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6

Early Retirement, Mental Health, and Social Networks

Axel Börsch-Supan and Morten Schuth

6.1 Introduction

This chapter explores the interrelationships between early retirement, mental health—including cognition and subjective well-being—and the size and composition of social networks among older individuals in the Survey of Health, Ageing and Retirement in Europe (SHARE). We argue that early retirement has negative side effects on the size and intensity of the retirees' social networks. These side effects appear to explain part of the accelerated cognitive aging that occurs after early retirement.

Early retirement is popular in Europe. It is seen as a much appreciated social achievement that increases personal well-being, particularly among

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employees who suffer from work-related health problems. First introduced in the 1970s and 1980s, generous early retirement provisions in most European countries were instituted with few actuarial adjustments, if any (Gruber and Wise 1999). But times have changed since then. In response to the growth of the older segment of the population and to the precarious financial state of the public pension system, the costs of early retirement have come under increased scrutiny. This has led to a string of pension reforms in Europe since the 1990s, reducing pay-as-you-go pension benefits and introducing multipillar pension systems with supplemental occupational and individual pensions, in addition to the traditional unfunded retirement insurance (Börsch-Supan 2012).

Despite the enormous increase in life expectancy all over Europe, policymakers are still largely unwilling to challenge the widely popular early and normal retirement ages. Politically speaking, reducing the generosity of early retirement is often seen as "touching the third rail," with a fatal shock delivered at the next election. A case in point is France, where a timid increase in the retirement age, from sixty to sixty-two years, was partially reverted after the most recent presidential elections.

While many studies have addressed the macro connotations of early retirement, particularly its large costs, another body of literature has looked at the individual implications of early retirement. An immediate benefit from early retirement is the receipt of income support without the necessity to continue working, enabling individuals to enjoy more leisure. Moreover, early retirement relieves workers who feel constrained in their place of work, whether due to stressful job conditions or to work-impeding health problems. For such individuals, early retirement should manifest itself in an improvement of well-being and, potentially, also health. On the other hand, early retirement might also be harmful, because individuals who stop working may lose a purpose in life. This might, in turn, decrease subjective well-being and mental health. Early retirement may after all not be the bliss that many individuals hope for.

Börsch-Supan and Jürges (2006), using the German Socio-Economic Panel data, found that individuals were less happy in the year of early retirement than in the years before and after retirement. Moreover, individuals generally attained their preretirement satisfaction levels relatively soon after retirement. Hence, the early retirement effect on well-being appears to be negative and short lived rather than positive and long lasting, similar to what occurs in the set point model of happiness by Clark et al. (2003). Charles (2002) studied the effect of retirement on depression, and Lindeboom, Portrait, and van den Berg (2002) studied the effect of retirement and other factors (a significant decrease in income, death of the spouse, disability, and a move to a nursing home) on the mental health of individuals, using data from the Longitudinal Aging Study Amsterdam (LASA).

A seminal paper by Adam et al. (2007) based on SHARE found that cognition—measured mainly by memory abilities such as delayed word recall—

declined during retirement. This controversial finding has sparked an entire literature. While there are a few papers with the opposite result (Coe and Lindeboom 2008; Coe et al. 2012) based on US data exploiting variation in occupational pension plans, studies based on European data confirm the early findings (Bonsang, Adam, and Perelman 2010; Kuhn, Wuellrich, and Zweimüller 2010; Rohwedder and Willis 2010; and Mazzonna and Peracchi 2012) and show that the negative effect on cognition increases with the time in retirement. For a given age, these studies suggest that early retirees suffer more from cognitive and health decline than later retirees.

Research on these often emotional and highly contested issues is complicated by the fact that the measures of well-being, cognition, and health that are commonly available in general purpose surveys may suffer from justification bias (Bound 1991). That is, early retirees may report worse health in order to justify their early exit from the workforce. Moreover, early retirement is not an exogenous outcome, but is likely to be related to ill health and lower cognitive abilities. For example, persons in bad health are likely to retire earlier but also to report worse life satisfaction. Finally, those that hope or believe that life satisfaction will increase after retirement are more likely to retire at any age. We thus face the usual task of disentangling cause and effect.

The separation of selection effects and reverse causality from the genuine impacts of early retirement on well-being and health requires advanced econometric techniques that tend to make results controversial. The econometric problem is to find a counterfactual value for well-being and health had a person not taken early retirement. The usual instruments for identifying such a counterfactual are policy changes in early retirement rules, such as changes in the pensionable age or changes in the actuarial adjustments. The Survey of Health, Ageing and Retirement in Europe (SHARE), used for this chapter and described in section 6.2, is useful in this respect, as it provides institutional and credibly exogenous variation across countries to provide the necessary counterfactual. Moreover, since SHARE is a panel, the data also include conditioning variables describing health and well-being in earlier stages of life. Part of the difference between the US studies based on occupational pension plans and the European studies based on social security laws may reflect the better identification possible in the SHARE data.

This chapter goes one step further and investigates potentially causal mechanisms for the effects of early retirement on mental health, especially cognition. Its central hypothesis is derived from the anchoring function of employment: work, even if unpleasant and arduous, provides social contacts. Even disliked colleagues and a bad boss, we argue, are better than social isolation because they provide cognitive challenges that keep the mind active and healthy.

We briefly describe our data in section 6.2. The current analysis takes advantage of a major innovation in SHARE wave 4, the social network

data based on a name generator that identifies those persons with whom the respondents "discuss things that are important to them," that is, "good or bad things that happen to you, problems you are having, or important concerns you may have."[1] In the first step, we find significant correlations among early retirement, mental health and social networks, which give first evidence for our line of reasoning (section 6.3). This explanation is confirmed and strengthened in the second step when we control for other possible determinants (section 6.4). Unobserved common factors and potential reverse causality, however, call for an instrumental variable approach. This is done in section 6.5, which is the core of the paper. Using instruments describing the retirement regulations, similar to the approaches taken by Rohwedder and Willis (2010); Bonsang, Adam, and Perelman (2010); and Mazzonna and Peracchi (2012), plus regional variables describing social capital as instruments for the size and intensity of individual social networks confirms our findings. Section 6.6 concludes.

6.2 The SHARE Data

The Survey of Health, Ageing and Retirement in Europe (SHARE, see Börsch-Supan and Jürges [2005] and Börsch-Supan et al. [2005, 2008, 2011, 2013]) is a unique multidisciplinary and cross-national panel database of ex ante harmonized micro data on health, socioeconomic status, and social and family networks covering most of the European Union and Israel. To date, SHARE has collected three panel waves (2004, 2006, 2010) of current living circumstances and one wave of retrospective life histories (2008, SHARELIFE). Six additional waves are planned until 2024. SHARE gives a broad picture of life after age fifty, measuring physical and mental health, both objectively and subjectively; economic and noneconomic activities, income and wealth by sources; intergenerational transfers of time and money within and outside of the family; as well as life satisfaction and well-being. SHARE is modeled after, and harmonized with, the US Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA). In turn, together with these two surveys, SHARE has become a role model for further aging surveys worldwide. SHARE's scientific power is based on three key features: its panel design that grasps the dynamic character of the aging process, its multidisciplinary approach that delivers the full picture of the individual and societal aging, and its cross-nationally ex ante harmonized design that permits international comparisons of health, economic, and social outcomes within Europe and between Europe and the United States.

