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Geurts, T.

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Chapter 3

THE GRANDPARENT-GRANDCHILD RELATIONSHIP IN CHILDHOOD AND ADULTHOOD: A MATTER OF CONTINUATION?¹

Abstract We examined whether grandparents perceive adult grandchildren as frequent and important contacts by analyzing network membership. We additionally examined whether this network membership is related to relationship intensity during childhood. Network membership was assessed in 1992 (397 grandparents; 1,594 adult grandchildren) and at the 2005-2006 follow-up (155 grandparents; 429 adult grandchildren) from the Longitudinal Aging Study Amsterdam. Relationship intensity during childhood was assessed in 1992. One out of four grandparents identified at least one adult grandchild in their personal network. Adult grandchildren who had an intense relationship with their grandparents during childhood were more often in grandparents' network than others. An intense relationship during childhood promotes continuation of the relationship into adulthood and might contribute to grandparent's support potential.

¹This chapter is co-authored by Theo van Tilburg (Department of Sociology, VU University Amsterdam) and Anne-Rigt Poortman (Department of Sociology/ ICS, Utrecht University), and is published in *Personal Relationships* in 2011. The study is based on data collected in the context of the "Living arrangements and social networks of older adults" and "Longitudinal Aging Study Amsterdam" research programs. These programs are conducted at VU University in Amsterdam, and supported predominantly by the Ministry of Health, Welfare, and Sports, Directorate of Long-Term Care.

Introduction

Western societies have witnessed an increased life expectancy and decreased fertility during the twentieth century. As a consequence, families with relationships spanning more than two generations have become more common and the average size of the nuclear family has decreased (Putney & Bengtson, 2003). This verticalization of families implies that intergenerational relationships may have become increasingly important in contemporary families (Bengtson, 2001).

It is well documented that the grandparent - grandchild relationship is important during grandchild's childhood (Harper, 2005). For instance, 24% of grandparents in the U.S.A. engage in caregiving activities between 10 and 29 hours per week (Fuller-Thomson & Minkler, 2001) and about 2% raise their grandchildren (Bryson & Casper, 1999; Hayslip & Kaminski, 2005). Across European countries, 33% of grandmothers and 26% of grandfathers frequently care for their grandchildren (Hank & Buber, 2009). Yet, little attention has been given to the importance of the relationship when grandchildren are adults (Rosenthal, 2000). It is known that the frequency of contact between grandparents and grandchildren declines when grandchildren grow older (Field & Minkler, 1988; Silverstein & Long, 1998). Other studies examining the significance of the intergenerational relationship concluded that the relationship continues to be highly valued, personally meaningful, and potentially important (Kemp, 2005; Wenger & Burholt, 2001). Still, no research has been conducted that examined the extent to which adult grandchildren are frequent and important contacts for grandparents, even though some researchers signal that adult grandchildren can play an important role in emo-

tional and practical support (Dellmann-Jenkins, Blankemeyer, & Pinkard, 2000; Fruhauf, Jarrott, & Allen, 2006; Langer, 1990; Piercy, 1998). The current study examined the extent to which grandparent – adult grandchild relationships are perceived by grandparents as frequent and important contacts by analyzing network membership. Further it examined whether this membership is established by relationship intensity during childhood.

