

Social Networks And Mental Health: Evidence From SHARE

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Abstract

The relationship between social interaction and mental health is an area of continued focus for the social sciences. Using data from the Survey of Health, Ageing and Retirement in Europe (SHARE), this study examines the effect of social support network type on mental health in the context of two competing psychological models. The main effects hypothesis predicts that individuals with strong social support experience higher levels of wellbeing than those with weak social support, while according to the stress-buffering hypothesis, it is only upon exposure to unexpected negative life events that individuals with weaker levels of social support are adversely affected. Cluster analysis of objective criteria such as support-exchange and social interaction identifies four social support network types comparable to those found in previous studies: self-contained; spouse-reliant; family-dependent; and family and community integrated. Network profiles differ in terms of a number of socio demographic indicators, including age, education, and place of residence. Network variation across countries is also evident. Addressing concerns about omitted variables, we find a robust result that being in a social network characterised by low levels of support and social engagement is associated with higher levels of mental distress (the main effects hypothesis), but only for women. The magnitude of this effect is comparable to divorce, and appears to be mediated through feelings of loneliness. We find no evidence that being in such a network exacerbates the distress associated with traumatic life events (the buffer hypothesis). Strong spousal support is also found to have a positive effect, but again only for women.

JEL Classification: Z13, I10, J14

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1 Introduction

The relationship between social interaction and wellbeing has been widely discussed across disciplines in social science. Berkman (1984) defines a social network as a set of linkages whose characteristics in an identified group of people may explain the social behaviours of the people involved. The sociology literature has focused on characterising and understanding the mechanisms of social interaction and in psychology, researchers have identified potential mechanisms through which social interaction may affect wellbeing (Cohen and Willis, 1985). There is strong theoretical and empirical evidence supporting the existence of different social support networks, their implications for quality of life, their relationship to both physical and mental health (Fiori et al., 2006), and mortality and morbidity (Berkman, 1995). This relationship has received increased attention in the field of economics, partly due to the evidence that financial variables cannot explain all of the observed patterns in wellbeing (Clark et al., 2008). Various studies of social network typologies conducted with elderly samples in Europe, North America and Israel have identified what are now considered to be four robust forms of social networks among older people, all of which are characteristically comparable to those identified in the current study, and have consistently related to differing levels of wellbeing (Fiori et al., 2007).

This study investigates whether the social support networks of older Europeans exert an influence on their mental health. The approach adopted in this study is threefold. Firstly, to establish the number of different social networks present in the data, we employ the TwoStep cluster analysis procedure. By characterising social interactions within each cluster, and following the previous literature we identify four networks: self-contained, spouse-reliant, family dependent and family and community integrated. Each is profiled in terms of social interaction and demographics. Secondly, cross country differences in social support are examined. Finally, two hypothesis relating to social interaction and mental health are tested; whether being in a social network characterised by low levels of interaction is associated with lower levels of mental health (the main effects hypothesis) or whether the negative consequences of stressful life events are exacerbated by membership of such social networks (the buffer hypothesis). For the latter we adopt a difference in differences approach.

There are methodological difficulties with interpreting the association between social support and mental health as causal. Both social interaction and wellbeing may be determined by socio demographic characteristics, such as education or income. SHARE is a rich dataset that includes a wide variety of information on individual characteristics, the effects of which can be isolated and assessed in our empirical model. In addition, unobserved factors such as personality may be driving the relationship between network type and mental health status. This is addressed using panel data techniques and a difference in differences approach that allow us to examine changes within individuals over time, thereby controlling for all time invariant factors.

Further details of the literature and procedures are discussed in the following sections and structured as follows: Section 2 provides a theoretical and empirical basis for examining the relationship between social support and mental health and describes the data and methodology of the current study. Section 3 profiles each of the networks and tests the two hypotheses relating social support to mental health. Section 4 discusses the findings and concludes.

2 Social Networks and Wellbeing

2.1 Social support, health and wellbeing

Two theoretical models have been proposed in the psychological literature to explain the circumstances and nature of the relationship between social interaction, support and wellbeing (Cohen and Willis, 1985). The main effects hypothesis states that an individual’s level of wellbeing should be influenced by their level of social interaction regardless of current life circumstance. The buffer hypothesis states than an individual’s social network should only impact on their wellbeing when faced with stressful live events. In this case, support provided by positive interaction may be able to buffer or mitigate these negative events. Previous studies have yielded mixed results, perhaps as a result of the different definitions of social support used as well as fundamental differences in the manner in which the social interaction was measured.

The theoretical mechanisms for linking social networks to wellbeing are well documented in the psychology literature, and these are summarised in table 1. Information based models relate to the receipt of relevant information on positive behaviours which could help avoid negative life events or reduced the stress associated with such events. Self control can determine wellbeing, and a positive social network may increase an individual’s capacity to determine the outcome of certain stressors. Social support can increase feelings of self control, determination and coping ability. Identity and self esteem models underline the importance of social networks as a source of positive affect, which influences motivation, suppresses neuroendocrine response and enhances immune function. Social influence models outline the role of peer pressure and social norms in regulating behaviour insofar as individuals will refer to those around them with similar attitudes, experiences and views for information on how to behave and react. Social support could also influence people to focus more on the positive aspects of their lives, including their relationships. Tangible resource models relate to the provision of concrete monetary and non-monetary support, such as the provision of care, financial aid or advice.

Table 1: Summary of Psychological Processes Linking Social Support to Wellbeing

Pathway	Explanation
Information	Promotes positive behaviour, avoid negative events, stress coping, self control mechanisms
Identity and Self-Esteem	Social networks as a source of positive affect, motivation, neuroendocrine response, self control
Social Influence Models	Social norms and peer pressure, Social Comparison Theory, reference group, positivity
Tangible Resource Models	Provision of concrete support e.g. financial aid or personal care

Different sources of support have a differential impact on the wellbeing of older adults and the roles of kinship and friendships are not considered to be easily interchangeable. With regard to the family, relationships with adult children specifically are found to be most important to the physical wellbeing of older people (DuPertuis et al., 2001). The family consistently plays a central role in the provision of social support, however emerging trends in changing family structures and geographical dispersion of family members is likely to influence the availability and potential of families to offer support (Kohli et al., 2005). A number of studies have found that the relationship between neighbourhood effects and life satisfaction may be due to perceived levels of social support and interaction within a community (Shields et al., 2009). Therefore it is important that analysis of the structure of social support extends beyond family ties to include both community and neighbourly relationships.

2.2 Late Life Depression

The maintenance of good mental health is central to the promotion of a society which is happy, healthy, capable and engaged throughout the life course (Marks and Shah, 2004). Depression is the most frequent cause of emotional suffering in later life and significantly decreases quality of life in older adults (Blazer, 2009). Late-life depression is common among older people in Europe and, with cross-country variation, an excess of depressive symptoms has been evidenced among older European women. Indeed, gender differences are well established in the literature on depression and a higher prevalence among older females is amongst the most robust findings in psychiatric epidemiology (Prince et al., 1999).

