

Jorma Seitsamo

# Retirement Transition and Well-being

- A 16-year Longitudinal Study



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## People and Work

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# **Retirement Transition and Well-being**

*- A 16-year Longitudinal Study*

**Jorma Seitsamo**

**People and Work  
Research Reports 76**

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Helsinki, December 2006

*Jorma Seitsamo*

## ABSTRACT

The ageing of the labour force and falling employment rates have forced policy makers in industrialized countries to find means of increasing the well-being of older workers and of lengthening their work careers.

The main objective of this thesis was to study longitudinally how health, functional capacity, subjective well-being, and lifestyle change as people grow older, and what effect retirement has on these factors and on their relationships.

The present study is a follow-up questionnaire study of Finnish municipal workers, conducted in 1981 to 1997 at the Finnish Institute of Occupational Health. In 1981, a postal questionnaire was sent to 7344 municipal workers in different parts of Finland. The respondents were born between 1923 and 1937. All in all, the age of the study subjects ranged from 45 to 74 years. A total of 6257 persons responded to the first questionnaire (response rate 85.2 %). During the follow-up, 715 persons died and 1725 did not complete the questionnaire at each of the time points required. In the end, a total of 3817 persons had responded to all four (1981, 1985, 1992, 1997) questionnaires. (The response rate was 69% of the living participants who responded to the first questionnaire). Cross-tabulations, comparison of means, logistic regression analyses and general linear models with repeated measures were used to derive the results.

The transition from work life to retirement, and the following years as a pensioner were associated with many changes. Involvement in various activities increased during the transition stage but later decreased to the previous level. Physical exercise was an exception: it became increasingly popular over the years. Perceived health improved markedly from the working stage to the retirement transition stage, even though morbidity increased steadily during the follow-up. On the other hand, functional capacity decreased over the follow-up, especially among those who were occupationally active until the retirement stage. Subjective well-being remained stable during the follow-up period. There were, however, great differences based on the type of work, favouring those whose work had been mental in nature. The impact of activity level on maintaining well-being became greater during the follow-up, whereas the effect of physical functioning diminished.

Good physical functioning and an active life-style contributed to staying on at work until normal retirement age. Also work-related factors, i.e. possibilities for development and influence at work, responsibility for others, meaningful work, and satisfaction with working time arrangements were positively related to continuing working.

The transition from work to retirement had a positive impact on a person's health. The study results support the view that it should be possible to ease one's work pace during the last years of a work career. This might lower the threshold between work and retirement and convince people that there will still be time to enjoy retirement also a few years later.

## TIIVISTELMÄ

Eliniän pidentyminen ja yli 55-vuotiaiden osuuden väheneminen työvoimasta aina viime vuosikymmenen puoliväliin asti on saanut teollistuneiden maiden päättäjät etsimään keinoja ikääntyvien työntekijöiden hyvinvoinnin ylläpitämiseksi ja työuran pidentämiseksi.

Tämän väitöskirjatutkimuksen päätavoite oli selvittää pitkittäistutkimuksen keinoin miten terveys, toimintakyky, koettu hyvinvointi sekä elämäntyyli muuttuivat ikääntymisen myötä sekä miten eläkkeelle siirtyminen vaikutti näihin tekijöihin ja niiden keskinäisiin suhteisiin.

Tutkimus perustuu Ikääntyvä kuntatyöntekijä -seurantatutkimukseen, joka toteutettiin Työterveyslaitoksessa vuosina 1981–1997. Ensimmäisessä vaiheessa lähetettiin postikysely 7344:lle kunta-alan työntekijälle eri puolille Suomea. Tutkimukseen valitut olivat syntyneet vuosina 1923–1937 ja heidän ikänsä oli 45–58 vuotta. Kaikkiaan 6257 henkilöä vastasi ensimmäiseen kyselyyn (vastausprosentti oli 85,2 %). Seurannan aikana heistä kuoli 715 ja 1725 jätti vastaamatta johonkin myöhemmistä kyselyistä (1985, 1992 ja 1997). Seurannan loputtua 3817 oli vastannut kaikkiin kyselyihin (vastausprosentti oli 69 %). Tutkimuksen tuloksia analysoitiin ristiintaulukoimalla, keskiarvoja vertaamalla, logistisilla regression-analyysillä sekä yleisiin lineaarisiin malleihin perustuvilla toistomittauksilla.

Siirtyminen työstä eläkkeelle ja sitä seuranneet eläkevuodet toivat tullessaan monia muutoksia. Osallistuminen erilaisiin aktiviteetteihin lisääntyi eläkkeelle siirryttäessä mutta myöhemmin osallistumisvilkkaus vakiintui työssäoloajan tasolle. Liikunta oli tästä poikkeus ja sen suosio kasvoi vuosi vuodelta. Koettu terveys kohentui voimakkaasti eläkkeelle siirtymisen myötä, vaikka sairastavuus yleensä lisääntyi. Toisaalta toimintakyky heikkeni seuranta-aikana, erityisesti pitkään työelämässä jatkaneilla. Koettu hyvinvointi pysyi vakaana koko seuranta-ajan, joskin ammattialakohtaiset erot olivat selvät henkistä työtä tehneiden eduksi. Erilaisten aktiviteettien merkitys hyvinvoinnin ylläpitämiselle korostui seuranta-aikana kun taas toimintakyvyn merkitys väheni.

Hyvä toimintakyky ja aktiivinen elämäntyyli edesauttoivat myös työssä jatkamista normaaliin eläkeikään saakka. Myös työhön liittyvät tekijät, kuten mahdollisuudet vaikuttaa omaan työhönsä ja kehittyä työssään, vastuun ottaminen muista, työn kokeminen merkitykselliseksi sekä tyytyväisyys työaikajärjestelyihin vaikuttivat myönteisesti työssä jatkamiseen.

Tutkimuksen tulokset vahvistavat näkemystä, että työntekijällä pitäisi olla mahdollisuuksia helpottaa työtahtiaan viimeisinä työssäolovuosinaan. Tämä voisi osaltaan alentaa kynnystä työn ja eläkkeellä olon välillä ja siten työntekijä voisi vakuuttua siitä, että eläkepäivistä ehtii nauttimaan joitakin vuosia myöhemminkin.

## LIST OF ORIGINAL PUBLICATIONS

This dissertation is based on five original articles, which are referred to in the text by the Roman numerals I–V:

- I Seitsamo J & Ilmarinen J. Lifestyle, aging, and work ability among active Finnish workers in 1981–1992. *Scand J Work Environ Health* 1997; 23 suppl 1:20–6
- II Seitsamo J & Klockars M. Aging and changes in health. *Scand J Work Environ Health* 1997; 23 suppl 1:27–35
- III Seitsamo J & Martikainen R. Changes in capability in a sample of Finnish ageing workers. *Experimental Ageing Research*, 25:4, 1999, 345–352
- IV Seitsamo J. Qualities of work, functioning, and early retirement. A longitudinal study among Finnish ageing workers in 1985–1997. *International Congress Series No 1280*, 2005, 136–141.
- V Seitsamo J., Tuomi K. & Martikainen R. Activity, functional capacity and well-being in ageing Finnish workers. *Occupational Medicine* doi: 10.1093/occmed/kql105, 2006.

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# 1. INTRODUCTION

## 1.1. Ageing societies

It is well-known that life expectancy has increased and is continually rising in industrialized countries at present, but the same trend is also expected to take place in developing countries in the future (WHO 2002). In Europe, it is estimated that the proportion of people aged over 65 will triple to 30 % between 1950 and 2050. (Avramov et al. 2003).

In Finland, the proportion of pensioners will increase remarkably in the next few years when the post-war baby-boom generation reaches retirement age. In fact, for the first time in history, the proportion of those over 65 will be higher than that of those aged 20 or younger (Kautto et al. 2004). In addition, the labour force is ageing; it has been estimated (Ilmarinen 1999) that the proportion of 55 to 64 year olds is increasing steadily also in the European Union (EU) countries. This trend has often been seen as a negative phenomenon and the term “ageing society” is considered to represent a burden to the wealth of future societies. There is, however, another view which states that the increase of life expectancy has been one of the major advantages of the twentieth century, and instead of ageing, societies are “counter-ageing”. This means that people at a certain age today (i.e. at 60 or 70 years of age) are much healthier and “younger” than they were some generations ago. One major consequence of this development is that the age of retirement is becoming disassociated from the age at which people become old. (Reday-Mulvey 2005).

The ageing of the population is not a problem as such, but a simultaneous decrease in the employment rates of the older workers, the so-called age/employment paradox has become one of the main concerns of policy makers. Fortunately, from the mid-nineties onwards, the employment rate of older workers has steadily increased in the EU, from 36.0% in 1995 to 44.1% in 2005. The variation in the average employment rate within different EU countries has been great, and in 2005 it ranged from over 65% (Sweden) to less than 32% (Austria, Belgium, Italy and Luxembourg) (Employment in Europe 2005; Eurostat 2006).

Contrary to the other Nordic countries, the employment rates of older workers in Finland were below 40% during the 1990s. Recently, the proportion of the older work force has begun to rise and it is now growing rapidly compared to most European countries. In 2005, the employment rate of older workers was 52.7% in Finland, which is already above the EU target for the year 2010. Besides Finland, only 7 of the 25 EU countries (the United Kingdom, Denmark, Estonia, Cyprus, Ireland, Portugal and Sweden) have reached this target. (Eurostat 2006; Haataja 2006).

Not surprisingly then, one major issue in social policy has been to find the means of raising the employment rates of older workers in order to secure the financing of pensions (Gould et al. 2003). From the point of view of social policy, it is beneficial to encourage

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individuals to remain at work for longer, to retire at a later stage, to be active after retirement, to engage in health-sustaining activities, and to be as self-reliant as possible. (Davey 2002; Avramov et al. 2003). These factors form the key elements of the so called ‘active ageing’ paradigm, which was introduced at the turn of the century by the World Health Organization (WHO), and later taken up by the EU. The focus of WHO has been on keeping ageing people active during the extended post retirement period; while for the EU the main interest has been in increased labour force participation (Avramov et al. 2003.)

Retirement transition is one of the major events in a person’s life. For an individual, retirement may simply mean withdrawal from employment, a change into a role with new norms, duties and rights, or a transition passage from middle adulthood to old age (Atchley 2000). For some, retirement may mean a longed-for end to strenuous work, and for others, losing the meaning of life.

Increasing the healthy and viable years after retirement has also raised discussion about a completely new phase of life, the third age (Laslett 1989) which begins after the retirement transition and continues until the “deep old age” or “fourth age” characterised by physical pain and disabilities (Hockey et al. 2003). Even though the concept of the third age is positive in nature, promising a good life after the occupationally active period, paradoxically, the consequence of this “sugar coating” is that the border line to the fourth age may become steeper in the future. (Karisto 2002)

Despite the importance of the retirement transition, there is surprisingly little scientific knowledge, especially from longitudinal studies, about functional capacity and the health and well-being of those who are nearing retirement age. Much research has been conducted in the field of gerontology from the viewpoint of successful or healthy ageing, but the subjects have often been elderly citizens, over 70 or 80 years of age. Nowadays when the ageing workforce is one of the key issues in social policy, it is important to get more information about the factors affecting the well-being of those reaching their sixties and to find solutions to extend their occupationally active working careers.

