Predictors of social leisure activities in older Europeans with and without multimorbidity

Henrike Galenkamp1 · Cristina Gagliardi2 · Andrea Principi2 · Stanislawa Golinowska3,4,5 · Amilcar Moreira6 · Andrea E. Schmidt7 · Juliane Winkelmann7 · Agnieszka Sowa4,5 · Suzan van der Pas1 · Dorly J. H. Deeg1

Published online: 4 May 2016 © The Author(s) 2016. This article is published with open access at Springerlink.com

Abstract Older people spend much time participating in leisure activities, such as taking part in organized activities and going out, but the extent of participation may differ according to both individual and environmental resources available. Chronic health problems become more prevalent at higher ages and likely necessitate tapping different resources to maintain social participation. This paper compares predictors of participation in social leisure activities between older people with and those without multimorbidity. The European Project on Osteoarthritis (EPOSA) was conducted in Germany, UK, Italy, The Netherlands, Spain and Sweden (N = 2942, mean age 74.2 (5.2)). Multivariate regression was used to predict social leisure participation and degree of participation in people with and without multimorbidity. Fewer older people with multimorbidity participated in social leisure activities (90.6 %), compared to those without multimorbidity (93.9 %). The frequency of participation was also lower compared to people without multimorbidity. Higher socioeconomic status, widowhood, a larger network of friends, volunteering, transportation possibilities and having fewer depressive symptoms were important for (the degree of) social leisure participation. Statistically significant differences between the multimorbidity groups were observed for volunteering and driving a car, which were more important predictors of participation in those with multimorbidity. In contrast, self-reported income appeared more important for those without multimorbidity, compared to those who had multimorbidity. Policies focusing on social (network of friends), physical (physical performance) and psychological factors (depressive symptoms) and on transportation possibilities are recommended to enable all older people to participate in social leisure activities.

Keywords Leisure activities · Aged · Chronic disease · Social participation

Background

Increasing the level of participation of older people and promoting active ageing is an important goal of European policy in the context of current demographical ageing. Participation is a broad concept, but is often only viewed as engaging in activities that have economic value, such as labour market participation, volunteering or caregiving. However, many older people engage much more in other, more consumptive activities, such as going to a cultural event or on a day trip (Agahi et al. 2006; Klumb and Maier...
As these activities may increase their wellbeing and quality of life (Menec and Chipperfield 1997; Silverstein and Parker 2002), they constitute an important aspect of active ageing, according to the WHO’s definition (WHO 2002).

At the same time, many older people suffer from chronic health problems which increase the chance that participation is decreased or ceased altogether (Strain et al. 2002). Although a large body of research focuses on predictors of all kinds of social participation, little evidence exists on its predictors specifically in people with chronic health problems. People with health problems report that their health problems negatively affect their ability to engage in activities (Bowling 1995), and a substantial number report that they would like to do more activities in leisure time (Meulenkamp et al. 2013). Multimorbidity (the occurrence of two or more chronic diseases) is a rough and generic measure of health status, but with serious consequences for functioning and wellbeing (Marengoni et al. 2011). Given the increasing prevalence of chronic diseases among successive cohorts of older people (Crimmins and Beltrán-Sánchez 2011), and of multimorbidity, policies should focus on facilitating leisure participation particularly in this group.

The current paper focuses on social leisure activities, which can be defined as activities that are social in nature (i.e. it does not include individual activities such as reading or listening to music) and that are performed during free time and that are done by choice (Klumb and Maier 2007).

Factors associated with participation in social leisure activities

Based on previous studies on predictors of leisure activity (Gagliardi et al. 2007; Strain et al. 2002), we expect a variety of factors, both individual and environmental, to be associated with older people’s participation in social leisure activities. While older people enjoy participating in social leisure activities as they age (Chen and Fu 2008), most studies revealed an age-associated decline in the number of activities people are engaged in, both in the general older population and in people with chronic disease (Janke et al. 2006; Lefrancois et al. 1997; van der Meer 2008; Zimmer et al. 1997).

An important explanation for decreasing participation with age can be found in the decline in health (Lefrancois et al. 1997; Strain et al. 2002). Older people in better physical and mental health show higher participation rates than those in poorer health. In particular, chronic diseases, functional limitations, depressive symptoms, poor perceived health and cognitive impairment are associated with lower participation in social leisure activities (Gagliardi et al. 2007; Griffin and McKenna 1999; Janke et al. 2006; Menec 2003; Nummela et al. 2008; Strain et al. 2002). In addition, in people who suffer from chronic diseases the severity of their condition, as indicated by ADL limitations or level of pain, might negatively influence leisure participation (Zimmer et al. 1997).

Other individual-level factors have been shown to be associated with a higher level of participation in social leisure activities as well. Among these were female gender (Gagliardi et al. 2007; Janke et al. 2006; Minhat and Mohd Amin 2012; van der Meer 2008), living with a partner (van der Meer 2008; van der Pas and Koopman-Boyden 2009), having a higher number of social contacts (Chen and Fu 2008; Menec 2003; Satariano et al. 2002), higher socioeconomic status (Gagliardi et al. 2007; Strain et al. 2002; van der Meer 2008) and psychological factors such as higher levels of self-efficacy (Perkins et al. 2008). One study that was performed specifically among older people with arthritis showed that those with a larger and more intimate network more often continued their participation in leisure activities, or replaced some activities with other activities, compared with those who had a smaller social network of relatives and friends (Zimmer et al. 1997).

Relatively little attention has been given to the environment of older people, which can be facilitating or restricting when it comes to participating in leisure activities. Thus, living in more prosperous neighbourhoods and having more transportation possibilities was shown to be associated with a higher level of participation in leisure activities (Dahan-Oliel et al. 2010; Gagliardi et al. 2007; Griffin and McKenna 1999; van der Meer 2008). In turn, the availability of public transportation and leisure opportunities may also depend on the level of urbanization. For example, in the Netherlands, living in a city is positively associated with participation in cultural recreation (van der Meer 2008).

Participating in other types of activities may pose restrictions to the time people may have at their disposal for social leisure activities. Previous studies showed that not providing informal care, being retired or working part-time were associated with higher participation in leisure activities (Janke et al. 2006). On the other hand, active older adults may engage in multiple activities such as leisure, caregiving and volunteering (Schmidt et al. 2015).

Leisure participation in people with and without multimorbidity

According to Atchley’s continuity theory (Atchley 1989), older people attempt to preserve and maintain patterns of thoughts, activities and habits; and they prefer to accomplish this objective by using strategies tied to their past experiences of themselves and their social world. Atchley distinguishes internal and external continuity, where
internal refers to the ‘self’ or ‘identity’. External continuity, in contrast, refers to the practice of interaction with familiar people and engagement in familiar activities. Indeed, it was found that previous participation in activities was an important predictor of current participation in leisure activities (Agahi et al. 2006; Strain et al. 2002; Verbrugge et al. 1996).

