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**Old-age social exclusion: The role of social relations in loneliness and social isolation**

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## Abstract

**Objective:** Social exclusion has intersecting dimensions in old age. This article focuses on one particular dimension: exclusion from social relations. The aim of the study is to examine if reciprocity patterns within family and social networks have impact on loneliness and social isolation among older people. **Method and data:** This article employs a theoretical framework based on: 1) the intergenerational family solidarity model; and 2) the social convoy model. The analyses build on data from the Panel Survey of Ageing and the Elderly (PSAE) collected in 2002-3 and the total sample in this study consists of older individuals over 55 years living in Sweden, amounting to 5275 respondents (41.6% of gross-sample). The effects of social relations on loneliness and social isolation are analysed by using the ordinal logistic regression model. **Results:** Closer family reciprocity with children is associated with lower feeling of loneliness and help-giving behaviours mitigate loneliness. Stronger social networks are associated with the lower risk of social isolation. Older migrants have greater risk of feeling lonely and being socially isolated. Unemployment has significant effect on loneliness but not on social isolation.

**Keywords:** Social exclusion, loneliness, social isolation, intergenerational family solidarity model, social convoy model, old age, ageing.

## Introduction

Demographic changes in the Swedish population have received widespread academic and political interest, and several issues that accompany these demographic changes have been problematized in both academic and public debate. Life expectancy continues to increase and researchers and policy makers try to understand the consequences of the prolonged life-course we are destined for. The increasing prevalence of social exclusion comes as age and life undergoes dramatic change. For older people, many intersecting dimensions constitute the process of exclusion. This article focuses on one particular dimension of old-age exclusion: exclusion from social relations. In a wider sense, social exclusion refers to the divide between individuals and groups from the rest of mainstream civil society (Commins 2004). According to Peace (2001), the social exclusion term is used in a wide range of processes and phenomena, not only related to poverty. The term increasingly found itself becoming the idea of “exclusion from employment”, from its emergence in political discourse during the mid 80’s (Peace 2001). Silver (1994) referred to an important conceptual evolutionary process described as the specialization paradigm. Liberal ideologies stress the idea that contractual and voluntary exchanges of obligations and rights produce individual differences, which leads to competing and specialized spheres involving the market and social groups. Social exclusion is according to this perspective a result of discrimination, market failures and the liberal state’s lack of appropriate enforcement of rights (De Haan 1998). Exclusion however involves some agency, which means that individuals and groups are excluded by someone from somewhere or something. An act of exclusion is needed in order to exclude, which could entail individuals being excluded against their will, failing to integrate themselves due to lack of agency, or choosing to exclude themselves (Atkinson 1998). The normalisation and reification of the social exclusion term mean that agency is completely lost and it is widely used to label and identify particular and different groups (Peace 2001). There are a large number of ways that a person can qualify for belonging to a category of “socially excluded”. Peace (1999) identified spatial intensifiers which include factors as social isolation, loneliness from family and community and the sense of being forgotten and more (Peace 1999). Defining social exclusion is a product of different disciplinary perspectives and contexts (Silver 1995). Peace (2001) argued that social exclusion can be defined either narrowly or broadly. Narrowly it relates to income poverty and to those who lack attachment to the labour market. Broadly it relates to more than poverty, exclusion from the labour market and income inequality. Different national govern-

mental bodies have engaged in trying to formulate a definition of the concept of social exclusion, but Peace (2001) argued that the most useful definition was made by Burchardt et al. (1999). They suggested a concise two-point definition of social exclusion, entailing that an individual is socially excluded if the person is resident in a society and does not participate in the normal activities of citizens in that society. Normal activities (amongst other dimensions) include the dimension of social activity that relates to engagement in social interaction of significance with friends, family or identifying with a community or cultural group (Burchardt et al. 1999). Later studies have examined loneliness and social isolation in relation to exclusion from social relations, more specifically how risk factors around loneliness and social location and changes in social resources can generate subjective and objective exclusionary effects (Victor et al. 2005; Burholt & Scharf 2014). Loneliness has an involuntary character and it also includes the need for (or the longing for) social contact or belonging (Galanaki 2004), and individuals can experience loneliness even if others are present (Larson 1999). Based on Gallie et al. (2003), three spheres of sociability can indicate social isolation. Primary sphere of sociability shows the household structure of individuals, i.e. whether or not a person lives with others in the household. Secondary and tertiary sociabilities depend on informal and formal participation of individuals in society, i.e. whether or not a person meets friends or relatives, and whether or not a person socially participates in organization(s) or relevant activities.

#### *Objective and outline of the study*

Theoretically grounded in conceptual framework of social exclusion, one dimension is in focus of this study: exclusion from social relations. The research question guiding this empirical investigation is as follows: *Do reciprocity within family and social networks have impact on loneliness and social isolation among older people?* Using data from the Panel Survey of Ageing and the Elderly (PSAE), the items on social relations (loneliness and social isolation included), the potential impact of family solidarity and social networks can be empirically analysed.

The disposition of this article is as follows: First, a brief overview of the different theoretical perspectives that constitute the theoretical framework of this article will be presented, followed by a presentation of the study design and methodological choices. The results are then presented beginning with descriptive details of the data and followed by presentation of two

ordinal logistic models. Lastly, a theoretical interpretation of the results is then presented in the discussion followed by implications and concluding remarks.

## Theory and earlier research

### *Introduction*

Intergenerational family relations will become increasingly important as life expectancy continues to rise. Meanwhile older individuals are even more vulnerable to old-age exclusion, which tends to accumulate over the life course of older people. This article aims to empirically examine predictive factors for old-age exclusion from social relations, i.e. loneliness and social isolation, by employing a theoretical framework of family solidarity and social networks. The data of the Swedish sample from the Panel Survey of Ageing and the Elderly (PSAE) collected in year 2002 will be utilised. The article will first present the theoretical assumptions preceding the statistical analysis by giving a brief overview of the concepts of social exclusion, the intergenerational family solidarity model and the social convoy model.

