



Olli Nummela

# Trust, Participation, and Health among Ageing People

A Cross-Sectional Cohort Study of Men and Women Born in 1926–30, 1936–40, and 1946–50 in the Lahti Region, Southern Finland

Publications of the National Public Health Institute  26/2008

Department of Health Promotion and Chronic Disease Prevention  
National Public Health Institute  
*and*

Department of Public Health  
University of Helsinki, Finland

Helsinki, Finland 2008



**Olli Nummela**

**TRUST, PARTICIPATION, AND HEALTH AMONG  
AGEING PEOPLE**

**A CROSS-SECTIONAL COHORT STUDY OF  
MEN AND WOMEN BORN IN 1926-30, 1936-40,  
AND 1946-50 IN THE LAHTI REGION,  
SOUTHERN FINLAND**

**ACADEMIC DISSERTATION**

*To be presented with the permission of the Faculty of Medicine,  
University of Helsinki, for public examination in Auditorium XV,  
University Main Building, on December 5, 2008, at 12 o'clock noon.*

Department of Health Promotion and Chronic Disease Prevention  
National Public Health Institute, Helsinki, Finland

*and*

Department of Public Health, University of Helsinki, Finland

Helsinki 2008

**Publications of the National Public Health Institute  
KTL A26 / 2008**

Copyright National Public Health Institute

**Julkaisija-Utgivare-Publisher**

**Kansanterveyslaitos (KTL)**

Mannerheimintie 166  
00300 Helsinki  
Puh. vaihde (09) 474 41, telefax (09) 4744 8408

**Folkhälsoinstitutet**

Mannerheimvägen 166  
00300 Helsingfors  
Tel. växel (09) 474 41, telefax (09) 4744 8408

**National Public Health Institute**

Mannerheimintie 166  
FIN-00300 Helsinki, Finland  
Telephone +358 9 474 41, telefax +358 9 4744 8408

ISBN 978-951-740-873-8

ISSN 0359-3584

ISBN 978-951-740-874-5 (pdf)

ISSN 1458-6290 (pdf)

**Kannen kuva - cover graphic: Olli Nummela**

Yliopistopaino  
Helsinki 2008

**Supervised by**

Docent Antti Uutela, Ph.D.  
Department of Health Promotion and Chronic Disease Prevention  
National Public Health Institute  
Helsinki, Finland

Docent Tommi Sulander, Ph.D.  
Age Institute  
Kuntokallio-Foundation  
Helsinki, Finland

Professor Antti Karisto, Ph.D.  
Department of Social Policy  
University of Helsinki  
Helsinki, Finland

Docent Ossi Rahkonen, Ph.D.  
Department of Public Health  
University of Helsinki  
Helsinki, Finland

**Reviewed by**

Docent Markku Hyypä, M.D.  
Department of Health and Functional Capacity  
National Public Health Institute  
Turku, Finland

Professor Sakari Suominen, M.D.  
Department of Public Health  
University of Turku  
Turku, Finland

**Opponent**

Docent Ari Haukkala, Ph.D.  
Department of Social Psychology  
University of Helsinki  
Helsinki, Finland



Labor omnia vicit improbus.

“Uphill work overcame all things.” (“Kaiken on voittanut peräänantamaton uurastus.”)

Vergilius

Olli Nummela, Trust, participation, and health among ageing people.

A cross-sectional cohort study of men and women born in 1926–30, 1936–40, and 1946–50 in the Lahti region, southern Finland

Publications of the National Public Health Institute, A26/2008, 72 Pages

ISBN 978-951-740-873-8; 978-951-740-874-5 (pdf-version)

ISSN 0359-3584; 1458-6290 (pdf-version)

<http://www.ktl.fi/portal/4043>

## **ABSTRACT**

The main purpose of the present study was to explore the associations between good self-rated health and economic and social factors in different regions among ageing people in the Päijät-Häme region in southern Finland.

The study examined data from a survey conducted in Päijät-Häme in 2002 as part of the research and development project “Ikihyvä 2002–2012” (Good Ageing in Lahti region – GOAL project). The sample was stratified by age, gender, and municipality within 14 municipalities of the hospital district. The baseline data set consisted of 2,815 participants born in 1926–30, 1936–40, and 1946–50. The response rate was 66 %. The respondents filled in two questionnaires and attended a physical examination and blood tests. Cross-tables and logistic regression analyses were computed to derive the results.

Self-perceived adequacy of income was significantly associated with good self-rated health, especially in the urban areas. Similar associations were found in the rural areas, though education was also considered an important factor. Adequacy of income was an even stronger predictor of good health than the actual income. According to gender, women had better self-rated health than men, but only in the urban areas. The youngest respondents had a better self-rated health than the others in the urban areas and in the sparsely populated countryside.

Social participation and access to help when needed were associated with good self-rated health, especially in the urban area and the sparsely populated rural areas. The result was comparable in the rural population centres. The correlation of trust with self-rated health was significant in the urban area.

High social capital was associated with good self-rated health in the urban area. The effect was quite similar in the other areas, though it was statistically insignificant. High social capital consisted of co-existent high social participation and high trust. The association of traditionalism (low participation/high trust) with self-rated health was also substantial in the urban area. The associations of self-rated health with low social capital (low participation/low trust) and “the miniaturisation of community” (high participation/low trust) were less significant.

From the forms of single participation among women, going to art exhibitions, theatre, movies, and concerts, and, among men, studying and self-development were positively related to self-rated health. Among women, active participation in religious events and voluntary work were negatively associated with self-rated health.

As a whole, only minor variations in self-rated health were found between the areas. However, the significance of factors associated with self-rated health varied according to the areas. Economic factors, especially adequacy of income was strongly associated with good self-rated health. Also when adjusting for economic and several other background factors, social factors were associated with self-rated health. Economic and social factors have a significant relation with ageing health. Thus, both economic inequalities and insufficient social relations are challenges for public health.

Keywords: self-rated health, adequacy of income, trust, participation, leisure activities, social capital, urban–rural, ageing

Olli Nummela, Luottamus, osallistuminen ja terveys ikääntyvillä.  
Poikkileikkaustutkimus 1926–30, 1936–40 ja 1946–50 syntyneistä miehistä  
ja naisista Päijät-Hämeessä  
Kansanterveyslaitoksen julkaisuja, A26/2008, 72 sivua  
ISBN 978-951-740-873-8; 978-951-740-874-5 (pdf-versio)  
ISSN 0359-3584; 1458-6290 (pdf-versio)  
<http://www.ktl.fi/portal/4043>

## TIIVISTELMÄ

Tämän tutkimuksen päätarkoituksena oli selvittää hyvän koetun terveyden ja taloudellisten sekä sosiaalisten tekijöiden välisiä yhteyksiä ikääntyvillä miehillä ja naisilla eri asuinalueilla Päijät-Hämeessä.

Tutkimuksessa käytettiin kyselyaineistoa Päijät-Hämeestä vuodelta 2002 osana Ikihyvä tutkimus- ja kehittämishanketta 2002–2012. Aineisto kerättiin iän, sukupuolen ja asuinkunnan mukaan ositetulla otoksella sairaanhoitopiirin 14 kunnassa. Tutkimukseen osallistui 2815 henkeä, jotka olivat syntyneet vuosina 1926–30, 1936–40 ja 1946–50. Vastausaktiivisuus oli 66 %. Tutkittavat vastasivat kahdessa kyselylomakkeessa esitettyihin kysymyksiin ja osallistuivat terveystarkastukseen sekä verikokeisiin. Tutkimuksen tulokset perustuvat ristiintaulukoihin ja logistiseen regressioanalyysiin.

Koettu rahojen riittävyys oli merkittävässä yhteydessä hyvään koettuun terveyteen erityisesti kaupunkialueella. Muilla alueilla tulos oli samansuuntainen, vaikka niissä myös koulutus oli keskeinen tekijä. Itse koettu rahojen riittäminen oli jopa todellisia tuloja tärkeämpi terveyden indikaattori. Sukupuolittaisessa tarkastelussa kaupunkialueen naisilla oli miehiä parempi terveys. Nuorimmalla ikäryhmällä oli vanhempia parempi terveys muualla paitsi taajaan asutulla maaseudulla.

Sosiaalinen osallistuminen ja mahdollisuus avun saamiseen tarvittaessa olivat yhteydessä hyvään koettuun terveyteen kaupunkialueella ja harvaan asutulla maaseudulla. Myös maaseudun taajamissa tulos oli samansuuntainen. Kaupunkialueella luottamuksella muihin ihmisiin oli merkittävä yhteys koettuun terveyteen.

Korkea sosiaalinen pääoma oli yhteydessä hyvään koettuun terveyteen kaupunkialueella. Vaikutus oli melko samanlainen muilla alueilla, vaikkakaan ei tilastollisesti merkitsevä. Korkea sosiaalinen pääoma muodostui samanaikaisesta korkeasta sosiaalisesta osallistumisesta ja korkeasta luottamuksesta. Myös traditionaalisuuden (matala osallistuminen/korkea luottamus) ja koetun terveyden välinen yhteys oli merkittävä kaupunkialueella. Yhteydet koetun terveyden ja matalan sosiaalisen pääoman (matala osallistuminen/matala luottamus) sekä ”kaventuneisuuden” (korkea osallistuminen/matala luottamus) välillä olivat vähäisempiä.

Osallistuminen taidenäyttelyihin sekä teatterissa, elokuvissa ja konsertissa käyminen naisilla, mutta opiskelu ja itsensä kehittäminen miehillä olivat yksittäisistä osallistumisen muodoista yhteydessä hyvään koettuun terveyteen. Naisilla aktiivinen osallistuminen hengellisiin tilaisuuksiin ja vapaaehtoistyöhön olivat negatiivisesti yhteydessä koettuun terveyteen.

Kokonaisuutena osoittautui, että koetun terveyden alue-erot olivat pieniä. Kuitenkin koettuun terveyteen yhteydessä olevien tekijöiden merkitys vaihteli alueittain. Taloudellisilla tekijöillä, erityisesti rahojen riittävyydellä oli voimakas yhteys hyvään koettuun terveyteen. Vaikka taloudelliset ja monet muut taustatekijät otettiin huomioon, myös sosiaaliset tekijät olivat yhteydessä koettuun terveyteen. Taloudellisilla ja sosiaalisilla tekijöillä on merkittävä yhteys ikääntyvien terveydelle. Siten sekä taloudellinen eriarvoisuus että riittämättömät sosiaaliset suhteet ovat haasteita kansanterveydelle.

Avainsanat: koettu terveys, rahojen riittävyys, luottamus, osallistuminen, vapaa-ajan toiminta, sosiaalinen pääoma, kaupunki–maaseutu, ikääntyminen

# CONTENTS

<b>Abbreviations.....</b>	<b>11</b>
<b>List of original publications.....</b>	<b>12</b>
<b>1 Introduction .....</b>	<b>13</b>
<b>2 Review of the literature .....</b>	<b>15</b>
2.1 SELF-RATED HEALTH AS AN INDICATOR OF HEALTH STATUS .....	15
2.2 SOCIOECONOMIC POSITION AND HEALTH .....	16
2.3 TRUST, SOCIAL PARTICIPATION, AND HEALTH.....	18
2.4 URBAN-RURAL DIFFERENCES AND HEALTH.....	21
2.5 IMPLICATIONS FROM PREVIOUS RESEARCH FOR THE PRESENT STUDY .....	22
<b>3 Aims of the study .....</b>	<b>24</b>
<b>4 Material and methods.....</b>	<b>25</b>
4.1 SUBJECTS AND PROCEDURES .....	25
4.2 STUDY VARIABLES .....	26
4.3 STATISTICAL METHODS .....	30
<b>5 Results.....</b>	<b>31</b>
5.1 SOCIOECONOMIC POSITION AND SELF-RATED HEALTH (I) .....	31
5.2 SOCIAL NETWORKS AND SELF-RATED HEALTH (II).....	33
5.3 COMBINATIONS OF SOCIAL PARTICIPATION AND TRUST WITH SELF-RATED HEALTH (III).....	35
5.4 LEISURE-TIME ACTIVITIES AND SELF-RATED HEALTH (IV).....	37
5.5 AREA DIFFERENCES .....	41
<b>6 Discussion .....</b>	<b>42</b>
6.1 MAIN FINDINGS .....	42
6.2 DISCUSSION OF THE FINDINGS .....	43
6.3 METHODOLOGICAL CONSIDERATIONS .....	48
<b>7 Conclusions.....</b>	<b>54</b>
<b>8 Acknowledgements .....</b>	<b>57</b>
<b>9 References.....</b>	<b>59</b>
<b>10 Appendix 1 .....</b>	<b>70</b>

## **ABBREVIATIONS**

BMI	body mass index
CI	confidence interval
N	number
OECD	Organisation for Economic Co-operation and Development
OR	odds ratio
SEP	socioeconomic position

## LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following original articles referred to in the text by their Roman numerals:

- I** Self-rated health and indicators of SES among the ageing in three types of communities. Nummela O, Sulander T, Heinonen H, Uutela A. *Scandinavian Journal of Public Health*, 2007; 35: 39–47.
  
- II** Self-rated health and social capital among ageing people across the urban-rural dimension. Nummela O, Sulander T, Karisto A, Uutela A. *International Journal of Behavioral Medicine*, in press.
  
- III** Social participation, trust and self-rated health: A study among ageing people in urban, semi-urban and rural settings. Nummela O, Sulander T, Rahkonen O, Karisto A, Uutela A. *Health & Place*, 2008; 14: 243–253.
  
- IV** Associations of self-rated health with different forms of leisure activities among ageing people. Nummela O, Sulander T, Rahkonen O, Uutela A. *International Journal of Public Health*, 2008; doi: 10.1007/s00038-008-6117-2

*The articles are reproduced by courtesy of Taylor and Francis (I), ISBM and Springer (II), Elsevier Ltd. (III), and Birkhäuser Verlag, Basel (IV).*

# 1 INTRODUCTION

Trust and social participation are important determinants of an individual's overall well-being, as they have been shown to have health-protective effects. Existing evidence proves that high levels of trust have been shown to be associated with better self-rated health in cross-sectional studies among the general population (e.g. Kawachi et al. 1999; Hyypä and Mäki 2001; Subramanian et al. 2002). Also active social participation is associated with better self-rated health (e.g. Kawachi et al. 1999; Hyypä and Mäki 2001). In addition, similar associations have been found among the ageing people (e.g. Veenstra 2000; Morrow-Howell et al. 2003; Pollack and von dem Knesebeck 2004). However, relatively few studies have been focused on the relationships between participation or trust and the living area (Greiner et al. 2004). Thus, there is a lack of knowledge of the health associations and regional differences with trust and social participation, particularly among ageing people.

The proportion of ageing people is growing in Finland. According to the population forecast, by 2030, people aged 65 years or over is expected to be approximately 26 per cent in Finland as a whole (Statistics Finland 2001). However, regional variation is wide. In the future, particularly in northern and eastern Finland, the proportion of ageing people will grow and the dependency ratios will weaken. Therefore, total spending on social and health care is predicted to increase considerably (Nivalainen and Volk 2002).

In the Päijät-Häme region in southern Finland the proportion of ageing people has been estimated to be higher than in the whole country (Statistics Finland 2001, 2006). Moreover, the age-adjusted mortality figures have been shown to be higher in the Päijät-Häme region than in Finland on average. It has been suggested that the main reasons for higher mortality are low socioeconomic factors in the area (Blom-Lange 1999). High-level education is not common, and the average pension level is lower than in the whole of Finland (Karisto et al. 2003).