Our hypothesis following continuity theory is that, in the face of multimorbidity, people strive to continue their participation in social leisure activities. Despite this striving for continuity, however, many older people are not able to continue their participation in social leisure activities. The extent of participation is likely to differ according to both individual and environmental resources that are available. Continuity theory suggests that in order to maintain external continuity in the face of adversity, older people use familiar skills to do familiar things in familiar places in the company of familiar people. In addition, Atchley notes that an organizational and physical infrastructure is important for continuity in activities. Thus, we expect that a decrease in functional capacity in those with multimorbidity may increase the importance of other—e.g. socioeconomic, psychological or environmental—resources, even though these resources have similar characteristics for people with and without multimorbidity. Thus, the availability of public transport in one’s neighbourhood may become more important for people who are not able to walk long distances, and thus may be a more important factor for social leisure participation in those with multimorbidity (Martin et al. 2012). Likewise, people with multimorbidity have higher health care expenses and thus a low income level may be more detrimental for social leisure participation than for people without multimorbidity. Thus, we expect that the availability, or the lack, of individual and environmental resources become more important when health declines, and as such our hypothesis is that they are stronger predictors of social leisure participation in people with multimorbidity, compared with people without multimorbidity.

Most of the studies cited above were conducted in one specific city or country. The current study was performed in a multi-country study, and as such might be more representative for different regions in Europe. This is the first study that focuses on a wide range of possible predictors of participation in social leisure activities, and comparing these between people in good and poor health. Given the evidence for a broad range of predictors, our study includes as potential predictors socioeconomic status, social, environmental, psychological and factors of physical functioning. Country, age and gender will be taken into account as controls.

**Methods**

The European Project on Osteoarthritis (EPOSA) involves six studies each performed in a different country with the same measurement instruments: Germany, UK, Italy, The Netherlands, Spain and Sweden. Random samples from these population-based samples are included, except for Italy, where a new sample was drawn. In each sample, 750 potential participants were contacted with the aim of recruiting 500 participants. Further details are available from the EPOSA design paper (van der Pas et al. 2013).

The overall age range was 65–85 years (with oversampling of the oldest respondents 80–85 years) in all countries except for the UK, which has an age range of 71–79 years. Data collection started between November 2010 and March 2011 in all countries, and ended between September and November 2011. Participants were visited in their homes by trained interviewers, except for Germany, Italy and Spain, where participants were examined by a trained interviewer in a health care centre and only disabled persons were visited in their home. The design and procedures of all six studies were approved by the Ethical Review Boards of the respective institutions.

The number of participants in EPOSA was 2942. A number of 125 respondents with missing data on participation in social leisure activities and 25 respondents without information on multimorbidity status were excluded from the analyses, resulting in 2792 participants. Respondents with missing data (N = 150) were more often women (P < .05) and had worse physical performance scores (P < .01). Other characteristics were not significantly different for these 150 respondents. The highest percentage of missing values on leisure activities (13.5 %) was observed for the UK and the lowest in Italy (1.9 %).

**Participation in social leisure activities**

We used questions from the Maastricht Social Participation Profile (MSPP), which measures frequency and diversity of social participation both in a formal (organizational) and informal context, based on definitions of social participation by older people with a chronic disease (Mars et al. 2009). The following seven items comprised social leisure activities (out of nine that were included in EPOSA): ‘How often in the past four weeks have you (taken part in/been to) (1) a club, interest group or activity group, church or other similar activity? (2) a cultural or educational event such as the cinema, theatre, museum, talk or course (3) eaten out? (4) out to a pub, café or tearoom? (5) a public event? (6) an organised games afternoon or evening? For instance, bingo, quiz or card games. (7) a day trip
organised by a club or society?’ Response categories ranged from 0 ‘not at all’ to 3 ‘more than twice a week’. An indicator of participation in social leisure (at least one of the items with a score ≥1) and a total social leisure activities score (range: 0–21) to measure the degree of involvement were used. Cronbach’s Alpha of these seven items of the MSPP was 0.59. The remaining two items of the MSPP represented volunteering and were included as predictors.

Classification variable: Multimorbidity

Multimorbidity is the occurrence of two or more coexisting chronic conditions (van den Akker et al. 1996). The selection of chronic diseases that was explicitly investigated was based on their prevalence (>5 %). Participants were asked if they suffered from chronic diseases or symptoms that lasted for at least three months or diseases for which they had been treated or were followed by a physician. Included were chronic non-specific lung disease, cardiovascular diseases, peripheral arterial disease, stroke, diabetes, cancer, osteoarthritis and osteoporosis. Respondents with multimorbidity were compared with people reporting no or only one disease.

Predictors of social and physical leisure participation

The selection of a broad range of predictors of participation was based on previous research among the general older population, e.g. (Gagliardi et al. 2007; Janke et al. 2006; van der Meer 2008).

Age and gender were included as demographical variables. As indicators of socioeconomic status were included self-reported income and educational level. Income was assessed by asking whether the respondent thinks the household is able to make ends meet with the total monthly income. This variable was dichotomized: with some or great difficulty versus easily or fairly easily. The highest level of education completed was coded as primary (elementary completed or not completed), secondary (vocational education or general secondary education) or tertiary (college or university education).

Social factors included marital status, categorized into single, widowed, divorced or having a partner (either married, registered partnership, cohabiting or living apart). Characteristics of the social network were assessed with the Lubben Social Network Scale (Lubben et al. 2006), assessing the number of family members and friends which respondents (1) see or hear from at least once a month, or (2) feel at ease with to talk about private matters, or (3) feel close to such that they could call on them for help. Responses ranged from 0 ‘none’ to 5 ‘9 or more’. Two subscale scores (separately for family and friends) were calculated (range 0–15). Cronbach’s alpha of the family and friends subscales was 0.81 and 0.80, respectively. Volunteer status was assessed with two questions from the MSPP, and was coded 1 if respondents carried out committee work for a club, society or other group or did any organised voluntary work.

It was asked whether respondents drive a car (‘yes’ vs. ‘no’). Environmental characteristics were measured using the Home and Community Environment instrument (White et al. 2010). The presence of the following features of the neighbourhood were assessed: parks and walking areas that are easy to use; places to sit and rest at bus stops, in parks, or other places where people walk; public facilities such as daily supermarket, bus stop, post office, bank or community centre; and public transportation close to home. For the first three features, response categories were dichotomized: a lot or some vs. not at all. For public transportation, the follow-up question to assess if respondents made use of these facilities was used, to make this question comparable to the question if participants drive a car. Urbanization grade was categorized as rural (<300 p/squared kilometre, <5000 inhabitants) or urban (>300 p/squared kilometre, >5000 inhabitants).

The following psychological variables were included. Anxiety and depressive symptoms were evaluated by the Hospital Anxiety Depression Scale (Zigmond and Snaith 1983), measuring levels of symptoms in the last week, comprising seven items for anxiety (Cronbach’s alpha 0.80, range 0–21) and 7 for depression (Cronbach’s alpha 0.71, range 0–21). Based on the finding that self-efficacy—the belief in one’s ability to execute certain behaviours—was related to participation in social leisure activities (Perkins et al. 2008), we expected that perceived control or mastery might also affect social leisure participation. In EPOSA, a measure of sense of mastery was included. The seven-item Pearlin Mastery Scale (Pearlin and Schooler 1978), consists of seven statements such as ‘I have little control over the things that happen to me’. The five response categories range from ‘strongly disagree’ to ‘strongly agree’, and higher sum scores indicate a higher sense of mastery (Cronbach’s alpha 0.78, range 0–28).