Adult Grandchildren's Importance to Grandparents

The relationship with an adult grandchild can be a contributor to a grandparent's well-being because of the meaning grandparents attach to their role (Reitzes & Mutran, 2004a). Departing from the study of Kivnick (1982), Hay-slip, Henderson, and Shore (2003) argue that the meaning of this single role includes a sense of continuity (carrying on the family line, or the sense of living on through the lives of grandchildren), extension of the self (by feeling valued as an elderly person or by vicarious accomplishments through the grandchildren), and satisfaction (by contributing to their grandchild's well-being through help, advice or indulgence). In addition, adult grandchildren can contribute to their grandparents' well-being because they can be a source of pride (Harwood & Lin, 2000) and because grandparents can derive enjoyment and companionship from the relationship with their adult grandchildren (Tomlin, 1998). Adult grandchildren can also contribute to their grandparents' well-being by providing support (Dellmann-Jenkins et al., 2000; Fruhauf et al., 2006; Piercy, 1998). For example, adult grandchildren may introduce new technologies and instruct their grandparents in how to operate them. In this way, grandparents can learn about societal developments through contact with their adult grandchildren. Although such support can also be provided by other young people, for instance in the context of intergenerational programs (e.g. Kaplan, Liu, & Hannon, 2006), adult grandchildren are more easily approached because many older people maintain contact with younger generations only within the family context (Hagestad & Uhlenberg, 2006). Furthermore, grandchildren, and in particular adult grandchildren, may assist a grandparent in need of care (e.g. Fruhauf et al., 2006), even though they are generally not the first in order of preferred care providers (Cantor, 1979). Scholars generally agree that the intergenerational relationship in general is

beneficial for a grandparent's well-being.

In the current study, we examine the extent to which grandparents perceive relationships with adult grandchildren as frequent and important contacts and study whether adult grandchildren are members of their grandparents' personal network. This network approach builds upon earlier studies as it captures both contact frequency and an affective component by including the importance of the relationship.

Adult Grandchildren's Membership in Grandparents' Network

The personal network consists of all persons with whom a focal individual has frequent and important contact. People in a personal network form a potential source of social support: Each person can be thought of as moving through life surrounded by a "convoy" of people to whom he or she is related through the exchange of support (Kahn & Antonucci, 1980). The composition of the convoy changes over time: Over the course of one's life, relationships inevitably will be lost but personal networks may also expand in later years (Van Tilburg, 1998). A grandparent may include an adult grandchild in his or her convoy (Antonucci, Akiyama, & Takahashi, 2004).

A prominent factor in the inclusion of an adult grandchild in the convoy is located in the strength of the grandparent-adult grandchild bond. We hypothesize that grandparents who build up an intense relationship with grandchildren during childhood are more likely to continue this relationship into adulthood than grandparents who have a distant relationship. Results from two studies support the idea that a strong bond is established during childhood. Taylor, Robila, and Lee (2005) observed more positive perceptions and greater satisfaction in the intergenerational relationship if adult grandchildren had co-resided with their grandparents during childhood. Brown's (2003) study observed that the quality of adult grandchild-grandparent relationships was higher when a grandparent had intensively cared for their grandchild during childhood. The relationship in childhood is of particular importance because discrepancies in developmental stages, the "generational stake" (Bengtson & Kuypers, 1971), are likely to hinder continuation of the relationship when both parties age (Harwood, 2001). Older generations strive to maintain continuity

in the intergenerational relationship while younger generations tend to exaggerate differences to facilitate separation from the family of origin (Aquilino, 1999). A strong bond between the parties at an early stage of the relationship may ensure convoy membership at a later stage even though discrepancies in the developmental stages become increasingly pronounced.

The likelihood of having an adult grandchild in the personal network is also affected by the following family characteristics: grandparent's number of grandchildren, partner status, contact with adult children (i.e. the parents of the grandchildren), geographic proximity to grandchildren, as well as the adult child's partner status. Having many grandchildren limits the importance of the relationship and decreases opportunities for contact with each individual adult grandchild (Elder & Conger, 2000). A grandparent living alone often has higher needs for support, which can be given by a grandchild (King, 2003). Frequent contact with an adult child increases opportunities for an adult grandchild's network membership since the grandparent-grandchild contact is indirectly being facilitated (Brown, 2003). Greater geographic proximity between grandparent and grandchild increases likelihood of network membership. Finally, the relationship with a grandchild can be disrupted by an adult child's divorce (Drew & Smith, 1999). Unfortunately, information about geographic proximity and divorce is not available for the current study because of time limitations in the data collection.