### *Social exclusion in old age*

According to Walsh et al. (2016), social exclusion is defined by at least four common features. First of all, social exclusion is a relative concept (Atkinson 1998). As mentioned previously, exclusion involves an act of agency. Furthermore, social exclusion is dynamic and processual so that individuals are interchangeably excluded and integrated and are experiencing different forms of exclusion over the life-course (Scharf 2015). Lastly, social exclusion is a multidimensional concept as exclusion impacts various domains of life over the life-course. Thus, multidimensionality is particularly important when studying exclusion of old-age individuals and groups (Walsh et al. 2016). Walsh et al. (2016) constructed a working definition of old-age exclusion that would acknowledge potential demographic ageing to intersect with exclusionary processes inspired by Levitas et al. (2007). They stated that social exclusion of older persons is a complex process, involving the denial or lack of resources, rights, goods and services as people age. Social exclusion further involves the inability to participate in normal activities and relationships that are available to the majority of individuals across multiple domains of society. It affects the quality of life of older individuals and the cohesion and equity of an ageing society (Walsh et al. 2016).

The study of Walsh et al. (2016) on social exclusion of older people presented a comprehensive review of conceptual frameworks of old-age exclusion in relevant contemporary literature (Barnes et al. 2006; Feng 2003; Jehoel-Gijsbers & Vrooman 2008; Kneale, 2012; Scharf & Bartlam; 2008; Scharf et al. 2005; and Walsh et al. 2012). Six domains were identified in which older people can experience exclusion: 1. Material and financial resources; 2. Services, amenities and mobility; 3. Social relations; 4. Civic participation; 5. Neighbourhood and community; 6. Socio-cultural aspects of society. This framework can serve as an orientating structure for studies of multidimensional old-age exclusion. Additionally, exclusionary pathways seem to be multi-level, not just affecting individual level circumstances but having also meso- and macro level implications. They seem also to be multifaceted, impacting on multiple areas of life (Walsh et al. 2016). One dimension of exclusion is in focus for this study: exclusion from social relations. Drawing on the working ideas of Burchardt et al. (1999) and Walsh et al. (2016), loneliness and social isolation are considered as exclusion from social interaction of significance with friends, family or communities: social relations. Walsh et al. (2016) noted three discernible features in the material analysed in their study that sets old-age exclusion apart as a form of disadvantage. Exclusion tends to accumulate over the life course of older people, thus contributing to an increasing prevalence in later life. Furthermore, older individuals have fewer opportunities and pathways to ascent out of exclusion (Scharf 2015). Lastly, higher susceptibility to exclusionary processes amongst older individuals makes them vulnerable to these intersecting processes (Jehoel-Gijsbers & Vrooman 2008; Walsh et al. 2012). Following their review findings and drawing on the working definition by Burchardt et al. (1999), Walsh et al. (2016) proposed a new definition of old-age exclusion:

Old-age exclusion involves interchanges between multi-level risk factors, processes and outcomes. Varying in form and degree across the older adult life course, its complexity, impact and prevalence are amplified by old-age vulnerabilities, accumulated disadvantage for some groups, and constrained opportunities to ameliorate exclusion. Old-age exclusion leads to inequalities in choice and control, resources and relationships, and power and rights in key domains of neighbourhood and community; services, amenities and mobility; material and financial resources; social relations; socio-cultural aspects of society; and civic participation. Old-age exclusion implicates states, societies, communities and individuals (Walsh et al. 2016:93).

For the purposes of this study, the definition and conceptual framework of social exclusion in old age proposed by Walsh et al. (2016) will be utilised for interpretation in this papers empirical analysis.

### *Intergenerational family solidarity model*

The intergenerational solidarity model is a theoretical construct used in order to characterize the behavioural and emotional dimensions of interaction, sentiment, cohesion and support between children and parents, grandchildren and grandparents, over the course of long-term relationships (Bengtson 1988; Bengtson & Schrader 1982; Roberts et al. 1991). The six conceptual dimensions for intergenerational solidarity include: 1. Affectual solidarity (evaluations and sentiments from family members regarding their relationship with other family members); 2. Associational solidarity (the type and frequency of contact between family members across generations); 3. Consensual solidarity (agreement in values, orientations and values across generations); 4. Functional solidarity (assistance, exchange of both instrumental assets and services, including emotional support, across generations); 5. Normative solidarity (norms about the importance of familialistic values, expectations of parental and filial obligations); and 6. Structural solidarity (means and prerequisites for cross-generational interactions, geographic proximity between members of family) (Bengtson 2001). Norms of familism seem to be strongly predictive of parent-child affective orientations, and greater opportunity for interaction (residual proximity and good parental health) seems to be strongly predictive of higher levels of association (Bengtson & Roberts 1991). Several dimensions for intergenerational solidarity are useful for explaining the results and are readily available measurements within the data used in this study: associational solidarity, functional solidarity and structural solidarity. Due to limitations in the available data, obtaining a useful measurement for affectual solidarity, consensual solidarity and normative solidarity as described by Bengtson (2001) are unfortunately beyond the scope of this study. But the theoretical framework is still useful in trying to theoretically explain the results from this study. Bengtson (2001) argued that multigenerational family bonds are more important than those previous family research has acknowledged and that demographic changes have important implications for families in our contemporary society. Recent research findings suggest that the main factor determining attenuated family solidarity is proximity between family members and that migrants are at greater risk from weakened family bonds. Men report of being more deprived of emotional support and help as well (Kiilo et al. 2016).

### *Social convoy model*

The social convoy model addresses the aspect of social relations throughout the life course, the giving and receiving of social support (Kahn & Antonucci 1980). A central idea of this model is that social support is important to individual well-being due to its direct implications on moderating effects of stress, including stress related to ageing. There have also been an extensive number of articles using social relations to analyse the connection to health outcomes (Luo et al. 2012; Luo & Waite 2014; Taube et al. 2015; Wister et al. 2016). Early studies in the late 80s started to focus on social relationships in relation to ageing (Berkman 1988). Social relations have been shown to be connected to several health outcomes including mortality rates (Berkman & Syme 1979; Litwin 1998) and the attempts have been made to explain the relationship between social networks and health (Berkman et al. 2000).

