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SOCIAL INTEGRATION AND LONELINESS: A COMPARATIVE STUDY AMONG OLDER ADULTS IN THE NETHERLANDS AND TUSCANY, ITALY

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ABSTRACT

On the average, older adults in Italy are lonelier than those in the Netherlands. The results of a study by Jylhä & Jokela (1990) showed that loneliness was more prevalent in regions of Europe where living alone was rarest and where community bonds were strongest. This inverse macro-level association, an increasing proportion of lonely older people and a decreasing proportion of older people who live alone from northern to southern Europe, could not be explained by differences in individual social integration. The aim of the present study was to reinvestigate this association. The data were from surveys conducted in the Netherlands ($N = 3750$) and northwestern Tuscany, Italy ($N = 1543$). Fewer older adults lived alone in Tuscany than in the Netherlands, which indicates that the Dutch were less integrated. As regards their participation in social organizations and personal networks, the Tuscan older adults were less integrated. To a large extent, loneliness among the Dutch and Tuscans based on differences in social integration could be similarly explained,

This study is based on Dutch data collected in the context of 'Living arrangements and social networks of older adults', a research program conducted at the Departments of Sociology and Social Gerontology and Social Research Methodology of the Vrije Universiteit in Amsterdam, and the Netherlands Interdisciplinary Demographic Institute in The Hague. The research was supported by a program grant from the Netherlands Program for Research on Ageing (NESTOR), funded by the Ministry of Education and Sciences and the Ministry of Health, Welfare and Sports. The Tuscan data were collected in the context of 'Older adults' living arrangements', a research program conducted at the Department of Economic Statistics and Mathematics, University of Pisa, Italy. Address correspondence to T.G. van Tilburg, Department of Social Research Methodology, Vrije Universiteit, De Boelelaan 1081c, 1081 HV Amsterdam, The Netherlands. [email: tilburgtvan@scw.vu.nl]

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and regional loneliness differences could be attributed to individual situations and characteristics:

KEY WORDS • aged • cross-cultural differences • loneliness • social integration • social networks

Earlier studies among older adults in North America (e.g. Peplau et al., 1982) as well as Europe (Berg et al., 1981; de Jong Gierveld et al., 1987; İmamoğlu et al., 1993; Jylhä & Jokela, 1990) have shown that loneliness is more frequent among older adults who live alone than among those who live with a partner. The 'protection' or 'integration' theory provides an explanation for the relatively high degree of well-being of persons with a partner (Gove & Hughes, 1980). It suggests that people need satisfying, intimate relationships that give them affection, identity and care. If this is realized, they are 'protected' from unhappiness and loneliness. Individuals with a partner who provides this intimacy are more likely to be happy and not to be lonely than individuals without a partner or with a partner who is not able to provide intimacy.

Loneliness is a situation experienced by the individual as exhibiting an unpleasant or unacceptable discrepancy between the amount and quality of their actual social relationships compared with their desired ones (Perlman & Peplau, 1981). This includes situations where there are fewer existing relationships than is considered desirable or admissible, as well as situations where the desired intimacy has not been realized. As a subjective experience, loneliness should be distinguished from objective social integration. Social integration refers to having personal relationships, to the content of these relationships and to being embedded in social contexts: each might contribute to the individual's well-being (Rook, 1987). Persons not being socially integrated are not necessarily lonely and vice versa. Other aspects of social integration besides living with a partner should be taken into account. Other household members besides a partner might also provide affection, intimacy and care. This is of particular interest to older adults, since their household members might include adult children and siblings. The personal network includes everyone with whom one has close ties or interacts regularly, and is also considered to provide cohesion. Other types of social contact are related to activities in voluntary organizations or church groups. It is suggested that in addition to the partner relationship, all these aspects of social participation are important means to avoid loneliness (Peplau, 1985).

The main research findings on loneliness have been confirmed in almost all the studies, but it is not clear whether the protection of social integration works in the same way in different countries and regions. Cross-cultural studies on loneliness among older adults are rare. In Europe, three studies (İmamoğlu et al., 1993; Jylhä & Jokela, 1990; Walker, 1993) show an increasing proportion of lonely older people and a decreasing proportion of older people who live alone from northern to southern

Europe. Since social integration, such as living with others, is usually associated with lower levels of loneliness, the observation that regional variations in levels of loneliness within Europe have revealed an inverse association has to be explained. However, in the study by Jylhä & Jokela (1990), differences with respect to individual social integration did not explain regional differences in loneliness. Therefore, other explanations for this paradoxical finding were suggested.