2.3 Sample

SHARE is the first study to involve a comprehensive, pan European investigation of the over 50s age group. Established specifically to address multidisciplinary facets of ageing, SHARE follows the approach successfully implemented by the English Longitudinal Study of Ageing (ELSA) in the UK, and the Health and Retirement Study (HRS) in the US. The first wave of SHARE was conducted in 2004 and featured 11 different countries across the European Union.¹

Data from the first and second waves of SHARE provide key information on community, family and social engagement which can be used to determine the type of social support networks in which these older people are embedded. Combining the first two waves provides a sample size of approximately 65,000 observations, of which around 37,000 refer to individuals present in both years (i.e. 18,500 individuals have been interviewed twice). In general the questions are identical across years and across countries.² For the majority of questions the number of missing values (i.e. refusals or “don’t know”) are insubstantial. In order to conduct the cluster analysis, questions which were not applicable to certain participants were combined with other information to produce extra categories within a variable. To illustrate, to the question on contact with grandchildren we added the category “no grandchildren”. For the small number of questions where there were relatively large amounts of missing values (frequency of contact with children, years in accommodation) we recoded these missing values and included a dummy variable indicating a recode in the cluster analysis. This leaves us with a final sample size of 61,825 observations which we can classify by social support network type.

The sample size that a survey of this scale provides is a significant advantage and using this dataset allows us to build on several aspects of the previous literature in this area. Firstly, the SHARE study is longitudinal. Secondly, the international dimension allows us to make cross country comparisons using comparable data. Thirdly, the interdisciplinary nature of the dataset enables us to include more comprehensive measures of social networks than in previous studies. Our measure of network type includes 20 variables relating to social engagement, family structure, community and exchanges of help and support.

¹ The first wave included Denmark, Sweden, Austria, France, Germany, Switzerland, Belgium, the Netherlands, Spain, Italy and Greece). In 2005 Israel was added to this group. In 2006/7 the second wave extended the survey to include the Czech Republic, Poland and Ireland. Data collection for SHARELIFE (an interim wave focusing on reconstructing the life histories of the respondents involved), is now complete in 14 countries. The fourth wave will incorporate Slovenia and will ultimately represent a panel of over 30,000 individuals in 16 countries.

² Israel only participated in the first wave, while Ireland, Poland and the Czech Republic were additions for the second wave; therefore these countries are yet to have a longitudinal component.

2.4 Measures

Mental Health EURO-D Scale

In this study, depression is measured using the EURO-D scale which comprises 12 binary variables measuring the presence or absence of the following symptoms: depression, pessimism, wishing death, guilt, sleeplessness, disinterest, irritability, loss of appetite, fatigue, lack of concentration, lack of enjoyment, and tearfulness (Prince et al., 1999). Within SHARE, the presence of symptoms are indicated by positive responses, therefore higher scores indicate higher levels of depressive mood. Within the EURO-D scale, a score greater than 3 has been determined as a cut-off point for what is considered clinically significant depression and that those above this threshold are likely to be diagnosed with a depressive disorder requiring therapeutic intervention. This threshold has been previously validated in the EURODEP study against a variety of clinically relevant indicators across Europe (Dewey and Prince, 2005).

Social Networks

As discussed in section 2.2., the primary components of social network of older people have previously been identified and employed in a range of studies (Berkman and Syme, Wenger, 1991). However, not all primary components are available in an identical form in the SHARE data. Therefore, variables have been included in the cluster analysis that are deemed to capture these differentiating components as well as additional variables relating to exchanges of help within and outside the household, and between family and non-family members. SHARE does not explicitly include a scaled measure of social engagement. Both church and social club attendance are measured and have previously been identified as primary components in differentiating social networks (Litwin, 1998). However, measuring social engagement on these two factors alone may lead to inaccurate estimates of social engagement when applied to such a culturally diverse region. Therefore a composite measure of the level and diversity of social engagement in the month prior to participation was constructed from seven binary variables measuring engagement in the following activities: voluntary or charity work, cared for a sick or disabled person, provided help to friends or neighbours, attended an educational or training course, gone to a sport, social or other kind of club, taken part in activities of a religious organisation (church, synagogue, mosque etc.), taken part in a political or community-related organisation. Total scores range from zero to seven; zero indicating no engagement in any of the activities listed and seven indicating engagement in all seven activities listed.

2.5 Cluster Analysis

Cluster analysis refers to a range of statistical procedures which, through a variety of processes, group cases that have similar characteristics across a range of variables thus producing homogeneous, meaningful empirical types within datasets. Cluster analysis has been used for examining multiple combinations of social relationships, and has been used in various fields including market segmentation and modern welfare state analysis (Saint-Arnaud, 2003). More recently, this technique has been used to identify clusters or networks of social support and has been cited as a useful statistical strategy for examining multiple combinations of social relationships (Litwin, 1998; Fiori et al. 2006). There are several forms of cluster analysis, the most common of which in the study of social networks are Hierarchical, K-Means and the TwoStep cluster procedure. The core feature of each approach is the measurement of the distance between cases on a combination of criteria which is then used to identify groups of cases within which there is clear homogeneity and between which there is clear heterogeneity. Hierarchical and K-means clustering can be used separately or in conjunction,

whereby hierarchical clustering is employed first as an exploratory measure. This dual approach has been adopted in previous studies of social networks of the elderly and psychological functioning of the oldest old (Fiori et al., 2007, Smith and Baltes, 1997); the former procedure as a means of investigating the nature and possible clusters and the latter to specify the clusters. Both hierarchical and K-means clustering procedures are limited to use with continuous variables and small or medium sample sizes only. Additionally, K-means clustering requires that the number of clusters is known in advance. The TwoStep procedure is designed to reveal natural groups or clusters within large datasets containing both categorical and continuous variables. The number of clusters is not predetermined in this procedure but rather the clusters are determined by an automatic clustering algorithm. Cluster distance and cluster criterion are calculated using the Schwarz Criterion Measures.

Initially, pre-clusters are identified for the purpose of reducing the size of the matrix containing the distance between all possible pairs of cases. Pre-clusters are clusters of the original cases which are used in place of raw data in hierarchical clustering. As each case is processed, the algorithm determines, using a distance measure, whether the current case should be merged with an existing cluster or should constitute a new cluster. The final pre-clusters are treated as a single entity and the size of the distance matrix is determined by the number of clusters, rather than the number of cases. The second step involves the application of the standard hierarchical clustering algorithm to the pre-clusters. The clustering algorithm used in the TwoStep procedure functions optimally where all variables are independent, where continuous variables are normally distributed and where categorical variables have a multinomial distribution. In this case these assumptions are not fully met, however, the procedure is generally considered robust, and in this case we are not adopting this technique for hypothesis testing, but rather as a data reduction exercise, the results of which will be used for follow-up analysis.

2.6 Variable Selection for Cluster Analysis

The principle components of social support networks of the elderly, namely: family, help/support, community and social engagement have been previously documented and identified (Fiori et al., 2006). Preliminary screening of all SHARE variables within these domains yielded 28 variables for potential inclusion. The resulting clusters were assessed for their within cluster homogeneity and their characteristics compared with social networks identified in previous literature. Variables which were identified as compromising within-cluster heterogeneity were removed from the variable list. Composite measures were developed and family proximity variables conflated into one single dependent variable. The finalised differentiating variables used in the cluster analysis are displayed in table 2 below.