Indicators of physical functioning were self-reported disability and measured physical performance. Mobility and self-care disability problems were measured using two questions from the Euroqol EQ-5D (Brooks et al. 2003). Respondents were categorized as limited (‘some problems’ or ‘confined to bed’) or not limited (‘no problems’). In addition, three performance tests were assessed (Guralnik et al. 1989): walking speed was measured by time taken to walk three metres as fast as possible, but not running; repeated chair stands by time taken to rise five times from a chair in normal tempo, without using the hands; and
Standing balance by the ability to perform the tandem stand for 10 s (with one foot behind the other and the heel of the first foot directly touching the toes of the other foot). The participants’ times for walking speed and repeated chair stands were divided into country-specific quartiles (scores 1–4; participants who were unable to perform these two tests were scored 0). The tandem stand is categorized into three groups. For comparability with the other performance tests, these three groups received the following scores: unable (<3 s = 0), able to hold position for 3 to <10 s (2), and able to hold position for 10 s (4). Each of the three tests was scored from 0 (inability to carry out the test) to 4 (best performance), resulting in an overall performance score (range 0–12). For descriptive purposes, the physical performance score was dichotomized with scores higher than nine representing good performance, and scores lower or equal than nine representing poor performance.

Statistical analysis

Age and sex distributions varied between the countries; therefore, a weighting variable was created for each individual within each country. The variables were derived from the European standard population in 2010 and calculated per sex and per 5-year age category, using the formula: \( W = \frac{N_{\text{exp}}}{N_{\text{obs}}} \) \((N_{\text{obs}} \) is the number of persons in a specific age/sex category in the country, and \( N_{\text{exp}} \) is the number of persons in a specific age/sex category in the European standard population in 2010). These were applied to all descriptive data with the exception of age and sex, allowing direct comparisons of the levels of participation across countries.

Bivariate associations were tested using T-tests or ANOVAs for continuous variables and Chi square tests for categorical variables. For descriptive purposes, network scores and mastery scores were dichotomized at the median value. For depressive and anxiety symptoms, existing cut-offs were used (Snaith 2003). Multivariate two-part regression models were applied: first, participation vs. non-participation was modelled, using logistic regression models. For the degree of participation in social leisure activities, linear regression models were applied. Those who did not participate were excluded from the analyses on participation frequency. All continuous variables were included as such and were not dichotomized. Average marginal effects (AMEs) are shown for the logistic models and standardized regression coefficients for the linear regression models. Significant differences were calculated through checking the AMEs and their standard errors, i.e. if \( \text{AME}_\text{multimorbidity} \) is larger/smaller than \( \text{AME}_{\text{no multimorbidity}} \pm 1.96^*\text{SE} \), the difference is significant at a \( p < .10 \) level.

All multivariate models to predict social leisure activities are stratified by multimorbidity status. In addition, models were run first without the indicators of physical functioning, disability and physical performance. These are considered to be in the pathway between multimorbidity and leisure participation (Verbrugge and Jette 1994) and, therefore, may mask any differences that may exist between the two groups. In a second model, the measures of physical functioning were included, in order to evaluate their contribution to the prediction of social leisure activities.

Analyses were conducted using IBM SPSS Statistics for Windows (Armonk, NY: IBM Corp) and STATA (College Station, TX: StataCorp LP). The level of statistical significance was set at \( P < .05 \).

Results

Table 1 shows characteristics of the sample stratified by multimorbidity status. Almost fifty per cent of the sample had multimorbidity (48.7 %). Respondents with multimorbidity \((N = 1358)\) were older, more often women, had lower socioeconomic status, and were more often widowed than people without multimorbidity \((N = 1491)\). Fewer of them volunteered, and they had a smaller network of friends. More people with multimorbidity lived in urban areas and fewer of them drove a car, compared to people without multimorbidity. They also reported fewer parks and places to stop and rest in the neighbourhood. Finally, compared to people without multimorbidity, they were generally in poorer physical and psychological health.

The share of people who reported their involvement in social leisure activities was quite high (Table 1, lower part): In those without multimorbidity, participation in social leisure activities was 93.8 %. Participation in those with multimorbidity was 90.4 %. Average scores on social leisure participation were 5.0 for people without multimorbidity, and 4.4 for those with multimorbidity. Table 2 shows the percentage who participated in each type of activity, by multimorbidity status. Largest differences in favour of the group without multimorbidity were observed in taking part in organised games and in day trips. Remarkably, the chance that people with multimorbidity had attended a public event was higher. Most predictor variables were associated with participation or the amount of participation in social leisure activities (Table 3). Only female gender, living in an urban area and having mobility limitations were not associated with being involved in social leisure activities. Variables not associated (in neither of the health groups) with the degree of participation were partner status and living in an urban area.

Table 4 shows the multivariate results for being involved in social leisure participation. Statistically significant predictors of participation in social leisure activities in those without multimorbidity were: self-reported
Table 1  Sample characteristics: By multimorbidity status

| Country         | No multimorbidity | Multimorbidity | P $^1$ | Unweighted N |
|-----------------|-------------------|----------------|--------|--------------|
| Germany         | 14.7 (5.0)        | 11.8 (5.2)    | <.001  | 2792         |
| Italy           | 14.1              | 19.8          |        |              |
| Netherlands     | 20.0              | 21.5          |        |              |
| Spain           | 16.2              | 22.3          |        |              |
| Sweden          | 20.2              | 17.0          |        |              |
| UK              | 14.8              | 7.6           |        |              |

Demographics

| Age (65-85) | 73.4 (5.0) | 75.0 (5.2) | <.001 | 2792         |
| Female gender | 45.7 | 57.4 | <.001 | 2792 |

Socioeconomic status

| Primary education | 39.3 | 51.5 | <.001 | 2789 |
| Secondary education | 37.4 | 31.4 |        |      |
| Tertiary education | 23.3 | 17.1 |        |      |
| Self-reported income: can easily make ends meet (vs. can not) | 84.8 | 76.6 | <.001 | 2755 |

Social

| With partner | 69.4 | 63.1 | <.001 | 2792 |
| Divorced     | 6.0  | 5.0  |        |      |
| Widowed      | 18.5 | 26.5 |        |      |
| Single       | 6.1  | 5.4  |        |      |
| Network of family (0-15) | 9.3 (3.2) | 9.2 (3.3) | .211 | 2776 |
| Network of friends (0-15) | 7.9 (3.5) | 7.3 (3.9) | <.001 | 2743 |
| Volunteering | 33.0 | 26.0 | <.001 | 2790 |

Environmental

| Urban (vs. Rural) | 60.5 | 64.6 | .031 | 2789 |
| Drives a car (yes vs. no) | 69.3 | 56.0 | <.001 | 2769 |
| Uses public transport (yes vs. no) | 56.4 | 53.1 | .094 | 2734 |
| Parks in neighbourhood (some/a lot vs. No) | 88.9 | 85.1 | .003 | 2777 |
| Public facilities in neighbourhood (some/a lot vs. No) | 88.8 | 88.6 | .869 | 2772 |
| Places to stop and rest (some/a lot vs. No) | 85.5 | 82.5 | .032 | 2757 |

Psychological health

| Depressive symptoms (0–20) | 3.1 (2.8) | 4.4 (3.4) | <.001 | 2728 |
| Anxiety symptoms (0–20) | 4.2 (3.4) | 5.3 (3.9) | <.001 | 2729 |
| Mastery (5–25) | 19.8 (3.9) | 18.5 (4.1) | <.001 | 2692 |