Demographic and social structures have changed rapidly in Finland during the last few decades. Structural changes in society have been extensive. Urbanisation and industrialisation have become widespread, and agriculture has diminished. This has levelled up the standard of living as well as the level of education. Furthermore, unemployment has been uncommon, and a trend of social mobility has been towards

upper classes (Karisto 2003). These structural changes have also affected the health threats which are no longer the same as before. From the perspective of health promotion, medical advances and medicine have overall only limited resources and methods for advancing health. Consequently, there is a great need for alternative approaches. Therefore, the Päijät-Häme hospital district, together with experts and researchers from many domains and institutions, started the Good Ageing in Lahti Region (GOAL) program.

Social capital is a concept that has been increasingly associated with the scientific and public health during recent years (Putnam 1995; Portes 1998; Kawachi and Berkman 2000; Islam et al. 2006; Ferlander 2007). Relatively little is known of the relationship of trust and social participation as components of social capital with self-rated health in different living environments among ageing people. In addition, though the socioeconomic position (SEP) and health are strongly correlated, all SEP indicators do not have identical associations with health. The present study is focused on the economic and social determinants of ageing people in different living environments. The purpose of this study is to increase the knowledge of self-rated health, in relation to economic and social determinants among ageing people living in different regions.

## **2 REVIEW OF THE LITERATURE**

The review of literature focuses on the importance of self-rated health and the health associations between socioeconomic position, trust, and social participation. Urban-rural differences in these associations are also viewed.

### **2.1 Self-rated health as an indicator of health status**

Self-rated health is a widely used and important means to measure a person's general health status (Idler and Benyamini 1997; Heistaro 2002). According to a review of 27 studies, global self-rated health is an independent predictor of mortality in a vast majority of studies, even when known health risk factors have been accounted for (Idler and Benyamini 1997). Furthermore, subsequent studies have established that self-rated health, not only associates with survival (Idler et al. 2000; Walker et al. 2004), but also with the use of services (Bath 1999; Bosworth et al. 2000), functional limitations (Damian et al. 1999; Idler et al. 2000), and chronic conditions (Bryant et al. 2000; Leinonen et al. 2001). Therefore, self-rating is a global and simple way to capture different viewpoints of health using comprehensive criteria. A brief four- or five-point scale item "How in general would you rate your health?" is a powerful tool for self-assessment and it combines factors from many different life domains (Idler and Benyamini 1997). In addition, global self-rated health is age-dependent, as it declines with increasing age. The age-trajectory is similar in individuals and populations (Andersen et al. 2007).

When examining health ratings in the old age, the global measure of self-rated health without explicit reference points has proved to be better than the comparative measure where respondents compare their health with that of their age peers (Vuorisalmi 2007). Overall, the health status has been seen as a multidimensional concept including medical, subjective, and functional aspects. Subjective and functional perspectives involve a person's living conditions and roles, whereas the medical measures are more straightforward, i.e. older people have a higher prevalence of ill-health than younger ones. The assessment of self-rated health is age- and gender-specific. It is a general estimate of medical illnesses, own experience of illnesses, functional disadvantages caused by illness, and higher than average somatic and psychic symptoms. Thus, the single item indicator of self-rated health is a reliable indicator and a multidimensional summary of the overall health.

Self-rated health forms a continuum, including different domains of health which vary according to the respondent's consideration (Manderbacka 1995, 1998).

## **2.2 Socioeconomic position and health**

Inequalities in health among the general population have been shown in a number of studies (Pappas et al. 1993; Mackenbach et al. 1997; Kawachi 2000), also in those conducted among ageing people (Martelin 1994; Avlund et al. 2003; Huisman et al. 2003; Knesebeck et al. 2003; Chandola et al., 2007). A recent study suggests that socioeconomic inequalities among ageing people in Finland have remained the same or become even broader in self-rated health (Rahkonen et al. 2007). In addition, socioeconomic differences in mortality vary strongly (Valkonen et al. 2007), and differences in the functional capacity have remained fairly the same (Sulander et al. 2006; Martelin et al. 2007).

There exists no one and only indicator of the socioeconomic position (SEP). The indicators vary according to the study aims, time points, and settings. All SEP indicators are not equally relevant to different health outcomes or different stages of life. A life course approach has considered several life stages with several SEP indicators at each stage (Galobardes et al. 2006). However, there is no agreement about the best measure for determining the socioeconomic position in older ages, and therefore the use of multiple indicators has been emphasised. Some limitations in analysing health inequalities among the ageing have been highlighted, such as the impact of living arrangements and caring tasks, and their interactions with the socioeconomic position, or the identification of the best health indicator at an older age (Artazcoz and Rueda 2007). Furthermore, the effect of time is an important factor when analysing health inequalities in a post-working population. The effect varies depending on the gender and the used SEP measure (Hyde and Jones 2007). It has been found that social inequalities in reported health will increase with age. Thus, health inequalities will pose a tough challenge in the future, when the population ages (Chandola et al., 2007).

While the traditional measures of the socioeconomic status (education, occupation, and income) are powerful predictors of health, they are still of limited value. For instance, measuring the years of education does not involve the quality of education, occupational information is not relevant among those not working currently, and the

income is mainly measured at only one point in adulthood. Moreover, it has also been suggested that among the ageing (after the age of 65 years), income is a less sensitive measure of the socioeconomic position (Lynch and Kaplan 2000). For instance, the income level may be equal among two ageing people, but the financial assets that can be used may differ. Financial assets associate strongly with health in old age (Robert and House 1996). Similarly, self-rated economic condition is strongly related to health among ageing persons (Cheng et al. 2002). Self-assessed financial position has been found to be an even better predictor of health than income (Balabanova and McKee 2002). It has also been found that an association exists between persistent self-assessed economic difficulties and serious coronary events, which is independent of other markers of socioeconomic position (Ferrie et al., 2005). Moreover, current self-reported economic difficulties as well as difficulties experienced in childhood associate strongly with common mental disorders (Laaksonen et al., 2007).

The most basic material conditions, such as sanitary, safe water, and adequate housing, have a strong and salient influence on health. Adequate material conditions are still relevant in the modern world. However, the interpretation concerning material conditions, in this context, has changed over time. The material basis of socioeconomic health differences has changed due to overall improvement in health. A relationship between income and health is not solely limited to the problems of poverty. Changed material conditions may be relevant in this context to understand socioeconomic health differences. Each small improvement in the income level may bring benefits which produce gains in health. The state of health seems to be sensitive to the fine gradations of material conditions in a different sense than in the past (e.g. access to a car, home ownership, home with a garden, healthy food) and such conditions may have cumulative benefits to health over the life course and influence the socioeconomic position and health of the future generations. These fine material conditions are closely tied to psychological states, health behaviour, and social circumstances which all influence a person's health (Lynch and Kaplan 2000).

It has been assumed that an adequate income is a general resource that provides a possibility to take advantage of a larger variety and better quality of goods and conditions and to have access to the skills and labour of others. It is seen as a buffer of the effects of social and environmental stress. It is also possible that accumulated assets expand the generalised resources, providing access to a better quality of goods and material conditions. Nowadays even small differences in material conditions may be

relevant in understanding the differences in health between the socioeconomic groups in the context of overall improvement in health (Lynch and Kaplan 2000).

## **2.3 Trust, social participation, and health**

### *Trust*

Trust is a multifaceted notion which may have an influence on population health. Trust is often divided into generalised trust towards large groups of people and particularised trust which indicates trust towards other like-minded people (Iisakka 2006). According to Veenstra (2002), the three clear sub-dimensions of trust are the following: social trust, political trust, and trust in experts and professionals. Social trust indicates trust in people whom interacting with in everyday life. Political trust is trust in governments. Persons trust in people from nearby communities the most and governments the least, but those persons who trust in one referent also tend to trust in another (Veenstra 2002).

Trust seems to be impossible to measure objectively, as it is already by definition a subjective variable (Lindström 2006). Personal trust indicates to which extent trusting attitudes prevail in all social interactions, and interpersonal trust characterizes the relationship itself. It is not known, however, to which degree the innate propensity to trust contributes to the development of interpersonal trust (Veenstra 2002). Thus, it is unsettled to which degree trust is a permanent or inherent characteristic of individuals.

Inequality in income is strongly associated with trust. High income inequality lowers the level of trust, which may have a negative influence on health (Kawachi et al. 1997). There is also evidence that separated or divorced people, people of a lower socioeconomic status, and younger persons more often report a lower level of trust (Subramanian et al. 2003). On the contrary, age and socioeconomic factors (such as income and educational level) have not been found to be associated with trust among the elderly. Overall, high trust may assure better emotional, financial, and logistical resources to older individuals (Pollack and von dem Knesebeck 2004).

The tendency and ability to trust in other people has been considered a positive interpersonal attitude. Close relationships and social networks are greatly dependent

on trust, which makes trust an important trait especially among older people. It is also plausible that trust is positively related to health (Barefoot et al., 1998). In cross-sectional studies high levels of trust have been shown to be associated with better self-rated health (e.g. Kawachi et al. 1999; Hyypä and Mäki 2001; Subramanian et al. 2002). Also in a longitudinal study it was found that trust is positively related to functional health and survival (Barefoot et al. 1998). However, there is a need of longitudinal studies to show to which extent trust predicts subsequent self-rated health.

### *Social participation*

Social participation or social networks can be measured either as participation in voluntary organisations or engagement in formal or informal social activities (Cattell 2001). Social participation has been found to have health-protective effects. Previous studies have shown that better self-rated health is associated with membership in voluntary associations (Kawachi et al. 1999), with associational activity and religious involvement (Veenstra 2000; Hyypä and Mäki 2001, 2003), with volunteer and increased volunteer hours (Morrow-Howell et al. 2003), with social engagement (a cumulative index of social activities) (Zunzunegui et al. 2004), with participation in clubs and associations (Veenstra 2000), and with group participation assessed by whether people attended a church, charity group, sports club, self-help group or other local activities at least once a month (Pollack and von dem Knesebeck 2004). Social networks have implications for psychosocial pathways involved in health effects. Health protecting or damaging pathways vary with the characteristics of the networks. Health benefits can be coping, enjoyment of life, and hope (Cattell 2001).

### *Combinations of social participation and trust*

Traditionally there exists a close association between trust and social participation or engagement. However, social participation in its traditional forms has been partly compensated by new single-issue organisations or movements (Putnam 1995). The increasing number of ideologically, religiously or programmatically new forms of social participation may not guarantee generalised trust in other people. Shared values indicate the strong community and the high level of generalised social trust. However, people increasingly share norms and values in ways that link them with smaller and more flexible communities and groups. The types of groups have shifted to a smaller-radius, i.e. the circle of people that can be trusted has become more narrow, and the interest is focused on a single topic being less authoritative.

Therefore the type of groups people join has been changed, but still people do join groups and organisations even in larger numbers. Due to growing individualism the sense of community must be found elsewhere, in smaller and flexible groups where good things such as mutual recognition and identity can be experienced. This new phenomenon of low trust is linked together with high social participation and has been called “the miniaturisation of community”. Trust has decreased in the USA among younger birth cohorts (Fukuyama 1999). In Sweden low trust in other people seems to be more common in younger than in older age groups. Elderly people may have maintained their trust in other people by being traditionalists, though their participation in activities has decreased (Lindström 2004).

### *Social capital*

It has been suggested that social trust and civic engagement are closely correlated and represent different viewpoints of the same phenomenon, which is called the social capital (Putnam 1995). Social capital has been mainly defined either as Coleman (1988, 100) has done it, to represent something that “comes about through changes in the relations among persons that facilitate action”, or as Putnam (1995, 67) has defined it, as “features of social organisation such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit”. These definitions make social capital a community-level resource. Social capital is probably not only the sum of individual-level social networks, though it is measured at the individual level by a person’s social networks (Pearce and Davey Smith 2003).

Social capital is a complex concept and it can be measured in at least at four levels. At first level, the macro-level, the historical, social, political, and economic contexts within countries and regions are associated with societal structures that may produce varying amounts of social capital. At the second, meso-level, neighbourhoods or communities may influence social capital production and use within areas. The third level is individual-level behaviour, such as membership in groups, and the fourth level is composed of individual-level attitudes, such as trust and reciprocity (Macinko and Starfield 2001).

Social capital can be divided into cognitive or structural components which are complementary (Islam et al. 2006). The cognitive components of social capital consist of attitudes, norms, values, and beliefs operationalised as trust, sharing, and reciprocity between persons. Structural social capital components are contextual, indicating social networks or a civic engagement. In addition, horizontal and vertical

social capital can be found. Horizontal social capital encompasses bonding and bridging. Bonding social capital refers to relations between persons with shared social identity or strong ties (e.g. family members and close friends). Bridging social capital, instead, refers to weak ties between people with a different social identity (e.g. ethnic and occupational background). Vertical or linking social capital has been defined as hierarchical or unequal relations between persons leading differences in power and status (Szreter and Woolcock 2004; Islam et al. 2006).

In some studies it has been suggested that social capital may positively affect self-rated health (e.g. Kawachi et al. 1999; Hyypä and Mäki 2001). There has been a controversial debate on whether social capital or economic factors, such as income inequality and absolute income levels, have a stronger effect on the population health (Lindström and Lindström 2006). Some evidence supports the hypothesis that economic factors have a stronger influence on health compared to social capital (Lindström and Lindström 2006), but there is also evidence emphasising that the question still exists whether social capital affects health independently of economic factors (Smith and Polanyi 2003).

## **2.4 Urban-rural differences and health**

Regional variation in welfare in Finland has been polarised (Kainulainen et al. 2001; Heikkilä et al. 2002). Depopulation has increased in rural municipalities in Finland during the 1990's (Statistics Finland 2003a). The material standard of living is highest in cities and lowest in sparsely populated countryside areas (Kainulainen et al. 2001). However, the income level is at the lowest level in rural municipalities (Statistics Finland 2003b). In a study by Heikkilä et al. (2002) perceptions of scarcity indicated that material resources were the lowest in the sparsely populated countryside. Furthermore, the standard of living is most clearly associated with the economic and age structures as well as with unemployment and population density in the municipalities (Kainulainen et al. 2001).

The urban/rural division has been seen as an important dimension affecting health. Among the general population the health status has been found to be poorer, and the risk of poor health has been suggested to increase in rural rather than in more urbanised areas (Eberhardt and Pamuk 2004; Greiner et al. 2004). There are, however, deprived areas within the cities where the health status has also been found

poorer (Reijneveld et al. 2000). Similarly, rural elderly people have been found to have more health problems than the elderly living in urban areas (Mainous and Kohrs 1995; Gillanders et al. 1996; Yoo et al. 1998; Sulander et al. 2007). A consistent rural-to-urban gradient does not, however, always exist. The greatest health differences have been found between suburban and rural areas. Therefore a suburban category is required to explore health disparities accurately between different areas (Eberhardt and Pamuk 2004).

