators. Based on the reasoned action approach (Fishbein & Ajzen, 2011), we distinguish three types of predisposing factors: behavioral beliefs, normative beliefs, and control beliefs. Applied to older adults in need of care, “behavioral beliefs” reflect the degree to which people aim to be autonomous and independent in the way they organize their lives, indicated by sense of mastery and the value attached to independence. Several studies have shown that a lower sense of mastery is associated with more help from children (Bordone, 2014) and more use of services (Chipperfield & Greenslade 1999). Those with a greater sense of mastery and those who feel strongly about independence may refrain from using informal and formal care, and search for alternative forms, such as privately paid care. “Normative beliefs” in a care context refer to the perceived responsibility of government versus family in providing care for those in need, reflected in the degree to which people expect or prefer help from relatives or help from professional caregivers. Two indicators of normative beliefs are used: preference for informal care and preference for formal care. The third type of predisposing factors, “control beliefs,” indicates to what degree people believe they are able to control the care process, for example in deciding who provides what type of care at what time of day. As educational level generally reflects “the ability to cope with presenting problems and commanding resources to deal with these problems” (Andersen 1995: 2), it is also used as an indicator of control beliefs in this study.

In addition to an extension of predisposing factors, also specific types of the enabling factors will be included.

Enabling factors determine how the use of care is facilitated by contextual factors, such as the presence of relatives and the allocation of formal care, that is, the granting of formal care to individuals following an assessment. The importance of the social network for older adults' care use is already well established (e.g., Carpentier & Ducharme, 2003; Keating & Dosman, 2009). As proximity is an important prerequisite for the provision of instrumental types of care (e.g., Bell & Rutherford, 2013; Silverstein, Conroy, & Gans, 2008), and policy measures explicitly stress the necessity of local informal care, we will investigate whether the presence of a wide range of proximate kin and non-kin is related to the presence of a care network with more informal caregivers. Other enabling factors we consider are marital status, income, and degree of urbanization. As regards marital status, when a spouse is available informal care is provided more often without formal care (Suanet, Broese van Groenou, & van Tilburg, 2012). A higher income is related to more use of formal care services (Goda, Golberstein, & Grabowski, 2011). In terms of urbanization, a Dutch study has shown that informal care is more often provided in rural areas (Steenbekkers & Vermeij, 2013), and formal care is more often used in urban areas (Plaisier & de Klerk, 2015).

Finally, need factors indicate the necessity of care due to health problems. Both physical and mental health status will be examined, by including functional limitations, chronic diseases, cognitive impairment, and depression. Several studies have found that the greater the functional limitations and level of depression, the greater the odds of receiving formal care (e.g., Bock et al., 2014). Focusing specifically on the growing importance of certain predisposing and enabling factors, we formulated our second research question as follows "How are care network types related to older adults' predisposing, enabling and need factors, specifically regarding the capabilities to involve informal care and availability of proximate network members?" Figure 1 shows the theoretical model underlying the research analyses.

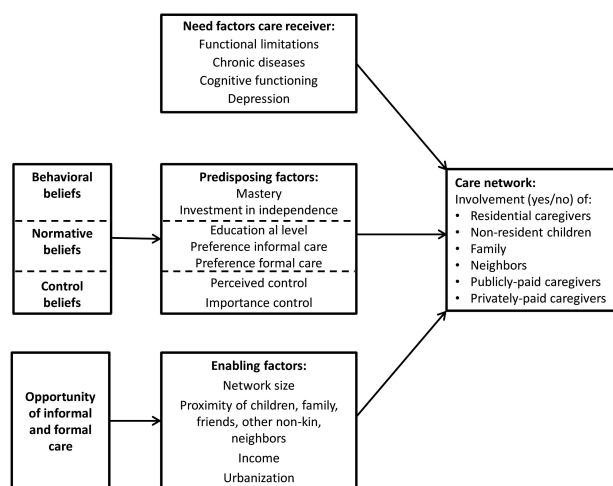


Figure 1. Theoretical model.