This thesis is based on an extensive longitudinal study of Finnish municipal workers which was carried out by the Finnish Institute of Occupational Health. The data was collected through four questionnaires during the period of 1981 - 1997. The main focus of the study was to clarify how the factors of work, health, functional capacity, work ability and perceived strain influence the ageing worker (Ilmarinen et al. 1991). Since then, the project has produced various reports and innovations regarding the issues of the ageing worker and work ability (Ilmarinen et al. 2004; Tuomi et al. 1998; Tuomi et al. 1997a, 1997b, 1997c).

The aim of this thesis is, in short, to examine how health, functional capacity, subjective well-being, and lifestyle change as individuals grow older, and what effect retirement transition has on these factors and on their relationships.

### 1.2. Key concepts of this study

#### Ageing

Long research tradition connects ageing with deterioration, weakening etc. According to this view, ageing comprises the transformations of the human organism or its functions and structures which result in the decline of biological, psychological, and behavioural capacities (Birren et al. 1993). However, in addition to the above “biological” view, there is also agreement that many other factors are involved. Fozard (1993) has gathered the following characteristics of ageing from different definitions:

1. Individual variability in ageing
2. The complexity of the interacting biological, psychological, and social forces that determine ageing, and
3. The changing environmental context in which ageing is studied.

The above features are quite close to the principles of the life course developmental perspective in psychology. According to this tradition, human ageing always involves multidirectionality of change, the contextualization of social developmental processes, and potential for plasticity of functioning (Pratt et al. 1994).

Sociologically, ageing can be studied at three levels (Turner 1995): at the level of the individual ageing experience, at the cultural level where social roles or norms are in focus, and finally, at the societal level where the political economy of ageing is the key issue. These levels are interrelated and indeed, one way of defining ageing is manifested through the tension between the individual’s capacity to make and re-make themselves and to resist the demands of social structure, and the ageing body (Hockey et al. 2003). In Turners words: “the crucial sociological issue in the ageing process is the contradictory relationship between the subjective sense of inner youthfulness and the exterior process of biological ageing”. In addition, individual ageing takes place within a generational or cohort context: certain generations may have collective memories which are different from other generations. (Turner 1995). Thus, chronological age alone does not determine ageing. An essential part of ageing research is the so called Age-Period-Cohort phenomenon (APC), which means that, besides age itself, age-related differences may be caused by the generation the person belongs to, or by the historical point in time and it is often difficult to distinguish these effects from each other. (Diggle et al. 1994).

A research tradition regarding successful, healthy or positive ageing is emerging in social gerontology. The goal of all these approaches has been to find the “best” pathway to the well-being of the elderly. These approaches emphasise various issues: healthy ageing focuses on the maintenance of health mainly through lifestyle choices, successful ageing strives toward personal well-being, autonomy and psychological adjustment, and the positive ageing approach aims to counter the negative aspects of ageing. (Davey 2002).

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All these theories have been criticized for the fact that they place responsibility on the individual and that they disregard the influence of structural and social factors (i.e. race, gender and class) (Estes 2001).

More recently, WHO introduced an active ageing paradigm (2002). The key goals in this approach were to maintain autonomy and independence. Autonomy is conceptualized as the perceived ability to control, cope with and make personal decisions about how one lives on a day-to-day basis, and independence in turn refers to the ability to perform basic daily functions. In this approach, the term “activity” refers to active involvement in various cultural and social affairs including physical activities (WHO 2002).

### Well-being

Even though the term well-being is used commonly in many areas of research, its meaning has been obscure. In its widest sense well-being may denote the whole universe of human life, including the physical, mental and social aspects which all form the so called “good life” (WHO 2002). The theory of “good life” is a philosophical one and dates back to ancient Greek philosophy. The concept of well-being has been approached from at least two points of view. It may be based on basic human needs, like Maslow’s (1970) well-known theory of the hierarchy of needs which states that well-being is based on fulfilment of physiological, social and psychical needs. More recently, Doyal and Gough (1991) classified needs as basic needs (physical health and autonomy) and intermediate needs (i.e. nutrition, protective housing etc.) which are essential to the satisfaction of basic needs. The resource approach, on the other hand, looks at well-being from the perspective of capacities and activities. The components of welfare, such as health or functional capacity, are not independent of each other but can also be considered as means of attaining another. (Karisto 1984).

Erik Allardt’s famous theory of well-being combines the need and the resource approaches. He introduced three key concepts of well-being: having, loving and being. Having refers to the standard of living and is close to the resource approach. Loving refers to togetherness and the sense of community, and being to the need for a social identity. (Allardt 1999). The indicators of well-being may be classified as objective or subjective, and Allardt (1996) has stressed that the above-mentioned clusters of components of well-being may be approached from both views:

	Subjective	Objective
Having	(Dis)satisfaction with living standards	Income level, health, employment etc.
Loving	Feelings of happiness or unhappiness	Number of friends, contacts etc.
Being	Experiences of alienation and self-actualization	Political activity, hobbies, invaluableity at work etc.

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Bradburn (1969) suggested that subjective well-being should have independent dimensions of both positive and negative affects and his view has formed the basis of more recent definitions even though general life satisfaction has also been included (Keyes et al. 2002; Kashdan 2004). There are also wider approaches to subjective well-being including concepts such as self-esteem or control over one's own life (Ervasti 2002; Goul Andersen 2002). These concepts are essential components of psychological well-being which, while related to subjective well-being, is nevertheless distinct from it (Keyes et al. 2002; Bowling 2005). For the purpose of this study, components of each Allardt's clusters above, were chosen and well-being (or welfare) is approached from four points of view: health, functional capacity, subjective well-being, and lifestyle: all of which offer a different angle to this multi-faceted concept.

### **Health**

Health is also a complex concept in itself and has been defined from many points of view. Good health is not merely an absence of disease. At the very least, health reflects the ability to cope with everyday activities in spite of diseases, and in its widest sense it denotes overall psychosocial well-being and morale. (Blaxter 2004; Blaxter 1990; Bowling 2005). Thus there is no single definition of health, and besides objective conditions, health is also based on the subjective experiences and concerns of everyday life (Blaxter 2004). Not surprisingly, in some studies, individuals and groups of people have been asked how they understand or describe health themselves. These responses may be grouped into the following types: absence or presence of illnesses (health as being), absence or presence of the feeling of well-being (health as having), and ability to function (health as doing). (Herzlich 1973; Manderbacka 1998; Benyamini et al. 2003).

The above types of health are close to the biomedical, the psychological, and the social angle to health (e.g. Purola et al. 1974; Karisto 1984). The medical concept defines disease and illness as deviations from the norm, as measured by certain health indicators. These indicators include chemical or physical measures (e.g. serum cholesterol, blood pressure), psychological test results, or symptoms reported by the individual. An individual can be considered healthy if no deviation from the defined reference values can be detected. The psychological dimension on the other hand is defined as the perception of health and illness by the individual, that is, a person's own assessment of his or her health, psychosocial conditions, and symptoms (Albrecht et al. 1984; Blaxter 1990; Blaxter 2004). Finally, the social viewpoint states that health and disease are dependent on social surroundings. The concept of illness relates to the disturbance and functional limitations in the relationship between the individual and his or her social environment, caused by a medically defined disease (Albrecht et al. 1984; Purola 1972).

There have been attempts to unite these views into a "united health" concept. Purola (1974) provided one definition when he stated that health is a balance between an individ-

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ual's psycho-physical systems and the social world, and that its three dimensions - medical, psychological and social - build a dynamic system. Health is not merely absence of disease, but a dynamic and harmonious balance between the individual's psycho-physical surroundings, the natural environment, and the social network. Disease and illness are characterized by disturbances in these relations. (Bäckman 1984; Söderqvist et al. 1988).

In many studies on health, self-rated health has often been the main focus of interest (Barsky et al. 1992; Jylhä et al. 1992; Suominen 1993; Macran et al. 1994). Self-rated health includes all sensations, experiences, observations and insights that are associated with subjective health. Self-rated health is recognized by a general self-assessment of health, the experienced symptoms, and functional capacity. (Jylhä 1985; Blaxter 1990).

In the present study, the concept of health was mainly approached from the perspective of limiting longstanding illnesses and self-rated health. The presence of diseases is also included.

### **Lifestyle**

There are also many approaches to lifestyle. A narrow definition restricts lifestyle to health-related aspects: A healthy lifestyle means simply avoiding unnecessary risks such as too little physical exercise, excessive use of alcohol, raised blood pressure, increased levels of cholesterol, obesity and smoking (WHO 1991). A healthy lifestyle is thus some sort of balance between all the health-related choices that a person makes (Lyons et al. 2000). These factors, which could also be called living habits or health behaviour, lead to a healthier and, possibly, longer life.

The broader definition of lifestyle is concerned with the whole way of life; it is an entity describing the totality of everyday life (Roos 1981). The way of life reflects certain characteristics of society, for example a Finnish way of life, or it may have group-level connections to social classes, generation and communities (Pohjola 1990). A related concept is Pierre Bourdieu's (1984) "habitus", mediating between structures of society and a person's interpretation of these structures. Habitus encompasses both the cultural style of a class, gender, age group, etc. and an individual's way of comprehending and relating to these features. (Lööv et al. 1990).

A third concept of lifestyle can be placed between the two definitions already given. According to this perspective, individual lifestyles are patterns of the (behavioural) choices people have made which have been constructed according to socioeconomic circumstances and the choices available (Milio 1981; Blaxter 1990; Blaxter 2004). Thomas Abel and his colleagues (Abel 1991; Abel et al. 1993; Cockerham et al. 1993) were inspired by Max Weber's distinction between *Lebensführung* (life conduct) and *Lebenschancen* (life chances). They created the following definition: healthy lifestyles comprise patterns of health-related behaviour, values, and attitudes adapted by groups of persons in response

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to their social, cultural and economic environment (Abel 1991). This definition covers the following two areas: structural conditions (life chances), which include such factors as income and education (also called resources) and personal choices (life conduct), or living habits. According to Pohjolainen (1990), various definitions of lifestyle may be understood hierarchically: the widest is the sociological way of life and, the narrowest is medical or epidemiological concept of health behaviour. Lifestyle as a social gerontological concept lies between these two. The perspective adopted in this thesis mainly follows the third definition of lifestyle, even though behaviour is not restricted to health related activities, and includes involvements in all kinds of leisure and social activities (Veil 2000).

### **Functional capacity**

Social gerontology has a long research tradition concerning the questions of functioning, functional capacity, functional ability, or functional status (Jylhä et al. 1992; Feskens et al. 1993; Heikkinen et al. 1993; Steinhagen-Thiessen et al. 1993). These concepts are quite similar to each other, and have usually also been approached from the physical, mental, and social point of view. They can be divided further into more specific domains e.g., physical capacity into cardio respiratory and musculoskeletal capacity, and mental capacity into memory and perceptual capacity. These aspects have mainly been studied through various performance tests or questionnaires. (Nygård et al. 1991).