Social support, according to Kahn & Antonucci (1980), is a concept related to two established bodies of theory: attachment and theories of role. The concept of convoy relates to the structure around individuals over the life course in which social support is given and received. These relationships vary in their quality (positive or negative) and closeness. The structure and function of convoys are influenced by personal (gender and age) and situational (role, demands, values and norms) characteristics that significantly implicate well-being and health (Antonucci et al. 2013). The life-course perspective is important since individual's circumstances and needs change over time and over the course of life. Thus, the form and amount of social support needed at any particular point in time is dependent on those circumstances. Furthermore, individual's past experiences affect the present and interpretation of individual differences, such as age and cohort effects, should refer to different experiences during the life course. An increase in lifespan has implications in how we treat the elderly as demographic group when the life course extends and cohorts thereby differ in longevity (Kahn & Antonucci 1980). Role is a behavioural concept and is consequently defined as a set of activities that are expected to relate to the individual's occupancy and position in the social space. Research has focused on the demand aspect of roles and particularly in the work context and under conditions of stress. Kahn and Antonucci (1980) argued that attention needs to be paid towards the constructive aspects of roles, i.e. they accommodate for a setting in which relationships with others develop. The need for social support may be elevated when a person's life role undergoes major change, in particular unpredicted and unwanted change.



Personal networks of family, friends and others that are in exchange of giving and receiving support, seen in the perspective of life course, is referred to as convoys (Kahn & Antonucci 1980). Support is defined by Kahn and Antonucci (1980) as consisting of certain kinds of transactions, expressions of positive affect and affirmation, giving of aid and assistance. The structure of a convoy could be illustrated as different layers of concentric circles, surrounding the individual or focal person. The most inner circle would represent the most stable members of the convoy, such as close family, close friend and spouse. The second layer would represent the somewhat role-related members that are likely to change over time. This layer would include i.e. friends from work, neighbours, family and relatives. The outer layer (and the most vulnerable layer to role changes) would include i.e. co-workers, supervisors, distant family and professionals. Central to the idea of the social convoy is role interchangeability, which means individuals enter and leave certain roles over the life course and some supportive aspects of convoy membership may be limited to that of the role (Kahn & Antonucci 1980). Age-related changes in convoy structure are according to Kahn and Antonucci (1980) readily predictable, i.e. the transition from school to work entails often a loss of members but inclusion of new ones. Recurring loss is a well-researched convoy property and individuals with role-linked convoys are at greatest risk of loss with increasing age, albeit loss of roles does not fully imply the loss of relationships. Fiori et al. (2007) used a pattern-centred and multi-dimensional approach when studying older adult's social networks that result in expanding the social convoy models structural conceptions. Six differentiated networks types emerged from their analysis: diverse-supported, family-focused, friend-focused supported, friend-focused unsupported, restricted-nonfriend unsatisfied, and restricted-nonfamily unsupported. Individuals with a structurally diverse network report higher levels of emotional and instrumental support. Individuals in the friends-focused unsupported group are primarily more active and report receiving less instrumental support. Restricted networks seem to be most common among the oldest-old (Fiori et al. 2007).

There are also a number of early research findings on gender which indicate that women have larger networks compared to men in later life and report providing more support than men (Ajrouch et al. 2005; Fuhrer & Stansfeld 2002). Women also report having more multifaceted networks than men, including having more friends but generally close to same number of family members, which suggests that there are some considerable gender differences (Antonucci 1985). Furthermore, women with larger social networks report less happiness, which

suggests that although women have more satisfactory relationships they also seem more burdened by them (Antonucci et al. 1998). In regards to assessments of support, a distinction could be made between perceived support, support believed to be available if needed; and enacted support, support actually provided in stressful times (Antonucci et al. 2013). There are also reported socioeconomic differences between men and women, and occupational effects are more pronounced for men than women in later life (Ajrouch et al. 2005).

#### *Implications for the study at hand*

The theoretical reasoning presented here suggests that older people are more vulnerable to becoming socially excluded. Exclusion from social relations would entail exclusion from social interactions of significance, either perceived or lived, i.e. loneliness and social isolation. Several factors of intergenerational family solidarity can be empirically analysed in this study: associational solidarity, functional solidarity and structural solidarity. Based on the theoretical reasoning behind this model, proximity and reciprocal behaviour could potentially be useful concepts for better understanding old-age exclusion. Changes in role and convoy membership structure and the structure and function of social networks could also help explain exclusion from social relations.

#### **Hypotheses:**

1. Closer family reciprocity with children is associated with lower feeling of loneliness.
2. Stronger social networks are related with lower risk of social isolation.

## Method

The method section will explain the data analysed, transformations conducted in order to prepare the data for analysis, ethical considerations, and the kind of statistical analysis deployed for the purposes of this study.

### *Data*

The data used in this study were from the Swedish sample of the Panel Survey of Ageing and the Elderly (PSAE), collected in 2002-03. The PSAE cross-sectional data included items on various topics: work related issues, health, psychosocial wellbeing, need of care and social relations. The gross-sample size was 12685 respondents, of which respondents younger than 55 years were excluded from further analysis since this study employed a division of age cohorts into four separate groups, including the middle-aged as described by Seccombe and Ishii-Kuntz (1991). The total sample (N) used in this study consisted of older individuals over 55 years living in Sweden, amounting to 5275 respondents (41.6% of gross-sample). Access to the data was granted through the Department of Sociology and Work Science, University of Gothenburg, after providing with a confidentiality agreement. This agreement was formulated around the central objectives stipulated by the Swedish Research Council (2002): the data will not be used for other purposes but of this study and will not be redistributed to a third party. The respondent's anonymity was assured since the data was anonymized prior to access.

### *Transformation of data*

The 'loneliness' item in the survey originally consisted of five different statements of which the respondent was prompted to identify with: 1. *'I rarely if ever feel lonely'*; 2. *'I sometimes feel lonely but I don't perceive it as a problem'*; 3. *'Sometimes I feel lonely and would like to spend more time with other people than I currently do'*; 4. *'I often feel lonely'*; and 5. *'I always feel lonely'*. The dependent variable 'social isolation' was a constructed variable in the PSAE-dataset and contained information on individual isolation from company and family. The original categories for this variable were: 1. *'Not living alone, socialize outside household often'*; 2. *'Living alone, socialize outside household often'*; 3. *'Not living alone, rarely socialize outside household'*; and 4. *'Living alone, rarely socialize outside household'*. The variable 'age' originally contained the respondent's birth year and was recoded into four age

groups: From 55-64; 65-74; 75-84; and 85 and over. Gerontologists divided the elderly demographic into four separate age cohorts: the middle aged (55-64), the young-old (65-74), the old (75-84) and the oldest-old (85 and over) (Seccombe & Ishii-Kuntz 1991). Furthermore, the variable for highest completed education was recoded into three categories: *Primary school*; *Secondary school*; and *University/college*. The original item in the survey for highest attained educational level contained seven different options that were grouped together. Grade school, elementary school and girl's school were recoded into the primary level category. High school and upper secondary school, ranging from two to four years of completion, were recoded into the category secondary school. The third category was university or college level education. Descriptive statistics are available for all dependent and independent variables in Table 1.1 for socio-demographic variables and 1.2 for family solidarity variables.