Regional differences in health and health behaviour between counties exist among the adult population in Finland (Helakorpi et al. 2007) as well as among the elderly people living in Finland (Sulander et al. 2007). Mortality in the heart diseases, for instance, has been found to be high in the eastern part of Finland (Koskinen 1994), and food habits are the healthiest in the region of Uusimaa (Berg 2000; Sulander et al. 2007). Urban-rural differences exist as well. Self-rated health has been found to be poorest in the sparsely populated countryside areas (Heikkilä et al. 2002). The health of elderly people seems to be poorest in the rural communities of the Päijät-Häme area in Finland (Fogelholm et al. 2006). Varying labour markets and demographic structures largely explain the health differences between the different types of municipalities in Finland (Heikkilä et al. 2002). Despite this, there is variation in the regional welfare (including health) in Finland which cannot be explained by education, age, and gender (Karvonen and Kauppinen 2008). However, the independent role of the effects of the living area on health has also been suggested (Lynch and Kaplan 2000). Eberhardt and Pamuk (2004) found that demographic and socioeconomic characteristics, health risk factors, and health care access were related to rural health disparities in the United States. Therefore, health promotion is a challenge among the elderly in the rural communities due to their adverse health and lifestyle profile (Fogelholm et al. 2006). Overall, it has been suggested that the differences in the regional welfare in Finland will continue to increase (Heikkilä et al. 2002). On the other hand, the latest information indicates that the splitting of regional welfare has become stagnated (Karvonen and Kauppinen 2008).

## **2.5 Implications from previous research for the present study**

Previous studies have shown that better self-rated health is associated with different forms of active leisure or social participation and high trust. Furthermore,

associations between the health status and SEP have been widely examined, but the potential impact of the community type when examining the relation between self-rated health and SEP among the ageing people has not often been considered. No agreement exists of whether trust and social participation affect health independently of the SEP factors. In addition, there is a lack of information concerning the urban-rural dimension and the relationship between participation, trust, and self-rated health among the ageing people. The present study attempts to shed light on all the questions mentioned above.

### **3 AIMS OF THE STUDY**

The purpose of the present study was to examine the associations of self-rated health with socioeconomic position (SEP), trust, and social participation among ageing people in varying living environments.

The specific aims of the present study were the following:

1. How does self-rated health vary by indicators of socioeconomic position across the urban-rural dimension? (I)
2. How do trust, various social contacts, social participation, and access to help contribute to self-rated health across the urban-rural dimension? (II)
3. How do combinations of participation and trust associate with good self-rated health across the urban-rural dimension? (III)
4. How do social, cultural or religious leisure activities relate to self-rated health and do confounding factors (SEP, sociodemographic variables, obesity, and health behaviours) contribute to this relation? (IV)

## 4 MATERIAL AND METHODS

### 4.1 Subjects and procedures

The study was based on the survey conducted in the Päijät-Häme hospital district in southern Finland in 2002. The intention was to monitor the participants in a ten-year follow-up study (2002-12) in the context of the “Good Ageing in Lahti region” (GOAL) program. The aim of the GOAL cohort study is to improve physical and psychosocial well-being and to promote health among ageing people in the region. The initial questionnaires contained questions with several topics, e.g. socioeconomic conditions, living conditions, health, health behaviour, use of healthcare and social services, social networks, and leisure-time activities (Valve et al. 2003; Fogelholm et al. 2006).

In the Päijät-Häme region, the structure of livelihood is polarised. The service sector is very important in Lahti, the biggest city (approximately 100 000 inhabitants), whereas agriculture and forestry are still quite common in the fringe area municipalities. As a whole, industrial production is a common source of livelihood in the area. Unemployment as well as long-term unemployment are at a high level in Lahti when compared to semi-urban and rural areas on average. In addition, both rates are higher in Päijät-Häme than in the whole of Finland (Karisto et al. 2003).

A stratified random sample (age group, gender, and municipality) was drawn from the National Population Registry and consisted of persons born in 1926-30, 1936-40, and 1946-50 in the 14 municipalities of the hospital district. The subjects were aged 72-76, 62-66, and 52-56 years, respectively, at baseline. They represented different phases of life at baseline from pre-retirement age to “early” old age. The participants were still in working life, recently retired or retiring, and pensioners. The baseline data set consisted of 2,815 participants representing 66 % of the sample (N=4,272). The response rates were 61 %, 70 %, and 58 % among men and 63 %, 74 %, and 70 % among women (born in 1926-30, 1936-40, and 1946-50, respectively). The data was obtained by postal survey (two questionnaires) as well as at clinical check-ups at the healthcare centre (Valve et al. 2003; Fogelholm et al. 2006).

## 4.2 Study variables

### SELF-RATED HEALTH

Self-rated health was defined by the answer to the question “Is your health generally good, rather good, average, rather poor, or poor?” From this item a dichotomous outcome variable was derived indicating health (good or rather good vs. average, rather poor or poor).

### TRUST AND SOCIAL NETWORKS

#### *Trust*

The statement “It is best not to trust anyone” was used in the assessment of generalised trust in other people. It contained four alternatives: “totally disagree”, “disagree”, “agree” and “totally agree”. It was dichotomised with the two latter alternatives as low trust (totally agree/agree) and with the two first alternatives as high trust (totally disagree/disagree).

#### *Social contacts*

Social contact with relatives and family members was probed with five questions involving frequency of contacts with either children, grandchildren, siblings, parents or other immediate relative(s). For the analyses, a sum index consisting of these five questions was computed. Persons with the minimum of three answers were included in the analyses. Answering alternatives ranged from 1 to 6, with 1 representing “almost daily” and 6 “I don’t have such contacts”. The sum index was dichotomised as those having poor social contacts and those having good social contacts. The cut-off point in the sum index was the mean.

The frequency of contacts with close friends or a relative(s) was assessed in a question with six choices. The range of answering alternatives was similar to that above. The variable was then dichotomised into two categories: alternatives 1-2 (maximum a few times a week) and 3-6 (a few times a month or less).

### *Social participation*

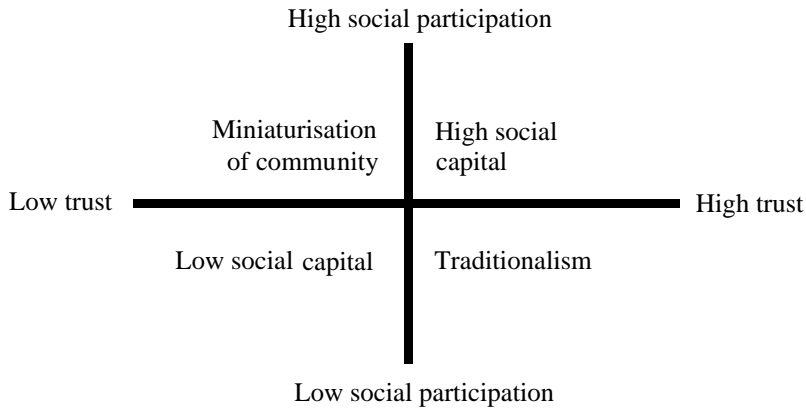
Social participation during the past 12 months describes how actively the person has taken part in social free-time activities. The respondents were asked about their involvement in hobbies (singing in a choir, art classes, playing music etc.), attendance to cultural (exhibitions, theatre, movies, concerts) or religious events, participation in studying and self-development, and voluntary work. The range of answering alternatives was from 1 (every day) to 6 (never). For the analyses, a sum index consisting of items mentioned before was computed and then dichotomised as those representing high and those representing low participation. The cut-off point in the sum index was the mean. The persons who answered at least three items (i.e. more than half) were included in the analysis.

### *Access to help*

The possibility of getting help from other people was assessed by asking how often the respondents thought they could get help, advice, company etc. if needed. This question had five alternative answers: “never, seldom, sometimes, mostly, and always”. It was measured as an index consisting of 19 items (the MOS social support survey) (Sherbourne and Stewart 1991) and dichotomised as those having poor or good access to help if needed. Persons who answered at least 12 items were included in the analysis. The cut-off point in the sum index was the mean.

## THE COMBINATIONS OF SOCIAL PARTICIPATION AND TRUST

The combination of social participation and trust was classified into four groups (Fig. 1). The group of “low social capital” indicates low social participation and low trust; low participation and high trust represent “traditionalism”, high participation and low trust indicate “the miniaturisation of community” and high participation and high trust stand for “high social capital”.



**Figure 1.** *The model of different combinations of social participation and trust. Adopted from Lindström (2004).*

#### LEISURE ACTIVITIES

To receive information of the leisure activities during the past 12 months, the respondents were asked about their involvement in 1) hobbies (singing in a choir, attending art classes, playing music etc.), 2) cultural events (going to art exhibitions, theatre, movies, concerts), 3) religious events, 4) studying and self-development, and 5) voluntary work. The range of answering alternatives varied from “every day”, “every week”, “every month”, “some times a year”, “less frequently” up to “never”. For the analyses the answers were dichotomised as “At least once a month” and “A few times a year or less”.

#### SOCIODEMOGRAPHIC FACTORS

The sociodemographic variables used in the present study were gender, age group, and marital status. The age groups were 52-56, 62-66, and 72-76 years of age. The marital status was dichotomised as follows: married or cohabiting was inserted into the first group and separated, divorced, widowed, and single into the second group. As the number of widowed and single people was low, these categories were pooled

for the analyses. Separated and divorced individuals were already grouped together in the questionnaire.

#### SOCIOECONOMIC POSITION INDICATORS

##### *Education*

Self-reported education was coded into two categories: a lower one for those with elementary education or less and a higher one for those with at least secondary education (middle school or higher).

##### *Disposable income*

The self-reported total disposable monthly income of a household was divided by the number of the consumption units as suggested by OECD. The first household member was weighted as 1.0, and every additional person of 14 years of age or over was given the weight 0.5. Persons of 0-13 years of age were given the weight 0.3 (Statistics Finland 2003b). Disposable income per month per consumption unit was then classified into three equal-sized groups: not more than €874, €875-1,209, and €1,210 or more.

##### *Adequacy of income*

Self-perceived adequacy of income after the necessary expenses had been deducted (e.g. cost of living and instalment of a loan) was derived from the reports and divided into two categories: very and rather good into the first category and average, rather poor, and very poor into the second.

#### HEALTH BEHAVIOURS AND OTHER INDEPENDENT VARIABLES

Health behaviours used in this study as control variables included smoking, binge drinking, physical exercise, and obesity. Daily smokers involved persons who reported that they regularly and on a daily basis smoked cigarettes, cigars or pipes. Binge drinking involved persons reporting that they consumed at least six units of alcohol at a time at least once a week. Self-reported leisure time in physical exercise at least for 30 minutes at a time (at least a little sweating and getting out of breath)

was dichotomised: at least four times per week and not more than three times per week. Obesity (body mass index  $\geq 30$ ) was calculated as measured weight (kg) divided by measured square of height ( $m^2$ ).

The presence of chronic illness as a control variable was probed using a list of 24 diseases diagnosed or treated by a physician in the past 12 months (no disease present/at least one disease present).

#### URBAN-RURAL DIMENSION

For the analyses, the respondents of Päijät-Häme were divided by place of residence into three categories. The persons who lived in the sole urban centre, the City of Lahti (approximately 100 000 inhabitants), were classified in the first group based on the population registry (Statistics Finland 2003c). The other two residential groups were the rural population centres (villages, suburbs or population centres in semi-urban or rural areas), and the sparsely populated areas (semi-urban or rural areas of low population density) in the countryside. This latter rural residential classification was based on the self-evaluation of the respondents (by questionnaire) (Valve et al. 2003).

### **4.3 Statistical methods**

The GOAL- project sample was stratified by age, gender, and living area to ensure that a sufficient number of respondents were included from the small rural municipalities. In the statistical calculations, the data was corrected by a weighting variable so that the weighted data matched the populations of the municipalities. Cross-tables with chi-square tests and both crude and adjusted odds ratios (based on logistic regression analyses) with 95 % confidence intervals (OR, 95 % CI) were calculated to investigate associations between the independent variables and self-rated health. The interactions of areas with different variables were included separately in the adjusted models. The variances explained ( $R^2$  Nagelkerke) are also presented in the studies I, II, and IV. The statistical analyses were performed using the SPSS 9.0 - 14.0 software packages.

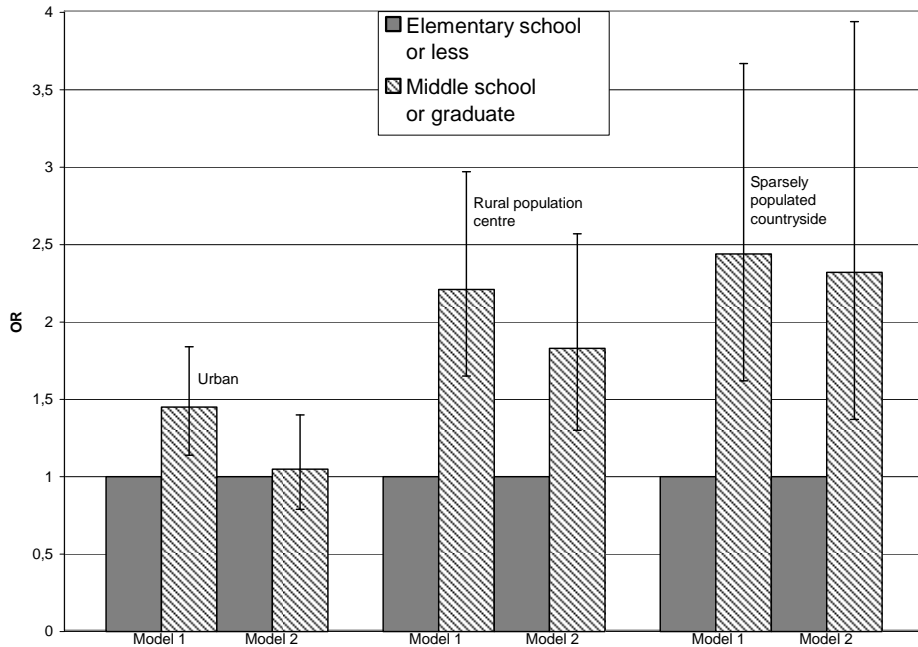
## 5 RESULTS

The findings of the Studies I to IV are presented in Figures 2 to 11, and in the Tables in the original publications. Table 2 in Appendix 1 gives a description (%) of the unweighted population distributions. Weighted population figures are used in all of the following results.

### 5.1 Socioeconomic position and self-rated health (I)

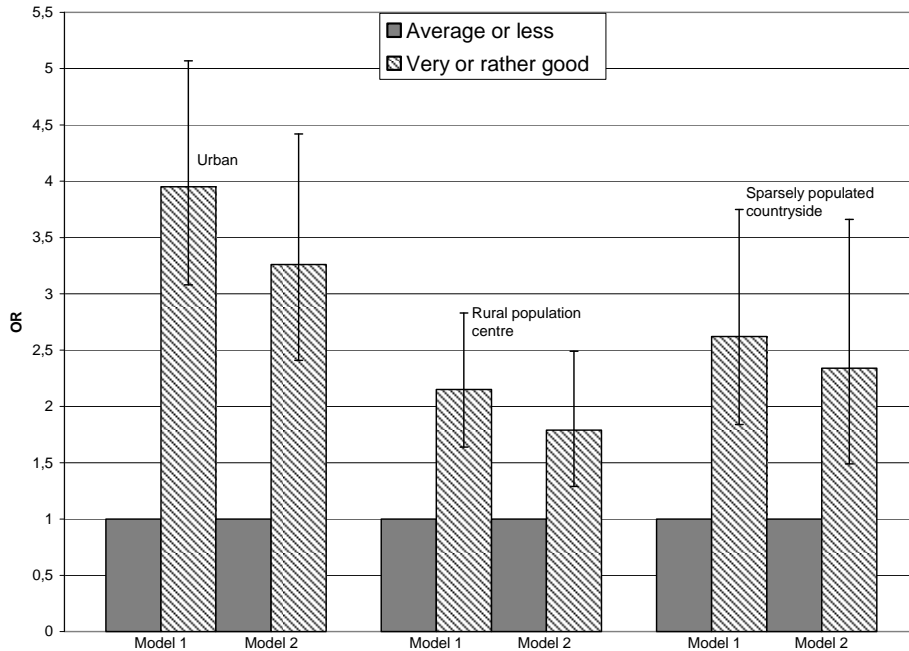
The information of the distribution of good self-rated health in different areas by background variables (%) as well as the unadjusted odds ratios indicated significant differences between almost all the sociodemographic and SEP variables and self-rated health (Fig. 2 and 3; Tables 2 and 3 in Study I). As descriptive result, women had better self-rated health than men in the urban area. Expectedly, the youngest persons had better health than the older ones. Married or cohabiting persons had better self-rated health than non-married persons in the urban and sparsely populated rural areas, but not in the rural centres. Persons with higher education and adequate income indicated better self-rated health compared to others. Higher income was associated with better self-rated health, except among the middle-income group (€ 875-1,209) in the sparsely populated countryside.