In a specific sense, functional capacity may mean a person's ability to perform the activities of daily living, usually measured by so-called ADL or IADL measures, and in its widest definition it may correspond to health status or quality of life. (Heikkinen 1995; Wang 2004). Among the holistic definitions is the recent WHO classification of functional capacity, disability and health, where functioning is defined as an umbrella term covering the dimensions of bodily functions (physiological functions), body structures (anatomical parts), activities (tasks or actions) and participation (involvement in life situations). It denotes the positive aspects of the interaction between individuals and environmental factors. (WHO 2001).

A more compact definition of functional capacity is offered by Wang (2004) when speaking of "activities performed by an individual to realize needs of daily living in many aspects of life including physical, psychological, social, spiritual, intellectual, and roles". There has also been criticism about the way in which functional capacity is used merely as a measurable characteristic, without considering the context in which functional capacities are used. Jyrkämä (2004) makes a distinction between potential and actual functional capacity. Actual functional capacity can be seen as "performance" composed of an interaction between being able (skills, information), being capable (physical, mental, bodily capacities), wanting (motivation, focus), and being obliged (constraints and possibilities caused by the context).

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In this study, functional capacity is used to denote a person's self-assessment of his or her functional capacities. It was defined as a person's ability to perform domestic and self-care activities free of physically-related limitations (Bowling 2005). The emphasis then, is on perceived capacity, not on performance tests or laboratory measurements.

## 2. AGEING, RETIREMENT AND WELL-BEING

### 2.1. Retirement transition

The end of a work career which has lasted for many decades and transition to retirement is undoubtedly one of the major events in a person's life. Since Freud, different stages of life and transitions have been central in many theories, for instance Erikson's (1982) eight stage life cycle or Levinson's (1979) seasons of life. Even though the focus in these theories was on youth and early adulthood the importance of late middle age was also acknowledged; Levinson's late adulthood transition stage for instance, corresponds to the period of retirement in a person's life (Levinson 1979).

Retirement may be roughly divided into "normal" retirement (based on age) and early retirement. In most Western countries there are institutional settings which make various forms of early exit, or pathways (unemployment pathway, disability pathway, voluntary pathway and gradual retirement pathway) possible. (Guillemard et al. 1991; Kohli et al. 1991).

In literature, there has been discussion about two types of factors contributing to the transition to early retirement (Kohli et al. 1991). There are push factors which induce people towards early exit; for example, poor health, changing work and work organization, and being tired of working. On the other hand, there are pull factors which increase employees' interest in early retirement. Among these are for instance, having more time for hobbies and the desire to spend more time with a spouse who has already retired. (Beehr et al. 2000; Hansson et al. 1997; Schultz et al. 1998).

There is a multitude of studies investigating the reasons for early retirement. Of many factors, self-rated health has proven to be an important predictor of early retirement (Karpansalo et al 2004; Månsson et al. 2001). Perceived health is also associated with intentions of retiring early (Harkonmäki et al. 2006; Huuhtanen et al. 1999). Work-related factors, for instance the physical and psychosocial work environment (Lund et al. 2001; Tuomi et al. 2001; Tuomi et al. 1991) and control over one's work (Krokstad et al. 2002) have also been associated with early exit from work life.

Retirement transition has been studied quite extensively in the last two or three decades, and the main interest has been in what, if any, changes in lifestyle are necessary or important in order to retain life satisfaction or general well-being. The question of successful ageing has been approached by three classical theories of social gerontology - the disengagement theory (Cumming et al. 1961), activity theory (Maddox et al. 1962) and continuity theory (Neugarten et al. 1968; Howe 1987; Dreyer 1989; Atchley 2000). Now it seems evident, that while all of these theories bear some seeds of truth, none of them encompass the whole truth, and that retirement is an individual process, which depends

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on many factors (personality, work history, sex, marital status, culture, education etc.), and which has different meanings to different people (Dreyer 1989; Pratt et al. 1994).

Some results have, however, been verified. First, the planning of retirement is important: if it is possible to get used to the idea of retirement in advance, both health and satisfaction are stronger compared to unscheduled retirement (Dorfman 1989; Dreyer 1989; Rosenkoetter et al. 2001; Nuttman-Schwartz 2004). Two other factors associated to the above are the timing of retirement and whether or not retirement happens voluntarily. There is evidence that if retirement occurs “on time”, say at the ages 62 - 65 years, there is less psychological distress (Bossé et al. 1987; Bossé et al. 1991; Dreyer 1989) than in those who retire “off-time”. This is the case especially in men. It is also true that if one is forced to retire, life satisfaction is lower (Dreyer 1989; Schultz et al. 1998).

According to research, the two most important factors predicting post-retirement life satisfaction are good health and financial security. (Dorfman 1989; Blaxter 1990; Pratt et al. 1994; Reitzes et al. 2004). When compared to those still at work, there is also evidence that retirement is beneficial for well-being and mental functioning (Drentea 2002; Mein et al. 2003). However, there are also results from extensive longitudinal studies that when pre-retirement health was controlled, no differences between the health and satisfaction of retirees and workers were found. (Pratt et al. 1994; Hansson et al. 1997). These contradictory results suggest that the relationship between retirement transition and health is still an open question and worthy of further study.

Retirement has also been studied as a process consisting of different phases. According to Atchley (2000) the initial honeymoon phase is followed by disengagement, then re-orientation, and finally mature retirement. Thériault (1994) describes three phases of psychosocial reactivity to retirement: the first phase is anxious in nature, the second brings about a decrease in culpability and the third is marked by improved functional capacity of the self. The first phase is thus described in opposing terms and it is evident, that the transition to retirement in particular is a stage which requires further study. What is common to both theories, however, is the idea of finally getting used or adjusted to retirement.

There is still one important fact, namely the role of society and social factors in retirement. This area has been studied by Phillipson (1987). He states that: “it is in the retirement transition that the individual calls upon the resources he or she has developed during the early and middle phases of the life course. In this sense the transition is not a movement from an old to a completely new life ... rather it is the final resolution of the advantages and disadvantages attached to given social and class positions.” Phillipson studied retirement transition in three different occupational groups, miners, car factory workers and architects. The retirement transition was easiest for the architects because they could redirect their skills (painting, carpentry, modelling) into the increased free time of the retirement period. For the car workers the situation was more problematic because the gap between work and retirement was large. For miners, the retirement transition was quite different:

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in the traditional mining community there is also a place for retirees, so the transition was not an individual burden, but merely a collective phenomenon. For the miners, retirement meant the consolidation of an existing level of activity, for the architects expansion and diversification of activity, and for many car workers, loss of activity. (Phillipson 1987).

### 2.2. Ageing and lifestyle

Most of the empirical research on lifestyle has studied aspects of a healthy lifestyle or health behaviour. The results clearly suggest the importance of physical exercise, moderate alcohol consumption, a low fat diet, and non-smoking in maintaining one's general functional capacity and ability to work, and possibilities to healthy or successful ageing (WHO 1991; Havemas-Nies et al. 2003; Peel et al. 2005).

According to recent survey studies there has been a positive trend in health behaviour among Finns and especially among the elderly (Helakorpi et al. 2005; Sulander 2005). Physical exercise in particular has become more and more common since the late 1970s (Prättälä et al. 1994; Aromaa et al. 2004).

Results from longitudinal studies show that involvement in activities decreases during ageing, at least among elderly people (Armstrong et al. 1998; Lampinen et al. 2000; Silverstein et al. 2002). The role of various activities in maintaining well-being has also proved to be important, and there is strong evidence that physical activity promotes mental well-being (Oman et al. 1999; Lampinen et al. 2002; Lampinen et al. 2003). Besides physical activity, different types of solitary, social, or productive activities have also been found to be crucial in many studies (Fratiglioni et al. 2004; Menec 2003; Singh-Manoux et al. 2003).

### 2.3. Ageing and health

Ageing is usually associated with an almost exponential increase of diseases and decrease in health. For instance, the Finnish Health 2000 study shows that the proportion of those Finns who have at least one chronic disease increases steadily from about 30% (30-44 years of age) to 66% (55-64 years old), to up to approximately 90% at 85+ years of age. In the same survey it was also found that health decreased as age increased: the proportion of those who reported poor or fairly poor health varied from 3% (30-44 year olds) to 15% (55-64 year olds) to as much as 45% (85+ year olds). (Aromaa et al. 2004).

Younger people may use different frames of reference when assessing their health compared with the older generation (Benyamini et al. 2003). Older people judge their health by functional capacity, younger males by physical fitness and younger females by energy and vitality (Blaxter 1990; Blaxter 2004).

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Even though age-related changes in health are clear in nationally based surveys, the results of some longitudinal studies of elderly people are not so simple (e.g. Jylhä et al. 1992; Heikkinen 1995; Leinonen et al. 1998). For instance, after retirement, diseases causing handicaps may remain at the same level for 10-15 years (Heikkinen 1995). Interestingly, persons aged over 70 perceived their health to be even better. According to Heikkinen (1993; 1995) ageing is associated with more diseases, but also with personal adjustment or successful coping mechanisms to deal with many symptoms. Similar results suggest that the relationship between the presence of diseases and health changes during ageing. In middle age, health parallels the presence of disease, whereas among younger and older people this relationship is distorted. This was also seen in older persons who assessed their health more positively than younger people (Blaxter 1990).

In the Finnish study (Jylhä et al. 1992), the prevalence of diseases and symptoms was higher and functional capacity lower in 80-89 year-old subjects than among those aged 60-69. However, the oldest persons perceived their health to be better than did the younger people. It would seem that within the concept of health there is more room for acceptance of diseases and symptoms and even for poorer functional capacity among the oldest age groups of subjects, meaning that the association between health and disability might become weaker with age (Jylhä et al. 1992; Hoeymans et al. 1997).

### **2.4. Ageing and functional capacity**

The most common result in the studies on the relationship between functional capacity and ageing is that functional capacity, or physical domain at least, decreases as people grow older (Kivinen et al. 1998; Fone et al. 2003; Heikkinen 1995; Lampinen 2004; Sulander 2005; Simons et al. 2000). There is, however, a clear birth cohort difference: younger generations have better functional capacity than older ones. For instance, the Finnish Health 2000 study shows that from 1980 to 2000 the functional capacity of the Finnish population improved markedly; for instance, the proportion of men and women over 65 who were able to walk half a kilometre increased from about 55% to 70% (Aromaa et al. 2004; Lampinen 2004). The same results have been found in other surveys made in Finland (Sulander 2005; Malmberg et al. 2002) and also in comparative international studies (Äijänseppä et al. 2005).

In addition to advancing age, good functional capacity is associated with many other factors, for instance with higher socio-economic status (Rautio et al. 2001; Rautio et al. 2005), and a higher level of education and healthy lifestyles (Heikkinen 1995). Based on a literature review, Stuck and associates (1999) concluded that heavy alcohol consumption, cognitive impairment, co morbidity, nutritional status, physical activity, health, smoking, and social activities all had an impact on functional capacity.

### **2.5. Well-being, functional capacity and activity**

There is a considerable amount of research on the relations between subjective well-being, activity, and functional capacity. The important role of physical exercise in maintaining well-being is reported in the literature (Boxtel et al. 1994; Gauvin et al. 1996; McAuley et al. 2000). Some studies have demonstrated that it is not only physical activity which contributes to well-being, but that activities of a social, productive or intellectual nature also have an important role (Burr et al. 2002; Cooper et al. 2002; Fisher et al. 1999; Herzog et al. 1991; Glass et al. 1995). In her recent longitudinal study of Canadian older adults, Menec (2003) found that the level of activity (including components of social, solitary, and productive activities) correlated positively with happiness, better functional capacity, and reduced mortality, but not however, with life satisfaction.