In four waves of SHARE, more than 150,000 interviews have been conducted with about 86,000 respondents age fifty and over and their poten-

1. Quotes from the SHARE wave 4 questionnaire (see Malter and Börsch-Supan 2013).

tially younger partners in nineteen countries (Austria, Belgium, Switzerland, Czech Republic, Germany, Denmark, Estonia, Spain, France, Greece, Hungary, Ireland, Israel, Italy, Netherlands, Poland, Portugal, Sweden, and Slovenia).

The SHARE target population consists of all persons born in 1954 or earlier in wave 1 (2004–2005), 1956 or earlier in wave 2 (2005–2006), and 1960 or earlier in wave 4 (2010–2011), who have their regular domicile in the respective SHARE country. A person is excluded if she or he is incarcerated, hospitalized, or out of the country during the entire survey period, unable to speak the countries' language(s) or has moved to an unknown address. In addition, current partners living in the household are interviewed regardless of their age. All SHARE respondents that were interviewed in any previous wave are part of the longitudinal sample. They are traced and reinterviewed if they moved within the country.

Covering the key areas of life, namely health, socioeconomics and social networks, SHARE includes a great variety of information: health variables, physical measures and biomarkers, psychological variables, economic variables, and social support variables as well as social network information. While the regular waves of SHARE, such as waves 1, 2, and 4, deal with the respondents' current living conditions, wave 3 (SHARELIFE) was conducted as a retrospective survey in order to collect information about the respondents' life histories.

The interviewers used computer-assisted personal interviewing (CAPI) to collect most of the data in all waves. In addition, self-administered (drop-off) questionnaires were handed out in waves 1, 2, and 4 after completion of the CAPI. If respondents deceased, end-of-life interviews were conducted face-to-face (CAPI) or by telephone (CATI) with a proxy, collecting the information regarding the respondent's last year of life. Proxy interviews were also used when respondents were not able to do an interview; for example, due to health reasons.

Even though SHARE is a panel survey with a stable core questionnaire over time, innovative research questions, physical measurements, or modules have been incorporated in each wave. For example, in wave 2, two physical measurements—peak flow and chair stand—were added (see next section for details). In wave 4 a completely new module—the social networks module based on a name-generator approach—has been implemented to learn more about the social connectedness of respondents. It is one of the key variables in this chapter.

In SHARELIFE, retrospective data with respect to childhood living circumstances, partners, children, accommodation, employment, socioeconomic and health conditions were collected with the help of a "Life History Calendar" similar to the one applied in ELSA. In this chapter, the life histories are essential to reconstruct the life courses of the respondents. One may suspect that this retrospective information provided by respon-

dents is incomplete or inaccurate. SHARE has therefore cooperated with the German Pension Fund (DRV) and linked the German survey data with administrative data held by the DRV. These administrative data are much more complete and accurate since they are process generated. We have used these administrative data for this chapter to check the validity of the self-reported employment histories in Germany and found a very close match (Korbmacher 2013).

From the first wave on, SHARE combined self-reports on health with physical performance measurements. In this chapter, we use grip strength as the most objective measure of physical health available in SHARE.

The core variables in this chapter are based on wave 4 of SHARE. Explanatory and auxiliary variables, however, are taken from all waves. We restrict our analyses on all individuals who are retired, for whom the retirement year could be ascertained (some 21,000 individuals), and who retired at or after the applicable statutory retirement age.

6.3 The Triangle of Early Retirement, Mental Health, and Social Networks

Figures 6.1 and 6.2 visualize the main story behind this chapter. Figure 6.1 shows the decline of cognition by age, separately for early and normal retirees. Cognition is measured by memory ability: the single values in immediate and delayed recall of a ten-word list and the sum of these two scores. The main point is that cognition is at all ages lower for early retirees, corresponding to about 1.5 years of aging on average.

Figure 6.2 shows the number of friends and former colleagues in the social network. While the relation is noisier than that of figure 6.1, it exhibits the same pattern: the number of friends and former colleagues in the social network also declines with age, and it is lower at all ages for early retirees.

Not only are cognition and social network size associated with early retirement, they are also correlated with each other, and these triangular relations hold for a broad set of measurement concepts for each of the three domains (see figure 6.3).

Figure 6.3 also serves to explain the key variables involved in this chapter. Individuals are categorized as retired when they self-report as retired. We then measure the time elapsed since retirement (time distance since retirement). We distinguish two retirement pathways: normal retirement (NR) at or after the statutory retirement age, and early retirement (ER) for all other labor force exits in the window of early retirement; that is, between the applicable statutory early retirement age and the normal statutory retirement age in each country. The two key variables for retirement are the interactions of a pathway dummy with the time elapsed since retirement: "NRdist" and "ERdist." These variables are of particular interest since they best describe the "dose" of retirement exposure that may have triggered a "response" in terms of social networks and mental health, using the parlance of epidemiology.

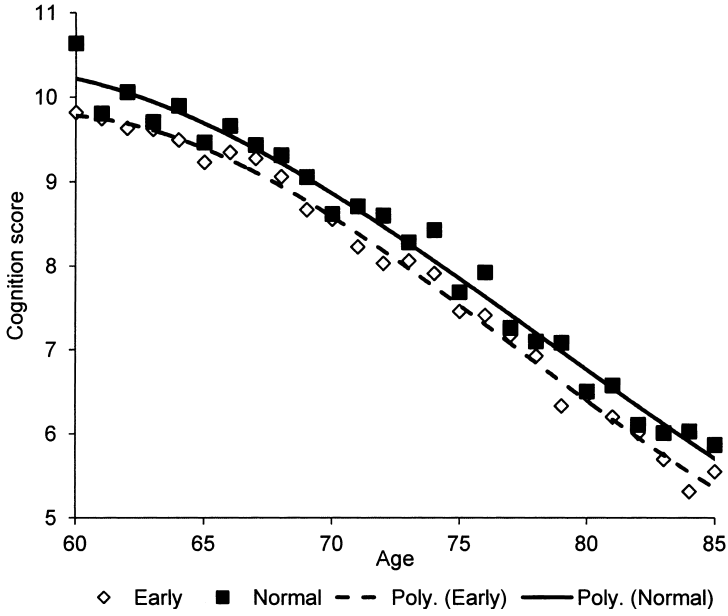

Fig. 6.1 Cognition by age and retirement pathway

Source: Own calculations from SHARE waves 1–2, release 2.5.0; wave 3, release 1; wave 4, release 1.1.1; full data set.