After adjusting for all other terms in the model, the results suggest that women had better self-rated health than men, but only in the urban area. The respondents in the youngest age group had better self-rated health than those in the oldest-age group, in the urban areas as well as in the sparsely populated countryside. Disparities by marital status vanished after adjusting for other independent variables. A higher education indicated better health (Fig. 2), but, after adjustments (Model 2), the result was unchanged only in both of the rural areas. Good adequacy of income was associated with better self-rated health across all areas (Fig. 3) but higher disposable income only in the urban area.



**Figure 2.** *Odds ratios (OR) and 95 % confidence intervals of good self-rated health by education in different living areas. Model 1: Unadjusted. Model 2: Adjusted for age group, gender, marital status, adequacy of income, and disposable income.*

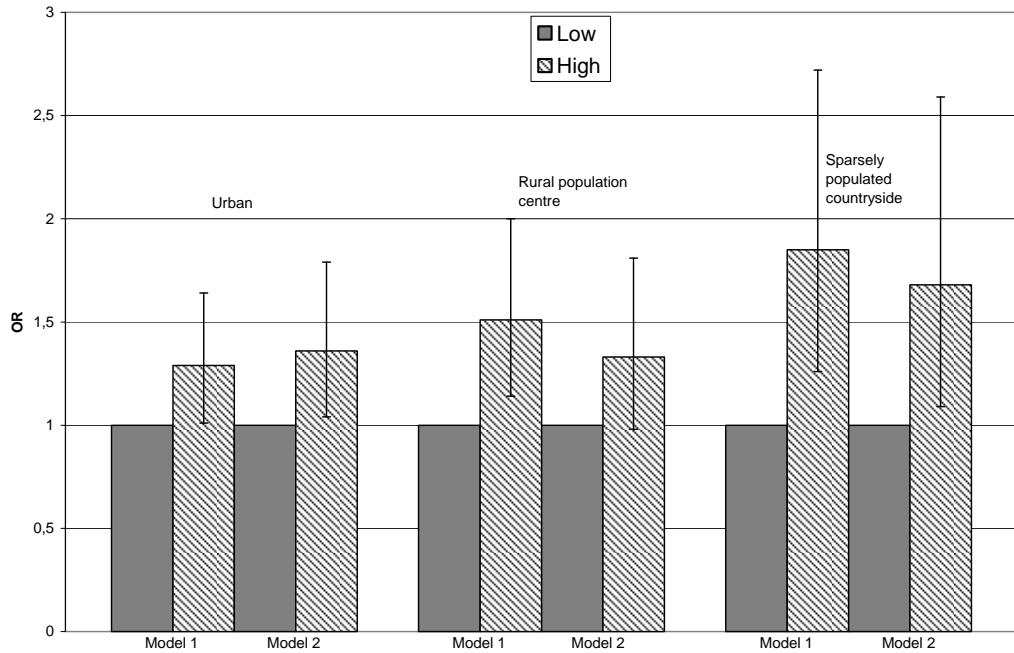
A higher percentage of explained variance is seen in self-rated health by all indicators both in the urban areas and in the sparsely populated countryside compared to the rural population centres. The interaction tests indicated that significant variations between the areas were found in self-rated health by gender, age, and adequacy of income (Study I; Table 3). In addition, after adjusting for other factors, the adequacy of income showed the strongest positive impact on self-rated health in the urban areas in all age groups. Similar associations with varying statistical significance were found in both rural areas where education was also an important correlate to self-rated health, varying by age group (Study I; Table 4).



**Figure 3.** *Odds ratios (OR) and 95 % confidence intervals of good self-rated health by adequacy of income in different living areas. Model 1: Unadjusted. Model 2: Adjusted for age group, gender, marital status, education, and disposable income.*

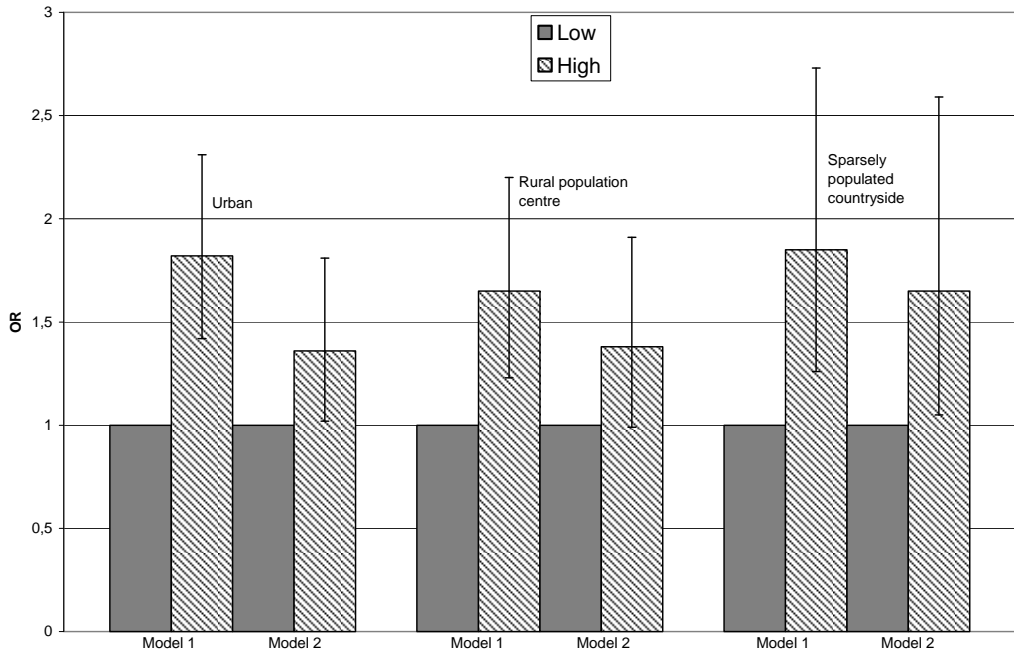
## 5.2 Social networks and self-rated health (II)

The findings of the Study II (Fig. 4 and 5; Tables 1 and 2 in Study II) show that trust was statistically significantly related to self-rated health in the urban areas and rural population centres, but after controlling for background variables this association disappeared. Social contacts with relatives or family members as well as frequency of contacts with close friends or close relatives were not statistically associated with self-rated health. Social participation (Fig. 4) and access to help from others (Fig. 5), were significantly related to self-rated health in the urban area and in the sparsely populated countryside after adjusting for all the examined background variables.



**Figure 4.** *Odds ratios (OR) and 95 % confidence intervals of good self-rated health by social participation in different living areas. Model 1: Adjusted for age group and gender. Model 2: Adjusted for age group, gender, marital status, education, obesity, daily smoking, chronic illnesses, and adequacy of income.*

The interaction tests (Study II; Table 2) showed that no significant variations in self-rated health were found between the areas. The percentage of explained variance in self-rated health by all indicators was highest in the urban areas. Self-perceived adequacy of income and presence of chronic illnesses had a strong correlation to self-rated health in the urban area (results not shown).



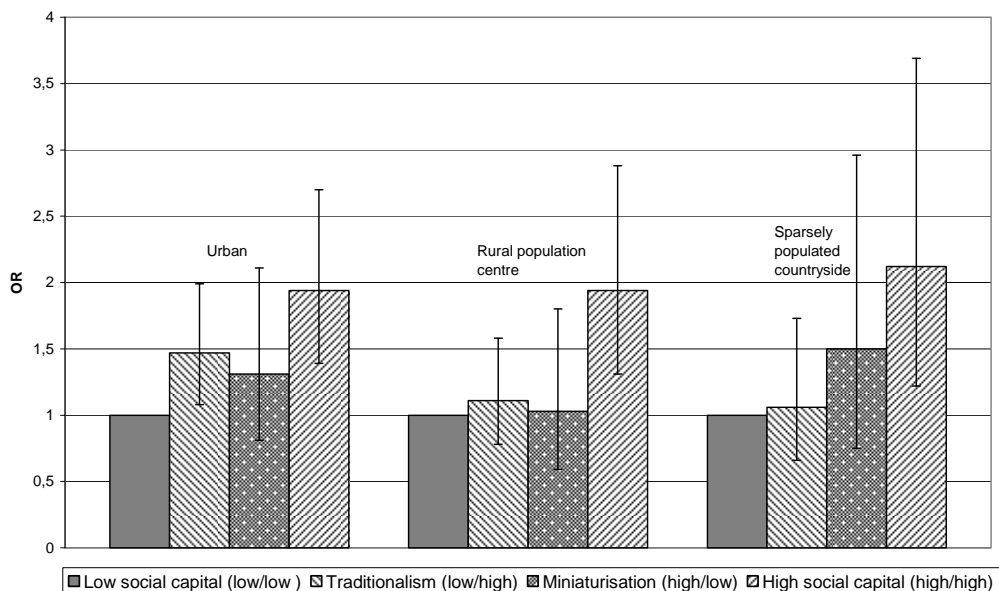
**Figure 5.** *Odds ratios (OR) and 95 % confidence intervals of good self-rated health by access to help in different living areas. Model 1: Adjusted for age group and gender. Model 2: Adjusted for age group, gender, marital status, education, obesity, daily smoking, chronic illnesses, and adequacy of income.*

### 5.3 Combinations of social participation and trust with self-rated health (III)

The percentage of respondents in the low and high social capital groups was approximately a quarter regardless of the area. Approximately 40 % belonged to the traditionalist group and approximately 9 % to the group of miniaturisation (Study III; Table 1).

Good self-rated health was at the highest level among respondents with high social capital and at the lowest level in the low social capital group. In the urban area, good self-rated health was slightly more common in the category of traditionalism than in that

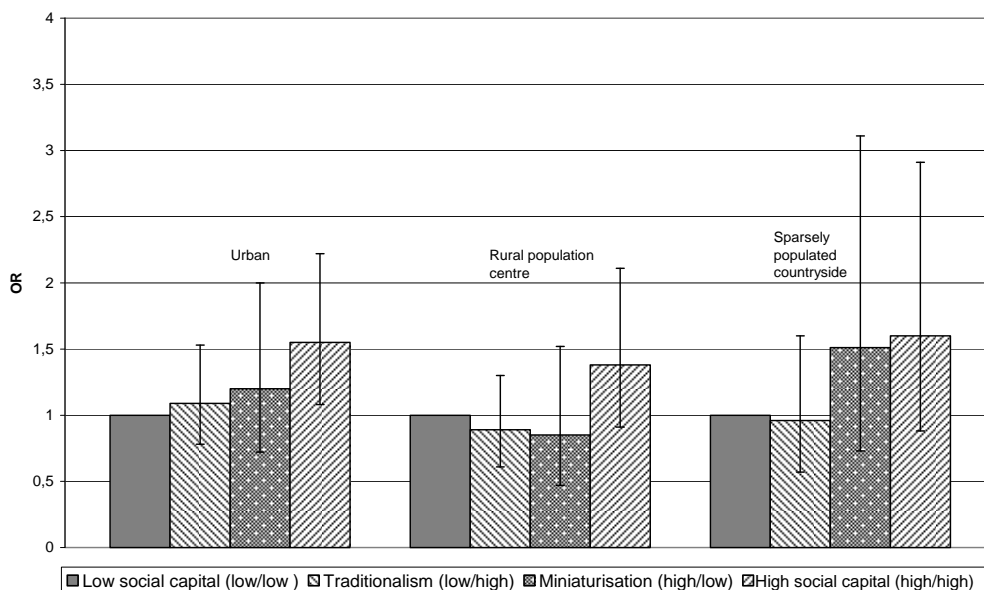
of miniaturisation. In the rural centres the figures were almost equal, but in the sparsely populated countryside they turned out to be in the reverse order (Study III; Table 2).



**Figure 6.** *Odds ratios (OR) and 95 % confidence intervals for good self-rated health by different combinations of social participation and trust. Adjusted for age group and gender.*

After adjusting for age and gender, the respondents with high social capital (high participation/high trust) had better self-rated health than those with low social capital (low participation/low trust) in all areas (Fig. 6). In addition, traditionalism (low participation, high trust) indicated better health in the urban area. After adjusting for age, gender, marital status, education and self-perceived adequacy of income, a statistically significant association between high social capital and good self-rated health was found only in the urban area (Fig. 7). However, in the other areas, the odds ratios were similarly directed but did not reach a statistical significance. As a whole, without area selection and after multiple adjustments, high social capital was associated with good self-rated health (results not shown). In

addition, the interaction tests showed no significant variations in self-rated health between the areas (Study III; Table 3).

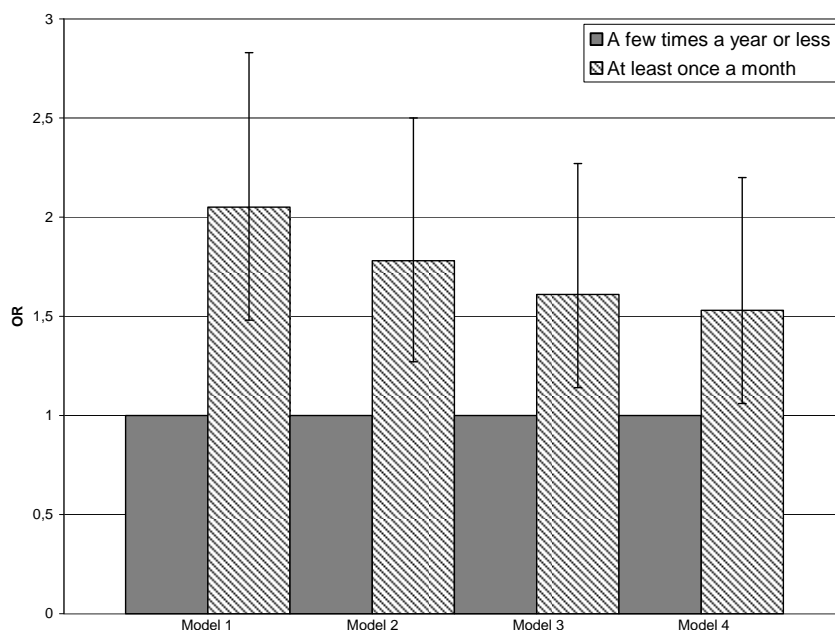


**Figure 7.** *Odds ratios (OR) and 95 % confidence intervals for good self-rated health by different combinations of social participation and trust. Adjusted for age group, gender, marital status, education, and adequacy of income.*

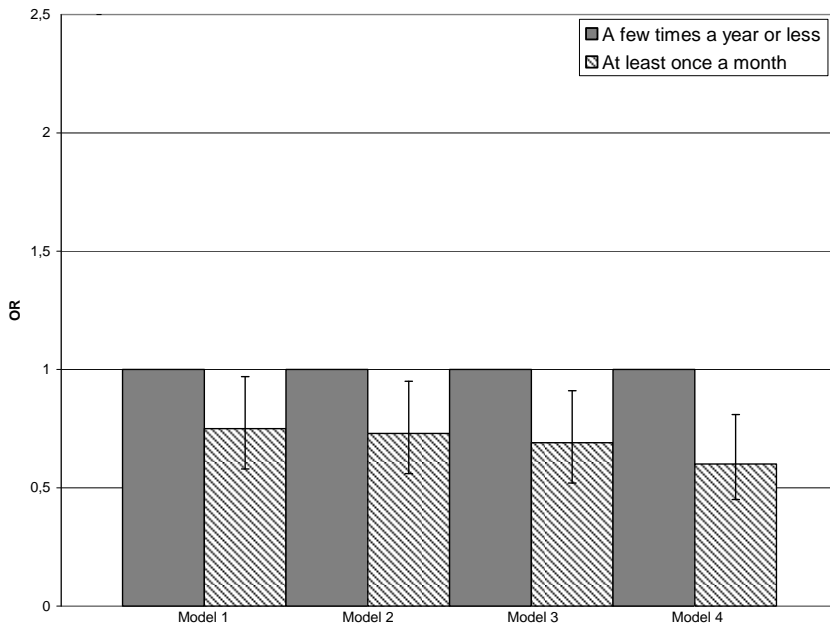
## 5.4 Leisure-time activities and self-rated health (IV)

According to the Study IV (Table 1), studying and self-development were the most common forms of leisure activities reported by the participants. The respondents in urban areas showed the highest prevalence of activity. Participating in religious events was also relatively common, but the differences between the genders were remarkable (i.e. lower among men). Visiting art exhibitions and going to the theatre, movies, concerts were more common in the urban areas than in the two rural areas.