The basic idea behind this thesis is that well-being is a many-sided phenomenon which is composed of various interrelated factors. In the study, subjective well-being, an active lifestyle, functional capacity, and health are under focus. Depending on the scope of the definition of each of these concepts, all the other factors may be merged into one, i.e., a broad approach to health consists of functional capacity, healthy lifestyle, and mental well-being. In this study, however, these concepts are treated as separate views of general well-being.

## 3. OBJECTIVES OF STUDY AND STUDY DESIGN

As said previously, the aim of the present study is to examine how well-being; characterized as subjective well-being, functional capacity, health, and an active lifestyle change as individuals in different occupations grow older from middle-age to old age, and to determine what effect retirement transition has on these factors and on their relationships.

The specific aims of the study were as follows:

1. To study the changes in subjective well-being, functional capacity, health, and lifestyle during a 16-year period from 1981 to 1997 (Articles I-III, V).
2. To longitudinally examine the impact of occupation and retirement transition on functional capacity (Article III).
3. To examine the effects of work characteristics, activity, functional capacity and health on early retirement (Article IV).
4. To study the effects of functional capacity and activity level on subjective well-being after retirement (Article V)

The baseline information was collected when the participants were still occupationally active and had been working in the same job for about 20 years on average. The transition to retirement began after the first questionnaire survey and it was at its peak in 1989-1990. By 1997 over 95% of the respondents had retired. (Figure 3.1).

Thus, the participants were followed through three stages of their lives: the period of the last occupationally active years (working stage), the period of reaching the retirement age of the cohort (the transition stage), and finally the period of steady retirement (the pensioner stage). The study design is illustrated by Figure 3.2.

The longitudinal data of this study provides an excellent opportunity to study the changes in different areas during retirement transition and it is also possible to assess the factors which may be essential in determining the most important issues affecting the lengths of occupational careers. A longitudinal study, that is, a study design where individuals are measured repeatedly through time, gives us some possibilities to control the APC-problem mentioned earlier. With longitudinal study design it is possible to distinguish changes over time within individuals (ageing) from differences among people at the baseline (cohort effects) and from influences associated to with each period of time (period effect). (Diggle et al. 1994). It must be stressed, however, that the APC-problem cannot be solved completely and interpretation of longitudinal analyses depends also, for instance, on the data, the goals of the study, and the state of knowledge in the area (Shock et al. 1984).

### 3. OBJECTIVES OF STUDY AND STUDY DESIGN

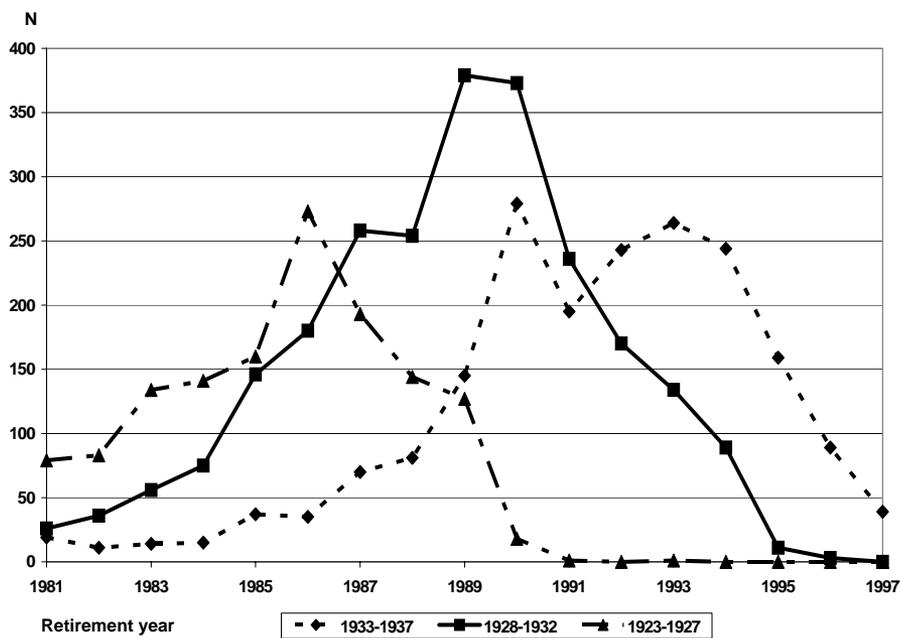


Figure 3.1. Number of retired employees in the three birth cohorts by retirement year.

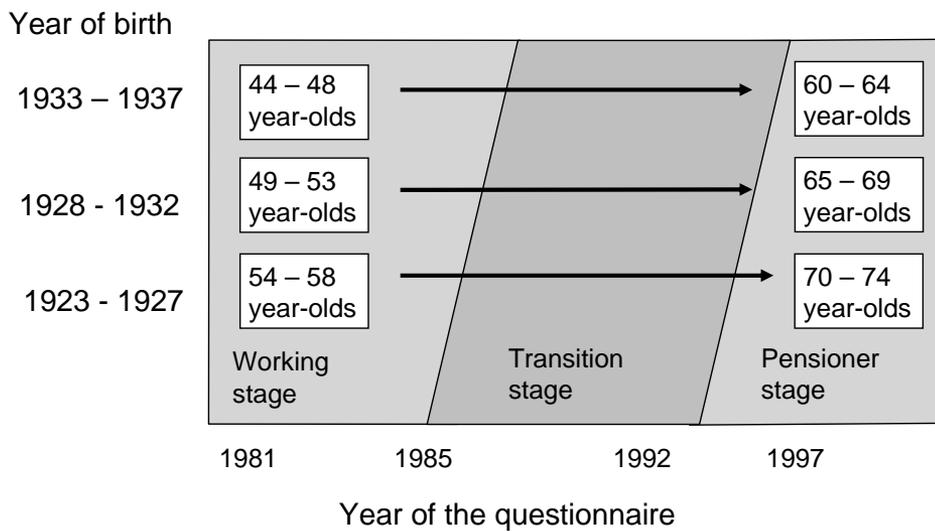


Figure 3.2. The study design

## 4. MATERIALS AND METHODS

The original aim of the whole research project on which this study is based, was to estimate and specify the bases on which the retirement of different occupations were determined. At that time, the retirement age in Finnish municipal occupations was job-dependent, ranging from 53 to 63 years and new criteria for retirement were needed. The study project was composed of questionnaires, clinical tests, and observations at workplaces and the measurements were extended to work demands and stressors, individual factors and characteristics, and indicators of strain. (Ilmarinen et al. 1991; Ilmarinen et al. 2004). After 1985, the scope of the study became wider and a more comprehensive view of ageing, health, work, and life-style was adopted in order to promote the work ability of older workers and, consequently, a satisfying third age (Tuomi et al. 1997a; Ilmarinen et al. 2004).

### 4.1. Study sample

The study sample is comprised of a follow-up questionnaire study of Finnish municipal workers which was conducted at the Finnish Institute of Occupational Health from 1981 to 1997 (Tuomi et al. 1985; Tuomi et al. 1997a). In 1981, a postal questionnaire was sent to 7344 municipal workers in different areas of Finland. The respondents were born between 1923 and 1937. All in all, the whole age range in this study was from 45 to 74

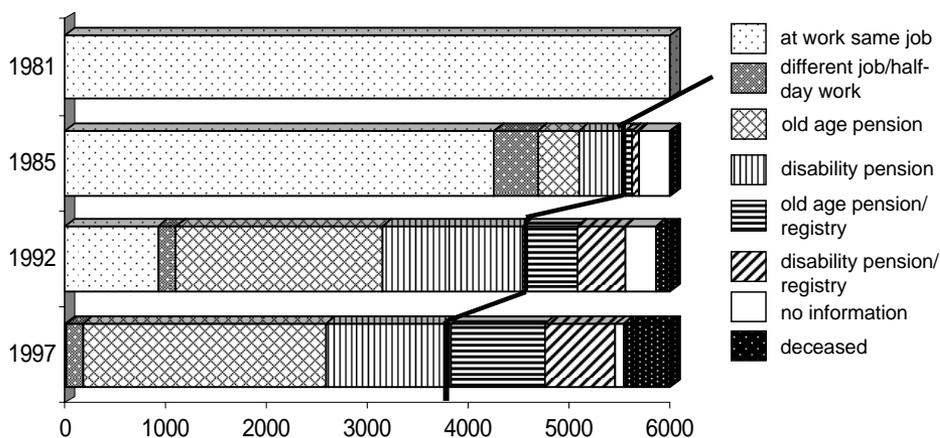


Figure 4.1.1. Study participants at different points in time. The black line differentiates those who responded to the questionnaires from the others

## 4. MATERIALS AND METHODS

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years of age. A total of 6257 persons responded to the first questionnaire (the response rate was 85.2 %). Even though the age range of the participants was small, it should be noted that dramatic differences in life course are possible, for instance the oldest respondents may have been in the war in 1939-1944. According to the information from the pension registry, 117 persons were receiving the Front Veteran's pension.

Over the follow-up, 715 persons deceased and 1725 did not complete the questionnaire at each of the points in time required. In the end, a total of 3815 persons had responded to all four (1981, 1985, 1992, 1997) cross-sectional questionnaires (the response rate was 69% of the living participants who responded to the first questionnaire). (Figure 4.1.1). Even though the number of those who returned the questionnaire decreased over time, it was possible to acquire more and more precise information about the retirement of the whole cohort from the registers and so, in 1997 only 83 persons were completely missing (Figure 4.1.1).

### 4.2. Study variables

#### Subjective well-being

The composite measure of subjective well-being was made up of positive affect and negative affect. It was based on mental symptoms and mental resource dimensions from the Occupational Stress Questionnaire (Elo et al. 1992). The six items included were as follows: "Have you recently been able to enjoy your regular daily activities?", "Have you recently been active and alert?", "Have you recently felt hopeful about the future?" (4=always, 3=rather often, 2=sometimes, 1=rather seldom, 0=never), "Are you strained?", "Are you nervous?" and "Are you depressed?" (4=never, 3=rather seldom, 2=sometimes, 1=rather often, 0=always). A summary score was created by calculating the sum of the items (see Table 4.3.1). The reliability index (Cronbach's Alpha) of the scale varied from 0.82 (1981) to 0.85 (1992). In addition, a question concerning satisfaction with one's life situation was included (1=very satisfied, 2=quite satisfied, 3=difficult to say, 4=quite dissatisfied, 5=very dissatisfied).

#### Functional capacity

The questionnaires from 1985, 1992 and 1997 covered various questions concerning the physical, mental and psycho-emotional domains of functional capacity. The physical and mental items had Likert-type scales (1-5 or 0-3) and the subjects estimated whether or not they had any difficulties in performing various tasks. The psycho-emotional items were also Likert-type by nature, but the questions covered the frequency of various symptoms (daily --- never).