Social Networks And Mental Health: Evidence From SHARE

Table 2: Differentiating Variables for Cluster Analysis of Social Support Networks

Domain	Variables
Family	Marital status Proximity of mother/father Number of brothers/sisters alive Number of children Location of nearest child Number of grandchildren Has great grandchildren
Help	Source and frequency of help received Source and frequency of help given Frequency of care to grandchildren
Community	Years in current community Years in current accommodation Household size
Social Engagement	Scale of activities (0-7)

Source: SHARE 2004 & 2006

3 Results

3.1 Social Support Networks

Four clusters were identified in the data (see table 3) which are comparable with those identified in previous studies. The largest group is cluster 2, with approximately 40% of the sample, followed by clusters 1 and 4 with between 20 and 25% each. Cluster 3 is the smallest with approximately 10%. The differences in the means of the most significant continuous variables used in the cluster analysis are also presented in table 3. In each case we reject equal means on the basis of an f test ($p < .001$). A summary of the key characteristics of each network is shown in table 4.

Table 3: Social Networks Composition

Cluster	No.	%	Mean Years In Community	Mean Household Size	Mean Social Engage- ment
1 Self-contained	12,660	20.50%	36.77	2.66	0.8
2 Spouse Reliant	26,942	43.60%	39.11	2.2	0.6
3 Family dependent	6,608	10.70%	44.63	1.8	0.53
4 family and Community Integrated	15,615	25.30%	36.18	2.15	1.38
Total	61,825	100.00%	38.48	2.24	0.83

Source: SHARE 2004 & 2006

Cluster 1 - Self Contained

Cluster one is characterised by those who have low levels of engagement within a small family network. Individuals are least likely to be married, have children or grandchildren. If a parent is still alive they are most likely to live far away. Members of the group may be isolated from their family, and help, where received, is provided by a person described as “other”, i.e. not a close relative. It is suggested that this type of network is more common in rural areas and more broadly, more prevalent in northern European countries where it may represent a privatisation of a more prosperous working class (Wenger, 1997). Findings in this study support the former suggestion but not the latter. Instead, this network type is largest in Greece (35.2% are in this category) and Italy (29.9%).³

Cluster 2 - Spouse Reliant

Cluster two is the largest of the four clusters (43.6%). Members of this cluster are most likely to be married and there is evidence to of a strong spousal support exchange within the household. No help is received from outside the household, and members engage little in social activities outside the home.

Cluster 3 - Family dependent

Perhaps due to age, members of this cluster report having the highest number of children, grand and great grandchildren. Consequently, these individuals are least likely to have living siblings or parents, are most likely to be widowed and have lived the longest in their current community compared with all other networks. They are most likely to be in need of help and support and to receive this from within the household. They are also most likely to give help within the household and rely on a network of close family ties with younger generations, receiving help most often from a child or grandchild. Engagement in social activities outside the house is low. Individuals in this network are often highly dependent but continue to remain in the community with the support of their close family. Social interaction in this group tends to occur through the receipt and provision of help and care, as opposed to socialising for its own sake.

Cluster 4 - Family and community integrated

Individuals in this cluster report the highest level of social engagement across a diverse range of activities. All report high levels of social interaction and provide help, usually to a close relative. They are equally likely to provide help to a parent, child or grandchild. Help received is most often from a child or grandchild. Individuals in this network are most likely to be married and have spent the shortest amount of time living in their current accommodation and community. It is suggested as the most common support network as well as the most robust. In this study this was the second largest network type (n=15,615). Previous studies have described this network as comprising members from families, friends and neighbours, with individuals experiencing a high level of reciprocal support. Accordingly, members of this network tend to report low levels of isolation, loneliness and depression.

³ See table 8.b.

Social Networks And Mental Health: Evidence From SHARE
Table 4: Summary of Key Social Support Network Characteristics

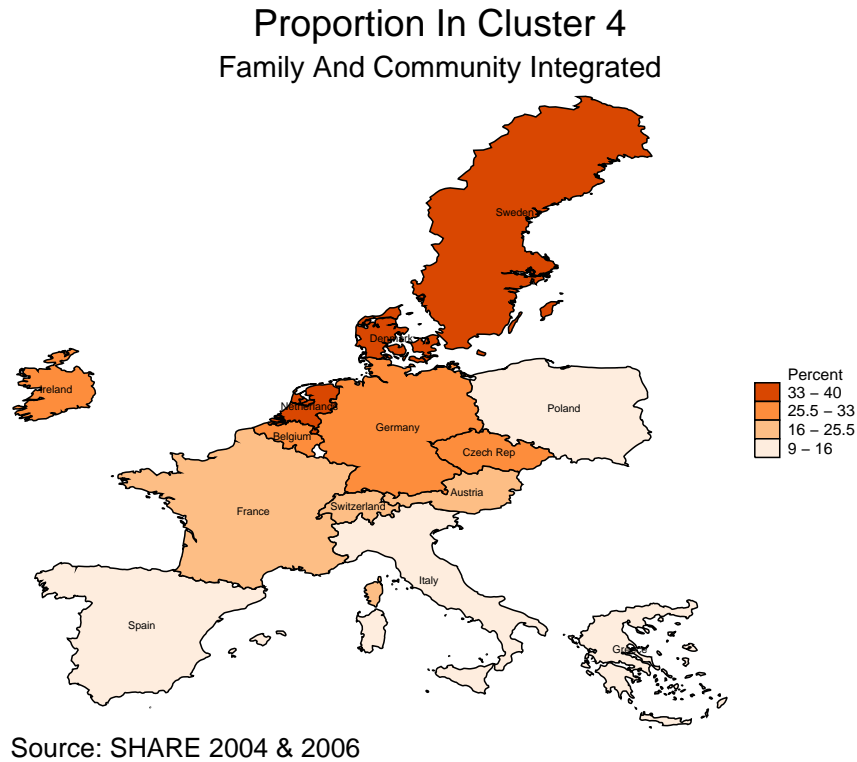
1 Self-contained	2 Spouse-reliant
Least likely to have children	Most likely to be married
Least likely to have grandchildren	Most likely for parents not to be alive
Largest household size	Receive no help from outside the home
Most likely to have never married	
Parents most likely to live far away	
Most likely to be helped by 'other'	
Most likely to give help to parent	
3 Family dependent	4 Family and community integrated
Fewest brothers and sisters alive	Highest level of social engagement
Most likely to have grandkids and great grandkids	Shortest time in accommodation or community
Longest in current accommodation and community	Most likely to be married
Lowest social engagement	Parents most likely to live far away
Least likely to be currently married	All gave help
Most likely widowed	Equally likely to give help to parent, child or grandchild
Most likely for parents not to be alive	If helped, most likely to be helped by child or grandchild
All received help from outside household	
Most likely to give help within household	
Most likely to need help and get help	
If helped, helped by kid or grandkid	