### *Statistical methods*

Ordinal logistic regression analysis was conducted in order to predict the outcome of a ranked multiple category variable using categorical covariates (Hosmer et al. 2013). The ordinal logistic regression was used to calculate odds ratios (OR) and associated 95% confidence intervals for the outcome of 1. Feeling of loneliness; and 2. Social isolation. ORs above 1 indicate higher odds of reporting feeling lonely in the first model and generally being socially isolated in the second model. ORs below 1 indicate lower odds of reporting feeling lonely in the first model and being socially isolated in the second model. In this study, the dependent variable for the first model was 'loneliness' which included five ranked response options previously described in this section. The dependent variable for the second model was 'social isolation' which included four ranked categories previously described in this section. There are some differences between the analytic approach of logistic regression and multiple linear regression which imposes some restrictions. Since the scale of the regression equation is not fixed and is subject to changes when variables are added to the model, the usual strategy of comparing differences in coefficients across models cannot be used in logistic regression. Instead, a single comprehensive model that contains all the variables in the model can be utilised, which adjusts for confounding and redundancy (Aneshensel 2013).

## Results

In this section the results from the empirical analysis will be presented in a straightforward manner and without theoretical analysis. This article will conclude with a theoretical discussion and analysis following the empirical analysis. Table 1.1 shows socio-demographical characteristics of the sample and Table 1.2 shows descriptive characteristics of the included family solidarity variables.

The socio-demographical characteristics within the sample analysed in this study show that there is a slight gender bias: women are slightly overrepresented in the sample. The largest age cohort in the sample is the middle aged (55-64) (34.7%), followed by the young-old (65-74) (29.2%), the old (75-84) (24.4%) and oldest-old (85 and over) (11.7%). The number of respondents report as migrants (foreign-born individuals) amount to 10.4 percent. The majority of respondents are married (54.5%) and only 8.7 percent are single. Furthermore, 13.7 percent are divorced and 23.1 percent of the sample report being widowed.

The most common educational level within the sample is primary school education (80% of total sample) and 72.4 percent report being unemployed, i.e. outside of the labour market. Regarding the dependent variables of this study, most of the respondents report that they rarely if ever felt lonely (52.2%); 37.4 percent of respondents report sometimes feeling lonely but do not perceive it as a problem; 6.8 percent of respondents report sometimes feeling lonely and would like to spend more time with others; 2.3 percent of respondents report often feeling lonely and 1.2 percent report always feeling lonely. Moreover, most of the respondents (51.2%) report that they live together with others and socialize outside of the household often (not isolated) while those who are living alone yet socializing outside of the household report at 31.5 percent. Amongst those who rarely socialize outside of the household 11.6 percent live together with others and 5.7 percent are living alone (socially isolated).

**Table 1.1 Descriptive statistics: Socio-demographic variables**

<i>Variables</i>	<i>% (n)</i>
Gender	
Men	45.0 (2374)
Women	55.0 (2901)
Age	
55-64	34.7 (1829)
65-74	29.2 (1541)
75-84	24.4 (1288)
85+	11.7 (617)
Nationality	
Non-migrants	89.6 (4724)
Migrants	10.4 (551)
Marital status	
Single/Unmarried	8.7 (461)
Married	54.5 (2873)
Divorced	13.7 (721)
Widow/widower	23.1 (1220)
Education	
Primary school	80.5 (4215)
Secondary school	9.0 (470)
University/college	10.5 (551)
Occupation	
Not employed	72.4 (3817)
Employed	27.6 (1458)
<i>Dependent variables</i>	
Loneliness	
I rarely if ever feel lonely	52.2 (2583)
I sometimes feel lonely but I don't perceive it as a problem	37.4 (1852)
Sometimes I feel lonely, would like to spend more time with other people	6.8 (334)
I often feel lonely	2.3 (116)
I always feel lonely	1.2 (61)
Social isolation	
Not living alone, socialize outside household often	51.2 (2661)
Living alone, socialize outside household often	31.5 (1634)
Not living alone, rarely socialize outside household	11.6 (604)
Living alone, rarely socialize outside household	5.7 (294)

*Note.* Data from Panel Survey of Ageing and the Elderly (PSAE), year 2002 sample.

The data of the family solidarity variables show that most respondents report meeting with their own children at least once a week, and a small percentage of 4.6 report meeting with their children rarely. The most common geographical distance from children is between 1 and 10 kilometres, at 35.1 percent. 22.5 percent report living closer than 1 kilometre and 9.5 percent report living more than 200 kilometres away. The vast majority of respondents report not giving any financial or economic assistance to children, and only 18.8 percent report doing so. Most commonly, the respondents report rarely giving any help to children (42.1%) and 36.5 percent report that they rarely if ever receive any help from their children in return.

**Table 1.2 Descriptive statistics: Family solidarity variables**

<i>Variables</i>	<i>% (n)</i>
Frequency of meeting own children	
At least once a week	64.8 (2739)
Once a month	22.6 (953)
Once quarterly	8.0 (339)
Rarely if ever	4.6 (195)
Distance from children	
Less than 1 kilometre	22.5 (1011)
More than 1 kilometre, less than 10 kilometres	35.1 (1581)
More than 10 kilometres, less than 50 kilometres	21.5 (968)
More than 50 kilometres, less than 200 kilometres	11.4 (513)
More than 200 kilometres	9.5 (429)
Giving financial assistance to children	
Yes	18.8 (809)
No	81.2 (3499)
Helping children	
Several times a week	7.3 (326)
Once a week	13.8 (622)
Once a month	19.1 (857)
Once quarterly	6.7 (301)
Occasionally	11.0 (496)
Rarely if ever	42.1 (1894)
Receiving help from children	
Several times a week	5.1 (227)
Once a week	10.6 (475)
Once a month	18.5 (832)
Once quarterly	10.0 (450)
Occasionally	19.3 (867)
Rarely if ever	36.5 (1638)

*Note.* Data from Panel Survey of Ageing and the Elderly (PSAE), year 2002 sample.