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The dimensions of functional capacity were constructed by factor analysis. In Article III (capability study), a four-factor solution with oblique rotation was selected and standardized factor scores with a mean of zero and standard deviation of one were calculated (Table 1, Article III). The advantage of the use of this technique was that it allowed correlation between factors. The factor solution explained 58 % of the total variance of the variables. The factors, i.e. the dimensions of functional capacity were cognitive capacity, physical capacity, psycho-emotional capacity, and motor capacity. For the purposes of this study, a summative measure of functional capacity was also constructed by summing up all these four dimensions.

In the studies of early exit (Article IV) and subjective well-being (Article V), the measure of physical functioning was formed simply by adding the eleven items concerning coping with daily activities. All items were dichotomized (1 = no difficulties, 0 = at least some difficulties), and a summary score was created (range 0-10) (Study V; Table 1). The reliability index (Cronbach's  $\alpha$ ) of this scale varied between 0.91 to 0.92.

### Health

The measure of health was constructed from two questionnaire items: "Compared to your friends of the same age, is your health much better, slightly better, the same, slightly worse, or much worse?" and "To what extent do diseases hamper your everyday life: not at all, relatively little, to some extent, rather much, or very much?". The responses to these questions were combined as follows: Good health was reported by individuals who considered their health to be much better or slightly better than subjects of the same age and who in addition also stated that diseases did not affect their daily life or did so relatively little (group A, table 4.2.1). Very poor health was reported by individuals who considered their health as worse than subjects of the same age, and stated that diseases affected their daily life rather much or very much (group D, table 4.2.1). Moderate health was reported by individuals whose answers could be grouped into category B in table 4.2.1, and poor health was reported by individuals who described both variables as being neutral, and one of the answers being a negative assessment (group C, table 4.2.1). In the case of missing information this was replaced by the corresponding value of the other variable.

### Lifestyle

Different activities were included in the questionnaires in 1981, 1992 and 1997. The question was: "To what extent are you engaged in the following hobbies or activities?" (3= daily, 2 = once or twice a week, 1 = less frequently, 0 = not at all). The items covered physical exercise, handicrafts, studying, reading literature, and attending clubs and associations. For the activity items, a summary score was also created (table 4.3.1.). In addition, living habits were measured by brisk physical exercise (at least twice a week vs. less seldom) to-

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**Table 4.2.1. Construction of different health groups**

Assessment of health compared with that of others of the same age	To which extent do diseases hamper daily life				
	Not at all	Relatively little	To some extent	Rather much	Very much
Much better	A	A	B	B	B
Slightly better	A	A	B	B	B
Equal to age mates	B	B	C	C	C
Slightly worse	B	B	C	D	D
Much worse	B	B	C	D	D

Abbreviations: (A = good health, B = moderate health, C = poor health, D = very poor health)

bacco consumption (smokes vs. does not smoke) and alcohol consumption (some alcohol vs. no alcohol ever).

In the study of early retirement (Article IV), the composite measure of activity level was formed from the 1985 questionnaire items covering various hobbies (outdoor activities, needlework, handicrafts, studying, reading, arts, traveling etc) and social involvements (seeing friends). The question was “How much pleasure or satisfaction do the following activities add to your life?” (0 = Not at all, 1 = To some extent, 2 = Quite much, 3 = Very much).

### Quality and meaning of work

The summary measures of the quality of work and work organization were picked from the previous reports of the study group (Tuomi et al. 1997b; Tuomi et al. 2001). The measures included here were responsibility for others, satisfaction with the work hour system, and the possibility to develop and influence one’s own work . The meaningfulness of work from the 1981 questionnaire was measured with the following question: “How do you feel about the following things?” (1 = I fully agree, 2 = I almost certainly agree, 3 = difficult to say, 4 = I almost certainly disagree, 5 = I fully disagree). The items were: “My time would feel empty if I weren’t at work”, and “only someone who works can feel that he/she is useful” These two items were summed up to a measure of the personal value of work.

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### **Type of work**

In total, 133 different occupation titles were included in the study. These were first classified into 13 occupational groups. These analyses were carried out by observations at workplaces with a German “ergonomic job analysis procedure”, known as AET (“Arbeitswissenschaftliche Erhebungsverfahren zur Tätigkeitsanalyse”) which covers the physical, mental, environmental, and organizational aspects of work (Rohmert et al. 1983). As a result of the profile analysis, depending on the physical or mental demands of the occupation, three types of work groups, physically demanding, mentally demanding, and mixed (consisting of both physically and mentally demanding work) were constructed. (Ilmarinen et al. 1991). The physical type of work included job titles from auxiliary work, installation work, and home care work. The mixed work group consisted of transport work, dumping ground work, kitchen supervision, dental work, and nursing work. Mental type work covered office work, administrative work, technical supervision, physician’s work, and teaching work (Ilmarinen et al. 1991). Since this classification of job titles is based on the physical and mental load of each job, it does not correspond to the traditional division between blue-collar and white-collar work. Therefore, for the purpose of the capability study (Article III), two dummy variables, mental work vs. other types and physical work vs. other types were created.

### **Pension type**

Information regarding the different types of pensions was acquired from The Finnish Centre for Pensions. Besides normal old age pension and disability pension, other pathways to early exit, i.e. early old age, individual early retirement, part-time, and unemployment pensions were also acquired.

### **Other background information**

The spouse’s occupational status (retired/occupationally active) from the 1997 questionnaire was also requested. Gender and age were included in all analyses.

### **4.3. Loss of participants**

One of the major problems in longitudinal studies is the loss of subjects over the follow-up period. It is almost inevitable that subjects will be lost due to mortality, changing addresses, emigration, or simply because they get tired of responding to the questionnaires. In addition, there is also evidence that old age itself and cognitive impairment are important reasons for refusal (Chatfield et al. 2005). To clarify differences between the deceased

#### 4. MATERIALS AND METHODS

**Table 4.3.1. Baseline characteristics among participants in the follow-up, deceased and non-respondents**

Baseline characteristics (range)	Participants in the follow-up (n=3817) % or Mean (Std)	Deceased (n=715) % or Mean (Std)	Non-respondents (n=1725) % or Mean (Std)
Gender			
Men	40%	67%	46%
Women	60%	33%	54%
Type of work			
Physically demanding	36%	54%	51%
Physically and mentally demanding	32%	25%	30%
Mentally demanding	32%	21%	19%
Physical exercise, outdoor activities			
Daily	34%	27%	33%
Less frequently	66%	73%	66%
Reading literature			
Daily	37%	38%	32%
Less frequently	63%	62%	68%
Studying			
Once, twice a week	19%	3%	3%
Less frequently	81%	97%	97%
Attending clubs and associations			
Once, twice a week	23%	4%	2%
Less frequently	77%	96%	98%
Needlework, handicrafts			
Daily	29%	20%	26%
Less frequently	71%	80%	74%
Activity level (0 - 15)	7.02 (2.5)	5.95 (2.8)	6.03 (2.7)
Age (45 - 58 years)	50.1 (3.5)	51.8 (3.7)	50.6 (3.6)
Functional capacity (0 - 33) <sup>a</sup>	25.9 (6.0)	22.6 (7.6)	24.3 (7.0)
Morbidity (0-24 diseases)	2.5 (2.4)	3.2 (2.8)	2.7 (2.5)
Well-being (0 - 24)	14.8 (3.8)	13.8 (4.3)	14.2 (4.1)
Health			
Good	6%	6%	7%
Average	31%	21%	23%
Poor	50%	46%	50%
Very poor	13%	27%	21%

<sup>a</sup> from 1985

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(n=715), non-respondents (n=1735) and the follow-up cohort (n=3817), that is, those who responded to all four questionnaires in 1981, 1985, 1992 and 1997, some distributions of the baseline variables of these groups were calculated (Table 4.3.1.)

Among the follow-up participants (table 4.3.1), there were fewer men, less persons doing physical work and more doing mental work compared to those who were deceased and other drop-outs. The follow-up participants were also healthier, more active, and they had better functional capacity than the other participants. On average, those who died during the follow-up were about 1.5 years older than those that we followed until 1997. Furthermore, among the deceased, both functional capacity and well-being had been lower and co-morbidity higher than among the remaining participants. In addition, the deceased were found to have been the ones with the highest proportion of very poor baseline health.

### 4.4. Methods

There are several methods for studying changes across time periods with the help of longitudinal data. These include, for instance, tracking changes in prevalence or means of the dependent variables between periods of time, creating transition tables, cross-tabulating occasions (see Jylhä et al. 1992) according to the direction of changes of the phenomenon between baseline and endpoint (increased/decreased/same level), or comparing the differences between means. The use of these methods becomes complicated if there are more than two time points involved, thus for these purposes, it is best to apply general linear models with repeated measures. This technique makes it possible to include the values of the dependent and independent variables simultaneously from each time point into the analysis. In addition, these models allow the utilization of incomplete (missing) data and also provide ways to deal with the correlation of successive observations (Verbeke et al. 1997; Brown et al. 1999).

In the study of lifestyle (Article I), the results were based mainly on the comparison of frequency tables, and the significance of the lifestyle changes from 1981 to 1992 were tested with Pearson's chi-square statistic.

In the study of health (Article II), the changes in the prevalence of diseases and health were tested with Pearson's chi-square test. Both the improvement and decline in health between 1981 and 1997 were analysed using logistic regression models. The analyses were performed on two groups. The first comprised the persons who had good or average health at the baseline, and the focus was on explaining the decline in health. The second analysis was based on the comparison between those whose health remained poor during the follow-up period and those whose health had improved during this time.

The associations between well-being, functional capacity, health, activities, age, type of work, occupational status, and gender were assessed by general linear models with repeated

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measurements (Articles III and V). These likelihood based methods are valid under missing at random assumption when missing data might depend on observed data (Little et al. 1987). With this method it was possible to use all available data from each time point and there was no need to be restricted to the follow-up data only. In addition, in the study of capability (Article III) the fitted values of functional capacity were calculated for the ages of 50 and 55 years.

In the study of early retirement (Article IV), the effects of the activity level and functional status as well as other independent factors to early exit from work were estimated by logistic regression analysis.

Statistical analyses were performed with the SAS statistical package (Littell et al. 1996). In addition, the logistic regression analyses in the health study (Article II) were performed using the EGRET program by the Statistics and Epidemiology Research Corporation.

## 5. RESULTS

### 5.1. Ageing and lifestyle changes (Articles I & V)

Lifestyle was approached from two angles: health behavior (manifested as alcohol consumption, smoking, and physical exercise) and involvement in various activities (frequent interest in reading, studying, needlework or handicrafts, and attending clubs and associations). The prevalence of physical exercise increased in all birth cohorts over the time when the respondents passed from working life to retirement (Table 5.1.1). The proportion of those exercising briskly stabilized to the level of 50 % in all groups except in the oldest birth

**Table 5.1.1. Proportion of various health behaviours (%) at different stages (working, transition, pensioner) in 1981, 1992 and 1997 according to gender and year of birth.**

Stage	Year of birth					
	1933 - 1937		1928 - 1933		1923 - 1927	
	Women	Men	Women	Men	Women	Men
Exercising briskly, at least twice a week						
working (1981)	33	33	31	30	32	24
transition (1992)	50	45	56	50	55	53
pensioner (1997)	52	45	50	46	41	39
	***	***	***	***	***	***
No alcohol use						
working (1981)	34	13	47	11	54	12
transition (1992)	23	14	30	14	36	14
pensioner (1997)	29	16	38	18	43	18
	***	n.s.	***	**	***	n.s.
Smoking						
working (1981)	8	19	10	23	8	22
transition (1992)	11	23	11	24	8	19
pensioner (1997)	6	14	5	14	6	9
	**	***	***	***	n.s.	***
N	884	548	924	657	477	327

\*:  $p < 0.05$ ; \*\*:  $p < 0.01$ ; \*\*\*  $p < 0.001$ ; n.s. not significant

## 5. RESULTS

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cohorts. Physical activity decreased during the retirement years among the oldest people in this study (69 - 74 years of age). The proportion of men who did not use alcohol at all was quite stable over the follow-up time. The alcohol consumption of women, on the other hand, increased as the respondents passed from work to retirement. However, the proportion of women who did not use alcohol at all increased thereafter. The proportion of men who smoked remained around 20% and that of women around 10% during the transition stage from working life to retirement. After that, however, the proportion of smokers gradually diminished, with the exception of the oldest female age cohort.