Physical health

| Mobility limitations (yes vs. no) | 16.2 | 37.2 | <.001 | 2771 |
| Self-care limitations (yes vs. no) | 5.6  | 13.9 | <.001 | 2771 |
| Physical performance (0–12) | 8.8 (2.5) | 7.5 (3.1) | <.001 | 2746 |
| Chronic non-specific lung disease | 3.3  | 25.1 | <.001 | 2789 |
| Cardiovascular diseases | 8.9  | 43.6 | <.001 | 2783 |
| Peripheral arterial disease | 1.9  | 22.5 | <.001 | 2781 |
| Diabetes mellitus | 5.2  | 21.5 | <.001 | 2786 |
| Stroke | 1.2  | 10.2 | <.001 | 2777 |
| Cancer | 4.4  | 24.9 | <.001 | 2790 |
| Osteoarthritis | 38.7 | 80.4 | <.001 | 2786 |
income sufficiency, a large network of friends, volunteering, and the presence of places to stop and rest in the neighbourhood. In those with multimorbidity, significant predictors of participation in social leisure activities were secondary or tertiary versus primary education, being widowed, having a large network of friends, being a volunteer, driving a car, using public transport and having fewer depressive symptoms. Remarkably, having mobility limitations was associated with higher participation in social leisure activities. Compared with the dichotomous indicator of participation in social leisure activities, more similarities between the groups with and without multimorbidity were found in the degree of social leisure participation. The predictors higher education, being widowed and having fewer depressive symptoms were now also significant in the group without multimorbidity. Furthermore, anxiety symptoms significantly predicted a higher social leisure activities score in those without multimorbidity. Across multimorbidity groups, the strongest and the most consistent predictor appears to be whether someone is involved in volunteer work.

Statistically significant differences between predictors in the groups with and without multimorbidity are shown with an asterisk, only if one of the two AMEs are statistically significant. Only three predictors differed statistically significantly between multimorbidity groups. Volunteering and driving a car were more important for participating in the group with multimorbidity. Self-reported income was more important for the degree of participation in those without multimorbidity. Differences between AMEs were also observed for mastery, public facilities and for self-care limitations, but in neither of the health groups, these were statistically significant predictors of participation or the degree of participation.

Models that were not adjusted for indicators of physical functioning (mobility and self-care limitations and physical performance) revealed rather similar results, except for ‘places to stop and rest’ and being widowed, which were no

Table 1 continued

|                      | No multimorbidity (%/mean (sd)) | Multimorbidity (%/mean (sd)) | P*          | Unweighted N |
|----------------------|---------------------------------|------------------------------|-------------|--------------|
| Osteoporosis         | 3.7 (30.7)                      |                              | <.001       | 2774         |
| Social leisure activity |                                |                              |             |              |
| Participation in social leisure activities (yes/no) | 93.8 (90.4) |                              | .001        | 2792         |
| Degree of participation in social leisure activities (0-18) | 5.0 (3.1) | 4.4 (3.2) | <.001 | 2792 |

Weighted to the European standard population in 2010, except for age and gender

1 Chi square test for categorical variables; T test for normally distributed variables

Table 2 Social leisure participation by multimorbidity status

| How often in the past four weeks have you… | No multimorbidity (≤2 diseases) (%) | Multimorbidity (≥2 diseases) (%) | P for difference |
|------------------------------------------|------------------------------------|---------------------------------|-----------------|
| Taken part in a club, interest group or activity group, church or other similar activity? | 54.9 | 51.7 | .055 |
| Been to a cultural or educational event such as the cinema, theatre, museum, talk or course? | 42.7 | 35.7 | <.001 |
| Eaten out? | 77.0 | 69.8 | <.001 |
| Been out to a pub, café or tearoom? | 65.5 | 54.6 | <.001 |
| Been to a public event? | 17.2 | 20.1 | .030 |
| Taken part in an organised games afternoon or evening? For instance, bingo, quiz or card games. | 31.1 | 21.9 | <.001 |
| Been on a day trip organised by a club or society? | 18.5 | 14.7 | .005 |

*a The percentages represent those who reported ‘less than once a week’, ‘once or twice a week’, or ‘more than twice a week’ versus those that did not take part in the activity.
Table 3  Leisure activity by multimorbidity status and predictors

| Participation in social leisure | Participation (yes vs. no) | Degree of participation |
|--------------------------------|-----------------------------|-------------------------|
|                                | No multimorbidity | Multimorbidity | No multimorbidity | Multimorbidity |
|                                | %     | P     | %     | P     | Mean | P  | Mean | P  |
| **Country**                    |       |       |       |       |       |     |       |     |
| Germany                        | 98.0  | <.001 | 97.4  | 0.002 | 6.4  | <.001 | 6.1  | <.001 |
| Italy                          | 87.1  |       | 88.1  |       | 3.9  |       | 3.6  |       |
| Netherlands                    | 92.4  |       | 89.0  |       | 4.3  |       | 3.7  |       |
| Spain                          | 91.5  |       | 87.7  |       | 4.7  |       | 4.2  |       |
| Sweden                         | 95.3  |       | 90.6  |       | 4.6  |       | 4.4  |       |
| UK                             | 98.0  |       | 97.0  |       | 6.2  |       | 6.3  |       |
| **Demographics**               |       |       |       |       |       |     |       |     |
| Age 65–74                      | 95.0  | 0.019 | 93.7  | <.001 | 5.1  | 0.007 | 4.7  | <.001 |
| Age 75–85                      | 91.8  |       | 87.1  |       | 4.6  |       | 4.0  |       |
| Female gender                  | 93.4  | 0.501 | 89.7  | 0.258 | 4.9  | 0.193 | 4.1  | <.001 |
| Male gender                    | 94.3  |       | 91.6  |       | 5.1  |       | 4.8  |       |
| **Socioeconomic status**       |       |       |       |       |       |     |       |     |
| Primary education              | 90.2  | <.001 | 87.0  | <.001 | 4.3  | <.001 | 3.8  | <.001 |
| Secondary education            | 95.5  |       | 93.2  |       | 5.1  |       | 4.4  |       |
| Tertiary education             | 97.2  |       | 95.5  |       | 5.8  |       | 5.8  |       |
| Income: can easily make ends meet | 95.5  | <.001 | 91.8  | 0.001 | 5.2  | <.001 | 4.5  | 0.001 |
| Income: cannot easily make ends meet | 85.5  |       | 85.5  |       | 3.9  |       | 3.9  |       |
| **Social**                     |       |       |       |       |       |     |       |     |
| With partner                   | 93.6  | 0.709 | 90.3  | 0.036 | 4.9  | 0.781 | 4.3  | 0.707 |
| Divorced                       | 95.1  |       | 95.5  |       | 4.9  |       | 4.8  |       |
| Widowed                        | 93.4  |       | 91.4  |       | 5.0  |       | 4.4  |       |
| Single                         | 96.4  |       | 81.7  |       | 5.3  |       | 4.3  |       |
| Network score family ≤9        | 93.0  | 0.165 | 87.9  | 0.001 | 4.8  | 0.033 | 5.1  | <.001 |
| Network score family >9        | 94.8  |       | 93.2  |       | 5.1  |       | 4.7  |       |
| Network score friends ≤8       | 91.1  | <.001 | 86.5  | <.001 | 4.3  | <.001 | 5.7  | <.001 |
| Network score friends >8       | 96.9  |       | 95.8  |       | 3.5  |       | 5.6  |       |
| Volunteering                   | 98.0  | <.001 | 98.8  | <.001 | 6.4  | <.001 | 6.3  | <.001 |
| Not volunteering               | 91.8  |       | 87.4  |       | 4.3  |       | 3.7  |       |
| **Environmental**              |       |       |       |       |       |     |       |     |
| Urban                          | 93.6  | 0.724 | 90.8  | 0.432 | 4.9  | 0.572 | 4.3  | 0.601 |
| Rural                          | 94.1  |       | 89.5  |       | 5.0  |       | 4.4  |       |
| Drives a car                   | 94.9  | 0.019 | 94.1  | <.001 | 5.2  | <.001 | 5.0  | <.001 |
| Does not drive a car           | 91.7  |       | 85.7  |       | 4.4  |       | 3.6  |       |
| Uses public transport          | 96.5  | <.001 | 93.0  | 0.001 | 5.3  | <.001 | 4.9  | <.001 |
| Does not use public transport  | 91.0  |       | 87.5  |       | 4.5  |       | 3.8  |       |
| Parks in neighbourhood         | 94.5  | 0.032 | 91.4  | 0.011 | 5.1  | 0.011 | 4.6  | <.001 |
| No parks in neighbourhood      | 90.1  |       | 85.6  |       | 4.4  |       | 3.2  |       |
| Public facilities in neighbourhood | 94.6  | 0.006 | 91.2  | 0.004 | 5.0  | 0.103 | 4.5  | <.001 |
| No public facilities in neighbourhood | 89.0  |       | 83.9  |       | 4.6  |       | 3.2  |       |
| Places to stop and rest        | 95.2  | <.001 | 92.0  | <.001 | 5.1  | <.001 | 4.7  | <.001 |
| No places to stop and rest     | 86.8  |       | 84.1  |       | 4.0  |       | 3.2  |       |
Discussion