Differences in the likelihood of having an adult grandchild in the personal network were also to be expected from the grandparent's age, gender, and health. Age differences were to be expected because older people tend to evaluate kin relationships as more emotionally rewarding than other relationships (Carstensen, 1992) and because older people are from an earlier generation who generally have more frequent contact with grandchildren (Lyyra, Lyyra, Lumme-Sandt, Tiikkainen, & Heikkinen, 2010). Grandmothers are more likely to identify an adult grandchild in their network than grandfathers because women are generally more involved in kin relationships than men (Michalski & Shackelford, 2005) and also because the grandmother role concerning network membership is more prescribed by gender norms than the grandfather role (Reitzes & Mutran, 2004b). Physical and cognitive health problems may impose restrictions upon the older adults' capacities to engage in interaction with their adult grandchildren, or their greater need for support may trigger

adult grandchildren to support their grandparents.

The current study is the first to examine the membership of adult grandchildren in the grandparents' personal network from childhood characteristics using data covering a long time span. Two questions guided our research: (1) To what extent do grandparents identify adult grandchildren as part of their personal network? (2) To what extent does an intense grandparent-grandchild relationship during childhood increase an adult grandchild's chance of becoming part of the grandparent's personal network taking into account other factors that may affect network membership?

Methods

Respondents

In 1992, the Living Arrangements and Social Networks research program (Knipscheer, De Jong Gierveld, Van Tilburg, & Dykstra, 1995) interviewed 3,805 Dutch older adults from the birth cohorts 1908 – 1937. The sample was taken from the population registers of eleven municipalities in three regions of the Netherlands; the northeast, the southeast, and the west of the Netherlands. The sample was stratified by gender and date of birth. Respondents were interviewed face-to-face in their home with use of a personal computer. The questionnaire was computerized because this allowed for a complex questionnaire design including routing procedures and additional questions for random subsamples. The cooperation rate was 62%. The sample included 2,601 grandparents. Due to time limitations, the computer randomly selected 813 grandparents who were to be asked about the name, gender, age, and contact frequency of all their non-coresiding biological grandchildren. These grandparents were asked two additional questions about overnight visits and caregiving for each grandchild aged 16 years or younger. The respondents were followed up by the Longitudinal Aging Study Amsterdam (LASA; Huisman et al., 2011). The first and follow-up observations allowed network identification of grandchildren if they were 18 years or older at the specific observation, i.e. at T_0 (1992), T_1 (1992-1993), T_2 (1995-1996), T_3 (1998-1999), T_4 (2001-2002), or T_5 (2005-2006).

The T_0 sample included grandchildren of various ages (range: 0 - 43 years; $N = 4,494$). Given their age, some grandchildren were ineligible for the study

at hand. We therefore categorized the grandchildren in groups of ages between 0 and 3 years old; between 4 and 11 years old; between 12 and 17 years old; and aged 18 years or older (Table 1). To examine the extent to which adult grandchildren are identified in the grandparent's personal network (research question 1), we analyzed adult grandchildren at T_0 ; younger grandchildren did not qualify as network members in our network delineation. We excluded 8 grandparents for whom network information was not available due to health incapacity and analyzed data from 397 grandparents with 1,594 adult grandchildren.

Table 1 *Number of Grandchildren and Grandparents by Various Age Categories of Grandchildren at the 1992 Observation (T_0)*

Age of grandchildren	Grandchildren (<i>n</i>)	Grandparents (<i>n</i>)
18 and older	1,675	405
12 - 17	941	393
4 - 11	1,327	511
0 - 3	551	333
Total ^a	4,494	813

Note: ^aThe total number of grandparents is the number of unique grandparents in the sample - one grandparent can have grandchildren in multiple age categories

To examine the extent to which relationship intensity during childhood promotes network membership in adulthood, we selected grandchildren for whom questions on relationship intensity during childhood at T_0 were asked, i.e. 11 years or younger, and who were qualified to be network member at T_5 . As such, only grandchildren between the ages of 4-11 at T_0 were included in the analysis because they were over the age of 18 at T_5 . Due to attrition over time, we lost a number of grandparents and their grandchildren for this analysis. Grandparents were lost because of death ($n = 189$), refusal ($n = 66$), ineligibility ($n = 32$), contact problems ($n = 8$), and missing information about networks due to ill health ($n = 53$). In addition, several grandchildren aged 4 at T_0 were excluded ($n = 28$) because the time interval was just too short for these grandchildren to have reached the age of 18 at the time of observation