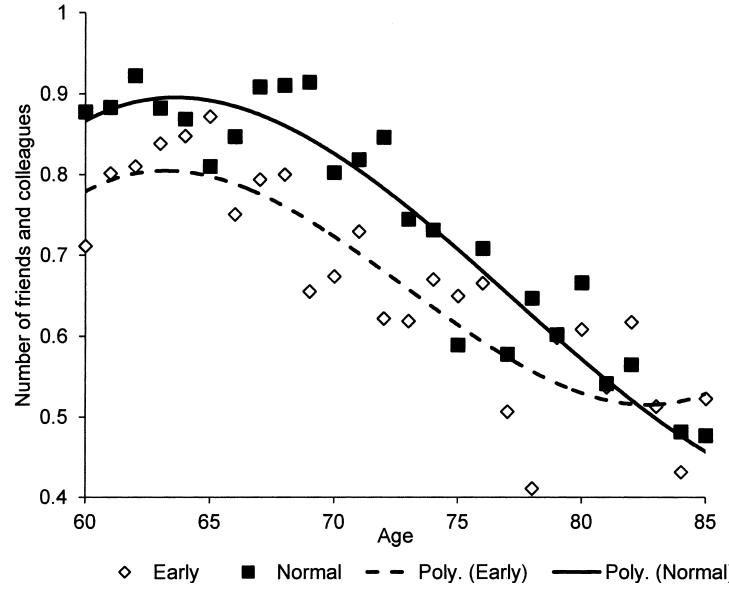

Fig. 6.2 Number of friends and former colleagues by age and retirement pathway

Source: Own calculations from SHARE waves 1–2, release 2.5.0; wave 3, release 1; wave 4, release 1.1.1; full data set.

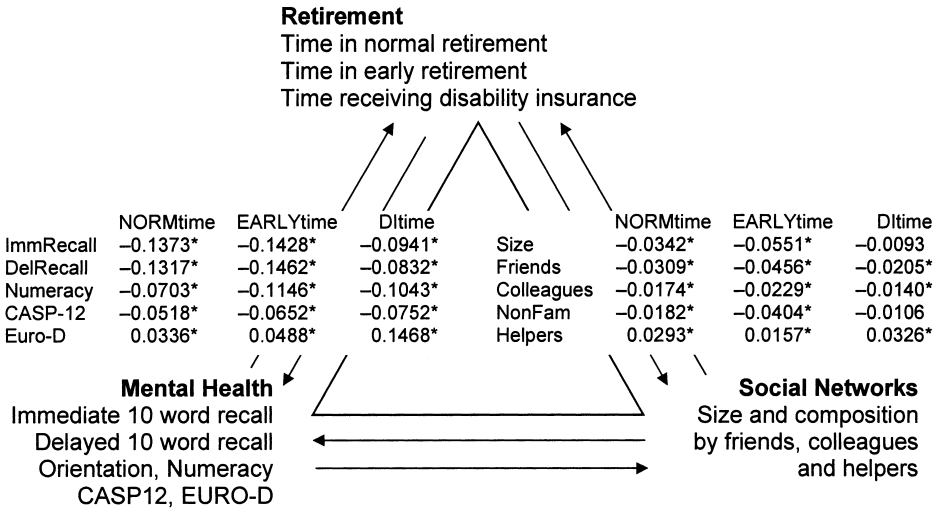

Fig. 6.3 Correlations in the triangle of early retirement, mental health, and social networks

Source: Own calculations from SHARE waves 1–2, release 2.5.0; wave 3, release 1; wave 4, release 1.1.1; full data set.

Mental health is measured by five variables: the number of words recalled from a list of ten—both immediately (ImmRecall) and delayed (after about thirty minutes) (DelRecall)—and a composite indicator of numeracy. In our later analyses, we will add the scores of immediate and delayed recall and simply call it "Cognition." We add a twelve-item composite scale (CASP-12) designed to measure the quality of life in old age, adapted by SHARE from the original nineteen-item scale (Hyde et al. 2003), and a depression scale (EURO-D) targeted at severe depression symptoms (Prince et al. 1999).

We characterize social networks, the third domain in this chapter, by their size (number of individuals mentioned as close confidants) and their composition, focusing on nonfamily members, including friends and colleagues. More precisely, the variable "sn_size" counts all members of the social network and "friends&c" counts the number of friends and former colleagues/coworkers in the network.

Figure 6.3 reports the correlations among these variables, based on the working sample that includes all individuals who have retired by wave 4. Asterisks mark statistically significant relationships between the variables (at 1 percent).

Time since retirement is significantly related to all mental health variables: it affects cognition and well-being negatively and increases the measure of depressive symptoms. Moreover, the time elapsed after an early retirement has stronger associations with worsening mental health than the time elapsed since normal retirement, although individuals retiring early are almost always younger than those retiring at the pensionable age.

Time elapsed since retirement is also correlated with smaller social networks, both overall and concerning colleagues, friends, and other nonfamily members. Again, this time effect is stronger for early retirees than normal retirees. Correlations with the number of formal helpers have, as expected, exactly the opposite pattern.

Finally, the association between social networks and mental health is highly significant. Larger social networks are strongly associated with better cognitive abilities, higher subjective well-being, and less depression.

The main questions of this chapter are now whether these relations uphold when the influence of other variables (section 6.4) and potential reverse causality are accounted for (section 6.5).

6.4 Controlling for Other Determinants

The correlations depicted may have many reasons. An underlying common cause could be physical health. Individuals with worse physical health tend to retire earlier. They may have mobility problems and therefore less ability to maintain their social network. Suffering from bad physical health is likely to reduce well-being and increase depression, and to reduce mental health and cognition either directly (biologically) or indirectly (psychologically).

Demographic variables such as age, gender, and marital status also affect all three variables. Retirement rules are age and gender specific in all SHARE countries; age, gender, and marital status are significant factors influencing morbidity, and they are associated with the size and closeness of social networks. Also education is likely to modify all the observed associations.

The following regression analyses control for these background variables. Health is characterized by functional abilities (basic activities of daily living, denoted by ADL, independent activities of daily living, denoted by IADL, and the global activity limitation indicator developed by van Oyen et al. 2006, denoted by GALI), the presence of one or more chronic illnesses (longill), and the objective measure of grip strength (maxgrip) measured in kilograms. We do not correct for subjective health as this is highly correlated with well-being once objective health is controlled for.

Age enters the regression as a quadratic polynomial, education is measured in years, and "couple" indicates that the respondent lives in a partnership, whether married or not.