## Method

### Sample

The study draws on the 2011–2012 wave of the Longitudinal Aging Study Amsterdam (LASA), an ongoing cohort study in the Netherlands focusing on older adults' physical, cognitive, emotional, and social functioning (Huisman et al., 2011). The first LASA measurement was carried out in 1992–1993 using a random sample of 3,107 older adults aged 55–85 years, drawn from the general Dutch population. The respondents were selected from 11 municipalities in the west, north-east, and south of the Netherlands, regions which vary in terms of religious denomination and degree of urbanization. Older adults and older men were oversampled. A second birth cohort, consisting of 1,002 respondents aged 55–64 years, was added in 2002–2003. A follow-up measurement was carried out every 3–4 years. The average response rate for each follow-up was 81%; 12% had died, 2% were too ill or cognitively impaired, 5% refused to be re-interviewed, and less than 1% could not be contacted due to relocation. The 2011–2012 wave included questions about the respondent's care network. Of the 1,308 older adults surveyed, we selected those who lived independently ( $n = 1,263$ ) and used at least one of five types of care (see below,  $n = 553$ ). As variation in care network types was the main focus of our study, we selected respondents who were actually using care, regardless of whether their health status indicated a need for care. Sixty-two older adults did not fully complete the interview, leading to a study sample of 491 older adults.

### Care Network Identification

The respondents were asked whether they received help with instrumental activities of daily living (IADLs), activities of daily living (ADL), nursing, transport, and/or administrative tasks (yes/no). Receiving help with IADL tasks was described as help with household tasks, such as preparing meals or cleaning the house. Help with ADL tasks was explained as help with personal care such as washing, dressing, and going to the toilet. Nursing tasks were described as wound care, ostomy care, insertion of a probe or catheter, giving injections or giving medication. Transport was determined as transport outdoors, facilitating visits to family, friends, or health services (such as visits to the doctor or hospital). Help with administrative tasks was specified as assistance in arranging assistive devices or housing adaptations and taking care of financial and administrative matters. If they answered affirmatively, respondents were asked from whom they received the care. They reported for each task every person who provided help with that specific task the caregiver type (12 types, e.g., partner, volunteer, privately paid caregiver) and the number of hours of care provided by the caregiver per week.



## Care Network Variables

We distinguished between the following six caregiver types by combining the earlier 12 types: (i) coresiding caregivers (presence of partner, coresident child, and/or coresident other); (ii) non-coresiding children; (iii) other family; (iv) neighbors/friends/acquaintances/volunteers; (v) publicly paid caregivers (presence of district nurse, household worker, and/or hospital personnel); and (vi) privately paid caregivers. The category “other, namely...” was checked on a case-by-case basis and assigned to the relevant category. A latent class analysis (LCA) was applied to estimate care network types, based on six dichotomous variables on caregiver type, namely the presence of at least one caregiver of the aforementioned caregiver types.

Further, to describe the networks in detail we calculated the total number of different caregivers per type and the total hours of care per caregiver type. Hence, we aggregated the information across tasks and added together the total number of caregivers per caregiver type in order to calculate the actual total number of caregivers involved. For the children, the names were identified. For the other caregiver types, we listened to the taped interviews to identify the total number of individuals per caregiver type, that is, to determine whether it was (for example) the same neighbor who helped with two different types of tasks, or two different neighbors. We also determined whether the respondents received help with each of the five different types of tasks, aggregated the number of tasks the respondents received help with and recoded this to one, two, or three or more tasks.

## Need Variables

Functional limitations were measured by assessing difficulty in performing six activities (Van Sonsbeek, 1988): “Can you walk up and down fifteen steps without stopping?”, “Can you use your own or public transportation?”, “Can you cut your own toenails?”, “Can you dress and undress yourself?”, “Can you sit down and stand up from a chair?”, “Can you walk outside for five minutes without stopping?” (0 = *without difficulty* to 4 = *not at all*). The items were added together, with a higher score indicating more functional limitations ( $\alpha = .78$ ). Information on chronic diseases were obtained by means of self-report: respondents indicated whether they had arthritis, cancer, cardiac disease, chronic non-specific lung disease, diabetes mellitus, peripheral arterial disease (PAD), or had suffered a stroke. The number of chronic diseases was then summed. In earlier waves of the LASA study, information on chronic diseases was obtained from General practitioners as well. After comparing the information of the general practitioners with the self-reports, the self-reports were found to be fairly accurate, with the exception of arthritis and PAD, which was less accurate (Galenkamp, Huisman, Braam, Schellevis, & Deeg, 2014).