T_5 . This exclusion at the level of the grandchildren led to the loss of a few grandparents ($n = 8$). Of the 511 grandparents at T_0 with grandchildren aged 4 – 11 years, we have data on 155 at T_5 . The selected grandchildren ($n = 429$) were 18 – 25 years old at T_5 .

The 155 grandparents eligible for the follow-up deviated from the other 658 grandparents in the 1992 sample (mean age 72.5; 54% female). Eligible grandparents for the T_5 sample were younger at T_0 ($M = 64.9$; $t_{(811)} = 11.3$, $p < .001$) and the percentage of grandmothers was higher (64%; $\chi^2_{(1)} = 5.2$, $p < .05$). Because respondents with severe cognitive or physical illness were often not able to participate in the full interview, the follow-up consisted of grandparents who were relatively in good health. For instance, the selected 155 grandparents for research question 2 scored 1.8 points higher at T_0 on the Activities of Daily Living scale ($t_{(811)} = -5.0$, $p < .001$) than the other 658 grandparents (mean score 27.3).

Measures

To obtain adequate information on personal networks, the respondents were asked to identify members of their network by name (Van Tilburg, 1998). Only people over the age of 18 could be identified. Seven relationship domains were specified: household members, children and their partners, other relatives, neighbors, colleagues, fellow members of organizations, and others. For each domain the following question was posed: “Name the people with whom you have frequent contact and who are important to you.” For the domain of “other relatives,” the interviewer informed the respondent that the following types of family members could be identified: parents, siblings, cousins, nieces and nephews, aunts and uncles, grandchildren and in-laws. By linking the names of grandchildren identified in the network at T_0 and at T_5 to the names that were provided for all grandchildren at T_0 , we examined for each adult grandchild whether he or she was a member of the grandparent’s personal network at T_0 and T_5 . We thereby created two dependent variables indicating whether an adult grandchild is a member of the grandparent’s network at T_0 (used for research question 1; 0 = not identified, 1 = identified) and whether an adult grandchild is a member of the grandparent’s network at T_5 (used for research question 2; 0 = not identified, 1 = identified).

Information characterizing the intensity of the relationship during child-

hood was obtained at T_0 by asking four questions for each grandchild aged 16 years or younger. Preceding these questions, all grandchildren were identified by name. The first question was about contact frequency: "How often are you in touch with ...?" The second was about frequency of contact beyond family gatherings: "How often are you in touch with ... apart from birthday visits and religious holidays?" These two contact frequency questions had eight answer categories: 1 = never, 2 = once a year, 3 = few times a year, 4 = once a month, 5 = once a fortnight, 6 = weekly, 7 = few times a week, and 8 = each day. Reliability of such measures is demonstrated by strong correlations between reports on contact frequency and travel time between parents and adult children (Klein Ikkink, Van Tilburg, & Knipscheer, 1999). The third question regarded frequency of overnight visits: "How often did ... spend the night at your home in the past twelve months?" The fourth question was about frequency of caregiving: "How often did you take care of ... in the past twelve months?" The third and fourth question had four answer categories: 1 = never, 2 = seldom, 3 = sometimes, and 4 = often. Two grandchildren had missing values on two of these measures, which were imputed to the variable's mean for contact or to the median when it concerned caregiving and overnight visits.

To enhance the comparability of the four indicators for relationship intensity during childhood, we rearranged the values into scales ranging from 0 to 1. To this end, we assigned the numerical values of between 0 and 1 for both contact measures to represent the answer categories. For example, the category "never" was assigned the value of 0, the category "weekly" was assigned the value of 0.67, and the category "each day" was assigned the value of 1. For the questions about frequency of overnight visits and of caregiving we assigned the values of 0, 0.33, 0.66, and 1 to the categories of never, seldom, sometimes, and often, respectively.