Table 6.1 reproduces the findings quoted in the introduction to this chapter. Dependent variables are the cognition measures described in section 6.3,

Table 6.1 **The influence of retirement on cognition**

	ImmRecall (1)	ImmRecall (2)	DelRecall (3)	DelRecall (4)	Cognition (5)	Cognition (6)
ERdist	–0.013***	–0.004	–0.029***	–0.010***	–0.042***	–0.013**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.005)
NRdist	–0.013***	–0.003	–0.031***	–0.009**	–0.044***	–0.012**
	(0.003)	(0.003)	(0.004)	(0.004)	(0.007)	(0.006)
Female	0.829***	0.694***	0.920***	0.782***	1.748***	1.475***
	(0.033)	(0.034)	(0.040)	(0.040)	(0.066)	(0.067)
Age	0.037	0.007	0.061**	0.018	0.096*	0.024
	(0.025)	(0.025)	(0.029)	(0.029)	(0.049)	(0.049)
Age_sq	–0.001***	–0.000**	–0.001***	–0.000**	–0.001***	–0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Couple	0.098***	0.119***	0.037	0.054*	0.134***	0.172***
	(0.025)	(0.025)	(0.031)	(0.031)	(0.051)	(0.050)
Edu_years	0.092***	0.094***	0.096***	0.105***	0.188***	0.200***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.006)
Maxgrip	0.025***	0.020***	0.027***	0.022***	0.051***	0.042***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Longill	–0.092***	–0.055**	–0.143***	–0.062**	–0.236***	–0.118**
	(0.025)	(0.026)	(0.031)	(0.031)	(0.051)	(0.051)
ADL	–0.027	–0.013	–0.028	–0.016	–0.054	–0.028
	(0.021)	(0.021)	(0.023)	(0.022)	(0.039)	(0.039)
IADL	–0.204***	–0.204***	–0.198***	–0.188***	–0.404***	–0.394***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.032)	(0.032)
GALI	–0.072***	–0.072***	–0.135***	–0.095***	–0.208***	–0.168***
	(0.026)	(0.026)	(0.032)	(0.032)	(0.052)	(0.052)
COUNTRY FE		YES		YES		YES
Constant	3.032***	4.241***	0.481	2.109*	3.542*	6.393***
	(0.921)	(0.930)	(1.083)	(1.079)	(1.808)	(1.808)
N	19,893	19,893	19,887	19,887	19,897	19,897
Adj. *R*-sq	0.231	0.252	0.191	0.229	0.244	0.277

Note: Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

and the main explanatory variables are two variables indicating time spent in early and normal retirement (ERdist and NRdist). Columns (1), (3), and (5) show that retirement affects cognition even when other potential determinants are held constant. We are aware that such a regression may possibly reflect reverse causality. We will address this in section 6.5.

Table 6.2 shows that part of the explanation for this relation may be social networks. Adding the social network variables to the regression in table 6.1 increases the fit of the regression and reduces the coefficients of the early retirement variables. The social network variables have significant effects

Table 6.2 The influence of retirement and social networks on cognition

	ImmRecall (1)	ImmRecall (2)	DelRecall (3)	DelRecall (4)	Cognition (5)	Cognition (6)
ERdist	–0.011***	–0.003	–0.026***	–0.010***	–0.037***	–0.013**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)
NRdist	–0.010***	–0.002	–0.028***	–0.009**	–0.038***	–0.011*
	(0.003)	(0.003)	(0.004)	(0.004)	(0.006)	(0.006)
Sn_size	0.058***	0.054***	0.075***	0.062***	0.133***	0.116***
	(0.008)	(0.008)	(0.010)	(0.010)	(0.016)	(0.016)
Friends&c	0.076***	0.058***	0.092***	0.051***	0.167***	0.109***
	(0.009)	(0.009)	(0.012)	(0.012)	(0.019)	(0.019)
Female	0.785***	0.657***	0.864***	0.743***	1.648***	1.399***
	(0.033)	(0.034)	(0.040)	(0.040)	(0.066)	(0.067)
Age	0.029	0.003	0.052*	0.015	0.080	0.018
	(0.025)	(0.025)	(0.029)	(0.029)	(0.049)	(0.049)
Age_q	–0.000***	–0.000**	–0.001***	–0.000**	–0.001***	–0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Couple	0.122***	0.134***	0.065**	0.064**	0.186***	0.197***
	(0.026)	(0.026)	(0.032)	(0.031)	(0.052)	(0.051)
Edu_years	0.088***	0.090***	0.090***	0.101***	0.179***	0.190***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.006)
Maxgrip	0.025***	0.020***	0.026***	0.022***	0.051***	0.042***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Longill	–0.101***	–0.069***	–0.155***	–0.077**	–0.256***	–0.147***
	(0.025)	(0.026)	(0.031)	(0.031)	(0.051)	(0.051)
ADL	–0.029	–0.014	–0.030	–0.016	–0.058	–0.029
	(0.021)	(0.021)	(0.023)	(0.022)	(0.039)	(0.039)
IADL	–0.198***	–0.201***	–0.191***	–0.185***	–0.392***	–0.389***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.032)	(0.032)
GALI	–0.061**	–0.068***	–0.122***	–0.091***	–0.184***	–0.161***
	(0.026)	(0.026)	(0.032)	(0.032)	(0.052)	(0.052)
COUNTRY FE		YES		YES		YES
Constant	3.148***	4.250***	0.614	2.107**	3.794**	6.402***
	(0.916)	(0.926)	(1.074)	(1.073)	(1.793)	(1.798)
N	19,893	19,893	19,887	19,887	19,897	19,897
Adj. *R*-sq	0.239	0.257	0.200	0.233	0.254	0.282

Note: Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

on cognition: network size in general and the number of friends and former colleagues in particular significantly increased cognition.

Indeed, as table 6.3 shows, early retirement has a direct effect on the total size of the social network, and also on the number of friends and former colleagues in the social network.

We tested the robustness of these results against unobserved coun-

Table 6.3 The influence of retirement on social networks

	Sn_size (1)	Sn_size (2)	Friends&c (3)	Friends&c (4)
ERdist	–0.014***	–0.002	–0.018***	–0.002
	(0.003)	(0.003)	(0.003)	(0.002)
NRdist	–0.016***	–0.004	–0.022***	–0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Female	0.445***	0.453***	0.245***	0.223***
	(0.032)	(0.033)	(0.026)	(0.027)
Age	0.046*	0.023	0.068***	0.039**
	(0.024)	(0.024)	(0.019)	(0.019)
Age_sq	–0.000*	–0.000	–0.000***	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Couple	0.168***	0.180***	–0.440***	–0.426***
	(0.026)	(0.025)	(0.023)	(0.022)
Edu_years	0.024***	0.036***	0.037***	0.046***
	(0.003)	(0.003)	(0.002)	(0.003)
Maxgrip	0.002	0.004**	–0.001	–0.001
	(0.001)	(0.002)	(0.001)	(0.001)
Longill	0.129***	0.169***	0.019	0.085***
	(0.026)	(0.026)	(0.021)	(0.022)
ADL	0.003	0.001	0.022*	0.017
	(0.018)	(0.019)	(0.014)	(0.013)
IADL	–0.011	–0.004	–0.076***	–0.059***
	(0.015)	(0.015)	(0.010)	(0.010)
GALI	–0.067***	–0.018	–0.079***	–0.042*
	(0.026)	(0.026)	(0.022)	(0.022)
COUNTRY FE		YES		YES
Constant	0.107	0.306	–1.813***	–0.663
	(0.878)	(0.877)	(0.703)	(0.698)
N	20,003	20,003	20,003	20,003
Adj. *R*-sq	0.026	0.053	0.063	0.102