Cognitive functioning was measured using the Mini-Mental State Examination (MMSE) scale (Folstein, Folstein, & McHugh, 1975). A higher score indicated better cognition. Finally, depression was measured using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). Respondents indicated on a 4-point scale for 20 items how often they experienced each symptom in the past week. A higher score indicated a higher level of depressive symptoms ( $\alpha = .86$ ).

## Predisposing Variables

### Behavioral Beliefs

Regarding the sense of mastery (Pearlin & Schooler, 1978), the respondents were asked to indicate on a 5-point scale their degree of agreement with five statements, such as “I have little control over things that happen to me.” A higher score indicates a greater feeling of self-control. Investment in independence was assessed by asking the respondents to reflect on a 5-point scale on 13 statements, like “It is important to me to be able to live independently” (Auman, Bosworth, & Hess, 2005). A higher score indicates a higher investment in independence ( $\alpha = .76$ ).

### Normative Beliefs

Preference for informal care was assessed by two statements: “When you need temporary help, you should be able to rely on your children, family or neighbors” and “When older adults need help with personal care, they must be able to rely on their children, family or neighbors” (1 = *completely disagree* to 5 = *completely agree*). A preference for informal care (0 = no, 1 = yes) was scored if the older adult agreed or completely agreed with at least one of the statements. To measure preference for formal care, two statements were used: “It is objectionable to be dependent on professional agencies for help” and “Help from professional agencies takes place at the expense of your independence” (1 = *completely disagree* to 5 = *completely agree*). (Complete) disagreement with at least one of the statements resulted in a preference for formal care (0 = no, 1 = yes).

### Control Beliefs

Perceived control of care was assessed using three questions, concerning whether recipients were able to determine who provided the care, what kind of care was provided, and at what time of the day or week. Response categories ranged from 1 (*leave it completely to others*) to 3 (*I determine it completely myself*) and were summed across items ( $\alpha = .80$ ). In addition, respondents were asked whether they felt it to be important to have control over their care (1 = *very unimportant* to 5 = *very important*). Educational level was measured (1 = *low*; elementary school, 2 = *middle*; secondary education, 3 = *high*; higher vocational or university level).

## Enabling Variables

Personal network size is the sum of all persons the respondent reported being in touch with regularly and who were important to them (Van Tilburg, 1998). Next, the number of proximate network members with frequent contact other than the partner was assessed. Because of the skewed distribution, these variables were recoded into at least one child/family member other than spouse or child/friend/other non-kin or neighbor nearby (<15 minutes of travel distance) with frequent contact (0 = no, 1 = yes). Net monthly income was investigated. For respondents with a partner living in the same household, we multiplied total household income by 0.7 to make it comparable with incomes of single-person households. Urbanization is based on the number of addresses per square kilometer, ranging from 1 (*less than 500*) to 5 (*more than 2,500*).

## Procedure

To estimate care network types, an LCA was applied using Mplus 7.0, based on six dichotomous variables on caregiver type, namely the presence of at least one caregiver of the following caregiver types: coresiding caregivers, non-coresiding children, other family, neighbors/friends/acquaintances/volunteers, publicly paid caregivers, and privately paid caregivers. LCA is a person-centered approach that identifies subgroups of individuals who are similar in terms of the care network composition. Models for 1–6 latent classes were computed. The models were compared using Akaike's information criterion (AIC), Bayesian information criterion (BIC), sample-size adjusted BIC, chi-square tests of model fit, and entropy. A smaller value of the AIC and BIC indicates a better goodness of fit (Lanza, Collins, Lemmon, & Schafer, 2007). The entropy score indicates how well class membership is predicted by the indicators (McCutcheon, 2002), with values higher than .80 regarded as acceptable (Ram & Grimm, 2009). Finally, the Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR-LRT) is a chi-square difference test which assesses goodness of fit by testing the difference between the fit of a model with  $k$  classes and a model with  $k - 1$  classes. Based on these indicators and theoretical considerations

concerning the meaningfulness of the class solution, the model that represented the data best was chosen (Jung & Wickrama, 2008).