We included frequency of contact between the grandparents and their adult children because network membership of adult grandchildren is likely to be influenced by these adult children, i.e. the parents of the grandchildren, in particular when adult grandchildren live with them (Geurts, Poortman, Van Tilburg, & Dykstra, 2009). All adult children were first identified by name. Subsequently, frequency of contact with each adult child was assessed by asking 'How often are you in touch with ...?'. The answer categories ranged between never (value 1) and each day (value 8). We recoded these values to

a scale of 0 to 1. For example, “never” was assigned the value of 0, “weekly” the value of 0.67, and “each day” the value of 1. We further included physical capacities of grandparents by an Activities of Daily Living scale (consisting of six items with five answering categories; Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963; $\alpha = .82$; range: 6-30) and cognitive capacities by the Mini Mental State Examination (24 questions; Folstein, Folstein, & McHugh, 1975; $\alpha = .71$; range: 0 - 30), respectively. Higher scores indicated better capacities for both scales.

Procedure

Network membership distinguishes between kin relationships that are perceived as important contacts (relationships included in the network) and other kin relationships. To examine the extent to which grandparents identified adult grandchildren in their personal network, we present descriptive statistics about grandparents’ network identifications of adult grandchildren. As these isolated figures are hard to interpret, we additionally examined grandparents’ network identifications of biological adult children and siblings.

We next conducted a multilevel logit regression analysis (Fielding & Goldstein, 2006; Rasbash, Steel, Browne, & Prosser, 2004) to address our second research question on the significance of relationship intensity during childhood for membership in grandparents’ personal network in adulthood. We distinguished three hierarchical levels representing the generations: adult grandchildren (level 1) were nested within adult children (level 2), and adult children were nested within grandparents (level 3). Iterative generalized least squares estimation was used.

We first generated an empty model for the 14-year follow-up to examine how variance was divided amongst grandparent and adult child level (level 1 variance is fixed and therefore unreported). These variances reflect the influence of unmeasured characteristics and indicate the extent to which network membership can be ascribed to differences between grandparents (grandparent level) and differences between grandparent – adult child relationships (child level). We next generated full regression models including explanatory and controlling variables. Since the four explanatory variables for relationship intensity during childhood are moderately to highly correlated (r between .30 and .92), a full regression model for each indicator was calculated. In the

resulting four full models, we controlled for adult grandchild's gender and age (level 1), the adult child's gender, and contact frequency (level 2). Furthermore, we included grandparent's age, gender, number of grandchildren, partner status (0 = not living alone, 1 = living alone), and physical and cognitive capacities as control variables. We also included personal network size, because identifying an adult grandchild in the network is more likely in large networks (level 3). Tolerance testing indicated that all independent variables qualified for the regression analysis assumption concerning the absence of multicollinearity.

Results

Table 2 presents descriptive statistics about network membership at T_0 of adult grandchildren to address research question 1. One out of four grandparents with adult grandchildren identified an adult grandchild in their personal network. Additional statistical analysis (results not shown in Table 2) revealed that 8% of the grandparents identified one adult grandchild, 7% two adult grandchildren, and 9% identified three or more. On average, grandparents had four adult grandchildren, of whom about one was identified in the personal network.

To put these figures into a broader perspective, we present similar descriptive data in Table 2 regarding the network membership of adult children and siblings. Nearly all grandparents identified at least one adult child in their personal network. They had on average between three and four adult children, many of whom were members of their personal network. The proportion of adult children identified in the grandparent's personal network was substantially higher than the proportion of adult grandchildren.

Many grandparents had one or more siblings alive. More than half of these grandparents identified one or more siblings in their personal network. They had about three siblings on average, of which one was a member of the network. These figures show that network membership of siblings is proportionally twice as high as membership of adult grandchildren. However, the mean number of siblings and of adult grandchildren in networks was not significantly different from each other; in fact, the means differed by less than 0.03.