Note: Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

try effects since there are large differences in all three domains across the SHARE countries. The northern countries are healthier, while the social networks in the southern countries are larger. Retirement rules are also very different across countries. These differences may reflect cultural and historical differences common to the three domains (retirement, cognition, and social networks) and might thus cause the observed correlations without a genuine relationship among the three domains. We therefore reestimated the aforementioned regressions with country fixed effects (columns [2], [4], and [6] in tables 6.1, 6.2, and 6.3). Results change only very little, indicating

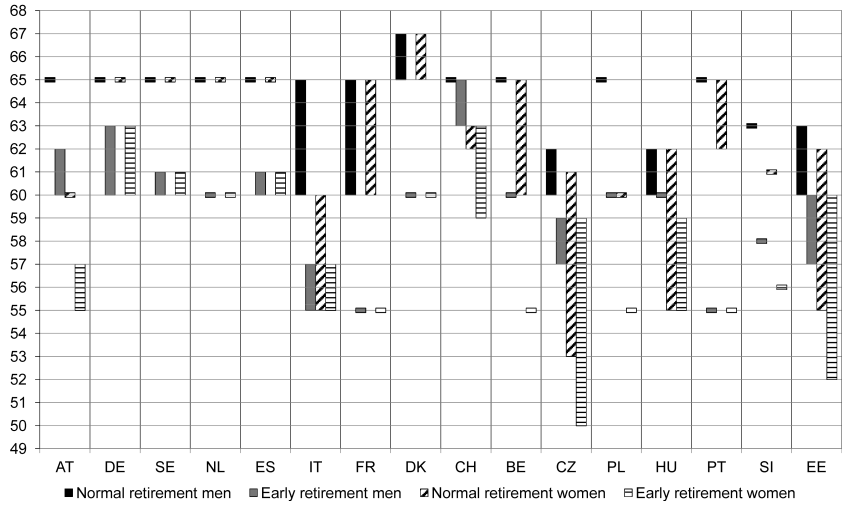

Fig. 6.4 Variation in early and normal retirement ages across time, cohorts, and gender

Source: Own calculations from national authority data, the Social Security Association, and the MISSOC database, 1992–2012.

that the correlations between the three domains are not due to unobserved country specificities.

6.5 Accounting for Reverse Causality and Common Unobservable Factors

The regressions in section 6.4 may suffer from endogeneity bias. As pointed out in the introduction, the correlation between early retirement and weak cognition may be due to two mechanisms that run in opposite directions: in addition to the causal effect of retirement on cognition and, more general, mental health, weak cognitive abilities may precipitate early retirement because employers tend to hold on to the most productive workers, selecting out less productive ones.

In order to isolate the first of the two mechanisms, we use instruments that capture retirement regulations. Such instrumental variables will change cognition if the first mechanism is active, but are not affected by individual cognition. This identification strategy is similar to the approaches taken by Bonsang, Adam, and Perelman (2010), Rohwedder and Willis (2010), and Mazzonna and Peracchi (2012), but we exploit more individual variation (see figure 6.4). More precisely, we instrument the time after early retirement by the difference of the individual's age and the statutory eligibility age for early retirement (LERdist), and the time after normal retirement by the difference of the individual's age and the statutory eligibility age for normal retirement (LNRdist), both based on the information about the

statutory eligibility age provided by national authorities, the Social Security Association, and the MISSOC database.[2] The latter is generated by the European Commission (various years) and various other auxiliary data sources.[3] These statutory eligibility ages vary by time, cohort, and gender, providing the individual variation mentioned earlier.

There is a good reason to also be careful with the exogeneity of the number of friends and former colleagues in the social network. While it appears farfetched that the size and intensity of social networks cause early retirement, cognition and social network size and intensity may be caused by similar unobserved variables. Unobserved health and psychological characteristics may reduce cognition and cause an increasing distance to friends and former colleagues as these individuals age. We therefore exploit regional variables drawn from external sources that describe social capital to instrument for the size and intensity of individual social networks. Specifically, we use the regionally aggregated means of the variable called "trust in other people" (agg_trust) from the European Social Survey (ESS) wave 2 (2004), which is available for all involved SHARE countries. The regions (on the so-called NUTS-1 level) represent states or departments within each country. A second instrumental variable is the logarithm of population density in 2010 by NUTS-1 regions (lpden) from Eurostat. Note that it is unlikely that these variables affect individual cognition directly while they affect cognition indirectly through their effect on social networks.

Tables 6.4, 6.5, and 6.6 report the first stage regressions and show the predictive power of the instruments for the potentially endogenous variables. The rightmost columns include country dummies and interactions of the country dummies with age. The cognition measure is the sum of the scores from the immediate and the delayed word recall. All *F*-tests are highly significant. The policy variables (LRNdist and LERdist) are highly significant for the time since retirement, while the social capital variables (agg_trust and lpden) are highly significant for the number of friends and former colleagues in the social networks.

Our main results from the second stage are displayed in tables 6.7, 6.8, and 6.9. Table 6.7 confirms our findings from figure 6.2 and table 6.2 in this instrumental variable regression. The number of friends and colleagues in the social network declines with the time since retirement, holding age and age squared constant. This effect is larger for the early retirees as compared to the normal retirees. Note that both effects are highly significant in the full specification.

Table 6.8 shows the effects for the time since retirement on cognition, corresponding to figure 6.1 and table 6.1, but taking account of potential endogeneity. It has the same pattern: cognition declines with time spent in retirement, and this effect is larger for early retirees than normal retirees. Both effects are highly significant in the full specification.

2. We are grateful to Fabrizio Mazzonna who provided the statutory eligibility ages for Italy.
3. Data available on request.