During the follow-up, the involvement in activities changed in many respects. (Table 5.1.2; Article V, Table 2). Daily reading was more common among women than among men. About half of the women continued daily reading throughout the follow-up period. The men's involvement in daily reading was quite stable (about one in four were daily readers) in all birth cohorts, and there were no major changes during the follow-up time.

Studying was common among women in their working and transition stages, but decreased thereafter, especially among men and among the oldest. Attending clubs and associations was most common among younger men at the working stage but after retirement, women's activity increased whereas among men interest in this kind of activity decreased. Needlework and handicrafts were most common among the oldest women. During the follow-up the prevalence of needlework decreased among women, but among men there was an increase in handicrafts, especially among the younger men (Table 5.1.2).

The above results of the well-being study (Article V) are based on the responses of the study participants who completed all questionnaires. In the study of lifestyle (Article I), the focus was on those who were active workers until 1992, i.e. to the transition stage. When comparing the involvements in various activities of these active workers (Table 3, Article I) to results of the whole follow-up cohort (Table 5.1.2.), some major differences appear among those in the middle birth cohort (in Article I those aged 49-51 years). Among working women there were less active readers (41% vs. 52%), attendance in clubs and associations was less (10% vs. 28%), there was less interest in needlework or handicrafts (21% vs. 41%), and more studying among men (17% vs. 13%). Among working men studying was more common (17% vs. 13%) than among men of the whole cohort. Physical exercise was also less frequent both among men (32% vs. 50%) and women (40% vs. 56%). (Table 3, Article 1; Table 5.1.2) It must be remembered, however that among working men, especially the proportion of those doing mental work was higher, 44% (Article I, Table 1) compared to 32% of the follow-up cohort (Table 4.2.1).

## 5. RESULTS

**Table 5.1.2. Involvement in activities (%) at different stages (working, transition, pensioner) in 1981, 1992 and 1997 according to gender and year of birth.**

Activity	Stage	Year of birth					
		1933 - 1937		1928 - 1933		1923 - 1927	
		Women	Men	Women	Men	Women	Men
Reading, daily							
	working (1981)	42	26	45	25	51	27
	transition (1992)	44	22	52	24	61	31
	pensioner (1997)	46	22	49	23	54	22
		n.s.	n.s.	**	n.s.	***	**
Studying, at least twice a week							
	working (1981)	21	21	21	17	16	17
	transition (1992)	21	18	23	13	23	12
	pensioner (1997)	18	12	17	9	12	10
		*	***	***	***	***	*
Attending clubs and associations, at least twice a week							
	working (1981)	22	26	19	25	24	22
	transition (1992)	21	18	28	19	38	24
	pensioner (1997)	29	21	32	21	37	25
		***	**	***	*	***	n.s.
Doing needlework or handicrafts, daily							
	working (1981)	39	10	43	8	46	6
	transition (1992)	29	9	41	9	41	12
	pensioner (1997)	32	16	36	14	35	9
		***	***	***	**	***	n.s.
	N	884	548	924	657	477	327

\*:  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ ; n.s. not significant

## 5.2. Ageing and changes in health (Article II)

The aim of the second study was to explore changes in health, manifested both as the number of chronic diseases and as the combination of health and limiting longstanding

## 5. RESULTS

**Table 5.2.1. Distribution of perceived health (%) at different stages (working, transition, pensioner) in 1981, 1992 and 1997, by gender**

Gender		Stage		
Health		Working	Transition	Pensioner
Men	N	1523	1428	1528
Good		5	18	21
Average		28	27	26
Poor		53	37	35
Very poor		14	18	17
			$p < 0.001$	
Women	N	2269	2169	2276
Good		6	19	22
Average		33	29	31
Poor		48	36	34
Very poor		13	16	13
			$p < 0.001$	

illnesses described in chapter 4.2.2. As the follow-up period in Article II was eleven years (1981 - 1992), additional analysis was performed to cover the whole follow-up period, from the working stage to the pensioner stage in 1997. Besides changes in health over time, the main tasks of the study covered the differences in perception of health between employed and retired persons, the associations between ageing, the prevalence of diseases and health, and factors which predicted good or poor health at the pensioner stage.

There was evident polarization in the changes of perceived health over the follow-up. As the participants passed from the working stage to the transition stage, the proportion of those who reported their health as good became four-fold, rising to over 20%. At the same time, the prevalence of very poor health also increased both among men and among women. From 1992 to the pensioner stage in 1997 the prevalence remained quite the same. (Table 5.2.1)

If we also analyze the birth cohort differences, some interesting points emerge, (Article II, Table 4; Figure 5.2.2). The increase in the proportion of very poor health as the participants passed from work to retirement was evident only in the youngest cohort. Furthermore, among the two younger cohorts; those born in 1933-1937 and 1928-1932, the proportion

## 5. RESULTS

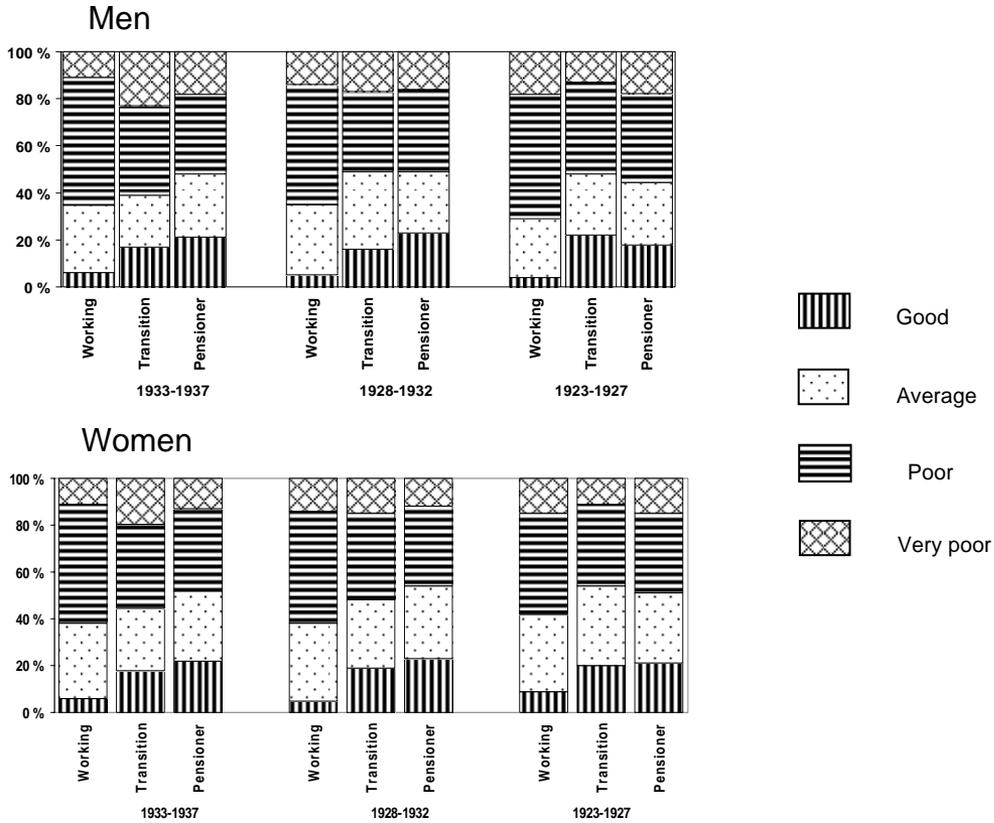


Figure 5.2.2. Distribution (%) of perceived health at different stages (working, transition, pensioner) in 1981, 1992 and 1997, by gender and by birth cohort. N=3815.

of good health also increased until the pensioner stage, whereas in the oldest cohort, this was not the case, and among men, this proportion decreased over the retirement years.

Type of work and occupational status both were associated to health (Study II, Table 5). It was perceived as best among those who were working in mentally demanding work. This tendency continued to the end of the follow-up, even when the participants had mainly retired. The highest proportion of very poor health was among those transferred to disability pension during the follow-up.

It is worth noting, that even if the proportion of good perceived health increased as the participants passed from work to retirement, the prevalence of cardiovascular, respira-

## 5. RESULTS

**Table 5.2.3. Prevalence (%) of the most common diseases at different stages (working, transition, pensioner) in 1981, 1992 and 1997 among men and women.**

Disease	Working		Transition		Pensioner	
	Men	Women	Men	Women	Men	Women
Musculoskeletal disease	34	37	49	53	42	51
Cardiovascular disease	19	15	35	27	48	41
Respiratory disease	9	10	13	13	14	14
Mental disorder	4	3	4	4	5	7
N	1523	2269	1428	2169	1528	2276

tory, and mental diseases increased over the whole 16-year follow-up (Table 5.2.3; Study II, Table 3). The prevalence of musculoskeletal disease followed a different pattern: after a strong increase from the working stage to the transition stage, it began to decrease, especially among men.

There was also a drop in the proportion of those who reported no diagnosed disease. Over the occupationally active years, the prevalence of “completely” healthy persons decreased with age, from 42% in the youngest cohort to 29% in the oldest cohort. At the transition stage the proportion of healthy subjects was below 20%, both among men and women and in all birth cohorts. As the participants reached the pensioner stage, there was only a slight drop in the prevalence of healthy subjects. Interestingly, birth cohort was no longer associated to the absence of disease. (Table 5.2.4.)

The final study question in the health study (Article II) was to determine how lifestyle, life satisfaction, and number of diseases while still working predicted an improvement or a decline in health at the transition stage (Study II, Tables 8 and 9). The strongest predictors of a decline in health were the number of diseases diagnosed by a physician (the odds ratio for three diseases vs. no diseases was 10.6), smoking, physically demanding work, and the presence of a cardiovascular disease (OR for each factor was 1.5). Brisk physical activity at least twice a week during leisure time prevented the decline in health to some extent (OR 0.8). In the second model, the focus was on the improvement of health. The

## 5. RESULTS

**Table 5.2.4. Proportion (%) of healthy (no diseases diagnosed by a physician) subjects at different stages (working, transition, pensioner) in 1981, 1992 and 1997, classed by gender and birth cohort.**

Gender		Stage		
Birth cohort		Working	Transition	Pensioner
Women				
	N			
1933-1937	884	42	17	15
1928-1932	924	37	18	15
1923-1927	477	29	17	12
Men				
	N			
1933-1937	548	42	16	13
1928-1932	657	36	16	15
1923-1927	327	33	14	13

predictors were mainly the same as in the previous model (the effects were, of course opposite). The assessment of one's life situation was an important predictor here: those who were not satisfied with their life situation showed only half the probability (OR 0.5) of improvement in health compared to satisfied persons. Also, inactivity and lack of hobbies hampered any improvement in health (OR 0.7).