To explore the extent to which the predisposing, enabling, and need factors distinguished between the network types, we performed a multinomial logistic regression analysis using STATA 12.0 and computed average marginal effects (AMEs). AMEs measure the change in the probability of the dependent variables when there is a one-unit change in the independent variable, calculated when holding all other variables constant at their mean sample value (Long, 1997). Hence, AMEs depend on the values of all independent variables. In this way, we were able to determine the relative importance of the independent variables for each network type, taking into account the importance for other network types without selecting an arbitrary reference group. Partner status was not used as a predictor in the multinomial analyses as it resembled one of the latent class indicators, that is, partner providing care. Income was standardized in the multinomial analyses. Collinearity statistics were calculated for the set of explanatory variables and were within an acceptable range (highest variance inflation factor = 1.58). Missing values for the number of caregivers involved per type, and the number of hours' care, were imputed by means of the missing value analysis in SPSS, version 21. Missing values for the need, predisposing, and enabling variables were replaced by the grand mean. Investment in independence had the most missing values,  $n = 55$ , followed by mastery,  $n = 8$ . Urbanization had the least missing values,  $n = 1$ .

## Results

### Choice of the Class Solution

The fit indices are shown in Table 1. Compared with a three-class model, the VLMR-LRT showed that adding a fourth class was meaningful. Also, theoretically we preferred to distinguish four classes, as one class in the third model was split into two classes in the fourth model and had distinct features with regard to our research question (i.e., one containing more informal care and the other containing more formal care). As regards the five-class solution,

**Table 1.** Model Fit With 1–6 Classes, Based on Six Indicators ( $N = 491$ )

Model	AIC	BIC	SSA-BIC	Entropy	VLMR-LRT
					$p$ Value
1	2,898.561	2,923.740	2,904.696	—	—
2	2,703.807	2,758.360	2,717.098	.914	<.001
3	2,603.499	2,687.428	2,623.948	.928	<.001
4	2,582.862	2,696.166	2,610.469	.849	.013
5	2,580.553	2,723.232	2,615.316	.917	.001
6	2,589.069	2,761.123	2,630.990	.880	.284

Note: AIC = Akaike's information criteria; BIC = Bayesian information criteria; SSA-BIC = Sample-size adjusted Bayesian information criteria; VLMR-LRT = Vuong-Lo-Mendell-Rubin likelihood ratio test.

we observed that one class in the fourth model, the large informal network ( $n = 105$ ) was split into two for the fifth model, resulting in two small groups ( $n = 74$  and  $n = 37$ ), with one containing more help from children, publicly paid care, and privately paid care, and the other containing more help from other family, neighbors, and privately paid care as well. Given the small size of one of those groups, as well as the fact that the BIC increased by almost 30 points (and a lower BIC is preferred), we chose the fourth model. Average latent class probabilities for this class are shown in Table 2. As these off-diagonal probabilities are rather low, this corroborates our choice of a four-class solution.

### Description of the Network Types

The first network type is the privately paid network ( $n = 138$ , 28%, Tables 3 and 4), as mostly privately paid help was present, and hardly any other caregivers. The older adults in this network type mostly received household care. They can be characterized as being in relatively good health, with many financial and social resources, and in control of their lives and their care (Table 4). Second, a network with predominantly coresidential care was distinguished ( $n = 78$ , 16%). Most often partners ( $n = 72$ ), and otherwise other coresiding informal caregivers, were always present in this network type, sometimes in the co-presence of privately paid help (in 18% of cases). However, in 76% of cases, this care network consisted solely of informal caregivers, with the largest share in hours of informal care (8.63 hours on average). Only in 14% of cases was more than one informal caregiver present (numbers not shown in table), underscoring the fact that this was a sole caregiver type of network. Within this network, personal care and help with transport was often received. This network type comprises mostly partnered older adults with moderate functional limitations and a relatively large social network. Third, a large and more diverse informal care network was identified ( $n = 105$ , 21%). Older adults in this network had help from non-coresiding children (in 71% of cases), other family (23%) and neighbors (15%), sometimes assisted by publicly paid and/or privately paid help. This network was characterized by the presence of relatively many informal caregivers (in 49% of cases, more than two informal caregivers), and help was mostly provided with transport and administrative care. The share of informal care was higher in this type of care network