Source: SHARE 2004 & 2006

3.2 Network Variation

There is considerable variation in the frequency and distribution of network types across and within each country. The Swedish and Danish have the lowest proportion in cluster 1, while the Italians, Greeks, Swiss and Irish have the highest. Spain and Israel are overrepresented for cluster 2, while the Netherlands, Denmark, Ireland and Belgium are underrepresented. The Czech Republic has the highest proportion in cluster 3, while Ireland has the lowest. Sweden, Denmark, Belgium and the Netherlands have the highest proportion in category 4, while Spain has by far the lowest. The proportion in cluster 4 by country is presented in figure 1. There is therefore some evidence of a north-south gradient in social interaction. It is important to state here that these results do not contradict the perception that southern European countries are more family oriented, cluster 4 reflects individuals who are engaged with *both* family *and* community, whereas cluster 3 refers to those individuals whose only source of social interaction is their families. The cross country differences may in part reflect heterogeneity in education levels between network types. Geographical location also plays a role in the within and between country distribution of each network type and previous literature has identified locality as an important determinant of network type (Phillipson et al., 1998, Phillipson, 2002). In order to identify the independent effect of a variable on the probability of being in a particular cluster, and establish that a single variable does not distinguish the clusters, we estimate a pooled multinomial logit model. Further details are presented in the Appendix.

Figure 1: International Distribution of Clusters

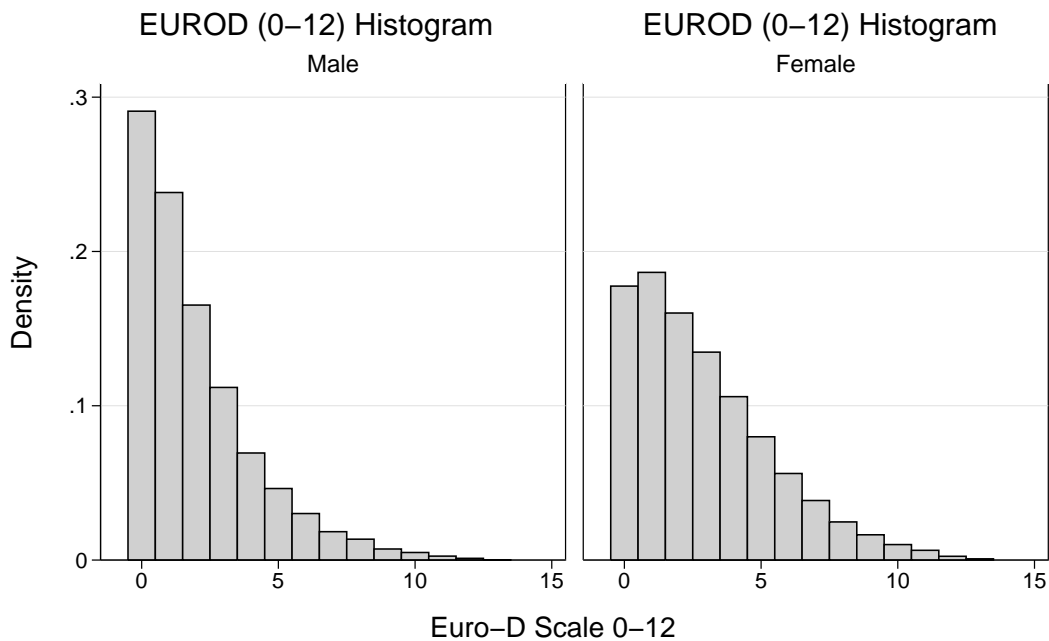


3.3 Depression

As is evident in figure 2 below, the distribution of the EURO-D scale across gender is indicative of higher levels of depressive symptoms among women. Kwachi and Berkman (2001) highlight the differential effects of social support on gender, suggesting that a potential explanation for the increased levels of psychological distress among women relates to the gender differences in social networks. There are also substantial cross country differences in the prevalence of depressive symptoms as shown in figure 3, which gives the average EURO-D score by country. There is a clear gradient, with northern countries generally reporting lower levels of depressive mood. To some extent this mirrors the pattern of higher proportions in the well integrated networks in these countries. Loneliness is a negative mental state, often present in conjunction with other depressive symptoms. It is a subjective feeling caused by the absence of a definite needed relationship or set of relationships. Social isolation and loneliness are heavily related and often co exist. However, loneliness can be experienced by individuals who are socially integrated. As can be seen in figure 4, there is substantial variation in mean scores for loneliness across the four social support network types, with cluster 3 (family-dependent) reporting the highest levels of perceived loneliness.⁴

⁴ Loneliness was measured in a self completed drop-off questionnaire which supplemented the main computer based questionnaire in SHARE. One question was asked: “How often have you experienced the feeling of loneliness over the last week?” Response categories ranged from one to four, one indicating “all the time”, two indicating “most of the time”, three indicating “some of the time” and four indicating “none of the time”. Cluster three also report the lowest levels of life satisfaction.