İmamoğlu et al. (1993) and Jylhä & Jokela (1990) both used cultural differences to help understand the inverse macro-level association between the percentages of older adults who lived alone and the percentages of lonely older adults in various European regions. Societal values affect individual standards. According to the theory of mental incongruity (de Jong Gierveld & Dykstra, 1993), two classes of mental elements can be distinguished: standards and cognitions. Standards are expressions of desires or what ought to be; cognitions refer to what one experiences. People will be lonely if their standards do not fit their cognitions. Living alone involuntarily is an example of a situation of incongruity (Dykstra, 1995a). Johnson & Mullins (1987) stated that people have relationship standards that reflect at least partly the cultural values of a society. Because of differing value systems, people in different societies have different standards. Following İmamoğlu et al. (1993) and Jylhä & Jokela (1990), the difference between the European regions could be explained, at least partly, by the fact that in southern Europe older adults without a partner are expected to live with their families (family orientation); as a result living alone is a loneliness provoking situation. In contrast, in northern Europe, older adults without a partner prefer to live alone (individualistic orientation) rather than live with family members; as a result the latter situation provokes loneliness.

The present study is partly a replication of the study by Jylhä & Jokela (1990) with data from older adults in the Netherlands and Tuscany, Italy. The aim is to explain the paradox of the inverse macro-level association by elaborating on individual social integration. Our research questions were: (i) are older adults in Tuscany more lonely, on the average, than in the Netherlands?; and (ii) to what degree are differences in loneliness between Dutch and Tuscan older adults attributable to individual social integration? One reason for conducting this study is that we thought we might find deviating results since we used more elaborate instruments to measure social integration and loneliness. For *household composition*, Jylhä & Jokela used two categories: living alone and living with others. We used five categories, including the distinction between living with or without a partner and living with or without children. For *participation in social organizations*, we used three indicators, whereas Jylhä & Jokela used only one. For the *personal network*, Jylhä & Jokela concentrated on close relations with neighbors, whereas we included all types of relationships (kin and non-kin, close and not close). The limitation to neighbors in the study by Jylhä & Jokela may have limited the validity of their findings. As shown by Höllinger & Haller (1990) in a comparative study among adults

in seven countries, neighborhood relationships do not reflect cultural differences; these differences are more often reflected in extended kin relationships and friendships. Furthermore, the results of the study by Mullins et al. (1987) showed that the number of neighbor relationships does not influence differences in loneliness. Research conducted by Beckman (1981) and Dykstra (1993) showed that having different types of relationships is an important means to avoiding loneliness. Besides the availability of specific types of relationships, we were able to assess the number of relationships, the contact frequency and the intensity of instrumental and emotional supportive exchanges as important characteristics of the network. For *loneliness*, Jylhä & Jokela used a direct single measure, whereas we used an item scale with better psychometric properties.

Design of the study

Dutch sample. In 1992, face-to-face interviews were conducted with 4494 respondents (Broese van Groenou et al., 1995). They constituted a stratified random sample of men and women born in the years 1903 to 1937. The oldest, and the men in particular, were overrepresented. The sample was taken from the registers of 11 municipalities: the city of Amsterdam (population 714,000) and two rural communities in the west (population 18,000 and 14,000), one city (population 52,000) and two rural communities (population 36,000 and 9000) in the south, and one city (population 97,000) and four rural communities (populations between 4000 and 18,000) in the east of the Netherlands. All the larger rural communities were collections of a number of small villages. The combination of a city and its surrounding communities within a region and the combination of three regions together represented the variations in culture, religion, urbanization and aging in the Netherlands. Within the sex and birth year strata, the sample was representative for the Dutch older population. The response was 61.7 percent. The data were collected by 88 local interviewers. They attended a 4-day interview training course and were supervised during data collection.

Tuscan sample. In 1993 and 1994, face-to-face interviews were conducted with 1564 respondents who lived independently in northwestern Tuscany, Italy. They constituted a random sample of independently living men and women born in the years 1903 to 1937. The sample was taken from the registers of 34 municipalities in the provinces of Pisa, Lucca, Livorno and Massa-Carrara. The cities Livorno (population 167,000), Pisa (population 98,000), Lucca (population 86,000), Massa (population 67,000), Carrara (population 66,000) and Viareggio (population 57,000) were included. The population of the other municipalities varied from less than 1000 to 36,000. The sample was representative of central northern Italy with respect to sex, age, urbanization, and social and economic circumstances (Bottai, 1995). The response was 66.0 percent. The data were collected by 113 local interviewers, who were trained before data collection.