compared with that in the coresidential network in terms of number of people (2.03 vs 1.23 caregivers), but not in number of hours (3.47 vs 8.63 hours of care). This network type comprises older adults with moderate functional and cognitive limitations, with children and other relatives living nearby, and a preference for informal care. Fourth, a publicly paid care network was distinguished ( $n = 170$ , 35%). All older adults in this network type received publicly paid help. Informal care was present in 49% of cases. In a quarter of cases, more than two informal caregivers were present, a relatively large number of formal caregivers were available (2.06 formal caregivers), and relatively many hours of care were provided (6.22 hours in total). The older adults received help with many tasks, including personal care and nursing care. Thirty-nine percent had a partner, but only in 9% of the cases did this partner provide help. The publicly paid network is characterized by older adults with a high care need based on age and health, low personal and social resources, and a heavy dependence on formal care.

### Associations With Need, Predisposing, and Enabling Factors

The multinomial regression analyses revealed the relative impact of the need, predisposing, and enabling factors on each of the care network types (Table 5). The results show that all three types of factors differentiate between network types but to varying degrees. As regards need factors, older adults in a privately paid network had better cognitive functioning, whereas those in the publicly paid network had more chronic diseases and depression. Older adults in the coresidential care network had more functional limitations. It can be concluded that older adults with a coresidential and publicly paid care network were in relatively poor health and that those with a privately paid care network were in relatively good health. With regard to predisposing factors, none of the three belief types mattered for the large informal network, but they did impact on the other network types in some way, especially the privately paid network. For the latter, no preference for informal care, greater perceived control, and attaching greater importance to control of the care were significant indicators. Older adults in a coresidential network felt more strongly about investing in independence, whereas those in a publicly paid network had a lower level of education. In contrast to what

**Table 2.** Average Latent Class Probabilities for Most Likely Latent Class Membership (row) by Latent Class (column)

	1 (privately paid)	2 (coresidential)	3 (large informal)	4 (publicly paid)
1 (privately paid)	.964	.000	.003	.034
2 (coresidential)	.000	.000	.000	.000
3 (large informal)	.121	.036	.843	.000
4 (publicly paid)	.068	.000	.000	.932

*Note:* The average latent class probabilities indicate the prediction for class membership, which can be read on the diagonal. On the off-diagonal are the posterior probabilities shown for the subset of observations with the most likely class, if they would be in another class.