Table 6.4 **First stage: Time elapsed since early retirement**

	ERdist (1)	ERdist (2)	ERdist (3)	ERdist (4)
LERdist	0.740***	0.608***	0.581***	0.367***
	(0.037)	(0.044)	(0.045)	(0.045)
LNRdist	–0.506***	–0.424***	–0.391***	0.004
	(0.038)	(0.046)	(0.048)	(0.047)
Agg_trust	0.418	0.432	0.454*	0.375
	(0.270)	(0.271)	(0.276)	(0.267)
Lpden	–0.250***	–0.220**	–0.214**	–0.182**
	(0.089)	(0.089)	(0.090)	(0.088)
Female		–0.012	–0.144	–0.615***
		(0.113)	(0.165)	(0.164)
Age		0.902***	1.001***	1.349***
		(0.158)	(0.168)	(0.167)
Age_sq		–0.006***	–0.006***	–0.010***
		(0.001)	(0.001)	(0.001)
Couple		0.607***	0.618***	0.567***
		(0.117)	(0.119)	(0.118)
Edu_years		–0.052***	–0.052***	–0.051***
		(0.012)	(0.013)	(0.013)
Maxgrip			–0.013*	–0.013*
			(0.007)	(0.007)
Longill			–0.045	0.009
			(0.119)	(0.117)
ADL			0.094	0.021
			(0.110)	(0.109)
IADL			–0.017	0.038
			(0.093)	(0.091)
GALI			–0.083	–0.086
			(0.119)	(0.117)
N	19,944	19,944	18,531	18,531
F	300.787	255.826	199.315	231.266
Fp	0.000	0.000	0.000	0.000

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

F-test of excluded instruments:

$F(4,19924) = 310.77$	$F(4,19919) = 51.73$	$F(4,18501) = 46.21$	$F(4,18488) = 41.49$
Prob > $F = 0.0000$	Prob > $F = 0.0000$	Prob > $F = 0.0000$	Prob > $F = 0.0000$

Angrist-Pischke multivariate *F*-test of excluded instruments:

$F(2,19924) = 303.82$	$F(2,19919) = 18.05$	$F(2,18501) = 20.17$	$F(2,18488) = 21.21$
Prob > $F = 0.0000$	Prob > $F = 0.0000$	Prob > $F = 0.0000$	Prob > $F = 0.0000$

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 6.5 First stage: Time elapsed since normal retirement

	NRdist (1)	NRdist (2)	NRdist (3)	NRdist (4)
LERdist	–0.769***	–0.928***	–0.876***	–0.684***
	(0.082)	(0.125)	(0.127)	(0.142)
LNRdist	1.421***	0.964***	0.938***	0.504***
	(0.080)	(0.064)	(0.065)	(0.068)
Agg_trust	–0.328	–0.207	–0.127	–0.040
	(0.258)	(0.245)	(0.250)	(0.241)
Lpden	0.099	0.049	0.056	0.026
	(0.102)	(0.096)	(0.099)	(0.096)
Female		0.990***	1.003***	1.626***
		(0.319)	(0.352)	(0.369)
Age		–0.207	–0.253	–0.684***
		(0.223)	(0.233)	(0.221)
Age_sq		0.006***	0.006***	0.009***
		(0.001)	(0.001)	(0.001)
Couple		–0.553***	–0.555***	–0.502***
		(0.111)	(0.112)	(0.110)
Edu_years		–0.001	0.002	–0.004
		(0.011)	(0.011)	(0.011)
Maxgrip			0.008	0.009
			(0.006)	(0.006)
Longill			0.103	0.037
			(0.105)	(0.102)
ADL			–0.080	0.012
			(0.106)	(0.103)
IADL			0.149*	0.073
			(0.089)	(0.085)
GALI			0.080	0.102
			(0.105)	(0.102)
N	19,944	19,944	18,531	18,531
F	762.791	743.866	588.702	596.536
Fp	0.000	0.000	0.000	0.000

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

F-test of excluded instruments:

F(4,19924) = 2192.68 *F*(4,19919) = 79.10 *F*(4,18501) = 70.35 *F*(4,18488) = 20.08

Prob > *F* = 0.0000 Prob > *F* = 0.0000 Prob > *F* = 0.0000 Prob > *F* = 0.0000

Angrist-Pischke multivariate *F*-test of excluded instruments:

F(2,19924) = 586.17 *F*(2,19919) = 10.35 *F*(2,18501) = 11.89 *F*(2,18488) = 26.85

Prob > *F* = 0.0000 Prob > *F* = 0.0000 Prob > *F* = 0.0000 Prob > *F* = 0.0000

*** Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 6.6 **First stage: Size of social network (friends and ex-colleagues)**

	Friends&c (1)	Friends&c (2)	Friends&c (3)	Friends&c (4)
Agg_trust	0.167***	0.166***	0.144***	0.138***
	(0.052)	(0.051)	(0.054)	(0.054)
Lpden	0.082***	0.056***	0.061***	0.062***
	(0.019)	(0.018)	(0.019)	(0.019)
LERdist	–0.001	0.016**	0.015*	0.011
	(0.008)	(0.008)	(0.008)	(0.009)
LNRdist	–0.013*	–0.032***	–0.032***	–0.035***
	(0.008)	(0.009)	(0.009)	(0.010)
Female		0.248***	0.244***	0.260***
		(0.024)	(0.032)	(0.032)
Age		0.051***	0.040*	0.033
		(0.019)	(0.021)	(0.021)
Age_sq		–0.000***	–0.000**	–0.000
		(0.000)	(0.000)	(0.000)
Couple		–0.406***	–0.422***	–0.420***
		(0.022)	(0.023)	(0.023)
Edu_years		0.046***	0.047***	0.047***
		(0.003)	(0.003)	(0.003)
Maxgrip			–0.001	–0.001
			(0.001)	(0.001)
Longill			0.085***	0.084***
			(0.022)	(0.022)
ADL			0.013	0.012
			(0.014)	(0.014)
IADL			–0.056***	–0.060***
			(0.011)	(0.011)
GALI			–0.037*	–0.037*
			(0.022)	(0.022)
N	19,944	19,944	18,531	18,531
F	60.674	89.676	71.463	50.639
Fp	0.000	0.000	0.000	0.000

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

F-test of excluded instruments:

$F(4,19924) = 54.06$	$F(4,19919) = 10.44$	$F(4,18501) = 9.19$	$F(4,18488) = 10.00$
Prob > F = 0.0000	Prob > F = 0.0000	Prob > F = 0.0000	Prob > F = 0.0000

Angrist-Pischke multivariate *F*-test of excluded instruments:

$F(2,19924) = 19.35$	$F(2,19919) = 12.58$	$F(2,18501) = 11.32$	$F(2,18488) = 11.11$
Prob > *F* = 0.0000	Prob > *F* = 0.0000	Prob > *F* = 0.0000	Prob > *F* = 0.0000

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 6.7 **Second-stage IV estimation: The effect of (early) retirement on the number of friends and ex-colleagues in the social network**