### *Model 1: Intergenerational family solidarity and loneliness*

The main effects model for factors explaining loneliness (see Table 2) reports 12% of explained variance in the outcome variable. The results from this model show that individuals meeting their children once a week have significantly lower odds for feeling lonely (odds ratio [OR] .64; 95% confidence interval [CI] -.82, -.04), compared to individuals who rarely if ever meet their children. Proximity within family also has a significant effect on feeling of loneliness since individuals living 1-10 km (OR 1.45; CI .05, .69), 10-50 km (OR 1.37; CI .001, .63) and 50-200 km (OR 1.59; CI .15, .77) away from their children have significantly higher odds for feeling lonely compared to the counterparts living 200 km and further. However, the significant effects of proximity do not exist when interaction terms are included in the expanded model. The within-family reciprocal patterns in the data show that individuals who help their children more frequently have lower odds of feeling lonely. Individuals help-

ing their children several times a week have lower odds of feeling lonely (OR .60; CI -.79, -.20), as well as individuals helping their children once a week (OR .75; CI -.51, -.05) and once a month (OR .74; CI -.50, -.09) compared to individuals who rarely if ever helped their children. Rather interestingly, the results show that individuals receiving help from their children in return are more likely to feel lonely but the significant effects of receiving help from children do not exist when interaction terms are included in the expanded model. Individuals receiving help from their children several times a week have higher odds for feeling lonely (OR 1.55; CI .08, .79). Likewise, individuals receiving help once a week (OR 1.32; CI .03, .53), once a month (OR 1.40; CI .14, .53) and once quarterly (OR 1.44; CI .13, .59) are more likely to feel lonely.

The results from the main effects model for loneliness further show that gender has a strongly significant effect on loneliness, men having lower odds of feeling lonely (OR .69; CI -.50, -.23) compared to women. Even though the effect of age on loneliness is not significant, the results reveal that the middle aged (55-64) and the old (74-84) are more likely to feel lonely, and the young old (65-74) are less likely to feel lonely when compared to the oldest-old (85 and over). Non-migrant individuals have lower odds (OR .60; CI -.71, -.28) of feeling lonely compared to migrants. The results further suggest that marital status has a significant effect on loneliness since single (OR .53; CI -1.05, -.19), married (OR .35; CI -1.22, -.85) and divorced (OR .76; CI -.49, -.03) individuals have lower odds of feeling lonely compared to widowed individuals. Absence from the labour market is significantly related to the higher likelihood of feeling of loneliness (OR 1.43; CI .14, .57). Compared to individuals who have completed university education, individuals with primary level (OR .73; CI -.53, -.08) and secondary level (OR .72; CI -.62, -.02) education are less likely to feel lonely. This relationship is further explored in the expanded model for loneliness.

The expanded model for factors explaining loneliness (see Table 2) that includes several additional interaction terms reports 15% of explained variance in the outcome variable. If we start with the interaction between gender and education, the results show that men have lower odds of feeling lonely compared to women and the odds of feeling lonely among individuals with primary and secondary education are significantly lower. But when the interaction is included into the model, the odds of feeling lonely increase (OR 1.68; CI .08, .97), which shows that the interaction of education and gender has a significant effect on loneliness. Furthermore, the relationship between receiving help from children and loneliness is further differentiated be-



tween age cohorts in this expanded model. In particular, individuals aged 55-64 who report receiving help from their children occasionally (OR 2.01; CI -.13, 1.54) and once quarterly (OR 4.66; CI .62, 2.46) have higher odds of feeling lonely. Individuals receiving help once quarterly aged 65-74 (OR 3.63; CI .37, 2.22) and 75-84 (OR 3.22; CI .23, 2.12) have higher odds of feeling lonely. Individuals aged 55-64 living 10 to 50 km from their children have lower odds of feeling lonely (OR .31; CI -2.17, -.18). These results show that there is a substantial difference in the association between help receiving and loneliness by age categories. The inclusion of the interaction terms in the expanded model further shows that there is a significant difference in the association between proximity and loneliness among age cohorts. The main effect of proximity is insignificant when interacted with age cohorts. Moreover, the results show that there is a difference in the association between giving financial assistance to children and loneliness. The individuals aged 75-84 have lower odds of feeling lonely when giving economic help to their children (OR .32; CI -2.01, -.23).

To summarize the findings from the loneliness model: while the main effects model suggests that age has no significant effect on loneliness, the results from the expanded model show that age has an interacting effect with other covariates on loneliness. The middle-aged, the young-old and the old have higher odds of feeling lonely when receiving help from their children occasionally or quarterly. Age seems to interact with other reciprocal patterns as well since the results from the expanded model show that individuals in the old cohort helping their children financially have lower odds of feeling lonely. The expanded model also shows that there is a substantial difference in the association between loneliness and the interaction between education and gender, wherein men with primary level education are more likely to feel lonely. Furthermore, widowed individuals are at greater risk for feeling lonely. Absence or detachment from the labour market increases the likelihood of feeling lonely. Giving help generally seems to have a mitigating effect on loneliness among old-age individuals.