Table 2 *Descriptive Statistics for Personal Network Membership at T_0 of Adult Grandchildren, Adult Children, and Siblings*

Kin type	Respondents having this type of kin (<i>n</i>)	Percentage of respondents identifying one or more kin relationships in network	Mean number of specified kin types	
			Total	In network
Adult grandchildren	397	24%	4.0	0.8 (19%)
Adult children	397	95%	3.6	3.0 (84%)
Siblings	302	55%	2.7	1.1 (41%)

For research question 2 we regressed network membership. We first calculated an empty model to evaluate how variance is divided. The decomposition of variance indicates that network membership of an adult grandchild is mainly predicted by characteristics that are manifest at the grandparent level ($\sigma^2_{\text{grandparents}} = 2.73$). Characteristics at the level of adult children are of very little importance ($\sigma^2_{\text{children}}$ is close to zero). Note that the high variance at the grandparent level presumably precludes significant effects of grandparents' characteristics included in the multivariate models.

The four multivariate models included explanatory and control variables. Table 3 presents the descriptive statistics of all variables included in the analyses. On average, grandparents eligible for the follow-up were 79 years of age. They had an average number of 6.0 grandchildren and were often living alone (43%). Relationship intensity shows considerable variation during childhood as can be read from the standard deviations.

Results of the logit regressions are presented in Table 4. All indicators pertaining to relationship intensity at childhood were positively related to future network membership. The largest effect was observed for contact frequency, followed by contact frequency beyond family gatherings, overnight visits, and caregiving. The estimated parameter for caregiving, however, did not reach statistical significance. We calculated the increase in likelihood of network membership for each indicator of relationship intensity. Based on the regression equation and controlled for all other effects, the probability for an adult grandchild to be identified in his or her grandparent's network was .21 when contact in childhood was monthly and .38 when contact was daily; estimates

Table 3 *Descriptive Statistics of Explanatory and Control Variables Used in the Regression Analysis of Adult Grandchild's T₅ Network Membership*

Variable	Range	M	(SD)
<i>Grandparent level (n = 155)</i>			
Age	69 - 93	78.9	(5.9)
Grandmother (vs. grandfather)	0 - 1	.64	(.5)
Number of grandchildren at T ₀	1 - 46	6.0	(5.8)
Network size	2 - 45	16.5	(8.6)
Living alone (vs. not living alone)	0 - 1	.43	(.5)
Physical capacities	10 - 30	25.8	(4.7)
Cognitive capacities	18 - 30	27.0	(2.4)
<i>Adult child level (n = 265)</i>			
Daughter (vs. son)	0 - 1	.52	(.4)
Contact frequency	0 - 1	.68	(.2)
<i>Grandchild level (n = 429)</i>			
Granddaughter (vs. grandson)	0 - 1	.50	(.5)
Grandchild's age at T ₀ (years)	4 - 11	7.3	(2.1)
Contact frequency at T ₀	0 - 1	.58	(.2)
Contact frequency at T ₀ (beyond family gatherings)	0 - 1	.55	(.2)
Overnight visits at T ₀	0 - 1	.42	(.4)
Caregiving at T ₀	0 - 1	.44	(.4)

were about equal for contact beyond family gatherings. Grandchildren who seldom stayed overnight were less likely to be identified in the grandparent's network (probability = .26) than grandchildren who stayed overnight often (probability = .43); estimates were about equal for childcare. The results further showed that grandparents are more likely to identify adult granddaughters (probability of .39) than adult grandsons (probability of .19) in their personal network. The likelihood of network membership at T₅ is higher for adult grandchildren who were older at T₀, as indicated by the positive effect of .26 of the grandchild's age at T₀.