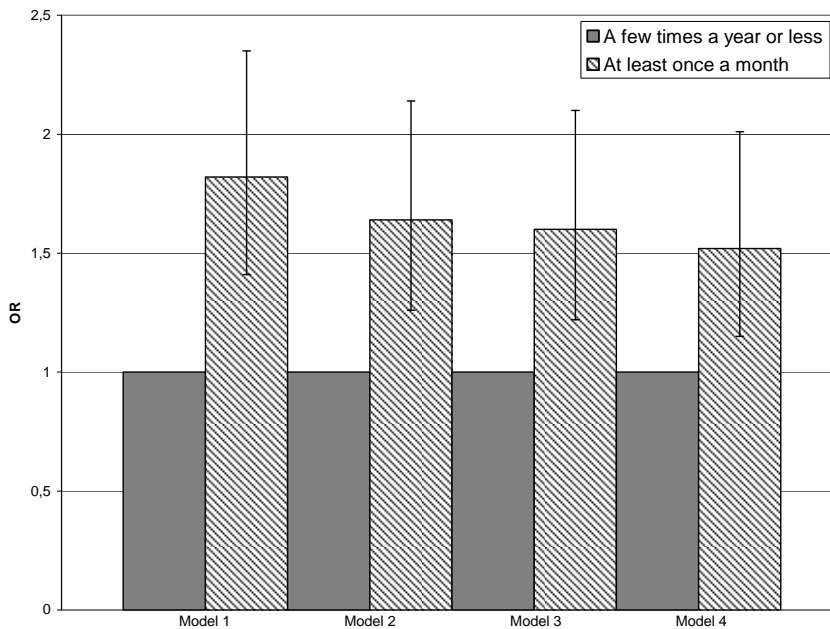
According to Table 2 in the Study IV, the women visiting art exhibitions or going to the theatre, movies, and concerts at least once a month had better self-rated health than their counterparts. Also the women living in the sparsely populated countryside, who sang in a choir, did art painting or played music at least once a month, had a better self-rated health than the others. Religious events and voluntary work were negatively associated with self-rated health among urban women. However, voluntary work was positively associated with self-rated health among women in the sparsely populated countryside. Good self-rated health was more common among the respondents who reported active studying and self-development, excluding men living in the rural centres.



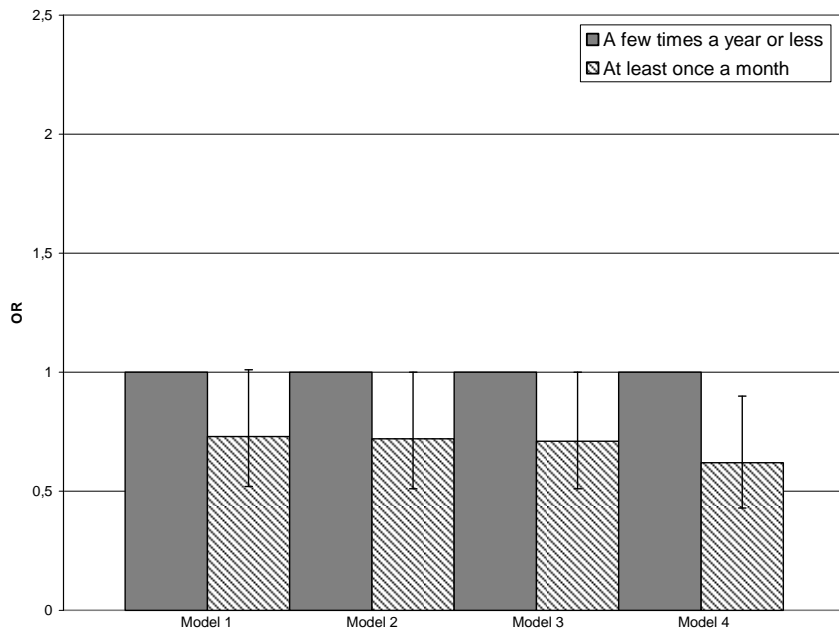
**Figure 8.** *Odds ratios (OR) and 95 % confidence intervals for good self-rated health by art exhibitions, theatre, movies and concerts among women. Model 1: Adjusted for age group and area. Model 2: Adjusted for age group, marital status, education, and area. Model 3: Adjusted for age group, marital status, education, adequacy of income, and area. Model 4: Adjusted for age group, marital status, education, adequacy of income, obesity (BMI  $\geq 30$ ), daily smoking, binge drinking, physical exercise, and area.*



**Figure 9.** *Odds ratios (OR) and 95 % confidence intervals for good self-rated health by religious events among women. Note: Adjusted as in Fig. 8.*



**Figure 10.** *Odds ratios (OR) and 95 % confidence intervals for good self-rated health by studying and self-development among men. Note: Adjusted as in Fig. 8.*



**Figure 11.** *Odds ratios (OR) and 95 % confidence intervals for good self-rated health by voluntary work among women. Note: Adjusted as in Fig. 8.*

After adjustments of the background variables, going to art exhibitions, theatre, movies, and concerts among women, and studying and self-development among men, were significantly and positively related to self-rated health (Fig. 8 to 11; Tables 3 and 4 in Study IV). Active participation in religious events and voluntary work were negatively associated with self-rated health among women. The results remained the same even after controlling for sociodemographic and SEP variables. The interaction tests (results not shown in Tables) indicated that significant variations between the genders were found in self-rated health by voluntary work and religious events. The impact of area on the results was minor (figures not given). Explained variances for the genders were lower for men than for women.

## 5.5 Area differences

The additional analyses shown in Table 1 present the differences in good self-rated health by area.

**Table 1.** *Prevalences (%), odds ratios (OR) with 95 % confidence intervals, and p-values of good self-rated health according to living area.*

	%	Model 1	Model 2	Model 3	Model 4
<b>Living area</b>					
Urban	48.8	1	1	1	1
Rural population centre	47.2	0.93 (0.78-1.11)	0.90 (0.76-1.07)	0.94 (0.79-1.12)	0.95 (0.79-1.14)
Sparsely populated countryside	45.3	0.92 (0.75-1.13)	0.89 (0.72-1.09)	0.92 (0.75-1.14)	1.03 (0.82-1.28)
P	0.378				

Model 1: Adjusted for age group and gender.

Model 2: Adjusted for age group, gender, and marital status.

Model 3: Adjusted for age group, gender, marital status, and education.

Model 4: Adjusted for age group, gender, marital status, education, and adequacy of income.

The percentage of good self-rated health was slightly higher in the urban area than in the other areas, but the differences were not statistically significant. After adding age, gender, marital status, and education into the models, the results were rather constant. However, after adding the adequacy of income into the Model 4, the odds ratios of good self-rated health among those living in the sparsely populated countryside increased, but did not reach statistical significance. Thus, the differences between the areas in good self-rated health remained minor.

## 6 DISCUSSION

The aim of the present study was to examine the associations of self-rated health with socioeconomic position (SEP), trust, and social participation among ageing people in different living areas in the Päijät-Häme hospital district in southern Finland.

### 6.1 Main findings

1. Self-perceived adequacy of income was, even after multiple adjustments, the most important factor associated with self-rated health in the urban area. In the other areas, the results were quite similar, but more multifaceted, as education was also found to be an important factor of good self-rated health, though varying by age groups. The adequacy of income was observed as a stronger predictor of good health than the actual income. According to gender, women had better self-rated health than men, but only in the urban areas. The youngest respondents were found to have better self-rated health than their older counterparts in the urban areas and in the sparsely populated countryside.

2. Both social participation and access to help from others, were statistically significantly related to self-rated health in both the urban and sparsely populated countryside areas, even after adjusting for age group, gender, marital status, education, adequacy of income, obesity, daily smoking and chronic illnesses. The correlation of trust to self-rated health was substantial in the urban area. No major differences by area were found.

3. After adjusting the background variables, high social capital was statistically significantly associated with good self-rated health only in the urban area. The result was quite similar in the other areas, even though not statistically significant. No significant variations in self-rated health between the areas were found.

4. Going to art exhibitions, theatre, movies, and concerts among women, and studying and self-development among men, were related to better self-rated health, even after the background variables were adjusted. Among women, however,

activity in religious events and in voluntary work was negatively associated with self-rated health. The impact of area on the results was minor.

## **6.2 Discussion of the findings**

### *Self-perceived adequacy of income*

The finding that self-perceived adequacy of income is a significant correlate to health is partly in accordance with the results from previous studies. The results are not directly comparable due to varying age spans, countries, and phrasing of the questions, but the general overview of the results is congruent with that of other studies (Prager et al. 1999; Balabanova and McKee 2002; Cheng et al. 2002). Ageing people, who report having enough money to meet their needs, are healthier than those whose perceived adequate financial resources were poor (Prager et al. 1999). Similarly, the elderly persons, who consider their economic condition poor (when asked whether they have enough money to cover daily expenses), also report poorer self-rated health (Cheng et al. 2002). Furthermore, the self-assessed financial situation of the household during the last month has been found to be a better predictor of health than the household income (Balabanova and McKee 2002). These results are in accordance with the present findings, despite the differences in item wording. Thus, the exact wording of the question about the adequacy of income does not seem to cause variation in self-rated health between studies. Despite different wordings, the conclusion is congruent.

Based on the previously mentioned results it seems that the adequacy of income must be taken into serious consideration when enhancing the health of ageing persons. For example, possibilities for participation in activities and medical treatment may be limited due to expensiveness and might have a negative influence on health. Therefore the personal experience that the financial strain is more closely related to health than the actual income might be particularly true among the elderly. The influence of income on health may depend on the adequacy of meeting the needs. In this case subjective measures might be useful (Cheng et al. 2002). Thus, the economic gap, independent of the absolute standard of living, is an important predictor of health (Kawachi 2000). However, the relationship between the inequalities in income and health is unclear. Income inequality is viewed as a proxy for a psychological, social, economic or environmental determinant of health (Macinko et al. 2003).

The effect of income inequality in health has been found to depend on geographical aggregation. It may be that social comparisons are made also across larger areas rather than in the neighbourhood. However, the reference groups used in social comparisons, are not widely known (Kawachi 2000). The results of the present study were in accordance with those of Rintala and Karvonen (2003) who found that the self-rated financial situation is the poorest in the sparsely populated countryside in Finland, but the correlation between a poor financial situation and health is stronger in the urban areas, though the differences are relatively small. Overall, in the urban areas, perceived distresses accumulate with poor living standards (Rintala and Karvonen 2003). The results of this study were similar to those of Rintala and Karvonen (2003), with notions of the geographical importance in health, indicating that the association between the subjective financial situation and self-rated health was not the same in different living areas. This suggests that the living area may affect the self-evaluation of the financial situation. Living in an urban area is expensive, as the material basis of living (housing, services and goods) must be bought from the market. On the other hand, it has been suggested that persons with a lower income may perceive a good financial situation if the income level is low in the living area (Rintala and Karvonen 2003).

### *Trust and social networks*

Social capital has both cognitive and structural components. A comprehensive review by Islam et al. (2006) of 42 studies (30 single level and 12 multilevel) showed that most of the studies operationalised social capital as a combination of the cognitive and structural dimensions. Forms of cognitive dimension, captured mainly on a micro level, include norms, attitudes, values, and beliefs operationalised as people's perceptions of the level of interpersonal trust, sharing, and reciprocity. Structural components of social capital, in turn, involve the breadth and intensity of activities in society. Those components are contextual and refer to the density of social networks or the patterns of civic engagement/informal participation. The structural and cognitive forms of social capital are complementary (Islam et al. 2006). The present study used both of the mentioned components of social capital. Trust as a cognitive form of social capital indicated attitudes at the individual level. The other indicators of the Study II (social contacts with relatives and family members, the frequency of contacts with close friends or close relatives, social participation, and access to help from other persons), can be interpreted as individual-level behaviour, such as membership in a group (Macinko and Starfield 2001).

Based on the results of the Study II, social participation and access to help from other persons seem to be the most important indicators of social capital relating to self-rated health. In addition, trust in other people in general, is a relatively important indicator of self-rated health in the urban area. These findings suggest that social participation and access to help from other persons are among the key priorities in community health promotion.

The association between trust and self-rated health found in the present study is partly congruent with the results of previous studies (Kawachi et al. 1999; Hyypä and Mäki 2001; Subramanian et al. 2002). However, the results are not directly comparable due to different age spans, varying societal and cultural settings, different adjustment of background variables, and different methods of analysis. In the present study trust was a particularly important correlate of subjective health in the urban area, though its significance diminished after adjusting for all the background variables. The present results (Study II), in accordance with previous perceptions, also suggest that the economic status of the respondents need to be controlled, when examining the associations of self-rated health with social capital. Studies in developed countries have shown that economic factors are more strongly associated with health than social capital at the national level (Kennelly et al. 2003; Carlson 2004). However, there are still questions that remain open, e.g. does the social capital affect health independently of the material and economic factors within countries (Smith and Polanyi 2003), and what is the role of egalitarianism in mediating the health impact of social capital (Islam et al. 2006).

#### *The combinations of social participation and trust*

A close association exists between social participation and trust. It has been suggested that these two, the core aspects of social capital, mutually enhance each other (Putnam 1995). However, in reality this does not always occur. The increasing numbers of more ideologically, religiously or programmatically narrowly defined and novel forms of social participation do no more provide support for generalised trust in other people. This phenomenon of low trust and high social participation has been called “the miniaturisation of community” (Fukuyama 1999). In Sweden, approximately a quarter of the population has been located into “the miniaturisation of community” group, which suggests that participation and trust do not necessarily enhance one another (Lindström 2004). The result is in line with that of the present study (III), suggesting that high social participation is not a necessary prerequisite for high trust, and vice versa.