This study examined the predictors of leisure participation in older European people with and without multimorbidity. As expected, older people with multimorbidity participated less in social leisure activities. In addition, they participated at a lower frequency compared to those without multimorbidity. Participation in social leisure activities was determined by factors in all the domains studied, including socioeconomic, social, environmental, and psychological and physical functioning characteristics.

Following Atchley’s continuity theory (Atchley 1989), we hypothesized that people with multimorbidity strive to continue their participation in social leisure activities, but that the importance of other resources than health—for example, socioeconomic, psychological or environmental resources—becomes greater than that for people without multimorbidity. This hypothesis was partly confirmed: both driving a car and volunteering were more important predictors in older people with multimorbidity, compared with those with no multimorbidity. In general, those with multimorbidity were older, reported more disability, and had fewer psychosocial resources. This might explain the importance of driving a car for their participation. Contrary to our hypothesis, having sufficient income to make ends meet was a more important predictor for people without multimorbidity. It seems that for those who are not particularly restricted in social leisure participation for health reasons, other factors—such as insufficient income—are important barriers for social leisure participation.

The strongest and most consistent predictor of participation in social leisure activities was being active in volunteer work. Since this was a cross-sectional study, the direction and causality of reported associations remain unclear. Thus, a person’s participation in volunteering may increase their participation in social leisure activities, presumably by an increased level of social ties (Pilkington et al. 2012) and vice versa. In addition, there may be overlap between the two, since volunteering may occur within the measured domains of social leisure. Since almost all volunteers participated in social leisure activities, we also ran models excluding volunteering as a predictor, but these models yielded very similar results with respect to the other predictors. This implies that findings with regard to the other predictors were not influenced by the strong association between volunteering and social leisure participation.

Higher education, widowhood, a large network of friends, using public transport and fewer depressive...
| Demographics | Participation in social leisure activities | Difference at P < .10 | Degree of participation in social leisure activities | Difference at P < .10 |
|--------------|------------------------------------------|------------------------|------------------------------------------------------|------------------------|
| Age (65–85)  | No multimorbidity AME (95 % CI) | Multimorbidity AME (95 % CI) | No multimorbidity B (95 % CI) | Multimorbidity B (95 % CI) |
| Female gender | -0.001 -0.003 0.002 | -0.002 -0.005 0.002 | -0.017 -0.052 0.018 | 0.014 -0.022 0.050 |
| Socioeconomic status | | | | |
| Secondary vs. Primary education | 0.017 -0.015 0.049 | 0.044 0.004 | 0.84 | 0.273 -0.116 0.663 | 0.027 -0.363 0.418 |
| Tertiary vs. Primary education | 0.034 -0.013 0.081 | 0.067 0.005 | 0.130 | 0.824 0.380 | 1.268 | 0.630 | 0.141 | 1.120 |
| Self-reported income: can easily make ends meet (vs. cannot) | 0.039 0.010 0.068 | 0.014 -0.021 | 0.049 | 0.571 0.112 | 1.029 | -0.358 | -0.769 | 0.053 |
| Social | | | | |
| Divorced vs. Partner | 0.007 -0.054 0.067 | 0.023 -0.055 | 0.101 | 0.072 -0.597 | 0.740 | 0.524 | -0.198 | 1.246 |
| Widowed vs. Partner | 0.017 -0.018 0.052 | 0.046 0.005 | 0.087 | 0.561 0.127 | 0.996 | 0.433 | 0.030 | 0.836 |
| Single vs. Partner | 0.005 -0.055 0.064 | -0.044 -0.102 | 0.013 | 0.495 -0.198 | 1.189 | 0.695 | -0.054 | 1.444 |
| Network of family (0–15) | 0.000 -0.004 0.005 | 0.002 -0.003 | 0.006 | 0.006 -0.047 | 0.060 | -0.003 -0.057 | 0.051 |
| Network of friends (0–15) | 0.006 0.002 0.010 | 0.006 0.002 | 0.011 | 0.165 0.116 | 0.213 | 0.179 | 0.132 | 0.226 |
| Volunteering (yes vs. no) | 0.045 0.005 0.084 | 0.143 0.060 | 0.225 * | 1.623 1.283 | 1.962 | 1.557 | 1.193 | 1.922 |
| Environmental | | | | |
| Urban (vs. Rural) | 0.000 -0.030 0.030 | 0.000 -0.039 | 0.039 | 0.099 -0.308 | 0.505 | -0.055 | -0.468 | 0.359 |
| Drives a car (yes vs. no) | 0.010 -0.022 0.041 | 0.042 0.003 | 0.081 * | 0.166 -0.234 | 0.567 | 0.513 | 0.117 | 0.909 |
| Uses public transport (yes vs. no) | 0.032 -0.002 0.067 | 0.060 0.021 | 0.099 | 0.557 0.177 | 0.937 | 0.354 | -0.037 | 0.745 |
| Parks in neighbourhood (a lot or some vs. Not at all) | -0.006 -0.045 0.033 | -0.011 -0.058 | 0.037 | 0.050 -0.538 | 0.638 | 0.304 | -0.239 | 0.847 |
| Public facilities in neighbourhood (a lot or some vs. Not at all) | 0.007 -0.030 0.043 | 0.009 -0.038 | 0.056 | -0.152 -0.686 | 0.381 | 0.388 | -0.178 | 0.954 |
| Places to stop and rest (a lot or some vs. Not at all) | 0.038 0.000 0.076 | 0.037 -0.011 | 0.084 | 0.476 -0.098 | 1.051 | 0.226 | -0.320 | 0.772 |
| Psychological health | | | | |
| Depressive symptoms (0–20) | -0.003 -0.008 0.002 | -0.006 -0.011 | -0.001 | -0.092 -0.166 | -0.018 | -0.114 | -0.178 | -0.051 |
| Anxiety symptoms (0–20) | 0.002 -0.002 0.006 | -0.001 -0.006 | 0.004 | 0.066 0.007 | 0.125 | 0.031 | -0.025 | 0.087 |
| Mastery (5–25) | 0.002 -0.002 0.006 | -0.004 -0.009 | 0.001 | -0.002 -0.056 | 0.052 | 0.006 | -0.046 | 0.058 |
| Physical health | | | | |
| Mobility limitations (yes vs. no) | 0.026 -0.012 0.064 | 0.047 0.006 | 0.089 | 0.230 -0.249 | 0.709 | -0.043 | -0.444 | 0.358 |
| Self-care limitations (yes vs. no) | 0.016 -0.037 0.069 | -0.037 -0.084 | 0.011 | -0.606 -1.341 | 0.129 | 0.254 | -0.302 | 0.811 |
symptoms were equally important predictors in both health groups, although some appeared significant in only one of the groups. These predictors were found for participation as well as for the degree of participation. The importance of higher education and perceived income confirms results by other studies (Gagliardi et al. 2007; Strain et al. 2002), and may be related to the costs of some social leisure activities, such as visiting restaurants and cultural events. Being widowed appeared predictive for social leisure participation in both health groups. Also, having mobility limitations was predictive for social leisure participation in the group with multimorbidity. In these cases, it might be that people engage in social leisure activities to avoid isolation caused by the loss of the partner and reduced mobility. Some activities (e.g. organised games afternoon or evening) could be performed at home, where mobility limitations are not necessarily a barrier. We observed that people with multimorbidity more often attended public events, which was a counterintuitive finding. Since many people were active in volunteer work, we examined if volunteering competed with attending public events in those without multimorbidity. But it appeared that among the volunteers, people with multimorbidity were even more likely to attend public events. Another tentative explanation might be that people with multimorbidity attend more disease or health-related events, but this hypothesis needs further studying.