Figure 2: Gender Distribution of EURO-D Score



Graphs by Gender

Figure 3: Depression in Europe

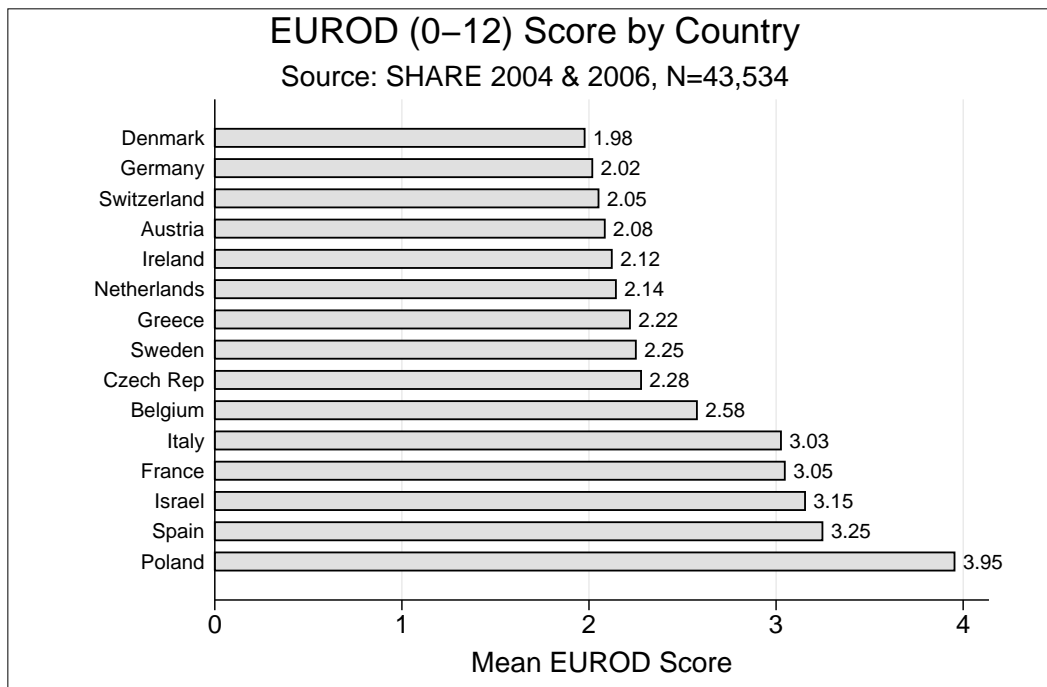
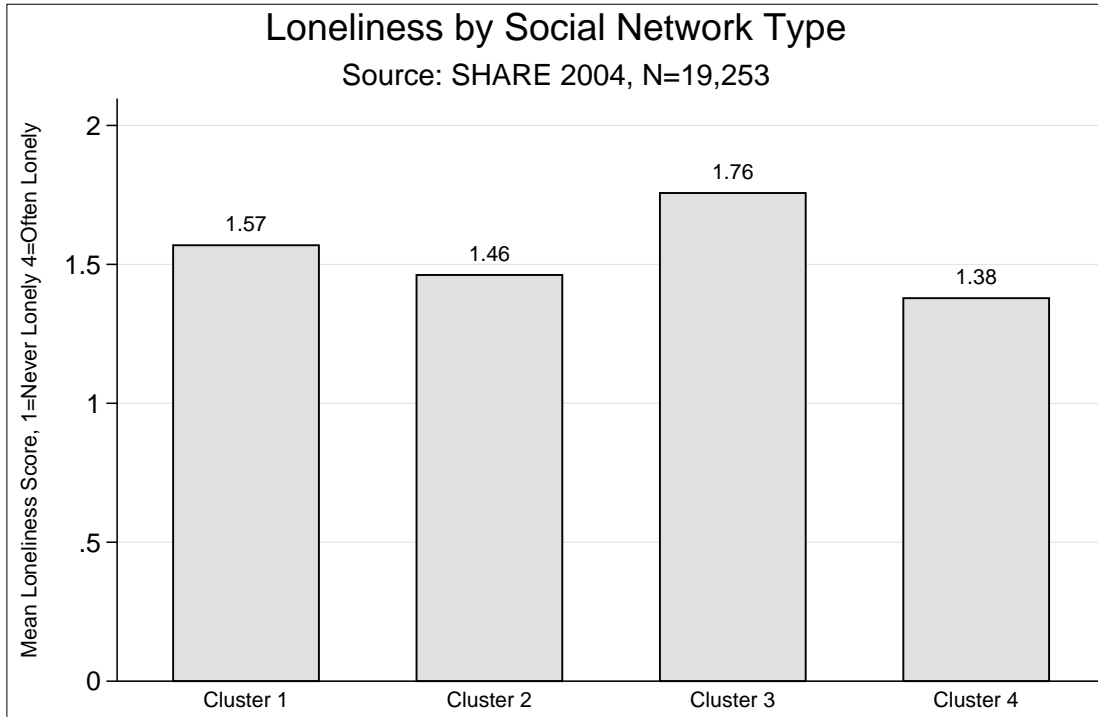
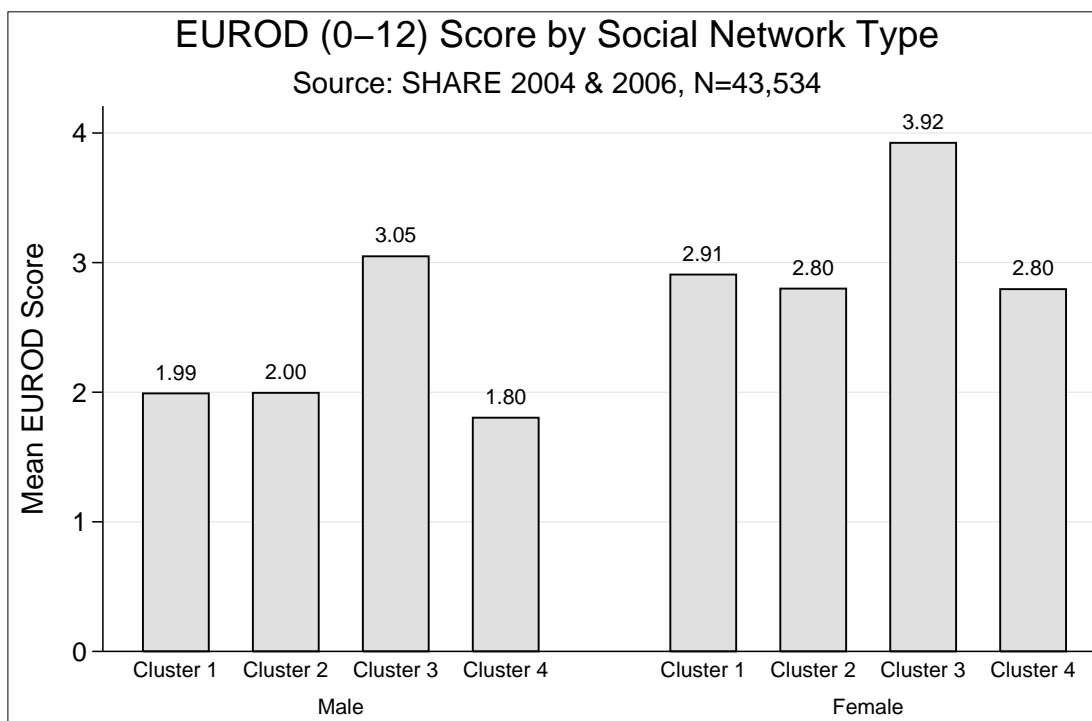


Figure 4: Loneliness



The Main Effects Hypothesis

In order to test the two hypotheses discussed in the introduction, we examine the relationship between wellbeing and social network type. We use levels of depressive mood (as measured by the EURO-D scale) as a measure of wellbeing and compare these across types of social interaction (as defined in section 3.1). When comparing mean levels of depressive mood across each social network type, there is preliminary evidence to support the main effects hypothesis as individuals in cluster 3 report higher levels of depressive mood than those in all other networks. It is important to state again here that cluster 3 reflects individuals who are reliant on their families for social interaction, in other words it is the reliance that is the potential negative, and the family. As discussed in the introduction, there are a number of issues that must be addressed before this can be interpreted as a causal relationship. Firstly, information in the data set on socio demographics such as age and education which could be driving this relationship must be controlled for. Secondly, we must account for the possibility that omitted variables such as personality are being captured by the cluster variable and affecting mental health. We model depression as a function of individual characteristics and membership of the four clusters. Even if we control for all characteristics available in the dataset, there may still be some other factor which is unique to the individual, and which is omitted. Once we assume that this factor does not change over time, then a fixed effects approach will provide consistent estimates of the effects of social network type. Although we argue that the fixed effects specification goes some way to addressing these concerns, as social interaction is a choice variable there will always be the concern that network type is associated with some time varying factor. It is also plausible that mental health could be the cause of an individual's social network, and not vice versa. Ideally this would be addressed using instrumental variables, however it is difficult to identify appropriate instruments in this case.