	Friends&c (1)	Friends&c (2)	Friends&c (3)	Friends&c (4)
ERdist	–0.021***	–0.069	–0.065	–0.097***
	(0.007)	(0.046)	(0.045)	(0.037)
NRdist	–0.015***	–0.060**	–0.059**	–0.068***
	(0.003)	(0.025)	(0.024)	(0.021)
Female		0.302***	0.292***	0.308***
		(0.049)	(0.049)	(0.044)
Age		0.104**	0.092*	0.118**
		(0.051)	(0.056)	(0.059)
Age_sq		–0.000**	–0.000	–0.000
		(0.000)	(0.000)	(0.000)
Couple		–0.392***	–0.413***	–0.398***
		(0.025)	(0.027)	(0.028)
Edu_years		0.044***	0.044***	0.042***
		(0.004)	(0.004)	(0.003)
Maxgrip			–0.001	–0.002
			(0.001)	(0.001)
Longill			0.089***	0.087***
			(0.022)	(0.023)
ADL			0.013	0.015
			(0.014)	(0.015)
IADL			–0.051***	–0.055***
			(0.011)	(0.012)
GALI			–0.035	–0.035
			(0.022)	(0.023)
Constant	0.841***	–4.342*	–3.838	–5.208**
	(0.031)	(2.521)	(2.621)	(2.470)
N	20,770	20,770	19,007	19,007
F	69.429	95.598	74.487	47.815
Fp	0.000	0.000	0.000	0.000

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 6.9 adds the number of friends and former colleagues in the social network to the IV-regression in table 6.8. It is significant in all specifications and reduces the coefficients of the retirement duration variables by about a third, relative to the full specification. We conclude that part of the nexus between retirement and cognition works through the shrinkage of social networks, here measured by the declining number of nonfamily members, namely friends and former colleagues.

Tables 6.10, 6.11, 6.12, and 6.13 explore the robustness of this result.

Table 6.8 **Second-stage IV estimation: The effect of (early) retirement on cognition**

	Cognition (1)	Cognition (2)	Cognition (3)	Cognition (4)
ERdist	–0.255***	–0.218*	–0.214*	–0.259***
	(0.023)	(0.119)	(0.119)	(0.084)
NRdist	–0.166***	–0.173***	–0.180***	–0.172***
	(0.009)	(0.065)	(0.062)	(0.052)
Female		1.020***	1.710***	1.710***
		(0.122)	(0.123)	(0.108)
Age		0.279**	0.196	0.264*
		(0.132)	(0.145)	(0.135)
Age_sq		–0.002***	–0.001	–0.001*
		(0.001)	(0.001)	(0.001)
Couple		0.218***	0.175***	0.205***
		(0.063)	(0.065)	(0.063)
Edu_years		0.212***	0.197***	0.193***
		(0.009)	(0.009)	(0.008)
Maxgrip			0.042***	0.041***
			(0.003)	(0.003)
Longill			–0.114**	–0.119**
			(0.054)	(0.056)
ADL			–0.016	–0.016
			(0.042)	(0.043)
IADL			–0.365***	–0.370***
			(0.035)	(0.036)
GALI			–0.159***	–0.157***
			(0.055)	(0.056)
Constant	9.846***	–4.001	–3.613	–5.856
	(0.093)	(6.451)	(6.820)	(5.605)
N	20,348	20,348	18,906	18,906
F	252.401	318.501	265.404	169.087
Fp	0.000	0.000	0.000	0.000

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Tables 6.10 and 6.11 employ alternative social network variables. In table 6.10, we replace the size by the intensity of the contacts to friends and former colleagues. We obtain very similar results, although the significance levels are lower. The same holds if we use the distance as an indicator for the quality of the social network (table 6.11).

Tables 6.12 and 6.13 finally employ interactions between the size and the quality of the social network. We obtain results very similar to tables 6.9 through 6.11, confirming the robustness of our findings.

Table 6.9 **Second-stage IV estimation: The effect of (early) retirement and social networks on cognition**

	Cognition (1)	Cognition (2)	Cognition (3)	Cognition (4)
ERdist	–0.218***	–0.149	–0.180*	–0.185**
	(0.027)	(0.099)	(0.104)	(0.088)
NRdist	–0.138***	–0.106	–0.136**	–0.120*
	(0.012)	(0.065)	(0.064)	(0.063)
Friends&c	1.919***	1.177**	1.067**	1.037**
	(0.473)	(0.507)	(0.512)	(0.516)
Female		0.664***	1.420***	1.411***
		(0.194)	(0.192)	(0.193)
Age		0.167	0.130	0.162
		(0.118)	(0.132)	(0.130)
Age_sq		–0.001**	–0.001	–0.001
		(0.001)	(0.001)	(0.001)
Couple		0.692***	0.627***	0.624***
		(0.208)	(0.219)	(0.213)
Edu_years		0.161***	0.147***	0.148***
		(0.023)	(0.024)	(0.023)
Maxgrip			0.043***	0.043***
			(0.004)	(0.004)
Longill			–0.212***	–0.210***
			(0.073)	(0.073)
ADL			–0.028	–0.029
			(0.044)	(0.043)
IADL			–0.310***	–0.313***
			(0.044)	(0.045)
GALI			–0.117*	–0.116*
			(0.062)	(0.062)
Constant	8.233***	0.572	–1.205	–1.589
	(0.412)	(5.587)	(6.077)	(5.480)
N	19,944	19,944	18,531	18,531
F	185.946	272.813	228.672	155.855
Fp	0.000	0.000	0.000	0.000

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

***Significant on the 1 percent level.

**Significant on the 5 percent level.

*Significant on the 10 percent level.

6.6 Conclusion

Is early retirement bliss? Evidence from earlier studies has placed this assumption in doubt. Early retirement may actually be a mixed blessing because cognition declines. Moreover, the effect of early retirement on subjective well-being seems to be negative and short lived rather than long lasting and positive.

Table 6.10 **Second-stage IV estimation: The effect of (early) retirement and contact intensity with friends and ex-colleagues in the social network on cognition**

	Cognition (1)	Cognition (2)	Cognition (3)	Cognition (4)
ERdist	–0.215***	–0.134	–0.167	–0.180*
	(0.030)	(0.103)	(0.107)	(0.092)
NRdist	–0.139***	–0.100	–0.131**	–0.120*
	(0.013)	(0.067)	(0.066)	(0.065)
Sn_contact	0.633***	0.371**	0.334**	0.328*
	(0.165)	(0.166)	(0.170)	(0.172)
Female		0.665***	1.424***	1.421***
		(0.198)	(0.197)	(0.196)
Age		0.142	0.108	0.139
		(0.125)	(0.137)	(0.139)
Age_sq		–0.001**	–0.001	–0.001
		(0.001)	(0.001)	(0.001)
Couple		0.753***	0.681***	0.685***
		(0.242)	(0.258)	(0.255)
Edu_years		0.166***	0.153***	0.152***
		(0.022)	(0.023)	(0.022)
Maxgrip			0.043***	0.043***
			(0.004)	(0.004)
Longill			–0.206***	–0.206***
			(0.074)	(0.074)
ADL			–0.023	–0.023
			(0.043)	(0.043)
IADL			–0.312***	–0.315***
			(0.044)	(0.045)
GALI			–0.124**	–0.124**
			(0.061)	(0.062)
Constant	8.281***	1.591	–0.296	–0.776
	(0.424)	(5.862)	(6.260)	(5.839)
N	19,944	19,944	18,531	18,531
F	170.492	265.172	223.018	151.052
j	0.048	0.460	2.394	2.383
jp	0.827	0.498	0.122	0.123