The Study III also revealed that the highest rate of good self-rated health was present among the high social capital group. This result is compatible with that of Lindström (2004), who found poor self-reported health as the most prevalent in the low social capital group in Sweden. The results are not entirely comparable due to different age groups, country, adjusted background variables, urban-rural context, and dependent variables, but the overviews of the results are congruent, indicating that good self-rated health is the most common among the group of high social capital.

### *Leisure-time activities*

Although active leisure participation has been found to be positively associated with self-rated health (Kawachi et al. 1999; Veenstra 2000; Hyypä and Mäki 2001, 2003; Morrow-Howell et al. 2003; Pollack and von dem Knesebeck 2004; Zunzunequi et al. 2004), the results in the Study IV only partially supported the assumption that participation in leisure activities is constantly associated with better self-rated health among ageing people. In addition, it has been suggested that the effects of leisure participation on health should be studied separately for the genders (Hyypä et al. 2006). The Study IV supports this view, as the results differ by gender. Going to art exhibitions, theatre, movies, and concerts were positively associated, whereas participation of religious events and voluntary work were negatively associated with self-rated health among women. Moreover, studying and self-development were positively associated with self-rated health among men. These associations remained, even after adjusting for sociodemographic and SEP variables, obesity, and health behaviours.

It has been suggested that ageing itself may limit social participation at a very old age. Longitudinally, the stability of participatory activities has been found to be from fair to moderate, lasting out until old age. Thus, social participation is a stable and valuable indicator in health studies (Hyypä et al. 2007). However, the study design and indicators measuring activities compared in this study were partially different, but there is no basis to presume a dissimilar conclusion. In addition, participation, especially in later life, has been found to be often a continuation of earlier participation. Individuals commonly maintain their activities with increasing age (Agahi 2008).

### *Health effects*

There are several possible explanations of how the inequalities in income may affect health. Psychosocial pathways at the individual level refer to the social comparison. This may enforce social hierarchies and lead to chronic stress and, consequently, to poor health. Psychosocial pathways at the macro level refer to social cohesion in the society. Income inequalities may lead to less trust, co-operation, and civic participation, but, also, to greater crime, and other unhealthy conditions. The so-called neo-material explanation suggests, that, at the individual level, fewer economic resources among the poor people, lead to a lesser possibility of medical treatment etc. At the macro level, low investment in social and environmental conditions, results in inequalities in health. In addition, an explanation may incur health selection, i.e. poor health lowers income. Finally, a statistical artefact explanation has been brought into existence, stating that poor people are the sickest and high income inequalities result in sicker people (Macinko et al. 2003).

Social networks are seen in the core aspect of social capital, but the direction of ties, levels of formality, strength, and diversity vary. The networks can be divided into horizontal and vertical, formal and informal, weak and strong, or bonding, bridging and linking. The forms are overlapping, and the impacts on health are different. Strong bonding ties, for example, may have an effect on health through psychosocial mechanisms, such as emotional support, sense of personal control, and stress reduction. However, the health effects may also be negative through behavioural mechanisms (for example physical inactivity or unhealthy dietary). Cross-cutting ties (bonding and bridging social capital) may open possibilities for the right contacts for various purposes, and provide access to new information and resources, enhancing personal control and improving ability to solve problems. High levels of bridging and linking social capital may also influence political decisions in society, thus producing better health on average. Nevertheless, more research is needed to study the impact that the different forms of social capital have on health (Ferlander 2007).

### **6.3 Methodological considerations**

DATA

#### *Participation rate*

The response rate was a typical 66 % for Finland at present. It can be labelled moderate. No specific details were available concerning the background of the non-respondents of the present study. However, the response rate could be better for the reason, that the external validity of the results is obviously threatened. Non-respondents tend to have a worse health status than the respondents. A low participation rate may bias the results in population-based health studies (Jackson et al. 1996; Jousilahti et al. 2005). Low response rates have an effect on the representativeness of the sample and they reduce the accuracy of the estimates. Standardised survey methods and correctly planned quality controls are needed to increase the quality of surveys (Tolonen 2005).

Although unhealthy persons attend less often than healthy persons in surveys, social inequality in health, according to different sociodemographic variables, seems to be unbiased (Søgaard et al. 2004). In addition, the differences between respondents and non-respondents tend to overstate the actual differences between respondents and the eligible population sampled (Jackson et al. 1996). It is not always possible to collect the information needed for health surveys through administrative statistics (Tolonen 2005). Some information can be collected only by using a questionnaire or by interviews, for example, trust in other people and perceived adequacy of income.

According to the life tables by Statistics Finland (2002), the number of survivors of 100,000 born alive is diminishing with age. Those still alive at the old age are, to some extent, a selective group. In 2002 in Finland, among the age group of 52-56 years of age, the percentage of survivors out of born alive was approximately 93 %. Among the age group of 62-66 years of age, the corresponding figure was 86 %, and 71 % among the age group of 72-76 years. The differences between the genders were clear. The number of survivors of 100,000 born alive was lower among men compared to women, especially among the oldest group; a selection is, thus, highest among the oldest group. This may have an influence on the results on the follow-up

when the respondents become older. However, there is no clear reason to assume that this will cause any harmful bias to the result at the baseline.

### *Cross-sectional design*

The cross-sectional design of the study is a limitation, as it is not possible to draw causal inferences from the results. The theoretical interpretation may be bi-directional. Poor health may lead to lower social participation, lower trust or inadequacy of income. The direction can also be the other way around. Being healthy may be a prerequisite for high trust, high social participation or good adequacy of income. Longitudinal data, which is to be gathered during the GOAL program, will offer a design for making causal inferences in the future. However, there is evidence supporting the causal effect of social capital on health (Rostila 2008).

### *Different level of studies*

Studies can be divided into single level and multilevel studies. Further, single level studies can be differentiated as individual level studies, when a unit is a subject, and ecological studies, when a unit is a group of individuals. In the ecological studies, both the social capital and the health are examined at the aggregate level. The question remains whether social capital should be examined at the individual or ecological level (Islam et al. 2006). As a further complication, it has been found that it is important to differentiate between the compositional and contextual effects of social capital measures (Poortinga 2006a). Compositional effects indicate that differences between groups are based on the characteristics of the individuals belonging to these groups. Moreover, contextual effects are found, when after controlling for relevant individual level confounders, group level characteristics are still associated with differences in the outcomes (Diez Roux 2002). By using multilevel analyses, an individual level can be controlled when contextual social capital is analysed (Islam et al. 2006). Thus, it is possible to deal simultaneously with the levels of individuals and those of groups (Diez Roux 2002). In the present study, conceptual misinterpretation was minimal, because the study was operated only at the individual level.

## MEASURES

### *Self-rated health*

The reliability and validity of the self-rated health measure in the present study was generally good. Self-rated health has been found to be an important predictor of mortality (Idler and Benyamini 1997). For the results of this study, the self-rated health reports were dichotomised into good vs. less than good health (i.e. good or rather good vs. average, rather poor or poor). While this impacts the magnitude of estimates, it does not affect the direction of the associations. However, the reason for using the cut-off point in a dichotomy was the primary interest in good self-rated health. In addition, the distribution of self-rated health in the five-scale was not normal.

### *Self-reported income*

The use of self-reported measures, especially for disposable income, may be a risk for differing interpretations across areas or age groups. Self-reported disposable income may bring some inaccuracies to the findings, but, possibly, it does not affect the direction of the results. The categorisation of the subjective reports may influence the findings, but the use of registry information would not solve the problem, as the results derived from that source would also be categorised.

### *Trust*

The sole reasonable cut-off point in a dichotomy was used to separate the low trusting people from the high trusting ones. Generalised trust in other people is a self-reported variable. It reflects the subject's perception of generalised trust in other people (Lindström 2004). Since trust is subjective and self-reported, it seems impossible to validate it directly (Lindström 2006). In this study the wording of the question of generalised trust was different than that used, for example, in the World Values Survey (WVS) where trust was measured by the question: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" According to the WVS data collected in 2000, the level of trust in Finland was 58 %, and, in 2005, it was almost equal (59 %) (Hellsten and Komu 2006). In 1995-97, however, the level was only 48 % (Carlson 2004). According to the Leisure Survey data in 2002 by Statistics Finland, the level of generalised trust (created by summary variable from three statements) rose up to 77 %. The differences between the results of the WVS and the Leisure Survey may be largely due to the wording of the questions (Iisakka 2006). Overall, according to

the European Social Survey (ESS) (Poortinga 2006b) and the European Values Study (EVS) (van Oorschot et al. 2006), the level of trust is the highest in the Nordic countries including Finland.

The item of trust was identical in the present study to that used in the FINRISK 2002 study. The comparability is, however, limited due to different areas and age spans, but the overviews are quite similar. In the FINRISK study, the level of high trust varied between 69-77 %, depending on the areas (Laatikainen et al. 2003). In this study, the reference figures were 64-67 %, depending on the area and gender. Thus, the level of trust seems to be slightly higher in the present study than in those using the same wording as in the WVS. Overall, the level of trust seems to vary between studies, but the comparability is restricted. One explanation for the differences may be that the WVS on generalised trust included two questions, which may have made answering more complicated (Iisakka 2006).

### *Social participation*

The indicators of social participation vary by study. The indicators used in the present study are slightly different than those used in some other studies (Hyypä and Mäki 2001; Lindström 2004; Pollack and von dem Knesebeck 2004). In this study, it was not possible to determine whether the activities were strictly social (i.e. done with other persons) or not. However, all forms of social participation done with other people may not have health promotion effects, or the effects may be unintended or even harmful. In the present study, some intriguing results were found (Study IV). Among women, active participation in religious events and voluntary work were negatively associated with self-rated health. This finding is probably a paradox: religious participation or voluntary work do not probably cause ill health; rather the propensity to engage in them may be heightened by ill health.

The above findings are not in line with previous studies. The meta-analytic findings (42 studies) by McCullough et al. (2000) entails that religious involvement significantly associates with lower mortality. Religious involvement among people aged 15-64 years (Hyypä & Mäki 2003) and attendance at religious services among the elderly (Veenstra 2000) have also been shown to be associated with better self-rated health. Lack of consistency in the results may be due to the measurements used (multiple dimensions of religious involvement were not reachable in this study), or active participation in religious events may also be interpreted as search for solace for an impairing health status (cf. Teinonen et al. 2007). In addition, the association

of leisure activities with good self-rated health may differ for men and women, due to their nature (i.e. type of volunteer work) or meaning (i.e. meaning of religious activity). It has been suggested that the health effects drawn from activity differ between the genders, and the effects of leisure participation on health should be studied separately for men and women (Hyypä et al. 2006). Furthermore, it is plausible that different types of activities may have different health benefits. For example, solitary activities may entail psychological benefits, and social and productive activities may bring physical benefits (Menec 2003). It has also been suggested that in late life women benefit most from participation in social activities and men from solitary activities (Agahi 2008).

In the sum index used (Studies II and III) several forms of participation are presented, though not all necessarily presenting membership in voluntary associations. Participation in organizations is beneficial for health but is not always the main source of social capital. The different types of participation in today's heterogeneous society are complex (Cattell 2001). Overall, compared with other studies involving Finland, social participation is at a high (Poortinga 2006b), higher than average (van Oorschot et al. 2006) or in rather moderate (Carlson 2004) level. It seems likely that the index used in the present study correlates with membership in voluntary associations. Furthermore, the dichotomisation used in the present study may be open to questions, because the best cut-off point for the sum index is difficult to verify. In this study, the cut-off point was the mean. Using the mean was a consistent method with the other sum index used. However, the mean was hardly dominated by the urban area. The figure was also very close to the median. The dichotomisation of the variable impacts the magnitude of associations, but not their direction. Moreover, some important activities may have gone unnoticed, since they were omitted from the questionnaire. Nonetheless, despite the possible limitations, the social participation sum index measures the social activity as a whole, and using the index has also positive aspects. Some forms of social participation may be difficult to engage in older age, due to of poor health, financial difficulties, long distances in rural areas, lack of public transport, and insufficient caring of close relatives. Thus, the sum index, consisting of several kinds of activities, may measure social participation more comprehensively than the simply crude per capita membership in voluntary associations.

### *Area definition*

In the present study, the area classification was based on both the population registry and the self-evaluation of the respondents. However, there might be a mismatch between the two. A level of the relevant geographical area seems to be difficult to define. For example, the postcode sectors as a proxy of neighbourhoods may not match the perceptions of the local community of the respondents (Poortinga 2006c). The subjective evaluation is also complicated by the fact that the boundaries between the cities and countryside areas have become more vague in Finland. The classifications of areas are diverse, and various interpretations and forms of informality exist. There are classifications made by different criteria and for different purposes. In addition, the contents of the areas may differ, but the term is similar. Thus, the area classifications are difficult to interpret and, consequently, remain quite confusing (Niemi 2004). This, however, is a validity threat for all geographical studies.

## 7 CONCLUSIONS

The present study was conducted in the area of Pääjät-Häme hospital district with the aim to illustrate the implications of the associations of self-rated health between self-perceived SEP indicators, trust, and social participation among the ageing people. The rationale using the Pääjät-Häme area for this study is well justified. The urban-rural division is distinct, demographic changes are rapid, and the socioeconomic factors in the area are low. Therefore health differences are broad in this area.

The focus of the present study, performed in the context of the GOAL program, was closely connected to studies of social capital and health. A recent literature review has identified two components of social capital – a cognitive component including trust, and a structural component including social networks and activity in society, such as informal participation or civic engagement (Islam et al. 2006). In this study, both components were found to have significant associations with self-rated health. In addition, this study evidently involved the two individual levels of social capital, according to the classifications by Macinko and Starfield (2001). However, Rostila (2008) has found that both individual and collective social capital is related to health and the most robust findings can be discovered at the individual level.

According to the literature, there are two major theories describing the pathways leading to inequalities in health: a psychosocial and materialist approach (Mansyur et al. 2008). In the psychosocial approach, social comparisons may affect social cohesion negatively and modify health differences (Kawachi and Berkman 2000), whereas in the material interpretation the material conditions at different socioeconomic levels are seen as the main determining factors of health differences (Lynch and Kaplan 2000). Neither an income inequality nor a psychosocial characteristic of the environment (e.g. trust and organisational membership) can be a universally accepted hypothesis, when explaining health differences between wealthy nations. Within countries, both factors are associated with poorer health (Lynch et al. 2001). In reality, material and psychosocial interpretations are not mutually exclusive (Kawachi et al. 2002.). It has also been suggested that health at a community level may be a consequence of social and economic processes at a macro level (Pearce and Davey Smith 2003). In addition, investments and the more equitable distribution of resources have been suggested as having the most impact in reducing health inequalities (Lynch et al. 2000). The present results are partly in line with the suggestion that material circumstances are mediators between social capital

and health (Mohan et al. 2005). Nonetheless, the present study suggests that after controlling several background variables (SEP and sociodemographic), some scope still remains for social capital to exert an influence on self-rated health.

Urban and rural living environments have a significant function in social gerontology. However, the person-environment concept is empirically under research (Marcellini et al. 2007). The results of the present study led to the outcome that the urban and rural areas of Päijät-Häme contain a mixture of characteristics associating with health. Demographic and economic structures differ, and the availability of facilities concerning social and cultural participation is dissimilar. The importance of social networks, trust, and self-perceived adequacy of income for good self-rated health seems to vary in different areas.

The results of the present study clearly indicate the importance of informal networks and help from other persons. In this study it was not possible to define who the help-givers exactly were, but it is likely that they were family members. It has been suggested that informal help given to one's neighbours is an important form of civic activity in Finland and it has not disappeared after the rise of public services (Kattainen et al. 2008). This study implies that health associations vary depending on the living area, thus indicating a clear health division especially in the sparsely populated countryside among people in need of help.