Gagliardi et al. (2007) showed that being dependent on public transport was associated with engagement in more at-home activities, but their study did not focus specifically on people with poor health. Transportation possibilities may compensate for mobility limitations, and this might explain why public transportation was a significant predictor of (the degree of) participation in social leisure activities, both in people with and without multimorbidity.

With regard to depressive symptoms, the association found may also represent two directions: a lack of social interaction may increase depressive symptoms; and depressive symptoms may have a negative influence on social leisure participation. Interventions targeted at depressed individuals include the prescription of structured exercise (Bridle et al. 2012), which are also considered a type of leisure activity. Thus, increasing other types of leisure activities may have important mental health benefits for older people, and in turn, benefits for social functioning.

With respect to the network of friends, research on changes in older people’s networks showed that the network may still increase, more often in younger than in older olds (van Tilburg and Broese van Groenou 2002). However, in the face of physical decline, the proportion of friends in the network has been shown to decrease (Aartsen et al. 2004). Thus investing in a large network of friends seems important especially for younger olds with multimorbidity.

| Table 4 continued |
| Participation in social leisure activities | Difference at P < 0.10 | Degree of participation in social leisure activities | Difference at P < 0.10 |
| No multimorbidity | AME (95 % CI) | Multimorbidity | AME (95 % CI) |
| Physical performance (0–12) | 0.002 | -0.003 | 0.007 | 0.004 |
| | 0.009 | 0.007 | 0.004 | 0.002 |
| | 0.004 | -0.002 | 0.007 | 0.004 |
| | 0.004 | 0.002 | 0.004 | 0.004 |

* Bold coefficients indicate a significance level of P < 0.05

AME average marginal effect; b, regression coefficient
Adjusted for country
Table 5 Multivariate regression models of social leisure activities, stratified by multimorbidity status, without measures of physical functioning

| Demographics | Participation in social leisure activities | Degree of participation in social leisure activities | Difference at $P < .10$ |
|--------------|------------------------------------------|-----------------------------------------------|-------------------------|
|              | No multimorbidity AME (95 % CI) | Multimorbidity AME (95 % CI) | No multimorbidity B (95 % CI) | Multimorbidity B (95 % CI) |
| Age (65–85) | –0.001 –0.003 0.002 | –0.002 –0.006 0.001 | –0.020 –0.054 0.013 | –0.001 –0.035 0.033 |
| Female gender | 0.005 –0.024 0.033 | 0.002 –0.035 0.039 | –0.113 –0.462 0.236 | –0.113 –0.473 0.248 |
| Socioeconomic status | | | | |
| Secondary vs. Primary education | 0.022 –0.010 0.053 | 0.045 0.005 0.084 | 0.279 –0.106 0.664 | 0.048 –0.341 0.437 |
| Tertiary vs. Primary education | 0.036 –0.011 0.083 | 0.068 0.004 0.132 | 0.792 0.354 1.230 | 0.677 0.192 1.163 |
| Self-reported income: can easily make ends meet (vs. cannot) | 0.039 0.010 0.067 | 0.015 –0.020 0.051 | 0.553 0.101 1.006 | –0.356 –0.763 0.051 * |
| Social | | | | |
| Divorced vs. Partner | 0.007 –0.054 0.068 | 0.027 –0.051 0.106 | 0.097 –0.565 0.759 | 0.457 –0.262 1.177 |
| Widowed vs. Partner | 0.014 –0.021 0.048 | 0.046 0.006 0.087 | 0.522 0.093 0.952 | 0.386 –0.014 0.785 |
| Single vs. Partner | 0.006 –0.054 0.065 | –0.043 –0.101 0.014 | 0.379 –0.302 1.059 | 0.685 –0.057 1.426 |
| Network of family (0–15) | 0.000 –0.004 0.004 | 0.003 –0.003 0.008 | 0.007 –0.045 0.060 | –0.007 –0.060 0.047 |
| Network of friends (0–15) | 0.006 0.003 0.010 | 0.007 0.002 0.011 | 0.158 0.111 0.206 | 0.185 0.138 0.231 |
| Volunteering (yes vs. no) | 0.047 0.007 0.087 | 0.148 0.065 0.231 * | 1.626 1.290 1.963 | 1.600 1.239 1.962 |
| Environmental | | | | |
| Urban (vs. Rural) | 0.004 –0.026 0.033 | 0.001 –0.038 0.040 | 0.125 –0.276 0.526 | –0.073 –0.482 0.337 |
| Drives a car (yes vs. no) | 0.010 –0.021 0.041 | 0.046 0.008 0.085 * | 0.169 –0.226 0.564 | 0.611 0.224 0.999 * |
| Uses public transport (yes vs. no) | 0.033 –0.001 0.066 | 0.055 0.017 0.094 | 0.593 0.215 0.971 | 0.406 0.022 0.791 |
| Parks in neighbourhood (a lot or some vs. Not at all) | –0.001 –0.039 0.036 | –0.015 –0.062 0.032 | 0.009 –0.571 0.588 | 0.280 –0.255 0.814 |
| Public facilities in neighbourhood (a lot or some vs. Not at all) | 0.008 –0.028 0.044 | 0.014 –0.032 0.061 | –0.152 –0.683 0.379 | 0.388 –0.174 0.949 |
| Places to stop and rest (a lot or some vs. Not at all) | 0.031 –0.006 0.068 | 0.038 –0.010 0.086 | 0.475 –0.090 1.040 | 0.217 –0.325 0.759 |
| Psychological health | | | | |
| Depressive symptoms (0–20) | –0.003 –0.008 0.002 | –0.006 –0.011 –0.001 | –0.098 –0.171 –0.025 | –0.118 –0.180 –0.055 |
| Anxiety symptoms (0–20) | 0.002 –0.002 0.006 | 0.000 –0.005 0.005 | 0.063 0.005 0.122 | 0.037 –0.018 0.092 |
| Mastery (5–25) | 0.002 –0.002 0.006 | –0.003 –0.008 0.001 | 0.002 –0.052 0.055 | 0.022 –0.028 0.073 |