**Table 3.** Descriptives of Care Network by Network Type as Identified From the Latent Class Analysis (*N* = 491)

	Total	Privately paid	Coresidential	Large informal	Publicly paid
	<i>N</i> = 491	<i>n</i> = 138	<i>n</i> = 78	<i>n</i> = 105	<i>n</i> = 170
Class indicators					
Help from coresidential caregiver, %	19.1	0.0	100.0	0.0	9.4
Help from non-coresident child, %	28.5	0.0	9.0	71.4	34.1
Help from other family, %	8.6	2.2	0.0	22.9	8.8
Help from neighbor, %	6.9	2.9	3.8	15.2	6.5
Help from publicly paid caregiver, %	36.7	2.9	1.3	4.8	100.0
Help from privately paid caregiver, %	35.8	100.0	17.9	22.9	0.0
Care network variables					
Total number of coresidential caregivers (0–3), <i>M</i>	0.20 (0.43)	0.00	1.04	0.00	0.11
Total number of non-coresiding children (0–5), <i>M</i>	0.51 (0.99)	0.00	0.12	1.37	0.56
Total number of other family (0–5), <i>M</i>	0.13 (0.52)	0.02	0.00	0.38	0.12
Total number of neighbors (0–5), <i>M</i>	0.12 (0.53)	0.04	0.08	0.28	0.10
Total number of publicly paid caregivers (0–10), <i>M</i>	0.79 (1.81)	0.03	0.13	0.25	2.06
Total number of privately paid caregivers (0–4), <i>M</i>	0.40 (0.57)	1.11	0.19	0.25	0.00
Total number of caregivers (1–13), <i>M</i>	2.14 (2.21)	1.20	1.55	2.52	2.94
Hours/week coresidential caregiver (0–112), <i>M</i>	1.58 (6.96)	0.00	8.35	0.00	0.72
Hours/week children (0–99), <i>M</i>	0.92 (4.78)	0.00	0.20	2.72	0.89
Hours/week family (0–13), <i>M</i>	0.18 (0.97)	0.01	0.00	0.57	0.16
Hours/week neighbors (0–14), <i>M</i>	0.15 (0.88)	0.03	0.08	0.31	0.18
Hours/week publicly paid caregivers (0–20), <i>M</i>	1.53 (2.71)	0.08	0.01	0.30	4.18
Hours/week privately paid caregivers (0–22), <i>M</i>	1.09 (2.17)	3.09	0.42	0.70	0.00
Total number of hours/week (0.5–112)	5.61 (8.82)	3.26	9.07	5.13	6.22
One task performed, %	59.1	89.9	56.4	49.5	41.2
Two tasks performed, %	21.4	9.4	25.6	27.6	25.3
Three or more tasks performed, %	19.6	0.7	17.9	22.9	33.5
Personal care provided, %	12.2	0.7	17.9	4.8	23.5
Household care provided, %	87.4	98.6	71.8	66.7	98.2
Nursing care provided, %	8.6	0.0	9.0	5.7	17.1
Transport care provided, %	31.8	2.9	41.0	46.7	41.8
Administrative care provided, %	28.9	8.7	39.5	55.2	28.8

was shown by the bivariate analyses (Table 4), older adults with a publicly paid care network experienced a greater sense of mastery. Additional analyses revealed that controlling for need factors, in particular, caused this suppressor effect. Finally, with regard to enabling factors, older adults with a privately paid and publicly paid care network had higher and lower income, respectively. The older adults in the coresidential care network, and those in the large informal care network, were characterized by having other kin and children living nearby, respectively. In general, it can be concluded that health, normative and control beliefs, and income differentiate between the publicly and privately paid care networks, whereas health and social resources are more important for differentiating between the coresidential and informal care network.

## Discussion

The aim of this study was to obtain a detailed understanding of older adults' care networks. Given the austerity measures being imposed in publicly provided care in the

Netherlands, we had a specific interest in the potential of older adults to mobilize informal caregivers, as they might become even more important for community-dwelling older adults in the future (Da Roit, 2012). We found evidence for four network types, that is, the privately paid, coresidential, large informal, and publicly paid care network. The latter three resemble care network types identified in other studies (e.g., Broese van Groenou et al., 2016, Keating & Dosman, 2009), despite differences in the samples and network identification measures used. The identification of the privately paid care network type is rather new; this is possibly due to the sampling procedure used. We used an identification method entailing a wide range of care tasks to determine the care networks, and probably because the selection was based on care use and not on health status, we identified a rather large group with a privately paid network and limited health problems, which is generally not found in other population surveys (e.g., Keating et al., 2003).

The results show that informal and formal care are not mutually exclusive categories: informal care was likely to be supplemented by publicly paid or privately paid care