**Table 2. Ordinal logistic model of the factors explaining loneliness**

Variable	Main effects model: Loneliness						Expanded model: Loneliness					
	B	SE	Wald	OR	95% CI		B	SE	Wald	OR	95% CI	
					Lower	Upper					Lower	Upper
<i>Frequency of meeting children<sup>1</sup></i>												
Once a week	-.43	.20	4.71	.64*	-.82	-.04	1.16	1.21	.92	3.18	-1.21	3.54
Once a month	-.27	.19	2.04	.76	-.64	.10	-.33	.33	1.00	.71	-.98	.32
Once quarterly	.03	.19	.02	1.03	-.34	.40	.01	.27	.003	1.01	-.51	.54
<i>Distance, children<sup>2</sup></i>												
Less than 1 km	.20	.17	1.32	1.22	-.14	.54	-.68	1.07	.41	.50	-2.78	1.41
1 – 10 km	.37	.16	5.16	1.45*	.05	.69	.76	.71	1.13	2.13	-.64	2.17
10 – 50 km	.31	.16	3.85	1.37*	.001	.63	.16	.71	.05	1.17	-1.23	1.56
50 – 200 km	.46	.16	8.39	1.59**	.15	.77	.73	.62	1.36	2.07	-.49	1.95
<i>Giving financial assistance to children<sup>3</sup></i>												
Yes	.08	.08	.93	1.08	-.08	.25	.63	.47	1.76	1.87	-.15	1.42
<i>Helping children how often<sup>4</sup></i>												
Several times/week	-.49	.15	11.00	.60***	-.79	-.20	-.50	.15	10.44	.60***	-.80	-.19
Once a week	-.28	.11	5.95	.75*	-.51	-.05	-.30	.12	6.22	.74*	-.53	.06
Once a month	-.30	.10	8.07	.74**	-.50	-.09	-.28	.10	6.87	.75**	-.49	-.07
Once quarterly	-.21	.14	2.28	.80	-.49	.06	-.22	.14	2.26	.80	-.51	.06
Occasionally	-.04	.11	.17	.95	-.27	.17	-.04	.11	.11	.96	-.27	.19
<i>Receiving help from children<sup>5</sup></i>												
Several times/week	.44	.17	6.04	1.55*	.08	.79	.63	1.42	.19	1.87	-2.16	3.43
Once a week	.28	.12	5.06	1.32*	.03	.53	-.48	.88	.30	.61	-2.21	1.24
Once a month	.33	.10	11.47	1.40***	.14	.53	.22	.64	.11	1.24	-1.05	1.49
Once quarterly	.36	.11	9.70	1.44**	.13	.59	-.95	.57	2.80	.38	-2.08	.16
Occasionally	.11	.09	1.36	1.11	-.07	.29	-.63	.47	1.76	.53	-1.56	.30
<i>Gender<sup>6</sup></i>												
Male	-.36	.07	27.49	.69***	-.50	-.23	-.91	.29	9.32	.40**	-1.50	-.32
<i>Age<sup>7</sup></i>												
55-64	.25	.16	2.56	1.29	-.05	.57	.27	.44	.37	1.30	-.60	1.14
65-74	-.11	.13	.63	.89	-.38	.16	-.48	.45	1.13	.61	-1.36	.40
75-84	-.13	.12	1.05	1.13	-.38	.11	-.22	.45	.23	.80	-1.10	.66
<i>Nationality<sup>8</sup></i>												
Non-migrants	-.50	.10	21.06	.60***	-.71	-.28	-.49	.11	20.04	.61***	-.71	-.28
<i>Marital status<sup>9</sup></i>												
Single	-.62	.22	7.98	.53**	-1.05	-.19	-.66	.22	8.76	.51**	-1.10	-.22
Married	-1.04	.09	122.39	.35***	-1.22	-.85	-1.07	.09	125.39	.34***	-1.26	-.88
Divorced	-.26	.11	5.22	.76*	-.49	-.03	-.32	.11	7.59	.72**	-.55	-.09
<i>Education<sup>10</sup></i>												
Primary level	-.30	.11	7.39	.73**	-.53	-.08	-.57	.15	13.07	.56***	-.88	-.26
Secondary level	-.32	.15	4.63	.72*	-.62	-.02	-.53	.22	5.84	.58*	-.96	-.10
<i>Occupation<sup>11</sup></i>												
Not employed	.36	.10	10.98	1.43***	.14	.57	.39	.11	12.70	1.47***	.17	.61
<i>Gender*Education</i>												
Male*Primary							.52	.22	5.43	1.68*	.08	.97

Cont.

<i>Age*Giving financial assistance</i>							
	75-84*Yes		-1.12	.45	6.10	.32*	-2.01 - .23
<i>Age*Receiving help from children</i>							
	55-64*Quarterly		1.54	.46	10.82	4.66***	.62 2.46
	55-64*Occasionally		.70	.43	2.70	2.01 <sup>+</sup>	-.13 1.54
	65-74*Quarterly		1.29	.47	7.53	3.63**	.37 2.22
	75-84*Quarterly		1.17	.48	5.95	3.22*	.23 2.12
<i>Age*Distance, children</i>							
	55-64*10-50 km		-1.17	.50	5.42	.31*	-2.17 -.18
<i>N</i>	3726		3726				
<i>Nagelkerke R<sup>2</sup></i>	.12		.15				
<i>χ<sup>2</sup></i>	440.866		534.253				
<i>df</i>	29		97				

Note. Ordinal Logistic Regression. Dependent variable: Loneliness (n = 3726). SE = Standard Error. 95%. OR = Odds Ratio. CI = Confidence Interval.

\*\*\*p ≤ 0.001, \*\*p ≤ 0.01, \*p ≤ 0.05, +p ≤ 0.1.

<sup>1</sup>Reference category: Rarely.

<sup>2</sup>Reference category: > 200 km.

<sup>3</sup>Reference category: No.

<sup>4</sup>Reference category: Rarely if ever.

<sup>5</sup>Reference category: Rarely if ever.

<sup>6</sup>Reference category: Female.

<sup>7</sup>Reference category: 85+.

<sup>8</sup>Reference category: Migrant.

<sup>9</sup>Reference category: Widow/widower.

<sup>10</sup>Reference category: University education.

<sup>11</sup>Reference category: Employed.

### *Model 2: Socio-demographic characteristics and social isolation*

The main effects model for factors explaining social isolation (see Table 3) reports 31% of explained variance in the outcome variable. The results from this model show that age has a significant effect on status of social isolation. Compared to the oldest-old (85 and over), individuals aged 55-64 have lower odds of being socially isolated (OR .46; CI -1.02, -.53). Individuals in the young-old cohort (OR .55; CI -.78, -.38) as well as individuals in the old-cohort (OR .73; CI -.50, -.11) have lower odds of being socially isolated, compared to the oldest-old. Non-migrant individuals have lower odds of being socially isolated compared to migrants (OR .75; CI -.46, -.09). Furthermore, the results from the main effects model show that married individuals have significantly lower odds of being socially isolated (OR .10; CI -2.38, -2.05) and single individuals have higher odds of being socially isolated (OR 1.27; CI .02, .46), compared to widowed individuals. Individuals with primary level education have lower odds of being socially isolated (OR .69; CI -.55, -.16). However, the effect of education on status of social isolation is further investigated in the expanded model by adding an interaction term between education and gender. The results from this model show that men with

primary level education have lower odds of being socially isolated (OR .68; CI -.78, .002). This result shows that the interaction between education and gender has significant effect on social isolation.