The Tuscan study used a questionnaire adapted from the Dutch one. The Dutch questionnaire was available in Dutch and English and was translated into Italian. To measure loneliness, five positive and six negative items were used (de Jong Gierveld & Kamphuis, 1985). The positive items assessed

feelings of belonging, for example 'I can rely on my friends whenever I need them'. The negative items applied to aspects of missing relationships, for example 'I experience a sense of emptiness around me'. Answering categories were 'no', 'more or less' and 'yes'. Answers on positive items were reversed. To improve scale homogeneity, the answers were dichotomized, assigning the median category to the value indicating loneliness. The scale had a range of 0 (not lonely) to 11 (extremely lonely). The scale had been used in several Dutch surveys and proved to be a robust, reliable and valid instrument (van Tilburg & De Leeuw, 1991). The homogeneity (Loevinger's H 0.33 for the Dutch and 0.30 for the Tuscans) and reliability (ρ 0.81 and 0.75) of the scale were sufficient. There is evidence of the congruent validity of the scale. The scale score correlated among the Dutch respondents by 0.58 and 0.69, and among the Tuscans by 0.56 and 0.60, with two direct measures of loneliness: 'I sometimes feel lonely' and 'If we divide people into: the not lonely, the moderately lonely, the severely lonely, and the extremely lonely, what would you consider yourself to be?' Among a Dutch subsample ($n = 541$), the scale score correlated by 0.60 with a 9-item version of the UCLA loneliness scale (Russell et al., 1980). The correlations between this UCLA-scale and the two direct measures were lower (0.31 and 0.39) than those between the scale we used and the direct measures.

Five household compositions were distinguished: living alone, living with a partner without children, living with a partner and with children, living without a partner and with children, and living in a multiperson household without a partner and without children. Three types of activities within social organizations were distinguished. Church affiliation was indicated by the frequency of church attendance, ranging from 'yearly or less often' (1) to 'at least weekly' (5). For active membership in voluntary associations (e.g. political party, senior citizens' or cultural organization) and volunteer work (e.g. for an athletic association, community center, or parent-teacher association), dichotomous variables were created: being active or not.

For the personal network, relationships were identified with a domain-specific approach (van Tilburg, 1995). With respect to a number of role-type relationships (e.g. kin and neighbors), the question was posed: 'Name the persons (e.g. in your neighborhood) you have frequent contact with and who are important to you'. For all the respondents the partner, if there was one, was included in the network. Only persons above the age of 18 could be included. The number of persons was taken as the size of the total network. For the present analyses, nine relationship types were distinguished, based on Dykstra (1995b): partner, child, child-in-law, sibling, sibling-in-law, other kin, neighbor, friend and other non-kin. The size of these partial networks was calculated. The contact frequency was asked with a single question, 'How often are you in touch with ...?'; the answers were transformed into number of days a year. Other questions were posed about the 12 relationships with the highest contact frequency. The question asked about instrumental support received was 'How often in the past year did ... help you with daily chores in and around the house, such as preparing meals, cleaning the house, transportation, small repairs, or filling in forms?', and the question on emotional support received was 'How often in the past year did you tell ... about your personal experiences and feelings?' The answer categories were 'never' (0), 'seldom', 'sometimes' and 'often' (3).

Population size was recoded into three categories, (i) less than 50,000, (ii)

between 50,000 and 100,000, and (iii) more than 100,000. The educational level was measured by one question with nine categories, from 'primary school not completed' (1) to having a 'university degree' (9). The respondents' perception of their own health was determined by asking one question, 'How is your general state of health?', with answers 'poor' (1), 'not so good', 'fair', 'good' and 'very good' (5). The numbers of children and siblings alive were registered early in the interview, before the identification of personal network members. Children and siblings were identified by their first name. In the network delineation procedure, the respondents were instructed not to identify all their children and siblings, but only those who fit the criteria of frequent contact and importance.

This study focuses on the difference between two European regions. To get comparable samples for the Netherlands and Tuscany, respondents who did not fit in the proposed other sample were excluded, such as Dutch people who lived in institutions (leaving $n = 4123$), people who were younger than 55 (the lower limit in the Tuscan sample in 1993; leaving $n = 4105$), or those who answered a short version of the questionnaire (because of severe illness; leaving $n = 3876$), and Tuscans older than 89 (the upper limit in the Dutch sample in 1992; leaving $n = 1558$). Furthermore, Dutch and Tuscans with whom the interview was terminated or for whom data were missing on one or more explanatory variables were excluded (leaving $n = 3750$ and $n = 1543$, respectively). However, after these eliminations, there were still two differences that have to be taken into account: older Dutch males were over-represented and the Dutch sample was larger.