There was a significant reduction in variance at the level of grandparents in the four multivariate models (ranging from 26% to 34%), in which explanatory and control variables were added to the empty model. This means that differences in the network membership of adult grandchildren are to some extent explained by grandparents' characteristics. When a grandparent had

Table 4 Multivariate Multilevel Logit Regression Analysis of Grandparents Identifying Adult Grandchildren in Their Network at the 14-Year Follow-up (2005-2006; T_3 ; Unstandardized Regression Coefficients)

	Model 1	Model 2	Model 3	Model 4
<i>Grandparent level (n = 155)</i>				
Age	.03	.03	.03	.03
Grandmother (vs. grandfather)	-.58	-.54	-.68	-.63
Number of grandchildren at T_0	-.21 ***	-.20 **	-.20 ***	-.21 ***
Network size	.11 ***	.11 ***	.10 ***	.10 ***
Living alone (vs. not living alone)	.38	.35	.63	.46
Physical capacities	.00	.01	.02	.02
Cognitive capacities	.13	.14	.12	.11
<i>Adult child level (n = 265)</i>				
Daughter (vs. son)	.14	.12	.01	.10
Contact frequency	1.78	1.81	2.67 **	2.33 *
<i>Grandchild level (n = 429)</i>				
Intercept	-12.24	-12.99	-11.52	-11.08
Granddaughter (vs. grandson)	1.00 **	.98 **	.95 **	.99 **
Grandchild's age at T_0	.27 **	.27 ***	.25 **	.27 ***
Contact frequency at T_0	2.40 *			
Contact frequency at T_0 (beyond family gatherings)		2.39 *		
Overnight visits at T_0			1.17 *	
Caregiving at T_0				.74
<i>Random part</i>				
Variance: grandparent level	1.83	1.86	1.79	2.03
Variance: adult child level	.10	.09	.12	.03

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

Note. Models 1 - 4 differ in the variables assessing relationship intensity at childhood

more grandchildren, the likelihood of identifying an individual adult grandchild in the network decreased, as is shown by the negative coefficients in all models. Grandparents with more grandchildren have a large pool of grandchildren from which they can choose one or more grandchildren with whom they want to maintain important and frequent contact. For each individual grandchild, the likelihood of network identification is therefore less when more grandchildren are available. Grandparents more frequently included an adult grandchild in larger networks. This observation may reflect greater sociability of certain grandparents who therefore include more adult grandchildren in their network. Grandmothers and grandfathers were equally likely to identify an adult grandchild in their network. The models further show that a grandparent's age and his or her cognitive or physical capacities did not matter for the likelihood of network identification. Also, the expectation that grandparents who live alone are more likely to identify an adult grandchild in their network than other grandparents was not confirmed.

As expected from the low variance at the level of the adult children in the empty model, adult child's characteristics were of limited importance in predicting adult grandchildren's network membership. We observed no differences between adult grandchildren of daughters and adult grandchildren of sons. Yet frequency of contact with adult children was significant in the two models that assessed the relevance of overnight visits and caregiving. Given the insignificance of contact frequency in the other two models, at best this finding provides weak support for the idea that frequent contact with an adult child increases opportunities for an adult grandchild's membership in his or her grandparent's network.

Discussion

We examined the extent to which grandparents perceive relationships with adult grandchildren as frequent and important contacts by analyzing the extent to which grandparents identified adult grandchildren in their personal network. Our results showed that about one out of four grandparents identified at least one adult grandchild in their personal network. This observation suggests that a significant number of grandparents perceive the relationship with adult grandchildren as a frequent and important contact. On average,

grandparents had four adult grandchildren as potential network members of which they identified one in their personal network. The observation that the majority of adult grandchildren were not in their grandparent's network is in line with the conclusion of Geurts et al. (2009) that most adult grandchildren contact their grandparents only at family events, such as birthdays and Christmas. We should, however, interpret these figures with caution, as the size of the personal network depends on the method of data collection (Feld, Sutor, & Hoegh, 2007). The method that we applied allowed for large networks (Broese van Groenou & Van Tilburg, 2007), and consequently we observed that network membership of adult grandchildren is rather frequent among grandparents in our sample.