In order to clarify the changes between the transition stage and the pensioner stage, an additional logistic regression analysis was carried out for those whose health improved over the follow-up in 1981-1992 and who also retained good health until 1997 (Table 5.2.5).

All factors which were statistically significant in the earlier models were included in the model described. According to this, satisfaction with life situation (OR 0.07) and lifestyle factors, especially physical exercise (OR 1.3) were still important predictors of good health. On the other hand, the impact of diseases on good health was slightly smaller than before even though cardiovascular disease (OR 0.64) or three or more diseases (OR 0.36) had a diminishing effect on health. Occupational history and interest in hobbies when still occupationally active were no longer important factors.

## 5. RESULTS

**Table 5.2.5. Logistic regression analysis explaining the stable good perceived health in 1992 - 1997, other factors adjusted (OR = odds ratio, 95% CI = 95 % confidence interval). Participants whose health improved from 1981 to 1992 and remained good since then (N=523).**

Variable	Stable good health 1992 - 97	
	OR	95% CI
in 1981		
Age, years	1.0	0.97 - 1.03
Satisfaction with life situation		
very or quite satisfied	1	
not satisfied, not dissatisfied	0.52	0.33 - 0.84
very or quite dissatisfied	0.07	0.01 - 0.49
Physical exercise		
once a week at most	1	
at least two times a week	1.31	1.07 - 1.59
Time for hobbies after working hours		
yes	1	
hard to say	0.71	0.48 - 1.04
no	1.07	0.84 - 1.36
Smoking		
does not smoke	1	
smokes	0.92	0.68 - 1.24
Musculoskeletal disease		
no	1	
yes	1.17	0.91 - 1.50
Cardiovascular disease		
no	1	
yes	0.64	0.50 - 0.83
Physical work		
no	1	
yes	0.89	0.72 - 1.10
Diseases diagnosed by a physician		
no diseases	1	
two diseases at most	0.80	0.61 - 1.05
three diseases or more	0.36	0.25 - 0.50

## 5. RESULTS

### 5.3. Changes in functional capacity and transition to retirement (Article III)

In the capability study (Article III), the focus was on the changes of functional capacity (a summary score of cognitive, physical, psycho-emotional, and motor functioning) over the follow-up from the working stage to the pensioner stage. The main aim of the study was to find out whether any differences exist in functional capacity between different types of work (mentally demanding, physically demanding), whether occupational status (at work, retired) had any relations to the level of functional capacity, and finally, what the role of ageing is in these changes.

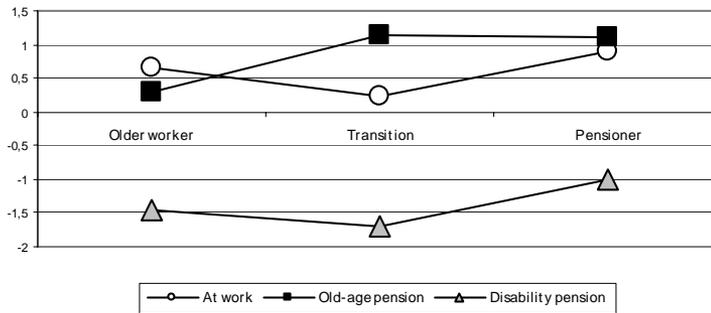
Over the follow-up, functional capacity decreased slightly from the working stage to the pensioner stage (Table 5.3.1.). The decrease was larger among men than among women, especially in cognitive, physical and motor functioning. Consequently, the decrease of total functional capacity was strong among men, and this drop also occurred at an earlier stage (the transition stage) than among women. At the end of the follow-up, at the pensioner stage, functional capacity was higher among women than among men.

The changes in functional capacity over time were also highly associated with occupational status (Figure 5.3.1.). From the transition stage onwards, there were outstanding changes in all occupational status groups. The previous decrease among occupationally active respondents and among disability pensioners had turned into an increase in functional capacity. The trend among the old-age pensioners was quite the opposite and at the final stage their level of functional capacity was somewhat lower than at the transition stage.

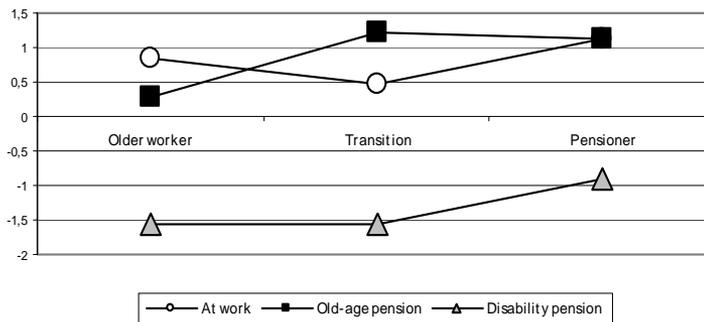
**Table 5.3.1. Mean level of the domains of functional capacity (factor scores) at different stages (working, transition, pensioner), in 1985, 1992, and 1997 according to gender.**

Domains of functional capacity	Men (n=1532)			Women (n=2285)		
	1985	1992	1997	1985	1992	1997
Cognitive	- 0.06	- 0.13	- 0.18	0.14	0.14	0.12
Physical	0.20	0.16	0.11	0.04	- 0.02	- 0.07
Psycho-emotional	0.06	0.05	0.04	0.00	0.02	- 0.03
Motor	0.01	- 0.09	- 0.14	0.07	0.11	0.09
Total functional capacity	0.22	- 0.01	- 0.17	0.25	0.24	0.11

## 5. RESULTS



### Men



### Women

Figure 5.3.1. Age adjusted mean functional capacity at different stages (older worker, transition, pensioner) in 1985, 1992, 1997 according to occupational status (at work, old-age pension, disability pension) in 1992, and gender. N=3817.

In order to clarify complex relations between functional capacity and work and retirement, the analysis of general linear models with repeated measurements were applied. The results of these analyses confirmed that type of work, age, and occupational status all were strongly associated to functional capacity (Article III, Table 3). To further clarify the dependencies between these factors, fitted values of functional capacity were calculated for two ages in 1985, those of 50 and 55 years (Figure 5.3.2).

According to the curves in the graphs, the great variation between occupational status groups decreased over the follow-up both in physical and in mental work. The reason for this was mainly a drop in functional capacity among the younger participants who were

## 5. RESULTS

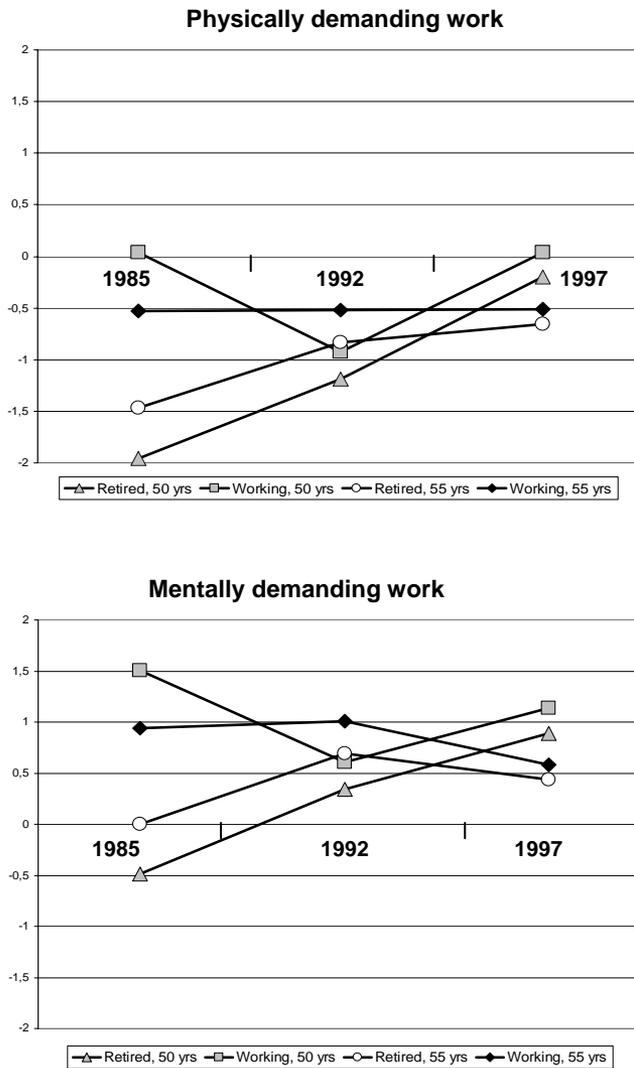


Figure 5.3.2. Fitted values of the general linear model of functional capacity calculated for ages 50 and 55 years. Estimated level of functional capacity at different stages in 1985 (working), 1992 (transition) and 1997 (pensioner) among different work type and occupational status groups. N= 2602.

## 5. RESULTS

at work in 1985 - 1992, and at the same time, an increase in the functional capacity of the younger retirees. From the transition stage onwards there was a clear age-related trend: the functional capacity of the younger increased, but in the older age groups there was a slight decrease, at least in those who used to do mentally demanding work when still occupationally active. Thus, the model suggests that the differences between the types of work will decrease as time goes on.

### 5.4. Activities, physical functioning, and early retirement ( Article IV)

So far, retirement has been treated mainly as a phenomenon explaining the various changes in functional capacity, health or lifestyle. In this chapter, the point of view is different: the main question was how the above factors and experiences of work promote or prevent the

**Table 5.4.1. Logistic regression analysis explaining early retirement in 1992-1997. Odd ratios (OR) and 95% confidence intervals (CI) of occupational factors, activity level, spouse's occupational status, meaning of work, and physical functioning. Disability pensioners excluded, N=2224.**

Factor 1981 - 1985	OR	95% CI
Female gender	0.60	0.48 - 0.75
Age (years)	0.72	0.69 - 0.75
Morbidity (number of diseases)	1.13	1.07 - 1.20
Type of work: Physical	0.46	0.35 - 0.61
Mixed	0.18	0.14 - 0.24
Mental	1	
Possibilities for development and influence at work	0.94	0.89 - 0.99
Responsibility for others	0.95	0.90 - 0.99
Satisfaction with the work time system	0.91	0.86 - 0.96
Meaning of work	0.95	0.90 - 0.99
Spouse's occupational status:		
Retired	1.46	1.17 - 1.83
Occupationally active	1	
Physical functioning	0.90	0.86 - 0.94
Activity level	0.89	0.83 - 0.96

## 5. RESULTS

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transition to early retirement. For the purpose of the early exit study (Article IV), those who had retired voluntarily (early old age pension or individual early retirement pension) were distinguished as a group of their own (n=653) which was compared to the old age retirees (n=1571). The differences of these two groups were then studied with logistic regression analysis. Also family income from the working stage was included in the analysis but its impact was not found to be significant, therefore this issue was excluded from the analysis.