It has been assumed that social distrust is the main aspect of creating distress. People have to trust that other people behave in a foreseeable way. Participating in social relations in a community makes a person's own social activity meaningful, which is far more important than all the other advantages, including the financial advantage. Trust develops as part of social integration. However, people who have lost their trust can manage well in their life if they are able to live in secure circumstances (Kortteinen and Elovainio 2006). Moreover, social participation and voluntary work are significant for health, but also for survival among the ageing. The role of near relatives among the ageing is also important (Teinonen et al. 2007). The present study partly supports the previous findings and implies the significance of financial resources and living area for participation in different social activities. Furthermore, the substantial significance of trust for health in the urban area can be expected to indicate growing health disparities in the future.

In conclusion, the findings of the present study support the view that investing in a more trustful environment, creating possibilities for social participation, and reallocating financial resources are of significance for health and overall well-being among ageing people. The main challenges and future tasks will be the following: how to stop growing income inequalities, especially poverty among ageing women living alone (Moisio 2008), how to influence social participation among passive people, and how to improve trust constantly. The effects on health of these achievements can be expected to be far-reaching and remarkable.

## 8 ACKNOWLEDGEMENTS

The present study was carried out in the Unit of Health Promotion of the Department of Health Promotion and Chronic Disease Prevention in the National Public Health Institute (KTL) during the years 2003 – 2008.

I would like to express my warmly thanks to the following persons; this thesis would not have been completed without their support and guidance. I was allowed a privilege to dedicate several years to this momentous study.

My sincere gratitude goes to my supervisors Docent Antti Uutela, Ph.D., Head of the Unit and Docent Tommi Sulander, Ph.D. for their professional input and diligent guidance throughout the years of the study.

My best thanks are due to my other supervisors and co-authors of the original articles: Professor Antti Karisto, Ph.D., for his extensive expertise, and Docent Ossi Rahkonen, Ph.D., for his experienced and competent advice also during the hard moments. I am also grateful to my co-author Heikki Heinonen, Ph.D., for his stimulating help as well as for creating a most enjoyable and positive working environment.

This study has been performed in cooperation with the Ikihyvä study group. My special thanks go to Docent Mikael Fogelholm, Sc.D., Leader of the Ikihyvä project and Raisa Valve, Ph.D., Coordinator of the project, for their valuable co-operation. Their input and role have been essential in the realization of the Ikihyvä project. This thesis is based on the dataset from the Ikihyvä project.

The official reviewers of this thesis Docent Markku Hyypä, M.D. and Professor Sakari Suominen, M.D. are acknowledged with gratitude. I greatly appreciate their competent advice and constructive criticism.

Furthermore, I would also like to thank Mr Richard Burton, Mr John Gage, and Ms Ilona Pihlman for revising the original articles and the language of this thesis.

This study was financially supported by the Ministry of Social Affairs and Health.

The background of this thesis is far in the past. To carry out this study has required long periods of isolation and tolerance of disappointments. Therefore I am grateful to those, especially my parents and brother, for their patience and understanding.

Helsinki, on a bright October day, 2008

*Olli Nummela*

## 9 REFERENCES

- Agahi N. Leisure in late life. Patterns of participation and relationship with health. Karolinska Institutet. Stockholm 2008.
- Andersen FK, Christensen K, Frederiksen H. Self-rated health and age: a cross-sectional and longitudinal study of 11,000 Danes aged 45-102. *Scandinavian Journal of Public Health* 2007;35:164-171.
- Artazcoz L, Rueda S. Social inequalities in health among the elderly: a challenge for public health research. *Journal of Epidemiology and Community Health* 2007;61:466-467.
- Avlund K, Holstein BE, Osler M, Damsgaard MT, Holm-Pedersen P, Rasmussen NK. Social position and health in old age: the relevance of different indicators of social position. *Scandinavian Journal of Public Health* 2003;31:126-136.
- Balabanova DC, McKee M. Self-reported health in Bulgaria: levels and determinants. *Scandinavian Journal of Public Health* 2002;30:306-312.
- Barefoot JC, Maynard KE, Beckham JC, Brummett BH, Hooker K, Siegler IC. Trust, health, and longevity. *Journal of Behavioral Medicine* 1998;21:517-526.
- Bath PA. Self-rated health as a risk factor for prescribed drug use a future health and social service use in older people. *Journals of Gerontology. Series A, Biological Sciences and Medical Sciences* 1999;54:M565-570.
- Blom-Lange M. Kuolleisuus, sairastavuus ja sosioekonomiset tekijät Päijät-Hämeen sairaanhoitopiirin kunnissa, Päijät-Hämeen sairaanhoitopiirissä ja suurissa kaupungeissa. Päijät-Hämeen sairaanhoitopiirin julkaisu A 4/1999. Lahti 1999.
- Berg MA. Ravitsemussuosituksiin liittyvien ruokatottumusten alue-erot ja niiden muutokset Suomessa. *Kansanterveyslaitoksen julkaisu A 1/2000*. Helsinki 2000.
- Bosworth HB, Butterfield MI, Stechuchak KM, Bastian LA. The relationship between self-rated health and health care service use among women veterans in a primary care clinic. *Womens Health Issues* 2000;10:278-285.

- Bryant LL, Beck A, Fairclough DL. Factors that contribute to positive perceived health in an older population. *Journal of Aging and Health* 2000;12:169-192.
- Carlson P. The European health divide: a matter of financial or social capital? *Social Science and Medicine* 2004;59:1985-1992.
- Cattell V. Poor people, poor places, and poor health: the mediating role of social networks and social capital. *Social Science and Medicine* 2001;52:1501-1516.
- Chandola T, Ferrie J, Sacker A, Marmot M. Social inequalities in self reported health in early old age: follow-up of prospective cohort study. *British Medical Journal* 2007;334:990-993.
- Cheng YH, Chi I, Boey KW, Ko LS, Chou KL. Self-rated economic condition and the health of elderly persons in Hong Kong. *Social Science and Medicine* 2002;55:1415-1424.
- Coleman JS. Social capital in the creation of human capital. *American Journal of Sociology* 1988;94S:S95-S120.
- Damian J, Ruigomez A, Pastor V, Martin-Moreno JM. Determinants of self assessed health among Spanish older people living at home. *Journal of Epidemiology and Community Health* 1999;53:412-416.
- Diez Roux AV. A glossary for multilevel analysis. *Journal of Epidemiology and Community Health* 2002;56:588-594.
- Eberhardt MS, Pamuk ER. The importance of place of residence: examining health in rural and nonrural areas. *American Journal of Public Health* 2004;94:1682-1686.
- Ferlander S. The importance of different forms of social capital for health. *Acta Sociologica* 2007;50:115-128.
- Ferrie JE, Martikainen P, Shipley MJ, Marmot MG. Self-reported economic difficulties and coronary events in men: evidence from the Whitehall II study. *International Journal of Epidemiology* 2005;34:640-648.
- Fogelholm M, Valve R, Absetz P, Heinonen H, Uutela A, Patja K, Karisto A, Kontinen R, Mäkelä T, Nissinen A, Jallinoja P, Nummela O, Talja M. Rural-urban differences in health and health behaviour: a baseline description of a community health-

promotion programme for the elderly. *Scandinavian Journal of Public Health* 2006;34:632-640.

Fukuyama F. *The great disruption. Human nature and the reconstitution of social order.* Profile Books. London 1999.

Galobardes B, Shaw M, Lawlor DA, Lynch JW, Davey Smith G. Indicators of socioeconomic position (part 1). *Journal of Epidemiology and Community Health* 2006;60:7-12.

Gillanders WR, Buss TF, Hofstetter CR. Urban/rural elderly health status differences: the dichotomy re-examined. *Journal of Aging and Social Policy* 1996;8:7-24.

Greiner KA, Li C, Kawachi I, Hunt C, Ahluwalia JS. The relationship of social participation and community ratings to health and health behaviors in areas with high and low population density. *Social Science and Medicine* 2004;59:2303-2312.

Heikkilä M, Rintala T, Airio I, Kainulainen S. *Hyvinvointi ja tulevaisuus maalla ja kaupungissa. Sosiaali- ja terveystieteen tutkimus- ja kehittämiskeskus STAKES. Tutkimuksia 126.* Helsinki 2002.

Heistaro S. Trends and determinants of subjective health: analyses from the national FINRISK surveys. *Publications of the National Public Health Institute A 24/2002.* Helsinki 2002.

Helakorpi S, Laitalainen E, Absetz P, Torppa J, Uutela A, Puska P. *Aikuisväestön terveystietäytyminen ja terveys maakunnissa 1978–2005. Kansanterveyslaitoksen julkaisuja B15.* Helsinki 2007.

Hellsten K, Komu M. Luotettavien listalla poliisi kärjessä, Kela neljäntenä. *Sosiaalivakuutus* 2006;44(1):12-13.

Huisman M, Kunst AE, Mackenbach JP. Socioeconomic inequalities in morbidity among the elderly; a European overview. *Social Science and Medicine* 2003;57:861-873.

Hyde M, Jones IR. The long shadow of work – does time since labour market exit affect the association between socioeconomic position and health in a post-working population. *Journal of Epidemiology and Community Health* 2007;61:533-539.

- Hyypä MT, Mäki J. Individual-level relationships between social capital and self-rated health in a bilingual community. *Preventive Medicine* 2001;32:148-155.
- Hyypä MT, Mäki J. Social participation and health in a community rich in stock of social capital. *Health Education Research* 2003;18:770-779.
- Hyypä MT, Mäki J, Impivaara O, Aromaa A. Leisure participation predicts survival: a population based study in Finland. *Health Promotion International* 2006;21:5-12.
- Hyypä MT, Mäki J, Alanen E, Impivaara O, Aromaa A. Long-term stability of social participation. *Social Indicators Research* 2007; published online (DOI 10.1007/s11205-007-9199-y).
- Idler EL, Benyamini Y. Self-rated health and mortality: a review of twenty-seven community studies. *Journal of Health and Social Behavior* 1997;38:21-37.
- Idler EL, Russell LB, Davis D. Survival, functional limitations, and self-rated health in the NHANES I Epidemiologic Follow-up Study, 1992. *American Journal of Epidemiology* 2000;152:874-883.
- Iisakka L. Sosiaalinen pääoma ja luottamus. In: Iisakka L. (Ed.) *Sosiaalinen pääoma Suomessa – Tilastokatsaus*. Tilastokeskus. Helsinki 2006.
- Islam MK, Merlo J, Kawachi I, Lindström M, Gerdtham UG. Social capital and health: does egalitarianism matter? A literature review. *International Journal for Equity in Health* 2006;5:3.
- Jackson R, Chambless LE, Yang K, Byrne T, Watson R, Folsom A, Shahar E, Kalsbeek W. Differences between respondents and nonrespondents in a multicenter community-based study vary by gender and ethnicity. The Atherosclerosis Risk in Communities (ARIC) Study Investigators. *Journal of Clinical Epidemiology* 1996;49:1441-1446.
- Jousilahti P, Salomaa V, Kuulasmaa K, Niemelä M, Vartiainen E. Total and cause specific mortality among participants and non-participants of population based health surveys: a comprehensive follow up of 54 372 Finnish men and women. *Journal of Epidemiology and Community Health* 2005;59:310-315.
- Kainulainen S, Rintala T, Heikkilä M. Hyvinvoinnin alueellinen erilaistuminen 1990-luvun Suomessa. Kahtiajakautuva Suomi? -tutkimusprojektin julkaisu. Sosiaali- ja terveystieteiden tutkimus- ja kehittämiskeskus STAKES. Tutkimuksia 114. Helsinki 2001.

- Karisto A, Nummela O, Konttinen R, Haapola I, Valve R, Uutela A, Heikkilä K. Ikääntyvä Päijät-Häme. Kuntien hyvinvointiraportti. Helsingin yliopiston Tutkimus- ja koulutuskeskus Palmenia. Raportteja ja selvityksiä 41/2003. Lahti 2003.
- Karisto A. Väestö vanhenee sukupolvittain - suuret ikäluokat esimerkkeinä. In: Heikkinen E, Rantanen T. (Eds.) Gerontologia. Duodecim. Tampere 2003, pp. 70-77.
- Karvonen S, Kauppinen TM. Hyvinvoinnin vajeet maalla, kaupungeissa ja kaupunkikeskuksissa. In: Moisio P, Karvonen S, Simpura J, Heikkilä M. (Eds.) Suomalaisten hyvinvointi 2008. Sosiaali- ja terveysalan tutkimus- ja kehittämiskeskus STAKES. Helsinki 2008, pp. 276-293.
- Kattainen E, Muuri A, Luoma ML, Voutilainen P. Läheisapu ja sen merkitys kansalaisille. In: Moisio P, Karvonen S, Simpura J, Heikkilä M. (Eds.) Suomalaisten hyvinvointi 2008. Sosiaali- ja terveysalan tutkimus- ja kehittämiskeskus STAKES. Helsinki 2008, pp. 218-231.
- Kawachi I, Berkman L. Social cohesion, social capital, and health. In: Berkman LF, Kawachi I. (Eds.) Social Epidemiology. Oxford University Press. New York 2000, pp. 174-190.
- Kawachi I. Income inequality and health. In: Bergman LF, Kawachi I. (Eds.) Social Epidemiology. Oxford University Press. New York 2000, pp. 76-94.
- Kawachi I, Kennedy BP, Glass R. Social capital and self-rated health: a contextual analysis. American Journal of Public Health 1999;89:1187-1193.
- Kawachi I, Kennedy BP, Lochner K, Prothrow-Stith D. Social capital, income inequality, and mortality. American Journal of Public Health 1997;87:1491-1498.
- Kawachi I, Subramanian SV, Almeida-Filho N. A glossary for health inequalities. Journal of Epidemiology and Community Health 2002;56:647-652.
- Kennelly B, O'Shea E, Garvey E. Social capital, life expectancy and mortality: a cross-national examination. Social Science and Medicine 2003;56:2367-2377.
- von dem Knesebeck O, Lüschen G, Cockerham WC, Siegrist J. Socioeconomic status and health among the aged in the United States and Germany: a comparative cross-sectional study. Social Science and Medicine 2003;57:1643-1652.

- Kortteinen M, Elovainio M. Miten auttaa huono-osaisia? In: Kautto M. (Ed.) *Suomalaisten hyvinvointi 2006. Sosiaali- ja terveysalan tutkimus- ja kehittämiskeskus STAKES*. Helsinki 2006, pp. 329-344.
- Koskinen S. Origins of regional differences in mortality from ischaemic heart disease in Finland. National Research and Development Centre for Welfare and Health (NAWH). Research reports 41. Jyväskylä 1994.
- Laaksonen E, Martikainen P, Lahelma E, Lallukka T, Rahkonen O, Head J, Marmot M. Socioeconomic circumstances and common mental disorders among Finnish and British public sector employees: evidence from the Helsinki Health Study and the Whitehall II Study. *International Journal of Epidemiology* 2007;36:776-786.
- Laatikainen T, Tapanainen H, Alfthan G, Salminen I, Sundvall J, Leiviskä J, Harald K, Jousilahti P, Salomaa V, Vartiainen E. FINRISKI 2002. Tutkimuksen toteutus ja tulokset 2. Taulukkoliite. Kansanterveyslaitoksen julkaisuja B7. Helsinki 2003.
- Leinonen R, Heikkinen E, Jylhä M. A pattern of long-term predictors of health ratings among older people. *Aging (Milano)* 2001;13:454-464.
- Lindström C, Lindström M. "Social capital," GNP per capita, relative income, and health: an ecological study of 23 countries. *International Journal of Health Services* 2006;36:679-696.
- Lindström M. Social capital, the miniaturisation of community and self-reported global and psychological health. *Social Science and Medicine* 2004;59:595-607.
- Lindström M. Social capital and lack of belief in the possibility to influence one's own health: a population based study. *Scandinavian Journal of Public Health* 2006;34:69-75.
- Lynch J, Kaplan G. Socioeconomic position. In: Bergman LF, Kawachi I. (Eds.) *Social Epidemiology*. Oxford University Press. New York 2000, pp. 13-35.
- Lynch J, Davey Smith G, Hillemeier M, Shaw M, Raghunathan T, Kaplan G. Income inequality, the psychosocial environment, and health: comparisons of wealthy nations. *Lancet* 2001;358:194-200.