To summarize the findings from the social isolation model: age has a significant effect on social isolation. The findings reveal that as people age, they are increasingly vulnerable to being socially isolated. Furthermore, the results show that single and widowed individuals are at greater risk of being socially isolated. Exclusion from the labour market does not appear to be a significant determinant for social isolation. Rather interestingly, men with primary level education have lower odds of being socially isolated. The results from the main effects model and the expanded model show that migrant individuals are at greater risk for being socially isolated.

**Table 3. Logistic model for social isolation & socio-demographic characteristics**

Variable	Main effects model: Social isolation						Expanded model: Social isolation						
	B	SE	Wald	OR	95% CI		B	SE	Wald	OR	95% CI		
					Lower	Upper					Lower	Upper	
<i>Gender<sup>1</sup></i>													
Male	.08	.06	1.68	1.08	-.04	.20	.25	.32	.61	1.28	-.38	.89	
<i>Age<sup>2</sup></i>													
55-64	-.77	.12	38.59	.46***	-1.02	-.53	-.78	.25	9.40	.45**	-1.28	-.28	
65-74	-.58	.10	32.36	.55***	-.78	-.38	-.54	.12	17.76	.58***	-.79	-.29	
75-84	-.31	.09	10.02	.73**	-.50	-.11	-.23	.11	3.82	.79 <sup>+</sup>	-.46	.001	
<i>Nationality<sup>3</sup></i>													
Non-migrants	-.27	.09	8.79	.75**	-.46	-.09	-.44	.18	5.80	.64*	-.81	-.08	
<i>Marital status<sup>4</sup></i>													
Single	.24	.11	4.92	1.27*	.02	.46	.25	.14	2.94	1.28 <sup>+</sup>	-.03	.54	
Married	-2.21	.08	690.79	.10***	-2.38	-2.05	-2.30	.10	468.19	.10***	-2.50	-2.09	
Divorced	-.04	.09	.20	.95	-.23	.14	.02	.12	.03	1.02	-.21	.26	
<i>Education<sup>5</sup></i>													
Primary level	-.36	.10	13.26	.69***	-.55	-.16	-.16	.14	1.26	.85	-.45	.12	
Secondary level	.03	.13	.07	1.03	-.22	.29	.10	.19	.25	1.10	-.28	.49	
<i>Occupation<sup>6</sup></i>													
Not employed	.12	.09	1.54	1.13	-.07	.31	-.25	.30	.73	.77	-.84	.33	
<i>Gender*Education</i>													
Male*Primary							-.38	.20	3.79	.68 <sup>+</sup>	-.78	.002	
N	5166						5166						
Nagelkerke R <sup>2</sup>	.31						.31						
x <sup>2</sup>	1714.478						1726.712						
df	11						22						Cont.

*Note.* Ordinal Logistic Regression. Dependent variable: Social isolation (n = 5166). SE = Standard Error. OR = Odds Ratio. 95% CI = Confidence Interval.

\*\*\*p ≤0.001, \*\*p ≤0.01, \*p≤0.05, +p≤0.1.

<sup>1</sup>Reference category: Female.

<sup>2</sup>Reference category: 85+.

<sup>3</sup>Reference category: Migrant.

<sup>4</sup>Reference category: Widow/widower.

<sup>5</sup>Reference category: University education.

<sup>6</sup>Reference category: Employed.

## Discussion

Firstly, the results presented in the previous section will be summarized, theoretically interpreted and discussed in detail followed by a general discussion on implications. Lastly this article will conclude with a section on brief concluding remarks, issues and limitations at hand, and suggestions for future research.

### *Interpretation of the results and their validity*

Drawing on the definition of social exclusion made by Burchardt et al. (1999) and Walsh et al. (2016), loneliness is considered as exclusion from social interaction of significance with friends, family or communities. It involves a lack or denial of social resources as people age and it involves the inability to participate in normal activities and relationships that are available to individuals across other domains of societal life. The findings from the loneliness model show that age and family reciprocal patterns have interacting effects on loneliness. However, no main effect of age is observed in the data. Instead, the results indicate that age has several interacting effects on loneliness with other covariates in the model. Earlier research has linked the relationship between old age and loneliness (Shute & Howitt 1990) but other studies have concluded that this relationship is not straightforward (Dykstra 2009; Fees et al. 1999). Another possible reason could be that the majority of respondents (63.9%) are in the cohort 55-64 (34.7%) and 65-74 (29.2%). According to van Dyk (2016), there is an increasing polarisation of the third and the fourth age with the young-old being praised for their ongoing ‘sameness’ and the oldest old being excluded for their ‘othering’, which partially explains that 52.2% of respondents report that they never feel lonely.

Another finding is that widowed and single individuals face greater risk of feeling lonely. This finding in itself is rather self-explanatory since the loss of a spouse or close confidant constitutes a major life change (Halleröd 2013). Previous knowledge about old-age exclusion in social relations amongst elderly tells us that restricted networks are more common amongst older people, especially amongst the oldest-old (Fiori et al. 2007). The tight-knit convoy

around older persons thus means that persons with few close confidants are subject to greater risk of losing social resources, such as support and friendship, when faced with loss (Philips et al. 2010). The need for social support is elevated when individual life role is subject to major change, which also mitigates stress related to ageing (Kahn & Antonucci 1980). Regarding social support, it is worth making the distinction between general social support and reciprocity of family, the latter measured by the family solidarity variables in the loneliness model. Proximity to and contact frequency with one's children have significant effect on feeling of loneliness in the main effect-model, but this association disappears when accounting for age-cohort effects. Structural solidarity (means and prerequisites for cross-generational interactions) and associational solidarity as theorized by Bengtson (2001) initially seem to have significant effect on loneliness, based on the results of the main effects on loneliness. The main effects model indicates that closer proximity is positively associated with higher possibility of feeling lonely. This effect appears to attribute to difference by age cohorts wherein individuals aged 55-64 living within 10-50 km are less likely to feel lonely. Proximity has earlier been known to be a determining factor for attenuated family solidarity (Kiilo et al. 2016) and this result confirms that proximity would influence feeling of loneliness among older individuals, however this association is likely to differ across age cohorts. Giving financial support to children is a significant determinant of feeling lonely among individuals aged 74-85, which might suggest that the effect of supporting children financially is substantially differentiated between age cohorts.