Figure 5: Depression by Social Network

Within SHARE we are able to control for a wide variety of socio demographic factors which influence mental health, including age, gender, marital status, employment status, health, socioeconomic status (using educational attainment as a proxy), whether the person is or was a smoker, and whether the person was born in the country of residence. The results from a panel regression involving individuals in waves one and two are presented in table 5. The first column is a random effects model which requires the assumption that there are no omitted variables (such as personality as discussed above), which are correlated with an individual's characteristics and their mental health. An advantage of using panel data is that we can control for any omitted variable that is time invariant by using changes for each individual over time. This is the procedure (fixed effects) that the second column implements.⁵ The coefficients are now only identified by movements from one category to another. It would be interesting to examine whether the effects are uniform (e.g. moving from cluster 4 into cluster 3), however we are concerned with the small sample size which results from considering specific transitions. A Poisson fixed effects model for count data gives similar results.⁶ The final two columns examine the role of gender in more depth by presenting the results for separate regressions for men and women. We choose cluster 4, Family and Community Integrated, as the base category, as these individuals appear to be the best integrated with their families and communities and the highest level of social interaction. The first column shows that being in cluster two has a significant positive effect on mental health relative to being in cluster 4 insofar as it reduces an individual's EURO-D score. Cluster 2, Spousal-Reliant, is the largest of the four networks and is characterised by a strong spousal interdependence, little or no social engagement outside the household and all support where needed is received from within the household, while no help is reported as received from outside the household. The higher levels of wellbeing as indicated by significantly lower levels of depressive mood experienced by those in this spousal reliant social network reflects the well established evidence of the association between partnership and wellbeing in later

⁵ In fact a Hausman test rejects the RE model.

⁶ See Appendix C.

life. Indeed it has long been accepted that singlehood is associated with considerable negative circumstances in later life, including higher late life mortality risk. For this group, the absence of a broad and diverse social network and lower levels of social engagement outside the household may be understood by the characteristics of it's members and their associated behaviours; couples who have aged together, who have a lengthy shared marital history and a long standing supportive bond. Furthermore, the presence of a spouse in later life is often used a proxy measure for the presence of a close confidant; a circumstance which has repeatedly been evidenced as promoting wellbeing in later life. Interestingly in this study, the positive effect on mental health of being in this social network is most prominent for women compared to men. Being in cluster 3, Family Dependent network, has a significant negative effect on mental health, again relative to cluster 4. When we control for the possibility that individuals may differ on unobservable variables and use fixed effects, we find that the magnitude of the coefficients is slightly reduced, however the interpretation remains the same. The result for cluster 3 remains robust when controlling for individual heterogeneity. This coefficient does not differ depending on the model, and at .2 is similar to the effect of divorce. Other variables have the expected effects.⁷ Poor health appears to be the most important predictor of mental health. The negative coefficient on age is consistent with previous research (Cornwell et al., 2008). We find that only women are affected adversely by being in a network with low levels of engagement as the coefficient on cluster 3 is insignificant for men. Likewise, only women appear to benefit from strong spousal support.

There may be time variant unobservables which are not adequately addressed in a panel specification, however as it stands the model is tightly controlled. We can be sure that the effects of health, marital status, ability to make ends meet and labour market status are not a source of bias in our results.

⁷ Height is included as a marker for early life conditions, while smoking is a proxy for risk preferences.

Social Networks And Mental Health: Evidence From SHARE

Table 5: EURO-D Panel Regression

VARIABLES	Panel RE EURO-D	Panel FE EURO-D	Panel FE (Men) EURO-D	Panel FE (Women) EURO-D
Cluster 1	-0.0592 (0.0382)	-0.115 (0.0938)	-0.0191 (0.128)	-0.178 (0.133)
Cluster 2	-0.237*** (0.0262)	-0.142*** (0.0355)	-0.0701 (0.0484)	-0.197*** (0.0510)
Cluster 3	0.202*** (0.0469)	0.195*** (0.0600)	0.136 (0.0935)	0.229*** (0.0783)
Partnership	-0.0234 (0.0885)	-0.260 (0.171)	-0.421* (0.227)	-0.0860 (0.256)
Separated	0.269** (0.119)	0.169 (0.177)	0.286 (0.224)	0.0468 (0.264)
Never Married	0.110** (0.0549)	-0.0871 (0.0849)	-0.000313 (0.116)	-0.174 (0.123)
Divorced	0.206*** (0.0487)	0.228*** (0.0728)	0.172* (0.102)	0.247** (0.103)
Widowed	0.310*** (0.0371)	0.280*** (0.0539)	0.0540 (0.0824)	0.357*** (0.0713)
Female	0.714*** (0.0380)			
Age	-0.106*** (0.0163)	-0.241*** (0.0571)	-0.388*** (0.0852)	-0.134* (0.0777)
Age Squared	0.000835*** (0.000121)	0.00139*** (0.000392)	0.00219*** (0.000601)	0.000802 (0.000524)
Very Good Health	0.250*** (0.0297)	0.174*** (0.0420)	0.201*** (0.0556)	0.145** (0.0624)
Good Health	0.686*** (0.0317)	0.379*** (0.0475)	0.342*** (0.0633)	0.396*** (0.0700)
Fair Health	1.512*** (0.0412)	0.886*** (0.0625)	0.824*** (0.0884)	0.920*** (0.0883)
Poor Health	2.953*** (0.0712)	1.837*** (0.0997)	1.870*** (0.154)	1.818*** (0.133)
Never Smoked	-0.0703* (0.0383)	0.218*** (0.0822)	0.172 (0.108)	0.147 (0.128)
Stopped Smoking	-0.0264 (0.0339)	0.204*** (0.0774)	0.280*** (0.0987)	0.123 (0.123)
Not Born in Country	0.116** (0.0476)	0.0687 (0.0731)	0.0486 (0.106)	0.0833 (0.101)
Constant	5.681*** (0.687)	11.70*** (2.354)	17.35*** (3.433)	7.784** (3.235)
Observations	33,076	33,762	14,938	18,824
Number of panelid	17,192	18,063	7,995	10,068
R-squared	.	0.051	0.055	0.054

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses

Controls: Education, Country, Area, Year, Make Ends Meet, Labour Market Status, Height
Omitted categories: Cluster 4, Married, Male, Excellent Health, Never smoked, and Born in country

Note: the dependent variable is the EURO-D 0-12 scale, where 0 indicates no depression