Assuming that the answer to our first research question is positive, three conditions have to be met in order to explain the paradox. Firstly, we should observe that with respect to other aspects than household composition the Dutch are more socially integrated than the Tuscans. Secondly, effects of aspects of social integration on loneliness should have a similar direction and strength among the Dutch and the Tuscans. If this is not the case, as expected for people living alone, the regional differences may flow from cultural differences. Thirdly, most of the variance in loneliness across regions has to be explained.

A regression analysis was conducted to assess the contribution of certain variables to an explanation of loneliness. Interaction terms between the region and the other explanatory variables were constructed, enabling us to test whether there were region specific effects. All variables were standardized to reduce the associations between main and interaction effect variables. Sex, age, municipality's population size, education and subjective health served as control variables. Dummy variables for household composition, the three variables for participation in social organizations and personal network characteristics served as indicators of social participation. For network size, partial network sizes were used. The number of children and children-in-law correlated strongly ($r = 0.70$), and the number of children-in-law has consequently been excluded from the regression analysis. For relationship characteristics, we calculated the mean across the relationships for each respondent and assigned a zero to respondents with no network members. For mean contact frequency, household members were not considered. For the mean intensity of instrumental and emotional support received, the 11 relationships with the highest contact frequency were considered. Partner support was left out of this calculation because it could not be compared with support within other relationships (Brown & Harris, 1978). Partner support variables correlated

very strongly with the availability of a partner and were not taken into account. Although there were substantial correlations between explanatory variables, the multicollinearity of each of the variables was acceptable. The highest multicollinearity was with region: 72 percent of the variance of this dichotomous variable could be explained by the other explanatory variables.

Applying ordinary least squares regression analysis to the pooled data set would violate the assumption of independence of error terms (Hox & Kreft, 1994). Therefore, multilevel regression analysis (MLn; Rasbash & Woodhouse, 1995) was used with respondents nested under the two regions. The multilevel analysis will lead to a regression equation that can be read as the product of an ordinary regression analysis. Standardized regression coefficients (β s) were computed by running the analysis with standardized variables. Unstandardized regression coefficients were computed on the basis of the β s and the standard deviations of the dependent and explanatory variables. For interaction effects, estimated loneliness scores were computed for specific categories in both regions on the basis of the regression equation. We evaluated the significance of the effects by computing the t -value as the regression coefficient divided by its standard error, with an infinite number of degrees of freedom, which is satisfactory given our sample sizes at the respondent level. Three models were distinguished. In the first model, control and social integration variables were introduced into the equation. In the second model, the variable for region was added. In the third model, interaction terms of region and respondent characteristics were introduced. There are two methods to evaluate the fit of the model in the multilevel analysis. The first one focuses on the significance of the model change. As in logistic regression analysis, each model is characterized by the -2 log likelihood (deviance). We applied the forward modeling approach of using an empty model (only containing a constant) at the start and adding effects in three steps. The difference between the deviance of the successive steps is χ^2 distributed with the number of added variables as degrees of freedom. Thus the significance of the model improvement can be evaluated after each step. The second method uses the decrease in the unexplained variance (Snijders & Bosker, 1994). In each step, the variability of the dependent variable is estimated at each level of analysis. The sum of these variance components in the empty model equals the variance of the variable. By adding explanatory variables to the model, the variance will decrease for either one or both of the levels. The extent of the decline provides insight into the explanatory power of the model. Unlike ordinary regression analysis, the added explained variances may be negative. If they are strongly negative, the specification of the model should be doubted. We applied both methods. The coefficients of the final equation will be presented together with the significance of the model improvement and added R^2 for each step. In step 1, the explained variance at the regional level indicates the degree to which we were able to explain the differences between the two regions by individual characteristics. By introducing the variable for region in step 2, the variance at the regional level will, by definition, be reduced to zero. The introduction of interaction terms in step 3 may reveal region-specific effects in either direction or strength.