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

This chapter has explored one mechanism that may explain why early retirement contains negative effects: the erosion of social networks after retirement. Social isolation, in turn, diminishes the day-to-day challenges that keep people mentally fit and well because, ultimately, human beings are social entities. We find evidence that retirement in general, and early retirement in particular, reduces the size of the social network, and in particular

Table 6.11 **Second-stage IV estimation: The effect of (early) retirement and the distance to friends and ex-colleagues in the social network on cognition**

	Cognition (1)	Cognition (2)	Cognition (3)	Cognition (4)
ERdist	–0.219***	–0.150	–0.178*	–0.177*
	(0.028)	(0.099)	(0.104)	(0.090)
NRdist	–0.135***	–0.107	–0.132**	–0.121*
	(0.012)	(0.065)	(0.065)	(0.063)
Sn_distance	0.604***	0.400**	0.389**	0.380**
	(0.154)	(0.175)	(0.181)	(0.182)
Female		0.697***	1.453***	1.446***
		(0.185)	(0.179)	(0.177)
Age		0.174	0.127	0.146
		(0.118)	(0.132)	(0.135)
Age_sq		–0.001***	–0.001	–0.001
		(0.001)	(0.001)	(0.001)
Couple		0.647***	0.618***	0.612***
		(0.192)	(0.210)	(0.201)
Edu_years		0.151***	0.133***	0.134***
		(0.028)	(0.030)	(0.029)
Maxgrip			0.045***	0.044***
			(0.004)	(0.004)
Longill			–0.196***	–0.195***
			(0.069)	(0.069)
ADL			–0.022	–0.022
			(0.044)	(0.044)
IADL			–0.320***	–0.320***
			(0.041)	(0.042)
GALI			–0.131**	–0.130**
			(0.061)	(0.061)
Constant	8.486***	0.490	–0.982	–0.782
	(0.363)	(5.630)	(6.098)	(5.713)
N	19,944	19,944	18,531	18,531
F	188.529	261.769	216.740	149.263
j	0.025	0.056	1.434	1.519
jp		0.875		0.813

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

the number of friends and other nonfamily contacts in the interpersonal milieu (and not only the number of immediate colleagues).

Our findings are robust and take account of the potential endogeneity of cognition and common unobservables in cognition and social network size and quality. The instruments seem to work well. An even better identification strat-

Table 6.12 **Second-stage IV estimation: The effect of (early) retirement and the number of friends and ex-colleagues in the social network *interacted with the contact intensity* on cognition**

	Cognition (1)	Cognition (2)	Cognition (3)	Cognition (4)
ERdist	–0.216***	–0.150	–0.182	–0.199**
	(0.033)	(0.108)	(0.111)	(0.094)
NRdist	–0.142***	–0.117*	–0.146**	–0.139**
	(0.013)	(0.067)	(0.066)	(0.064)
Friends_x_contact	0.157***	0.090**	0.078*	0.077*
	(0.045)	(0.043)	(0.044)	(0.044)
Female		0.752***	1.509***	1.510***
		(0.176)	(0.176)	(0.171)
Age		0.172	0.135	0.164
		(0.127)	(0.139)	(0.143)
Age_q		–0.001**	–0.001	–0.001
		(0.001)	(0.001)	(0.001)
Couple		0.638***	0.565**	0.572***
		(0.205)	(0.222)	(0.218)
Edu_years		0.167***	0.154***	0.153***
		(0.023)	(0.024)	(0.024)
Maxgrip			0.043***	0.043***
			(0.004)	(0.004)
Longill			–0.177***	–0.177***
			(0.068)	(0.069)
ADL			–0.016	–0.016
			(0.043)	(0.043)
IADL			–0.327***	–0.329***
			(0.041)	(0.043)
GALI			–0.132**	–0.131**
			(0.061)	(0.062)
Constant	8.638***	0.468	–1.283	–1.660
	(0.363)	(6.062)	(6.467)	(6.062)
N	19,944	19,944	18,531	18,531
F	161.092	250.813	213.993	145.033
j	0.226	0.578	2.656	2.642
jp	0.634	0.447	0.103	0.104

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

egy would be to exploit variation in social networks over time. While SHARE contains some indicators of social isolation in earlier waves, the sample sizes of these prototypical earlier waves were much smaller and this strategy failed due to too few observations. Since SHARE will include the social network measures again in wave 6, such analyses will be part of our future work. A

Table 6.13 **Second-stage IV estimation: The effect of (early) retirement and the number of friends and ex-colleagues in the social network *interacted with the distance to these friends and ex-colleagues in the social network* on cognition**

	Cognition (1)	Cognition (2)	Cognition (3)	Cognition (4)
ERdist	–0.219***	–0.183*	–0.208*	–0.216**
	(0.031)	(0.105)	(0.110)	(0.089)
NRdist	–0.141***	–0.136**	–0.161**	–0.150**
	(0.012)	(0.065)	(0.064)	(0.061)
Friends_x_distance	0.146***	0.091**	0.086*	0.083*
	(0.040)	(0.042)	(0.044)	(0.044)
Female		0.809***	1.558***	1.554***
		(0.158)	(0.156)	(0.150)
Age		0.215*	0.168	0.191
		(0.122)	(0.138)	(0.138)
Age_q		–0.001***	–0.001	–0.001
		(0.001)	(0.001)	(0.001)
Couple		0.561***	0.524***	0.524***
		(0.165)	(0.185)	(0.177)
Edu_years		0.156***	0.139***	0.139***
		(0.027)	(0.030)	(0.029)
Maxgrip			0.044***	0.044***
			(0.004)	(0.004)
Longill			–0.164**	–0.164**
			(0.065)	(0.066)
ADL			–0.014	–0.014
			(0.044)	(0.044)
IADL			–0.332***	–0.332***
			(0.040)	(0.041)
GALI			–0.148**	–0.146**
			(0.061)	(0.061)
Constant	8.797***	–1.427	–2.805	–2.706
	(0.307)	(5.907)	(6.449)	(5.831)
N	19,944	19,944	18,531	18,531
F	175.000	244.751	204.089	140.116
j	0.088	0.172	1.806	1.897
jp	0.767	0.678	0.179	0.168

Notes: Column (4) also includes country dummies and age interactions with country dummies. Robust standard errors in parentheses.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

second direction of our future work will exploit the job characteristics available in SHARE to account for differences in the physical demands, the stress levels, and the effort-reward balance in the last working place.

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Comment Elaine Kelly

A recent literature has shown that retirement has a negative impact on cognition (Adam et al. 2007; Bonsang, Adam, and Perelman 2012; Rohwedder and Willis 2010). Börsch-Supan and Schuth's chapter uses data on European retirees from SHARE to extend this work along two margins. First, by considering the impacts on cognition of different types of retirement. Second, by assessing whether the effect of retirement on cognition operates in part through changing social networks. Understanding the mechanisms

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