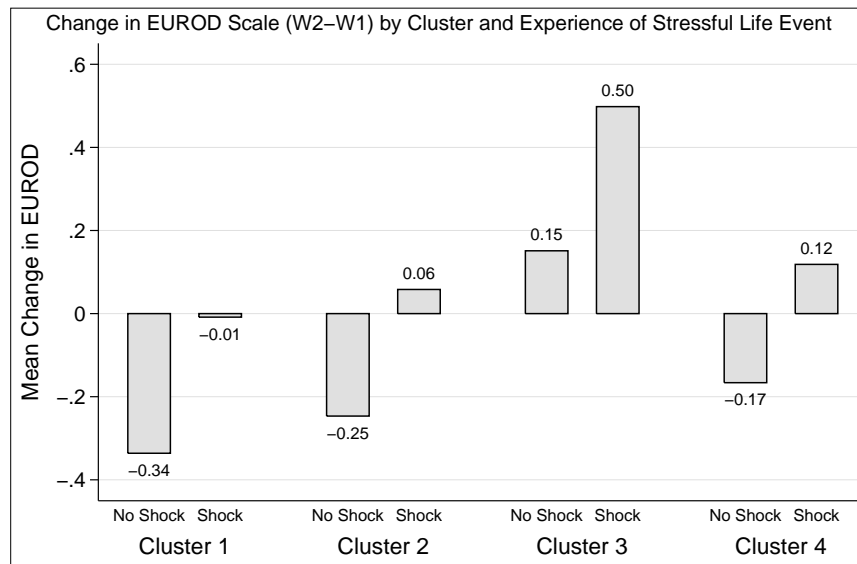
Source: SHARE 2004 & 2006

Turning to the issue of how the effect of social support manifests itself, we have already documented in Figure 4 that those in Network three report the highest levels of loneliness. By including this variable in the regressions presented above, the negative effect of having this social network type is reduced by around 25%. We conclude that loneliness is a potential mechanism through which the observed relationship between mental health and social network type may be operating.

The Buffer Hypothesis

In order to examine the buffer hypothesis (i.e. whether an individual’s social network is only important in the presence of stress), we identify individuals who experienced negative life events between waves. As the data do not contain sufficient time periods to identify the impact of specific transitions, we define a negative life event as one of the following: the death of a parent, becoming unemployed, onset of bad health, relationship breakdown (separation or divorce) or widowhood. This provides us with 6,631 transitions. It would be a concern if one group was experiencing more negative events, however we find that this is not the case. We adopt a difference in differences approach and regress the change in a person’s EURO-D scale on their characteristics in 2006. We include a dummy variable for whether the person experienced one of the stressful life events outlined above, and a dummy variable for membership of cluster 3 in 2006 (including the other clusters in the analysis does not change the results). There is also an interaction term to test whether a negative event has an additional effect on mental health for those in cluster 3. If the buffer hypothesis is correct, we would expect to see a larger impact of experiencing such a shock for individuals in social networks with lower levels of engagement (i.e. those in cluster 3). An examination of the descriptive statistics, however, reveals that the effect of a shock is similar for each social network type. As is evident from figure 6, the difference in the change in the EURO-D scores between those who experience a shock and those who do not is around .3 for each cluster.

Figure 6: Stress and Depression



These results are confirmed in a regression analysis. The effect of being in cluster three is again significant,

Social Networks And Mental Health: Evidence From SHARE

as is the effect of suffering from a negative life event. However, there is no additional effect of being in cluster three and suffering from a negative life event. Therefore we find no evidence to support the hypothesis that when faced with a negative life event, those with weaker social support networks experience an additional negative impact on their mental health. We have presented results for cluster 3 here, however the interaction terms for the other clusters are also insignificant.

Table 6: Buffer Hypothesis Regression

VARIABLES	Differences in Differences OLS Regression Change in EURO-D
Partnership	-0.0643 (0.14)
Separated	-0.434** (0.172)
Never Married	-0.305*** (0.0805)
Divorced	-0.183** (0.0739)
Widowed	-0.106* (0.0546)
Female	-0.126** (0.05)
Age	0.00945*** (0.0026)
Cluster 3	0.189** (0.0794)
Negative Event	0.407*** (0.042)
Cluster 3 X Negative Event	0.0633 (0.136)
Very Good Health	-0.0232 (0.0568)
Good Health	-0.159*** (0.0575)
Fair Health	0.305*** (0.0639)
Poor Health	1.182*** (0.102)
Never Smoked	-0.0984 (0.201)
Stopped Smoking	0.0773* (0.0456)
Not Born in Country	-0.0237 (0.0693)
Constant	-1.384** (0.563)
Observations	15,715
R-squared	0.044

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1
 Controls: As Table 5

Source: SHARE 2004 & 2006

4 Conclusions

The sample size that a survey of this scale provides is a significant advantage and using this dataset allows us to build on several aspects of the previous literature which relates social network type to wellbeing. Firstly, the SHARE study is longitudinal. Secondly, the international dimension allows us to make cross country comparisons using comparable data. Considerable cross-country variation in social support has been evidenced which emulates previous research supporting a North-South gradient in European social and family life (Tomassini, Kalogirou et al. 2004). Thirdly, the interdisciplinary nature of the dataset enables us to include additional direct measure of support to complement measures of social networks used in previous studies. Our measure of network type includes 20 variables relating to social engagement, family structure, community and exchanges of help and support.

The prevalence of depressive symptoms between countries is equally diverse, and most importantly, this study has highlighted the statistical link between the two. This relationship has been reaffirmed in this paper, with northern European countries tending to exhibit lower levels of depression, and a higher proportion of their populations in the well integrated social network type. At the individual level, we are able to take advantage of the rich nature of the SHARE data to control for a number of characteristics. We address omitted variable bias by using standard panel data techniques and difference in differences.

Where psychiatric epidemiology has highlighted an excess of depression among older women, this is reiterated in this study across the 14 participating European countries. Profiling individuals by their social network type provides a means of identifying those most at risk of developing depressive symptoms as they age. Across all approaches, we find a robust result that for women, weak social support networks are associated with higher levels of depressive mood (the main effects hypothesis). The magnitude of this effect is significant, and appears to be mediated through feelings of loneliness. Strong spousal support is also found to have a positive effect, but again only for women. We find no evidence that network membership either exacerbates or mitigates the effect of negative life events on depressive mood for either gender (the buffer hypothesis).

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Appendix A: Cluster and Country Comparisons

Table 7: Cross Country Differences

(a) Between Country Distribution

Cluster	Austria	Germany	Sweden	Netherlands	Spain	Italy	France	Denmark	Greece	Switzerld	Belgium	Israel	Czech Rep	Poland	Ireland	Total
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1 Local, self-contained	4.6%	7.9%	4.7%	7.0%	8.4%	12.6%	8.4%	4.1%	16.3%	4.3%	10.2%	3.1%	3.2%	3.0%	2.3%	100.0%
2 Private restricted	5.3%	7.9%	8.5%	7.7%	9.1%	9.2%	10.1%	5.5%	8.9%	3.8%	9.2%	4.4%	4.0%	4.8%	1.6%	100.0%
3 Family dependent	6.0%	10.0%	8.5%	8.1%	5.6%	6.0%	8.0%	6.4%	10.4%	2.6%	11.3%	4.3%	7.2%	4.4%	1.2%	100.0%
4 Locally Integrated	4.4%	9.2%	13.5%	12.0%	2.6%	5.5%	8.3%	10.6%	4.6%	3.8%	14.3%	2.8%	4.6%	2.1%	1.7%	100.0%