**Table 4.** Descriptives and Bivariate Associations With Care Network Types (vertical percentages,  $N = 491$ )

	Total	Privately paid	Coresidential	Large informal	Publicly paid	<i>p</i> Value
Age (64.10–99.57), M	78.44 (7.67)	76.00	73.15	79.89	81.96	<.001
Female, %	67.6	63.0	69.2	70.5	68.8	.59
Partner, %	51.3	60.9	93.6	26.7	39.4	<.001
Need factors						
Functional limitations (0–22), M	5.19 (5.23)	2.80	5.12	4.46	7.61	<.001
Chronic diseases (0–6), M	1.71 (1.17)	1.48	1.77	1.76	2.15	<.001
Cognitive functioning (15–30), M	27.28 (2.68)	28.30	27.60	27.16	26.39	<.001
Depression (0–40), M	10.49 (7.40)	8.89	9.86	9.84	12.46	<.001
Predisposing factors: Behavioral beliefs						
Mastery (5–25), M	16.60 (3.57)	17.42	17.08	16.46	15.80	.001
Investment in independence (3–65), M	51.24 (7.11)	50.60	52.86	51.19	51.04	.15
Normative beliefs						
Preference informal care, %	47.7	43.5	56.4	55.2	42.4	.05
Preference formal care, %	62.9	65.2	61.5	61.9	62.4	.93
Control beliefs						
Perceived control (3–9), M	6.99 (2.08)	8.17	7.59	7.34	5.54	<.001
Importance control (1–5) M	4.09 (0.89)	4.39	4.17	4.17	3.75	<.001
Education, %						<.001
Low	5.3	10.1	15.4	26.7	41.2	
Middle	54.6	46.4	70.5	59.0	51.2	
High	20.2	43.5	14.1	14.3	7.6	
Enabling factors						
Network size (0–54), M	16.10 (9.47)	17.74	18.06	15.87	14.02	.001
Children nearby, %	56.2	44.9	57.7	68.6	57.1	.003
Family nearby, %	35.2	27.5	33.3	42.9	37.6	.08
Friends nearby, %	25.3	33.3	30.8	24.8	16.5	.005
Other non-kin nearby, %	35.6	31.9	50.0	37.1	31.2	.02
Neighbors nearby, %	56.6	63.8	51.3	56.2	53.5	.22
Income (\$11–\$5,446), M	1,754 (862)	2,354	1,678	1,614	1,388	<.001
Urbanization (1–5), M	3.21 (1.35)	3.29	3.27	3.18	3.12	.71

Note: Coresiding children could also be part of the partner network, which explains why having a partner was 93.6% rather than 100%.

in about 25% of the coresidential and large informal care networks, and informal care was present in half the cases in the publicly paid network. Conversely, the two types of formal care (privately paid and publicly paid), did not co-occur, and spousal care largely excluded care from other informal caregivers such as relatives and non-kin. The majority of our sample used mixed forms of care, and the share of informal care varied widely between these care networks. The traditional distinction between the use of formal care only, informal care only, and both types of care neglects the variation in types of mixed-care networks. To increase the understanding of how processes of substitution and complementarity occur between formal and informal care, but also within types of informal care and between publicly and privately paid care, further research would be needed to identify the full care networks of older adults.

As a second research goal, we sought to identify which characteristics of older adults distinguish between care network types, using predisposing, enabling, and need factors of care use (Babitsch et al., 2012). Our results showed that predisposing beliefs as derived from the reasoned action

approach (Fishbein & Ajzen, 2011) added to indicators of need and enabling factors in differentiating between network types. It appeared that normative and control beliefs are both associated with network types, with the strongest associations for control beliefs. Older adults in the privately paid care network had the highest sense of perceived control over the care process. As they are in relatively small care networks, mostly receive household care, and have the financial means to pay for care out of their own pocket, it might be easier for them to control the care. By contrast, those with little perceived control and a low level of education and income were likely to have a publicly paid care network. As they were also the ones with higher age, poorer health and the largest care networks, these conditions may make it more difficult to exercise control over the care process. Being in control appeared to be less important for older people with coresidential and informal care networks, possibly because the informal caregivers assist in arranging the care or recruiting other informal caregivers.

As regards the enabling factors, we found that having a spouse and/or children nearby occurred significantly more often in the coresidential and informal network types. This