* Bold coefficients indicate a significance level of $P < 0.05$

AME average marginal effect, $b$ regression coefficient

Adjusted for country
The results of this study partly correspond to those of several previous studies that have assessed predictors of social leisure activities in the general older population, but differences with regard to specific predictors were also observed (Chen and Fu 2008; Gagliardi et al. 2007; Janke et al. 2006; van der Meer 2008). Studies vary greatly in their conceptualization of leisure participation. Groups of activities were for example based on factor analysis (Gagliardi et al. 2007; Lennartsson and Silverstein 2001; Silverstein and Parker 2002), or defined by the extent to which activities are social (Menec 2003), formal or informal (Broese van Groenou and Deeg 2010; Janke et al. 2006). The inclusion of multiple countries and a broad set of social, health and psychosocial predictors might explain differences with these previous studies.

Some of our findings might inform policies that aim at improving older people’s participation in leisure activities. In both the multimorbidity and non-multimorbidity groups, only a few people in each country did not engage in social leisure activities at all. As the participation rates in both health groups were quite high, we included also the degree of participation. This measure revealed a larger difference in participation between groups with and without multimorbidity. This indicates that interventions are better aimed at increasing the amount or promoting the continuation of leisure participation, rather than the initial decision to participate. Interestingly, predictors of the degree of participation were more similar between the groups with and without multimorbidity. This suggests that policy measures to increase the degree of social leisure activity should not necessarily be different for people with and without multimorbidity. This study gives some indications as to which personal and environmental factors should be targeted at in order to increase participation in social leisure activities in older people, namely good physical and psychological health, a large network of friends and appropriate transportation possibilities.

This study included multiple indicators of older people’s physical environment that might influence their participation in leisure activities. Some associations emerged that need further investigation. For example, the availability of places to stop and rest in the neighbourhood was associated with social leisure participation only in those without multimorbidity, even though mobility barriers are reported often by people with chronic diseases (Martin et al. 2012; Theis and Furner 2011). Our data show that a characteristic of the environment that might increase the social leisure participation of older people is the availability and accessibility of public transport. The question used for assessing use of public transport was limited to those who reported the availability of public transportation in the neighbourhood. The twelve percent who did not have public transportation available, however, might have used it for example while being in a different neighbourhood. It should be addressed in future research whether improving the availability of transport increases the level of participation in leisure activities.

A limitation of this study is non-response to certain variables in the study, which was related to physical performance. This influences the representativeness of our findings, and should be kept in mind when applying our results to the general older European population. The influence of country differences in non-response on our findings remains uncertain. In this study, different types of social leisure activities were combined, but the effect of leisure participation on wellbeing likely depends on the degree to which activities match older people’s preferences (Herzog et al. 1991). Further research might address differences in leisure preferences between people with and without multimorbidity.

We acknowledge that other meaningful groups with different health statuses can be made. For example, having more than two diseases, or multimorbidity combined with disability, might negatively affect participation in social leisure activities. Since this is a first step in exploring whether determinants of social leisure activity differ by health status, we decided to use multimorbidity—with proven negative effects on wellbeing and functioning (Marengoni et al. 2011)—as a grouping factor. This study did not focus on the specific diseases people with multimorbidity have, and future studies may address diseases with various types of disability, to provide more specific recommendations for interventions that enable people with chronic diseases to stay socially active. Eighty per cent of those with multimorbidity in this study reported to have osteoarthritis, a leading cause of disability among older people, especially when multimorbid conditions are present (CDC 2013). The high prevalence of arthritis may explain why better physical performance predicted social leisure activities. This high prevalence, however, cannot explain why mobility limitations predicted participation in social leisure activities, a finding that is difficult to explain.

No information on personality characteristics was available for this study, while personality aspects may play an important role in social leisure participation, and the degree of participation. In addition, no information on previous participation was available in this study, while this has been shown to be strong predictor of current participation (Agahi et al. 2006). It remains to be seen in future research if this continuity holds equally for older people with and without good health. Finally, it was beyond the scope of this article to include in the analyses country-level information, such as the availability of organized social and physical activities and the differences in climate. We acknowledge that there were quite some differences in leisure participation between the six
countries, and future studies may examine if the factors that have been identified in our study are important predictors in each of the countries.

To conclude, this study conducted in a sample of older Europeans showed that participation in leisure activities is rather high. This is good news with respect to the current focus of European policies on active ageing. However, (the amount of) participation in social leisure activities may be increased in particular in those with multimorbidity. They participated less, and less frequently in social leisure activities compared to older people without multimorbidity. To increase their wellbeing and quality of life, policies should focus on social (network of friends), physical (physical performance) and psychological factors (depressive symptoms), in order to increase social leisure participation. In addition, transportation possibilities may be improved for both groups of older people, as these were important predictors of participation in social leisure activities.

Acknowledgments This project has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no 320333 (MOPACT). The EPOSA research group: Germany: T. Aartsen MJ, van Tilburg T, Smits CH, Knipscheer KC (2004) A