Results

Differences in household composition. About the same percentage of Dutch and Tuscan older adults lived with a partner. However, a closer look at the

household composition revealed sizeable differences (Table 1). The main difference was that Tuscans tended to live with one or more of their children more often than the Dutch. Tuscan older adults have fewer children, not only compared with most northern European countries, but also compared with other southern European countries. For example, for Turkish older adults İmamoğlu et al. (1993) reported an average of 3.1 children, 0.8 of whom shared the household. Despite the small number of children, sharing a household with one's children is very common among Tuscan older adults, as it is among Italians in general (Höllinger & Haller, 1990). The percentage of Dutch older

TABLE 1
Description of the Dutch and Tuscan older adults

	Netherlands		Tuscany, Italy		<i>t</i> ^b	d.f.
	(N = 3750)		(N = 1543)			
	<i>M</i> ^a	SD	<i>M</i>	SD		
Loneliness (0–11)	2.3	2.6	3.2	2.6	-12.5	5291.0 *
<i>Demographic variables</i>						
Sex (male, female)	50.6	50.0	52.4	50.0	-1.2	2874.4
Age (55–89)	71.5	9.6	68.3	8.2	12.1	3351.2 *
Population size municipality (1–3)	1.8	.9	1.5	.7	13.3	3445.3 *
Educational level (1–9)	3.4	2.0	2.7	1.7	11.6	3290.7 *
Subjective health (1–5)	3.7	.9	3.1	1.1	17.6	2446.3 *
Number of children	2.8	2.1	1.8	1.8	22.9	4863.0 *
Number of children in the household	.2	.5	.6	.9	-18.1	2021.9 *
Number of siblings	2.9	2.5	1.9	1.7	17.0	4238.5 *
<i>Social integration variables</i>						
Household composition						
living alone	31.9	46.6	13.9	34.6	15.4	3823.6 *
living with partner, without children	52.9	49.9	37.5	48.4	10.5	2953.6 *
living with partner and children	10.5	30.6	30.4	46.0	-15.7	2125.4 *
living with children, without partner	2.7	16.2	14.1	34.8	-12.4	1822.3 *
living with others	2.0	14.0	4.1	19.8	-3.8	2203.8 *
Frequency of church attendance (1–5)	2.6	1.8	2.6	1.7	-.4	3050.4
Active in voluntary associations	25.8	43.8	10.6	30.8	14.4	4032.2 *
Active in volunteer work	27.2	44.5	9.3	29.1	17.2	4300.4 *
Total network size (0–77)	13.7	9.4	5.0	3.9	47.3	5290.2 *
Size partial network children (0–12)	2.4	1.8	1.1	1.0	31.6	4781.8 *
Size partial network children-in-law (0–11)	1.5	1.6	.5	.8	31.2	5195.1 *
Size partial network siblings (0–13)	1.1	1.6	.5	1.0	17.2	4522.4 *
Size partial network siblings-in-law (0–24)	1.4	2.4	.2	.8	26.1	5092.7 *
Size partial network other kin (0–33)	1.4	2.5	.8	1.4	12.6	4900.8 *
Size partial network neighbors (0–35)	1.4	2.7	.3	.9	23.0	5061.4 *
Size partial network friends (0–23)	1.7	2.2	.6	1.1	23.7	5138.2 *
Size partial network other non-kin (0–34)	2.2	3.6	.4	1.0	28.4	4859.8 *
Mean contact frequency (days per year)	90.3	66.6	180.9	133.6	-25.4	1864.9 *
Mean instrumental support received (0–3)	.7	.7	.9	.9	-8.9	2297.2 *
Mean emotional support received (0–3)	1.5	.9	1.8	1.0	-9.6	2496.9 *

^aPercentages for dichotomous variables.
^bIn the case of unequal variances, the computation is based on individual group variances and the number of degrees of freedom has been adapted.
 * *p* < .001.

adults who lived with their children decreased with age until 75; after that age, it remained stable. The percentages were 34.9 for the youngest 5-year age cohort (55–59), 19.0, 13.3, 7.9, 5.5, 5.3 and 5.0 for the oldest. For Tuscan older adults, there was a U-shaped association between the percentage of older adults with children living in their household and age. The percentages were 66.0, 52.6, 35.0, 32.0, 32.6, 43.2 and 53.8, respectively, for the age cohorts from young to old. It is not clear whether children of the oldest Tuscans never moved out, whether Tuscany's oldest adults moved into the household of their children, or whether the children returned to the parental home. However, the differences between the Tuscans and the Dutch are striking, and might reflect a regional difference in standards.