**Table 5.** Multinomial Analyses: Factors Associated With Care Network Types (AMEs,  $N = 491$ )

	Privately paid	Coresidential	Large informal	Publicly paid
Age	0.001	-0.018***	0.008**	0.010***
Female	-0.044	-0.047	0.046	0.045
Need factors				
Functional limitations	-0.008	0.011**	-0.009*	0.006
Chronic diseases	-0.028	-0.004	-0.008	0.040**
Cognitive functioning	0.017*	-0.007	-0.004	-0.006
Depression	0.003	-0.004	-0.004	0.006*
Predisposing factors: Behavioral beliefs				
Mastery	-0.004	0.001	-0.009	0.012*
Investment in independence	-0.002	0.005*	-0.003	0.000
Normative beliefs				
Preference informal care	-0.080*	0.031	0.063	-0.014
Preference formal care	-0.029	-0.008	-0.027	0.047
Control beliefs				
Perceived control	0.046***	0.009	0.014	-0.069***
Importance control	0.053*	-0.041*	0.009	-0.020
Middle education (vs low)	0.008	0.074	0.014	-0.097*
High education (vs low)	0.099	-0.014	-0.005	-0.080
Enabling factors				
Network size	0.000	0.002	-0.003	0.000
Children nearby	-0.054	-0.004	0.120**	-0.063
Family nearby	-0.033	-0.055	0.039	0.050
Friends nearby	0.055	0.000	0.025	-0.081
Other non-kin nearby	-0.049	0.062*	-0.006	-0.007
Neighbors nearby	0.061	-0.037	-0.030	0.006
Income	0.095***	-0.011	-0.018	-0.066**
Urbanization	-0.010	0.005	0.006	-0.001

Notes: AME = average marginal effect.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

again shows that informal care is to a very large degree the domain of partners and adult children. Remarkably, the proximity of other network members did not appear to matter for the care provision. Many older adults had relatives, neighbors, and friends living close by, but these types of relationships were only marginally involved in the care network. There may be two reasons for their lack of involvement. First, the older adults and their spousal caregivers may hesitate to ask others for help with providing care; second, their social contacts may find it difficult to offer help (cf. [Linders, 2010](#)). Although not many non-kin provide care, they generally do so out of affection for the care recipient ([Komter & Vollebergh, 2002](#)), but sometimes also because there are no spouses or child caregivers available ([Barker, 2002](#)). With changing family structures and conflicting roles in work and care for caregiving children, these non-kin social contacts have become an important potential source of informal care that could be recruited.

## Limitations

Several limitations of the current study can be identified. First, causal relations between the predisposing, enabling, and need factors and the care networks could not

be established in this cross-sectional design. Longitudinal research into care transitions (cf. [Allen, Lima, Goldscheider, & Roy, 2012](#)) would provide an insight into the directionality of these relationships. Observations over time could also shed more light on whether care network types are sequential and, for example, show under which conditions coresidential care networks are transformed into informal or publicly paid care networks. A related topic for future research could be to examine which members of the older adults' social network take on care tasks in times of need. Second, the results are derived in the Dutch context and in part reflect the fact that publicly paid care is means tested and provided to those in poor health and/or to those with low social and economic resources. This suggests that the proportion of older adults with the publicly paid network type could be smaller in countries with less generous care regimes. Cross-national research could explore how variation in national policies, such as the allocation of formal care and cultural norms regarding family care, is associated with network types.

## Societal Implications

The study used data collected a few years before more severe reforms took place in 2015. The share of (in)formal

care in network types may thus be different in future studies. Several developments regarding care network types can be foreseen when publicly paid care is reduced. The share of informal care was already high in two network types which is in line with other studies conducted in countries with lower levels of publicly provided care such as Canada and the United States (Keating & Dosman, 2009; Li, 2004). The large informal care network seems most resilient and able to sustain the level of care in times of austerity, but it is clear that having children living close by is an important feature here. For older adults without children, or without children nearby, it may be more difficult to develop such a care network. Our results show that care recipients in the coresidential care network do have multiple kin and non-kin living in the neighborhood who are not actively involved in caregiving. Increased awareness among these network members of the burden of spousal caregivers could lead them to become involved in caregiving. Community services involved in social care (volunteering, informal caregiver support) may help older adults to mobilize their network into caregiving. Older adults in the publicly paid network are the most vulnerable in times of cutbacks in publicly paid care. They often have the greatest care need, the least capabilities to arrange or pay themselves for the care, and the smallest networks. Earlier research suggests that a deterioration in health leads to network loss in later life (Broese van Groenou, Hoogendijk, & van Tilburg, 2013). Policymakers and care professionals should be mindful that these older adults would benefit from assistance in activating and/or increasing their potential care network, preferably before a severe care need arises, to ensure that they receive the care they need when they need it.

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