The main assumption that closer family reciprocity is associated with a lower feeling of loneliness is generally supported by the data. The family reciprocal patterns in the present study reveal that giving help to one's children rather than receiving help appears to have a stronger effect on mitigating feelings of loneliness. This finding might suggest that individuals that have reciprocal family relations, a social convoy of family members in exchange of giving and receiving, are less vulnerable to exclusion associated with old age, which Bengtson (2001) labels as functional solidarity. In relation to role changes involved in ageing, this result highlights the role or function of older people in family relations and family role structure. The role of grandparent becomes increasingly apparent as older people detach from other roles, and within the role of grandparent or parent of an adult child the expectations exist that you should help your kin unconditionally (Trafford 2007). This interesting characteristic could also be discussed in relation to Swedish culture. The individualistic way of thinking of

oneself as an individual emphasizes the idea of not needing any help or assistance from others (Fjällström & Sydner 2013), which might explain why receiving help has no influence on mitigating feelings of loneliness. On the contrary, receiving help could possibly be quite shameful since it violates the assumption of autonomy and independence of the individual (Sherwin & Winsby 2011). The results show that individuals that receive help from their children are more likely to feel lonely. Rather interestingly, this result might tell us that receiving help might evoke a sense of being a burden/dependence to one's children, which is in line with previous study showing that the Swedish caring model is more state-based rather than family-oriented (Jönsson et al. 2011).

The finding which emerges in the analysis of feeling of loneliness and employment status reveals that individuals who are to some extent excluded from the labour market face higher risk of feeling lonely. One plausible explanation might be that since role-linked relationships such as co-worker relationships are increasingly vulnerable to loss (since they are inherently connected to the social space of work), relationships integrated into the role as a worker might cease to exist when detaching from that role (Kahn & Antonucci 1980). The transition from work to retirement or unemployment may involve occurring convoy member loss without inclusion of new ones. In essence, the worker role of being an active actor in the labour market can to some extent be seen as a buffer from social exclusion since employed individuals are less vulnerable to feeling lonely compared to unemployed individuals. The results from the loneliness model also indicate some gender differences in feeling of loneliness wherein men have lower likelihood of feeling lonely compared to women. This finding is in line with previous Swedish studies showing that even though women generally have larger network and more often close friends compared to men, women still to higher extent report that they feel lonely and perceive loneliness as a problem (Halleröd 2009; Halleröd & Seldén 2013).

The results from the social isolation model generally support the second hypothesis, namely, stronger social networks are associated with the lower risk of social isolation. In the present study, older migrants are at greater risk of being socially isolated. It could be partially understood in light of recent research findings that migrants are more likely to suffer from weakened family bonds (Kiilo et al. 2016). Older migrants might face intersecting dimensions of exclusion, since old age comes with increased risk of exclusion and restricted networks of older people involve increased vulnerability to loss of central convoy members (Kahn & Antonucci 1980). Since older individuals potentially suffer from spousal loss or loss of close

friends and family, weakened family bonds might leave older migrant individuals in the status of social isolation. The results further reveal that as people age, they are increasingly vulnerable to being socially isolated. Contrary to our expectations, the results in the present study show that unemployment has no significant effect on social isolation. Hence, consistent with the results presented by Gallie et al. (2003), social isolation is primarily determined by the broader patterns of household formation and of sociability in the society rather than by unemployment *per se*.

### *Implications*

The results presented in this article have several theoretical implications. Firstly, the intergenerational family solidarity model has been proven to be useful in trying to understand social exclusion in old age in this study. In particular, the functional dimension of family solidarity gives important insight on how the nature of familial reciprocity influences individual feelings of loneliness. Furthermore, the convoy model contributes with important insight to the structuring of support and how changes in role, and convoy membership structure, affect individual-perceptions of loneliness. When used in conjunction, these two theoretical models provide an integrated conceptual framework for a better understanding of old-age exclusion from social relations. This article also contributes with important insights to the complexity of old-age social exclusion, although the scope of this article focuses on the dimension of exclusion from social relations. Secondly, several implications for practice come to mind. The article shows that the relationship between old age and loneliness is not so easily explained. There are several factors in play, and one that needs further attention is the importance of attenuated family solidarity. Some results suggest that the Swedish cultural context has important implications for family relations and reciprocity patterns.

Some limitations regarding the measurements have previously been mentioned in this article. The operationalization of the intergenerational family solidarity model is partially limited due to the limitations in the data used for this study. As mentioned earlier in this article, three dimensions are not available as a meaningful measurement: affectual solidarity, consensual solidarity, and normative solidarity.

### *Concluding remarks and suggestions for future research*

The theoretical assumption of this study is that older individuals are even more vulnerable to old-age exclusion which tends to accumulate over the life course. This article shows that the



theoretical framework of the intergenerational family solidarity model and the social convoy model can potentially be useful for a better understanding of social exclusion in old age. The empirical analysis reveals several findings: structural solidarity between older individuals and their adult children seems to mitigate feeling of loneliness, in particular help-giving behaviours. Unemployed older individuals are more likely to feel lonely, which might suggest that the working role in the labour market 'protects' individuals from exclusion from social relations. Another finding reveals that migrant older individuals might face greater risk of exclusion, since the empirical analysis shows that migrants have higher likelihood of feeling lonely and being socially isolated. Age is found to be positively associated with the risk of social isolation. There is something interesting about the Swedish context that might make older individuals feel even lonelier. Namely, receiving help from their adult children could violate the strong values of individualism and autonomy in contemporary society. This interesting finding needs further investigation and would potentially extend the scope for understanding the consequences of old-age exclusion in the wellbeing of older people in Sweden.

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