- Lynch JW, Davey Smith G, Kaplan GA, House JS. Income inequality and mortality: importance to health of individual income, psychosocial environment, or material conditions. *British Medical Journal* 2000;320:1200-1204.
- Macinko JA, Shi L, Starfield B, Wulu JT Jr. Income inequality and health: a critical review of the literature. *Medical Care Research and Review* 2003;60:407-452.
- Macinko J, Starfield B. The utility of social capital in research on health determinants. *Milbank Quarterly* 2001;79:387-427, IV.
- Mackenbach JP, Kunst AE, Cavelaars AE, Groenhof F, Geurts JJ. Socioeconomic inequalities in morbidity and mortality in western Europe. The EU Working Group on Socioeconomic Inequalities in Health. *Lancet* 1997;349:1655-1659.
- Mainous AG 3rd, Kohrs FP. A comparison of health status between rural and urban adults. *Journal of Community Health* 1995; 20:423-431.
- Manderbacka K. Terveystilante mittarit. Kuinka terveystilante on mitattu vuoden 1986 Elinolotutkimuksessa? Tilastokeskus. Helsinki 1995.
- Manderbacka K. Questions on survey questions on health. Swedish Institute for Social Research. Stockholm 1998.
- Mansur C, Amick BC, Harris RB, Franzini L. Social capital, income inequality, and self-rated health in 45 countries. *Social Science and Medicine* 2008;66:43-56.
- Marcellini F, Giuli C, Gagliardi C, Papa R. Aging in Italy: Urban-rural differences. *Archives of Gerontology and Geriatrics* 2007;44:243-60.
- Martelin T. Mortality by indicators of socioeconomic status among the Finnish elderly. *Social Science and Medicine* 1994;38:1257-1278.
- Martelin T, Sainio P, Sulander T, Helakorpi S, Tuomi K, Koskinen S. Toimintakyky. In: Palosuo H, Koskinen S, Lahelma E, Prättälä R, Martelin T, Ostamo A, Keskimäki I, Sihto M, Talala K, Hyvönen E, Linnanmäki E. (Eds.) *Terveystilante eriarvoisuus Suomessa. Sosioekonomisten terveystilanteen muutokset 1980–2005. Sosiaali- ja terveystilanteen julkaisu* 2007;23. Helsinki 2007, pp. 104-121.

- Menec VH. The relation between everyday activities and successful aging: a 6-year longitudinal study. *Journal of Gerontology, Series B, Psychological Sciences and Social Sciences* 2003;58:S74-82.
- Mohan J, Twigg L, Barnard S, Jones K. Social capital, geography and health: a small area analysis for England. *Social Science and Medicine* 2005;60:1267-1283.
- Moisio P. Köyhyyden ja toimeentulo-ongelmien kehitys. In: Moisio P, Karvonen S, Simpura J, Heikkilä M. (Eds.) *Suomalaisten hyvinvointi 2008. Sosiaali- ja terveystieteiden tutkimus- ja kehittämiskeskus STAKES*. Helsinki 2008, pp. 256–275.
- Morrow-Howell N, Hinterlong J, Rozario PA, Tang F. Effects of volunteering on the well-being of older adults. *Journal of Gerontology, Series B, Psychological Sciences and Social Sciences* 2003;58:S137-145.
- Niemi E. Kaupungin rajat. Laitakaupunki, esikaupunki, nukkumalähiö. *Hyvinvointikatsaus* 2004;15(3):4-13.
- Nivalainen S, Volk R. Väestö ja hyvinvointipalvelut vuonna 2030: Alueellinen tarkastelu. *Sosiaali- ja terveystieteiden tutkimus- ja kehittämiskeskus STAKES* 2002:15. Helsinki 2002.
- van Oorschot W, Arts W, Gelissen J. Social capital in Europe – Measurement and social and regional distribution of a multifaceted phenomenon. *Acta Sociologica* 2006;49:149-167.
- Pappas G, Queen S, Hadden W, Fisher G. The increasing disparity in mortality between socioeconomic groups in the United States, 1960 and 1986. *The New England Journal of Medicine* 1993;329:103-109.
- Pearce N, Davey Smith G. Is social capital the key to inequalities in health? *American Journal of Public Health* 2003;93:122-129.
- Pollack CE, von dem Knesebeck O. Social capital and health among the aged: comparisons between the United States and Germany. *Health and Place* 2004;10:383-391.
- Poortinga W. Social relations or social capital? Individual and community health effects of bonding social capital. *Social Science and Medicine* 2006a;63:255-270.
- Poortinga W. Social capital: an individual or collective resource for health? *Social Science and Medicine* 2006b;62:292-302.

- Poortinga W. Do health behaviors mediate the association between social capital and health? *Preventive Medicine* 2006c;43:488-493.
- Portes A. Social capital: its origin and applications in modern sociology. *Annual Review of Sociology* 1998;24:1-24.
- Prager E, Walter-Ginzburg A, Blumstein T, Modan B. Gender differences in positive and negative self-assessments of health status in a national epidemiological study of Israeli aged. *Journal of Women & Aging* 1999;11:21-41.
- Putnam RD. Bowling alone: America's declining social capital. *Journal of Democracy* 1995;6:65-78.
- Rahkonen O, Talala K, Sulander T, Laaksonen M, Lahelma E, Uutela A, Prättälä R. Koettu terveys. In: Palosuo H, Koskinen S, Lahelma E, Prättälä R, Martelin T, Ostamo A, Keskimäki I, Sihto M, Talala K, Hyvönen E, Linnanmäki E. (Eds.) *Terveyden eriarvoisuus Suomessa. Sosioekonomisten terveyserojen muutokset 1980–2005. Sosiaali- ja terveysministeriön julkaisuja 2007:23. Helsinki 2007, pp. 65-73.*
- Reijneveld SA, Verheij RA, de Bakker DH. The impact of area deprivation on differences in health: does the choice of the geographical classification matter? *Journal of Epidemiology and Community Health* 2000;54:306-313.
- Rintala T, Karvonen S. Koetun huono-osaisuuden kasautuminen erilaisissa kuntatyypeissä. *Yhteiskuntapolitiikka* 2003;68:454–464.
- Robert S, House JS. SES differentials in health by age and alternative indicators of SES. *Journal of Aging and Health* 1996;8:359-388.
- Rostila, M. *Healthy bridges. Studies of social capital, welfare, and health.* Stockholm University/Karolinska Institutet. Stockholm 2008.
- Smith P, Polanyi M. Social norms, social behaviours and health: an empirical examination of a model of social capital. *Australian and New Zealand Journal of Public Health* 2003;27:456-463.
- Søgaard AJ, Selmer R, Bjertness E, Thelle D. The Oslo Health Study: the impact of self-selection in a large, population-based survey. *International Journal for Equity in Health* 2004;3:3.

- Statistics Finland. Väestöennuste kunnittain 2001-2030. Tilastokeskus. Helsinki 2001.
- Statistics Finland. Kuolleisuus- ja eloonjäämislujuja. Tilastokeskus. Helsinki 2002.  
Available at: <http://www.tilastokeskus.fi/til/kuol/2004/>.
- Statistics Finland. Väestömuutokset 2001. Tilastokeskus. Helsinki 2003a.
- Statistics Finland. Tulonjakotilasto 2001. Tilastokeskus. Helsinki 2003b.
- Statistics Finland. Kunnat ja kuntapohjaiset aluejaot 2003. Tilastokeskus. Helsinki 2003c.
- Statistics Finland. Väestörakenne ja väestömuutokset kunnittain 2005. Tilastokeskus. Helsinki 2006.
- Statistics Finland. Väestörakenne ja väestömuutokset kunnittain 2006. Tilastokeskus. Helsinki 2007.
- Subramanian SV, Kim DJ, Kawachi I. Social trust and self-rated health in US communities: a multilevel analysis. *Journal of Urban Health* 2002;79:S21-S34.
- Subramanian SV, Lochner KA, Kawachi I. Neighborhood differences in social capital: a compositional artifact or a contextual construct? *Health and Place* 2003;9:33-44.
- Sulander T, Martelin T, Sainio P, Rahkonen O, Nissinen A, Uutela A. Trends and educational disparities in functional capacity among people aged 65-84 years. *International Journal of Epidemiology* 2006;35:1255-1261.
- Sulander T, Nummela O, Laitalainen E, Helakorpi S, Uutela A. Eläkeikäisen väestön terveyskäyttäytyminen ja terveys alueittain 1993–2005. Kansanterveyslaitoksen julkaisuja B30. Helsinki 2007.
- Szreter S, Woolcock S. Health by association? Social capital, social theory, and the political economy of public health. *International Journal of Epidemiology* 2004;33:650-667.
- Teinonen T, Isoaho R, Kivelä SL. Vanhusten sosiaalinen osallistuminen ja elinajan ennuste. *Suomen Lääkärilehti* 2007;62:1493-1498.

- Tolonen H. Towards the high quality of population health surveys. Standardization and quality control. Publications of the National Public Health Institute A 27/2005. Helsinki 2005.
- Valkonen T, Ahonen H, Martikainen P, Remes H. Sosioekonomiset kuolleisuuserot. In: Palosuo H, Koskinen S, Lahelma E, Prättälä R, Martelin T, Ostamo A, Keskimäki I, Sihto M, Talala K, Hyvönen E, Linnanmäki E. (Eds.) Terveyden eriarvoisuus Suomessa. Sosioekonomisten terveysterojen muutokset 1980–2005. Sosiaali- ja terveystieteiden tutkimuskeskuksen julkaisuja 2007:23. Helsinki 2007, pp. 44-64.
- Valve R, Absetz P, Fogelholm M, Karisto A, Katajamäki E, Nissinen A, Talja M, Uutela A. Ikihyvä Päijät-Häme –tutkimus. Perusraportti 2002. Päijät-Hämeen sairaanhoitopiirin julkaisuja A 12/2003. Lahti 2003.
- Veenstra G. Social capital, SES and health: an individual-level analysis. *Social Science and Medicine* 2000;50:619-629.
- Veenstra G. Explicating social capital: trust and participation in the civil space. *Canadian Journal of Sociology* 2002;27:547-572.
- Vuorisalmi M. Examining self-rated health in old age. A methodological study of survey questions. Tampereen Yliopistopaino. Tampere 2007.
- Walker JD, Maxwell CJ, Hogan DB, Ebly EM. Does self-rated health predict survival in older persons with cognitive impairment? *Journal of the American Geriatrics Society* 2004;52:1895-1900.
- Yoo IY, Lee CY, Kim MI. Health status of urban and rural elders in Korea. *Yonsei Medical Journal* 1998;39:417-423.
- Zunzunegui MV, Koné A, Johri M, Béland F, Wolfson C, Bergman H. Social networks and self-rated health in two French-speaking Canadian community dwelling populations over 65. *Social Science and Medicine* 2004;58:2069-2081.

## 10 APPENDIX 1

**Table 2.** *Description of variables (%), unweighted figures.*

	Urban (N=1193)	Rural population centre <sup>1</sup> (N=929)	Sparsely populated countryside <sup>2</sup> (N=653)
<b>Self-rated health</b>			
Average or less	54.2	53.5	57.1
Fairly good or good	45.8	46.5	42.9
(Missing)	(1.8)	(1.0)	(0.3)
<b>Gender</b>			
Male	48.3	45.9	50.5
Female	51.7	54.1	49.5
<b>Age group</b>			
72-76	31.4	29.2	34.3
62-66	37.6	36.5	34.6
52-56	31.0	34.3	31.1
<b>Marital status</b>			
Separated, divorced, widowed, single	32.4	25.7	23.7
Married or cohabiting	67.6	74.3	76.3
(Missing)	(1.8)	(0.9)	(0.6)
<b>Education</b>			
Elementary school or less	69.3	75.2	78.5
Middle school or graduate	30.7	24.8	21.5
(Missing)	(2.5)	(1.5)	(0.9)
<b>Adequacy of income</b>			
Average or less	36.9	38.4	48.8
Very or rather good	63.1	61.6	51.2
(Missing)	(2.5)	(1.8)	(4.3)

---

<b>Disposable income per month per consumption unit</b>			
<= €874	26.6	30.1	51.0
€875-1209	37.2	33.4	25.8
>= €1210	36.2	36.5	23.3
(Missing)	(13.1)	(13.0)	(19.8)
<b>Trust</b>			
Low	34.2	33.5	36.2
High	65.8	66.5	63.8
(Missing)	(6.8)	(6.6)	(8.1)
<b>Social contacts with relatives and family members (outside households)</b>			
Low	55.6	50.8	50.0
High	44.4	49.2	50.0
(Missing)	(2.6)	(1.7)	(2.3)
<b>Frequency of contacts with close friends or close relatives</b>			
Low	33.4	31.7	36.3
High	66.6	68.3	63.7
(Missing)	(4.7)	(3.9)	(4.6)
<b>Social participation</b>			
Low	64.3	64.6	65.1
High	35.7	35.4	34.9
(Missing)	(5.1)	(7.3)	(7.8)
<b>Access to help from auxiliary persons</b>			
Low	42.2	41.9	41.8
High	57.8	58.1	58.2
(Missing)	(11.0)	(14.2)	(16.8)

---

---

<b>Social participation/trust combinations</b>			
Low social capital (low/low)	25.2	23.6	25.1
Traditionalism (low/high)	39.5	41.0	40.5
Miniaturisation (high/low)	8.6	9.0	10.4
High social capital (high/high)	26.7	26.5	24.0
(Missing)	(8.7)	(10.1)	(11.5)
<b>Singing in a choir, art painting, playing music</b>			
A few times a year or less	89.3	87.8	90.7
At least once a month	10.7	12.2	9.3
(Missing)	(7.7)	(10.1)	(11.0)
<b>Art exhibitions, theatre, movies, concerts</b>			
A few times a year or less	83.9	91.2	92.7
At least once a month	16.1	8.8	7.3
(Missing)	(5.8)	(6.8)	(8.1)
<b>Religious events</b>			
A few times a year or less	80.8	81.7	81.3
At least once a month	19.2	18.3	18.7
(Missing)	(4.9)	(5.2)	(6.4)
<b>Studying and self-development</b>			
A few times a year or less	71.6	74.8	75.8
At least once a month	28.4	25.2	24.2
(Missing)	(6.5)	(8.7)	(9.3)
<b>Voluntary work</b>			
A few times a year or less	87.9	86.4	88.4
At least once a month	12.1	13.6	11.6
(Missing)	(7.7)	(9.6)	(11.8)

---

The sum is not always exactly 100 due to rounding. (Missing=missing % from total.)

<sup>1</sup> Centre, suburb or population centre in semi-urban or rural area.

<sup>2</sup> Sparsely populated part of semi-urban or rural area.