Differences in participation in social organizations. Differences between Dutch and Tuscan older adults emerged for two of the three organizational activities variables. No difference was observed for frequency of church attendance. The Dutch were more frequently active in one or more voluntary associations and more frequently involved in volunteer work.

Differences in personal networks. The difference in total network size between Dutch and Tuscan older adults was very large; the Dutch had an average of 13.7 with a maximum of 77 and the Tuscans an average of 5.0 with a maximum of 33. To find out whether the differences between the two regions could be attributed to the size of specific parts of the networks, the total network was split into several parts. Compared with the Dutch, the Tuscans specified fewer network members for all the types of relationships other than with a partner. If one assumes a hierarchy of personal relationships with respect to the social support provided (Cantor, 1989), the lower ranked types of relationships (in-laws, neighbors and 'other' non-kin) were less frequently available in the Tuscan networks, while higher ranked types (children, siblings, 'other' kin and friends) were available relatively frequently.

The difference in the size of the partial networks of children and siblings could not be explained by the availability of these relationships. Early in the interviews, the respondents specified the names of all their surviving children and siblings. On the average, the Dutch had more children than Tuscans and more siblings (Table 1), and one could expect that in absolute terms the Tuscans specified fewer children and siblings in their networks. However, compared with the Dutch, the Tuscans also specified *relatively* fewer children and siblings in their networks. Among the Dutch, 87.0 percent ($n = 3245$; respondents with children only) of the children and 43.3 percent ($n = 3192$; respondents with siblings only) of the siblings were specified as network members; among the Tuscans these figures were 64.6 percent ($n = 1367$) and 29.9 percent ($n = 1234$) ($t_{(1818.7)} = 17.9$, $p < .001$, and $t_{(4424)} = 9.3$, $p < .001$, respectively).

The relationships of Tuscan older adults were, on the average, more active than the Dutch ones. Within Tuscan relationships, contact was on the average more frequent than among the Dutch and the averages of instrumental and emotional support received by the older adults were higher for the Tuscans than for the Dutch. However, for the Tuscans, these averages were computed across a much smaller number of relationships than for the Dutch. Therefore, the Dutch had a larger number of active relationships than the Tuscans. For example, the mean number of Dutch network members contacted at least weekly was about twice the mean number for Tuscans.

Differences in loneliness. The Dutch and the Tuscans differed with respect to

loneliness. On the scale with a theoretical range from 0 to 11, the mean score of the Dutch was 2.3 and of the Tuscans 3.2. A multilevel regression analysis was conducted to compare the associations between loneliness and social integration variables across the regions, and to assess the contribution of individual social integration to an explanation of differences in loneliness (Table 2). Of the variance in loneliness, only 3.4 percent was at the regional level, which indicates that most of the differences were between respondents.

In the first step of the analysis, control and social integration variables were entered into the equation. This first model was a significant improvement to the empty model ($\chi^2_{(22)} = 1169, p < .001$). The variance at the regional level decreased by 75.4 percent, indicating that most of the differences in loneliness

TABLE 2
Explanation of differences in loneliness

	Bivariate <i>r</i>	Multilevel regression	
		Main effects (β)	Interaction effects (β)
Constant		.00	
<i>Control variables</i>			
Sex (male, female)	.08***	-.00	.04***
Age	.13***	-.01	
Population size municipality	.05***	.01	
Educational level	-.10***	-.02	
Subjective health	-.27***	-.19***	
<i>Social integration variables</i>			
Household composition ^a			
living alone	.23***	.16***	
living with partner, without children	-.19***	-.12***	
living with partner and children	-.08***	-.11***	
living with children, without partner	.07***	.04**	-.07***
Frequency of church attendance	-.09***	-.04**	
Active in voluntary associations	-.12***	-.04**	-.04**
Active in volunteer work	-.15***	-.03*	
Size of partial network, children	-.22***	-.10***	.04*
Size of partial network, siblings	-.15***	-.07***	
Size of partial network, siblings-in-law	-.18***	-.02	
Size of partial network, other kin	-.11***	-.08***	
Size of partial network, neighbors	-.17***	-.09***	
Size of partial network, friends	-.16***	-.04**	
Size of partial network, other non-kin	-.16***	-.04**	
Mean contact frequency	.01	-.13***	.07***
Mean instrumental support received	-.01	-.01	
Mean emotional support received	-.14***	-.08***	
<i>Region</i>			
Netherlands vs Tuscany, Italy	.17***	.09***	

^aDummy variables for household composition, with the mean as reference (the category of people living in a multiperson household without a partner and without children has been excluded from the regression analysis).