To put the figures into perspective, we compared network membership of adult grandchildren with network membership of adult children and siblings. The results showed that adult grandchildren's membership in grandparents' network is proportionally considerably lower than that of adult children and siblings. In an absolute sense, however, adult grandchildren's membership in grandparents' network was close to siblings' membership: On average, about one sibling and one adult grandchild were identified in the grandparent's personal network. Although this finding does not allow for definite conclusions, it suggests that relationships with grandchildren are important but not as important as relationships with adult children and siblings.

To explain variation in network membership of adult grandchildren, we relied on the convoy model, which assumes that the support network changes when people move through life as they age. We observed that the grandparent's age, health, and marital status were not related to the adult grandchild's network membership. The insignificance of age suggests that this family relationship is of similar importance among grandparents from young and old generations, or that the importance of the relationship remains on a similar level when grandparents get older. Grandparents living alone and frail grandparents, who are often in greater need of help than other grandparents, are not more likely to mobilize or trigger adult grandchildren to provide support. Further research could address whether this means that adult grandchildren are emotionally too distant for initiation of assistance when help is needed. Our observation however does not mean that adult grandchildren are of no importance for support: grandparents living alone and frail older people can

rely on those adult grandchildren who are already in their network before they were living alone or frail. This view is supported by a study of Keating and Dosman (2009) who observed that frail older adults are not only cared for by close kin but also by distant kin. This might indicate that support from adult grandchildren is important for grandparents in various phases of old age and that the meaning of the relationship goes beyond the support potential. It should be noted as a limitation of the study that due to sample attrition, there were only few impaired grandparents included and therefore the significance of their grandchildren's support probably could not be assessed appropriately.

Having frequent contact with a grandchild in childhood as well as having a grandchild staying overnight promoted grandchild's network membership once the grandchild has matured. We did not observe an association between caregiving in the past and future network membership. This was against our expectation given Brown's (2003) observation that caregiving during childhood increased relationship quality in adulthood. The current study, however, not only examined caregiving but also contact frequency and staying overnight. In doing so, the results from the study at hand show that it is presumably not caregiving itself that creates a powerful connection but the contact that comes along with caregiving, as suggested previously by Fuller-Thomson and Minkler (2001).

Grandmothers and grandfathers were equally likely to identify an adult grandchild in their personal network. This finding does not necessarily mean that grandmothers and grandfathers are equally involved in this relationship. Rather, it is likely that grandfathers maintain the relationship predominantly via their partners (e.g. Hank & Buber, 2009). Grandfathers probably identify those adult grandchildren in their personal network who are also in their spouse's network. It should be recognized that the insignificance of the grandparents' gender may also be due to the fact that importance is not fully captured by analyzing network membership in isolation of other factors such as affection or exchange of support. Future research could address gender differences in involvement with adult grandchildren.

The design of the present study could be improved upon in future research. First, information about family characteristics such as cohesion, cooperativeness, and strains was unavailable and therefore not included in the current study. It is likely that such characteristics are important for network

membership, as indicated by the large variance at the level of the grandparents. We suggest that further studies include adult grandchild's characteristics, such as geographic proximity, and adult child's characteristics, such as divorce, which were unfortunately not included in the current study because the interviews were limited in time. Finally, the present study only addressed Dutch grandparents, and the conclusions should only tentatively be extended to other Western countries.

Our study was one of the first to evaluate whether adult grandchildren are perceived by grandparents as frequent and important contacts by analyzing network membership. It improved on previous studies as it included all adult grandchildren of a grandparent. Furthermore, the longitudinal design facilitated the prospective analyses of relationship intensity during childhood for future network membership fourteen years later. While we paid attention to the support potential embedded in the adult grandchild's membership in grandparents' network, future studies might capture the importance of the grandparent-grandchild relationship more fully by focusing on affection, exchange of support, and meaning of the relationship.

In conclusion, we suggest that grandparents who are interested in optimizing their chances of having network contact with adult grandchildren in later life, would do well to invest in the relationship when grandchildren are in their childhood. In particular having frequent contact with grandchildren and having grandchildren stay overnight may contribute to this aim.

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