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

References

Aartsen MJ, van Tilburg T, Smits CH, Knipscheer KC (2004) A longitudinal study of the impact of physical and cognitive decline on the personal network in old age. J Soc Pers Relat 21(2):249–266
Agahi N, Ahacic K, Parker MG (2006) Continuity of leisure participation from middle age to old age. J Gerontol B Psychol Sci Soc Sci 61(6):S340–S346
Atchley RC (1989) A continuity theory of normal aging. Gerontologist 29(2):180–190
Bowling A (1995) What things are important in people’s lives? A survey of the public’s judgements to inform scales of health related quality of life. So Sci Med 41(10):1447–1462
Bridle C, Spanjers K, Patel S, Atherton NM, Lamb SE (2012) Effect of exercise on depression severity in older people: systematic review and meta-analysis of randomised controlled trials. Br J Psych 201(3):180–185
Broese van Groenou M, Deeg DHJ (2010) Formal and informal social participation of the young-old in the Netherlands in 1992 and 2002. Ageing Soc 30(3):445–465
Brooks R, Rabin R, De Charro F (eds) (2003) The measurement and valuation of health status using eq-5d: A European perspective. Kluwer Academic Publishers, Dordrecht
CDC (2013) Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation—united states, 2010–2012. MMWR Morb Mortal Wkly Rep 62(44):969
Chen SY, Fu YC (2008) Leisure participation and enjoyment among the elderly: individual characteristics and sociability. Educ Gerontol 34(10):871–889
Crimmins EM, Beltrán-Sánchez H (2011) Mortality and morbidity trends: is there compression of morbidity? J Gerontol B Psychol Sci Soc Sci 66B(1):75–86
Dahan-Oliel N, Mazer B, Gélinas I, Dobbs B, Lefebvre H (2010) Transportation use in community-dwelling older adults: association with participation and leisure activities. Can J Ageing 29(04):491–502
Gagliardi A, Spazzafumo L, Marcellini F, Moldenkopf H, Ruoppila I, Tacken M, Szémann Z (2007) The outdoor mobility and leisure activities of older people in five European countries. Ageing Soc 27(05):683–700
Griffin J, McKenna K (1999) Influences on leisure and life satisfaction of elderly people. Phys Occup Ther Geriatr 15(4):1–16
Guralnik JM, Branch LG, Cummings SR, Curb JD (1989) Physical performance measures in aging research. J Gerontol 44(5):M141–M146
Herzog A, House JS, Morgan JN (1991) Relation of work and retirement to health and well-being in older age. Psychol Aging 6(2):202
Janke M, Davey A, Kleiber D (2006) Modeling change in older adults’ leisure activities. Leisure Sci 28(3):285–303
Klumb RL, Maier H (2007) Daily activities and survival at older ages. J Ageing Health 19(4):594–611
Lefrancois R, Leclerc G, Poulin N (1997) Predictors of activity involvement among older adults. Activ Adapt Aging 22(4):15–29
Lennartsson C, Silverstein M (2001) Does engagement with life enhance survival of elderly people in Sweden? The role of social and leisure activities. J Gerontol B Psychol Sci Soc Sci 56(6):S335–S342
Lubben J, Blozik E, Gillmann G, Iliffe S, von Renteln Kruse W, Beck JC, Stuck AE (2006) Performance of an abbreviated version of the lubben social network scale among three European community-dwelling older adult populations. Gerontologist 46(4):503–513
Marengoni A, Angleman S, Melis R, Mangialasche F, Karp A, Garmen A, Meinow B, Fratiglioni L (2011) Aging with multimorbidity: a systematic review of the literature. Ageing Res Rev 10(4):430–439
Mars GM, Kempen GI, Post MW, Proot IM, Mesters I, van Eijk JT (2009) The maastricht social participation profile: development and clinimetric properties in older adults with a chronic physical illness. Qual Life Res 18(9):1207–1218
Martin KR, Schoster B, Woodard J, Callahan LF (2012) What community resources do older community-dwelling adults use to manage their osteoarthritis? A formative examination. J Appl Gerontol 31(5):664–684
McKenna K, Broome K, Liddle J (2007) What older people do: time use and exploring the link between role participation and life satisfaction in people aged 65 years and over. Aust Occup Ther J 54(4):273–284
Menec VH (2003) The relation between everyday activities and successful aging: a 6-year longitudinal study. J Gerontol B Psychol Sci Soc Sci 58(2):S74–S82
Menec VH, Chipperfield JG (1997) Remaining active in later life: the role of locus of control in seniors’ leisure activity participation, health, and life satisfaction. J Ageing Health 9(1):105–125

Meulenkamp TM, Cardol M, van der Hoek LS, Francke AL, Rijken M (2013) Participation of people with physical disabilities: three-year trend and potential for improvement. Arch Phys Med Rehabil 94(5):944–950

Minhat HS, Mohd Amin R (2012) Sociodemographic determinants of leisure participation among elderly in Malaysia. J Community Health 37(4):840–847

Nummela O, Sulander T, Rahkonen O, Uutela A (2008) Associations of self-rated health with different forms of leisure activities among ageing people. Int J Public Health 53(5):227–235

Pearlin LI, Schooler C (1978) The structure of coping. J Health Soc Behav 19:2–21

Perkins JM, Multhaup KS, Perkins HW, Barton C (2008) Self-efficacy and participation in physical and social activity among older adults in Spain and the united states. Gerontologist 48(1):51–58

Pilkington PD, Windsor TD, Crisp DA (2012) Volunteering and subjective well-being in midlife and older adults: the role of supportive social networks. J Gerontol B Psychol Sci Soc Sci 67B(2):249–260

Satariano WA, Haught TJ, Tager IB (2002) Living arrangements and participation in leisure-time physical activities in an older population. J Ageing Health 14(4):427–451

Schmidt AE, Ilincic S, Schulmann K, Rodrigues R, Principi A, Barbarella F, Sowa A, Golinowska S, Deeg D, Galenkamp H (2016) Fit for caring: factors associated with informal care provision by older caregivers with and without multimorbidity. Eur J Ageing. doi:10.1007/s10433-016-0373-4

Silverstein M, Parker MG (2002) Leisure activities and quality of life among the oldest old in Sweden. Res Aging 24(5):528–547

Snith RP (2003) The hospital anxiety and depression scale. Health Qual Life Outcomes 1(1):1–4

Strain LA, Grabusic CC, Searle MS, Dunn NJ (2002) Continuing and ceasing leisure activities in later life: a longitudinal study. Gerontologist 42(2):217–223

Theis KA, Furner SE (2011) Shut-in? Impact of chronic conditions on community participation restriction among older adults. Journal of aging research, 2011. J Aging. doi:10.4061/2011/759158

van den Akker M, Buntinx F, Knoottenus IA (1996) Comorbidity or multimorbidity: what’s in a name? A review of literature. Eur J Gen Pract 2:65–70

dan der Meer MJ (2008) The sociospatial diversity in the leisure activities of older people in the Netherlands. J Aging Stud 22(1):1–12

dan der Pas S, Koopman-Boyd P (2009) Leisure and recreation activities and wellbeing among older New Zealanders. In: Koopman-Boyd P (ed) Enhancing wellbeing in an ageing society: 65-84 year old New Zealanders in 2007. Waldegrave: The Population Studies Centre, University of Waikato, Hamilton and the Family Centre Social Policy Research Unit, Lower Hutt, Wellington, pp 117–132

dan der Pas S, Castell MV, Cooper C, Denkinger M, Dennison E, Edwards M, Herboldsheimer F, Limongi F, Lips P, Maggi S, Nasell H, Nikolaus T, Otero A, Pedersen N, Peter R, Sanchez-Martinez M, Schaap L, Zambon S, van Schoor N, Deeg D (2013) European project on osteoarthritis: design of a six-cohort study on the personal and societal burden of osteoarthritis in an older European population. BMC Musculoskelet Disord 14(1):138

dan Tilburg T, Broese van Groenou M (2002) Network and health changes among older dutch adults. J Soc Issues 58(4):697–713

Verbrugge LM, Jette AM (1994) The disablement process. Soc Sci Med 38(1):1–14

Verbrugge LM, Gruber-Baldini AL, Fozard JL (1996) Age differences and age changes in activities: Baltimore longitudinal study of aging. J Gerontol B Psychol Sci Soc Sci 51(1):S30–S41

White DK, Jette AM, Felson DT, LaValley MP, Lewis CE, Torner JC, Nevitt MC, Keysor JJ (2010) Are features of the neighborhood environment associated with disability in older adults? Disabil Rehabil 32(8):639–645

WHO (2002) Active ageing. A policy framework

Zigmond AS, Snaith RP (1983) The hospital anxiety and depression scale. Acta Psychiatr Scand 67(6):361–370

Zimmer Z, Hickey T, Searle MS (1997) The pattern of change in leisure activity behavior among older adults with arthritis. Gerontologist 37(3):384–393