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

between the Dutch and the Tuscans were attributable to individual characteristics. Of the control variables, only subjective health was significant. Most of the social integration variables were significantly related to loneliness and all were in the expected direction, which indicates that being more socially integrated is associated with less loneliness. The positive effect for the dummy variable living without a partner but with children indicates that the respondents in that category were less lonely than the respondents living alone, but lonelier than respondents living with a partner. The explained variance at the respondent level was 19.8 percent, which indicates that the differences across respondents were explained to a lesser degree than regional differences. Of the explained variance at the respondent level, 0.6 percent was explained by sex, an additional 2.5 percent by age, less than 0.5 percent by population size and education, 4.2 percent by subjective health, 5.0 percent by household composition, 1.4 percent by being active in organizations, 3.6 percent by partial network sizes, 0.8 percent by contact frequency, 0.3 percent by instrumental and 0.1 percent by emotional support.

In the second step, the variable for the region was added, which explains by definition all the variance at the regional level and no variance at the respondent level. The model improved significantly ($\chi^2_{(1)} = 9, p < .01$). The unstandardized regression coefficient for region was 0.5 ($p < .001$), which indicates that there was still a difference in mean loneliness between the two regions that was not explained by the individual characteristics. None of the effects of the other explanatory variables changed.

In the final step, interaction terms of region and control and social integration variables were entered into the equation. The estimates of this model are presented in Table 2. With this step, four main effects changed in strength. The estimate for the category of living without a partner and with children changed from .01 (NS) to .04 ($p < .001$). Both the effects of being active in voluntary associations and of the size of the partial network of other non-kin increased from $-.03$ ($p < .05$) to $-.04$ ($p < .01$). Finally, the effect of the mean contact frequency increased from $-.08$ ($p < .001$) to $-.13$ ($p < .001$). Five significant interaction effects were observed, which indicates a difference in direction or strength in the effects for the two regions (improvement model $\chi^2_{(5)} = 72, p < .001$; at the respondent level 1.1% explained variance was added). These regional differences could be clarified by looking at the loneliness estimates for specific categories, controlled for all the other variables. One interaction effect points to a difference with respect to the direction of the effect within the regions. Our expectation was that a differential regional effect would be observed for the category of older adults living alone. However, the differential effect was observed for another category of household composition, namely living without a partner but with one or more children. The first and second equations with only main effects did not show any effect, but with the introduction of the interaction effects in the third equation, the absence of significance of the effect in the prior equations appeared to be caused by averaging a positive effect among the Dutch and a negative effect among the Tuscans. The difference between the Dutch and the Tuscans could be clarified by looking at the loneliness estimates for the five categories, which controlled for all the other variables. For four categories, a difference of about $+.6$ was found (the Tuscans being lonelier than the Dutch), but for the category of people living without a partner but with one or more children the difference was $-.6$. The other interaction effects had implications for differences in the

strength of effects among the Dutch and the Tuscans. Among the Dutch, females and males had about equal estimated average loneliness scores (2.3 and 2.4, respectively), but among the Tuscans females were lonelier than males (3.1 and 2.7, respectively). The Dutch who were active in one or more voluntary associations had an estimated loneliness score of 2.3, and the Dutch who were not active had a score of 2.4; for the Tuscans, estimated scores were 2.3 and 3.1, respectively. When we compare childless respondents and, arbitrarily chosen, respondents with four children, the Dutch had estimates of 2.8 and 2.0 and the Tuscans had estimates of 3.0 and 2.9, respectively. For mean contact frequency, the Dutch and Tuscans with, on the average, monthly contact had estimated loneliness scores of 2.8 and 3.0, respectively, while those with, on the average, daily contact had estimated scores of 1.2 and 2.6, respectively.

Discussion

On the average, older adults in Tuscany are lonelier than older adults in the Netherlands. The aim of this study was to explain why this is the case, based on differences in social integration, and more specifically, household composition, participation in social organizations and personal network characteristics, such as size, contact frequency and social support received. Important predictors of loneliness were subjective health, household composition and the size of the network. There were no large differences in the effects across specific parts of the networks. The number of children, siblings, other kin and neighbors in the network had about the same effect on loneliness. Somewhat smaller effects were observed for the number of friends and other non-kin. In keeping with the results of a study by Rook (1987), the existence of relationships (probably as an indicator of companionship) rather than social support contributed to an explanation of loneliness. The variance explained at the respondent level was not large (21%), and calls for extended studies into the determinants of loneliness among older adults.