Source: SHARE 2004 & 2006

(b) Within Country Distribution

Cluster	Austria	Germany	Sweden	Netherlands	Spain	Italy	France	Denmark	Greece	Switzerld	Belgium	Israel	Czech Rep	Poland	Ireland	Average
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1 Local, self-contained	18.9%	19.0%	10.7%	16.5%	24.8%	29.9%	18.9%	12.7%	35.2%	23.3%	19.1%	17.0%	15.1%	16.4%	27.6%	20.5%
2 Private restricted	46.3%	40.7%	41.1%	38.7%	57.1%	46.4%	48.6%	36.5%	40.8%	44.0%	36.7%	51.6%	40.6%	56.5%	39.6%	43.6%
3 Family dependent	12.7%	12.6%	10.2%	10.0%	8.7%	7.4%	9.4%	10.4%	11.7%	7.5%	11.1%	12.5%	17.8%	12.5%	7.3%	10.7%
4 Locally Integrated	22.1%	27.6%	38.0%	34.9%	9.4%	16.2%	23.1%	40.4%	12.3%	25.2%	33.1%	18.9%	26.5%	14.5%	25.5%	25.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: SHARE 2004 & 2006

Social Networks And Mental Health: Evidence From SHARE

Table 8: Education Level By Cluster

Cluster	ISCED Educational Qualification							Total
	None	Primary	Lower Secondary	Upper Secondary	Post-Secondary	Tertiary	Postgraduate	
	%	%	%	%	%	%	%	
1 Local, self-contained	3.3%	23.1%	17.0%	29.8%	3.5%	22.6%	0.7%	100.0%
2 Private restricted	5.4%	30.9%	17.8%	27.4%	2.6%	15.5%	0.4%	100.0%
3 Family dependent	9.5%	37.7%	17.3%	22.0%	1.7%	11.7%	0.1%	100.0%
4 Locally Integrated	1.9%	18.9%	19.4%	32.0%	3.4%	24.1%	0.4%	100.0%

Source: SHARE 2004 & 2006

Table 9: Location By Cluster

Cluster	Area of Residence					Total
	Big city	Suburbs or outskirts of a big city	Large town	Small town	Rural area or village	
	%	%	%	%	%	
1 Local, self-contained	20.9%	17.0%	18.2%	20.1%	23.7%	100.0%
2 Private restricted	15.3%	15.9%	19.4%	23.4%	26.0%	100.0%
3 Family dependent	14.3%	15.6%	20.3%	22.9%	26.9%	100.0%
4 Locally Integrated	12.3%	18.5%	19.5%	24.2%	25.6%	100.0%

Source: SHARE 2004 & 2006

Appendix B: Cluster Comparison Regression

Table 10: Pooled Multinomial Logit Model (Base Outcome: Cluster 4)

Variables	Cluster		
	1 Local, self-contained	2 Private restricted	3 Family dependent
Age	-0.0250*** (0.00195)	0.0354*** (0.00122)	0.0866*** (0.00190)
Female	-0.183*** (0.0313)	-0.0420* (0.0235)	0.274*** (0.0360)
Not Born in Country	0.233*** (0.0544)	0.215*** (0.0421)	0.364*** (0.0595)
Partnership	0.356*** (0.110)	0.0355 (0.0868)	0.187 (0.151)
Separated	0.0198 (0.126)	-0.175* (0.102)	0.393*** (0.144)
Never Married	2.665*** (0.0719)	-0.270*** (0.0837)	-0.0651 (0.122)
Divorced	-0.0254 (0.0598)	-0.144*** (0.0448)	0.320*** (0.0680)
Widowed	0.347*** (0.0488)	-0.150*** (0.0377)	0.551*** (0.0456)
Suburbs or outskirts of a big city	-0.229*** (0.0511)	-0.0887** (0.0418)	-0.00403 (0.0624)
Large town	-0.358*** (0.0500)	-0.0894** (0.0406)	0.0461 (0.0592)
Small town	-0.410*** (0.0501)	-0.103** (0.0403)	0.00846 (0.0595)
Rural area or village	-0.349*** (0.0494)	-0.0928** (0.0399)	0.0635 (0.0588)
Primary	-0.105 (0.103)	-0.233*** (0.0773)	-0.718*** (0.0913)
Lower Secondary	-0.132 (0.105)	-0.437*** (0.0793)	-1.136*** (0.0974)
Upper Secondary	-0.104 (0.103)	-0.530*** (0.0779)	-1.287*** (0.0953)
Post-Secondary	-0.0539 (0.131)	-0.683*** (0.102)	-1.510*** (0.151)
Tertiary	-0.0161 (0.105)	-0.697*** (0.0795)	-1.433*** (0.0996)
Postgraduate	0.00691 (0.225)	-0.597*** (0.189)	-1.857*** (0.447)
Constant	1.490*** (0.187)	-0.898*** (0.131)	-5.629*** (0.189)
Observations	59,196	59,196	59,196

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Omitted Categories: Male, Born in Country, Married, Big City, No Education

Appendix C: Count Data Estimators

Table 11: EURO-D Count Data Panel Regression

VARIABLES	Poisson RE Regression EURO-D	Poisson FE Regression EURO-D
Cluster 1	-0.0283* (0.0165)	-0.0571 (0.0360)
Cluster 2	-0.106*** (0.0120)	-0.0649*** (0.0160)
Cluster 3	0.0555*** (0.0172)	0.0520** (0.0224)
Partnership	-0.0181 (0.0438)	-0.104 (0.0759)
Separated	0.0887* (0.0468)	0.0483 (0.0693)
Never Married	0.0483** (0.0230)	-0.0377 (0.0346)
Divorced	0.0839*** (0.0210)	0.0810** (0.0328)
Widowed	0.116*** (0.0144)	0.0979*** (0.0213)
Female	0.323*** (0.0163)	
Age	-0.0467*** (0.00671)	-0.122*** (0.0240)
Age Squared	0.000363*** (4.91e-05)	0.000694*** (0.000158)
Very Good Health	0.167*** (0.0189)	0.110*** (0.0257)
Good Health	0.394*** (0.0185)	0.213*** (0.0267)
Fair Health	0.696*** (0.0202)	0.401*** (0.0298)
Poor Health	1.021*** (0.0244)	0.620*** (0.0351)
Never Smoked	-0.0419** (0.0170)	0.0996*** (0.0349)
Stopped Smoking	-0.0102 (0.0152)	0.101*** (0.0334)
Not Born in Country	0.0450** (0.0196)	0.0182 (0.0306)
Observations	33,076	27,262
Number of panelid	17,674	13,638

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses

Controls: Education, Country, Area, Year, Make Ends Meet, Labour Market Status, Height

Source: SHARE 2004 & 2006

List of Tables

1	Summary of Psychological Processes Linking Social Support to Wellbeing	3
2	Differentiating Variables for Cluster Analysis of Social Support Networks	7
3	Social Networks Composition	7
4	Summary of Key Social Support Network Characteristics	9
5	EURO-D Panel Regression	15
6	Buffer Hypothesis Regression	17
7	Cross Country Differences	21
8	Education Level By Cluster	22
9	Location By Cluster	22
10	Pooled Multinomial Logit Model (Base Outcome: Cluster 4)	23
11	EURO-D Count Data Panel Regression	24

List of Figures

1	International Distribution of Clusters	10
2	Gender Distribution of EURO-D Score	11
3	Depression in Europe	11
4	Loneliness	12
5	Depression by Social Network	13
6	Stress and Depression	16