The results show that on average, the Tuscan respondents were lonelier than the Dutch ones because they were less socially integrated. Of the regional variance in loneliness 75 percent has been explained by individual differences. However, the remaining main effect of region was still significant: the initial regional difference of 0.9 decreased to 0.5 when it was controlled for differences in social participation. The region modified five effects, i.e. for sex, living without a partner but with children, number of children within the personal network, mean frequency of contact with network members and being active in voluntary organizations. Each of these point to a regional differential effect. We do not have an explanation for the sex difference. For the Dutch, living with children and without a partner was a loneliness-provoking situation, whereas it was a loneliness-alleviating situation among the Tuscans. As noted above, this type of household composition was more common among the Tuscans than among the Dutch. This might be related to different social standards, i.e. the individualistic Dutch who preferred to live alone if they did not have a

partner (anymore), and the family-oriented Tuscans who preferred to live with others, in particular with their children. This difference in standards could explain the differential effect on loneliness. The number of children within one's personal network and the mean contact frequency had smaller effects among the Tuscans than among the Dutch, while the reverse was true for participation in social organizations. One explanation might be that the frequency of contact with personal network members and being active in voluntary associations were at least partial indicators of the same phenomenon of social integration, and that having frequent contacts with people in the network was to a certain extent interchangeable with contacts within social organizations. This, in combination with the finding that the Tuscans were more active within their network relationships than the Dutch, could indicate that the Tuscans were less inclined to refer to social contacts as being important. We did not observe regional differences in the effects of sizes of specific parts of the networks other than for children. For extended kin, this deviates from the findings of Höllinger & Haller (1990), who observed that kin relationships are more important in Italy than in northwest Europe. For friendships, they argue that Italians maintain close relationships not only with relatives but also with friends, and that Italians are therefore different from other southern countries and are more like northwest Europe. However, this may not lead to the conclusion that Italians are culturally close to people in northwest Europe. According to Höllinger & Haller, the family structure of Italians, both in the North and in the South, may be characterized as patriarchal, which is not the case in northwest Europe.

The study was partly a replication of a study by Jylhä & Jokela (1990). They observed an inverse macro-level association: in northern Europe more older adults live alone, and in southern Europe there was more loneliness. While they studied six regions, two in the Northwest and four in the Southeast, we only had data from two regions, which may not be representative of northern and southern Europe. However, we observed the same association in our study of Dutch and Tuscan older adults. The association may reflect the cultural difference between the individualistic northern and the family-oriented southern European regions. However, our findings differed from those of Jylhä & Jokela with respect to an explanation of the paradox of the inverse association. They were not able to attribute the regional differences to individual situations and characteristics (the micro-level). Their cognitive theoretical explanation was that there were regional differences in value systems, so that the same situation (i.e. living alone) was more loneliness provoking in southern than in northern regions. We do not doubt the validity of this explanation, but, unfortunately, we did not have access to data on individual standards and were not able to perform a direct test of this hypothesis. However, in keeping with cultural differences between the regions, we observed that the situation of living without a partner but with children was a loneliness-provoking situation among the Dutch and a loneliness-alleviating situation among the Tuscans, which supports the cognitive explanation. We want to

remind readers here that, because the results emerged as they did despite including controls for age and health, the greater loneliness of elderly Dutch individuals who lived with their adult children cannot be attributed to their being older or sicker than the elderly Tuscans who lived with their children. We will add two other explanations. Firstly, in our study more elaborate measures were used for all the major variables. These measures may be more sensitive to detecting differences between the regions and associations with loneliness. However, many of the validity problems associated with conducting an empirical cross-cultural study, such as asking questions that may not have a similar meaning, differences in respondents' response styles and differences in the style and quality of interviewing, have not yet been studied. For example, there might be a lower threshold among the Tuscans in admitting loneliness than among the Dutch. Secondly, the results showed very large differences between the Dutch and the Tuscans with respect to all but one (i.e. the frequency of church attendance) of the variables for social integration. All of these, living with children excepted, were in favor of the Dutch, and most of the loneliness variance between the regions was attributable to differences in individuals' social integration. We conclude that there really is no paradox. The Tuscan older adults, who were less socially integrated, were lonelier than the Dutch. The Dutch were only less socially integrated with respect to household composition, and here different societal standards came to the fore. The results of this study transfer the attribution question to an explanation of differences in social integration. A question in need of further research is why social integration in southern Europe differs so much from northern Europe.

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