The results of the logistic regression analysis (table 5.4.1; Article IV, Table 2) indicate that if the spouse of the respondent had already retired, the “risk” of early retirement was 1.5 times higher than among those whose spouses were still at work or who were living alone. Also, a higher number of diseases indicated a higher risk of early retirement.

All the other factors had a preventive impact on early exit from work: if one’s work was experienced as meaningful, if a person was able to influence and to develop oneself at work, if his or her work involved interaction with others and responsibility for others, and if he or she was satisfied with work hour arrangements, the risk of early retirement was lower than for the other employees. Furthermore, good physical functioning and involvement in activities both contributed to staying at work until normal retirement age. The low OR values for physical and mixed type of work in particular indicate that, compared to mental work, early retirement was less frequent in these occupational groups. It should be emphasized that in mixed work many occupational groups had a lower retirement age (i.e. nurses and bus drivers) and early exit was not an option.

### **5.5. Activity, functional capacity and well-being of the ageing (Article V)**

The study of subjective well-being (Article V) was concerned with the connection between activities, physical functioning, and general well-being. Its main objective was to find out longitudinally how manifold involvements in activities and physical functioning predicted subjective well-being. The specific study questions were: (i) How did the level of activity and physical functioning change during the 12-16 years of follow-up in different occupational groups? (ii) Were there any changes in the level of well-being in the occupational groups during the follow-up? and (iii) What was the role of activity in maintaining a person’s well-being, and how was physical functioning connected to this?

The level of activity was highest at the time of transition to retirement in 1992 (Article V, Table 3). This was true both among men and women, and in all occupational groups. There was also a clear trend in the changes of the level of activity during the follow-up (Article V, Table 3). After the occupationally active years, the level of activity increased in every group, but after the retirement transition, activity decreased and at the pensioner stage (1997), the level of activity was the same as at the baseline in 1981. At the endpoint,

## 5. RESULTS

**Table 5.5.1. The general linear model of well-being 1985-1997. Estimates and 95% confidence intervals (CI). N=6257.**

Factor	Estimate	Lower 95% CI	Upper 95% CI
Intercept	4.52	3.15	5.88
Activity level <sup>a</sup>	0.32 ***	0.24	0.39
Physical functioning	0.30 ***	0.28	0.32
Activity level x physical functioning <sup>b</sup>	- 0.01 ***	- 0.01	0
Stage: pensioner 1997	0.95 ***	0.44	1.46
transition 1992	0.41	- 0.05	0.87
working 1985	0		
Activity level x 1997	0.10 ***	0.06	0.14
Activity level x 1992	0.04 *	0	0.08
Physical functioning x 1997	- 0.05 ***	- 0.07	- 0.04
Physical functioning x 1992	- 0.02 **	- 0.04	- 0.01
Age	0.04 **	0.01	0.06
Gender: female	0.05	- 0.11	0.20
male	0		
Type of work: physically demanding	- 0.14	- 0.32	0.05
mixed work	- 0.02	- 0.22	0.17
mentally demanding	0		
Occupational status: disability pension	0.55 ***	0.38	0.73
old-age pension	0.65 ***	0.49	0.80
occupationally active	0		
Number of diagnosed diseases	- 0.13 ***	- 0.16	- 0.11

<sup>a</sup> Activity levels in 1981, 1992 and 1997

<sup>b</sup> x = interaction between variables.      \* : p < 0.05; \*\* : p < 0.01; \*\*\* : p < 0.001

women were more active than men. The change in physical functioning over the follow-up was quite the opposite: after transition to retirement, capacities decreased, but during the pensioner stage, the drop in physical functioning ended. This trend was not clear in mixed type of work. The changes in well-being over the follow-up were small but positive. (Article V, Table 3).

The final study question covered the role of activity in maintaining a person's well-being, and how the level of physical functioning might strengthen or weaken this relation-

## 5. RESULTS

ship. To solve the problem, general linear models with repeated measurements were used. The final model included stage (working, transition, pensioner), level of activity, physical functioning, occupational status (occupationally active, disability pension and old-age pension) and number of diseases at different time points. Age, gender and occupational history (physical, mental or mixed work categories) and all significant interactions were also included. The estimates in Table 5.5.1. show how much each factor contributes to the average level of well-being.

Activity level and physical functioning both had a strong positive effect on well-being ( $0.32^{***}$  and  $0.30^{***}$ , respectively). The significant negative interaction between physical functioning and activity level indicates that these factors depend inversely on each other, which means that an improvement in physical capacity would decrease the positive effect of activity, and vice versa. Furthermore, both activity level and physical functioning were dependent on time effect. These interactions are presented in Figure 5.5.1. In the case of activity level, the time-related impact was positive: if a person was able to maintain his or her activity level across time at the different stages, its impact on well-being would be increasingly important. The effect of physical functioning was quite the opposite, meaning that the role of physical functioning in maintaining well-being would decline across time.

There were some significant effects of background variables in well-being: co-morbidity had a negative effect on well-being; transition to retirement - due to either old age or disability - increased well-being. Age also had a positive effect. On the other hand, gender and the type of work did not have any effect on well-being during the follow-up period.

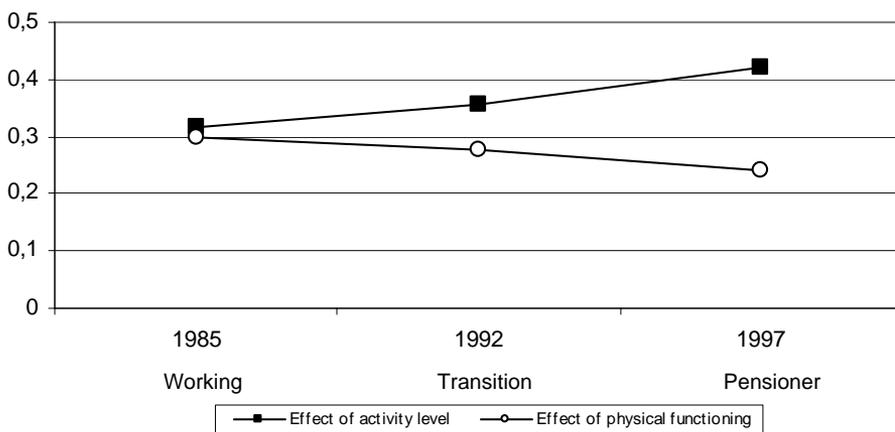


Figure 5.5.1. The estimated effects of activity level and physical functioning on well-being at different stages (working, transition, pensioner) in 1985, 1992, 1997.

# 6. DISCUSSION

## 6.1. Methodological considerations

### Participants of the study

The participants of this study were born between 1923 and 1937. This means that their childhood and youth was spent during a time when Finland was at war. Even though the oldest male participants were actually at the front line (about 2%), it can be said that on the whole they represent the generation, which Roos (1981) calls the generation of post-war reconstruction and economic rise. The participants spent their occupationally active years from the late 1940s to mid-1990s. At the baseline of this study, in 1981 they had been working about 20 years on average in the same occupation. At that time, work at the municipal sector was considered secure and most participants had stayed in the same job their whole working career. In the middle of the study period global economic recession also had a deep impact on Finland, including the municipal sector. But the major changes, retirement age adjustments, re-organizations in the municipal sector and high unemployment did not have time to influence the lives of the participants of this study as much as they did to the younger employees.

In the late 1980s, there were many occupations with a lower retirement age compared to the normal retirement age at that time (65 years). For instance, firemen (55 years), nurses (58 years), and bus drivers (55 years) were occupational groups which were well represented in this study. The pension reform of 1989 put an end to these lowered retirement ages. However, people who were in occupations with a lowered retirement ages, were still able to choose between the old and the new system. This transition period ended in 1994, but even after that, for those born before 1947, the retirement ages were not supposed to rise more than two years from the lowered age. (Blomster 2005). All these facts make this study group unique and the results of the study may not reflect current working life. Ageing, however is still an important issue and the mechanisms of ageing and age-related changes seen in the participants of this study are also relevant at this present time.

In this study, there were some major differences between the participants, the deceased, and those who did not respond to the questionnaires for some reason. The proportion of men and those who had been engaged in mainly physically demanding work decreased during the follow-up. While these changes should be borne in mind, there is no reason to believe that the differences had any impact on the relations between well-being, functional capacity and activities. Furthermore, at the baseline there were only minor differences in well-being, functional capacity, and involvements in activities between groups. Being aware of the above limitations, multivariate analyses were performed using a method (Little et al.

## 6. DISCUSSION

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1987) which allows the use of all available data at every time point. In this way we could minimize the possible bias caused by missing data.

### **Measures used and statistical methods**

The measure of functional capacity (the composite measure of physical, motoric, psycho-emotional, and cognitive functioning) was based on oblique factor analysis, a technique which allows factors to correlate. This means that the factors were not completely independent dimensions. Consequently, the level of the total functional capacity measure is not dependent on all domains of functional capacity, but some dimension may compensate the other.

The measure of health used in the study (own health compared to age counterparts, combined with the extent to which diseases hamper everyday life) differed from the commonly used single question where the respondents are asked to simply assess their health on a scale from “excellent” to “poor”. It has been suggested, however, that even when asked for their own assessments, people tend to compare their situation to that of others (Leinonen et al. 2001).

Two other methodological issues should be borne in mind. The first fact which needs consideration is the replacement of the 1985 activity measure with 1981 information in the multivariate analysis of well-being. This was necessary because the questions were different in 1985. This is not, however, a big source of bias since the time interval is only four years and the time period from 1981 to 1985 was still a steady occupationally active time for the respondents. The second methodological issue concerns the validity of the measures of well-being and functional capacity. The measure of well-being is based on two dimensions of the Occupational Stress Questionnaire which has been validated in clinical practice (Elo et al. 1992). The items of functional capacity were standard ADL- and IADL- questions, modified for middle-aged respondents, and which have proved their validity also elsewhere (Malmberg et al. 2002).

In this study, occupations were classified according to the German AET-method (Rohmert et al. 1983). This method is based on the physical, mental, environmental and organizational load of different jobs, and consequently, the three work type categories used in this study (physical, mixed, mental) did not exactly follow socio-economic classifications. The mixed type in particular included jobs which are normally classified as blue-collar work (e.g. dumping ground work) and white-collar work (e.g. dentist). However, the number of participants in these jobs was small and their effect on the results was only marginal. Another peculiarity in the mixed group was the gender segregation of the jobs: all drivers were men and all nurses were women, and these two occupations formed 80 % of all occupations in the group. This is the reason for the large gender differences in activities among persons in mixed work.

## 6. DISCUSSION

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The statistical method used in this study (general model with repeated measures) made it possible to include all the variations in the independent and dependent factors at each period of time (Diggle et al. 1994) in the analysis. This technique gives more accurate information regarding the relations between dependent and independent factors than a typical study setting where the endpoint situation is explained by the baseline situation, and the changes in variables between the follow-up periods are lost. One disadvantage of this method is that the models often become complicated and thus difficult to interpret.

### **6.2. Changes in well-being during the follow-up**

One main aim of this study was to examine the changes in well-being over a 16-year period from occupationally active years to retirement. The results confirmed that the transition from older worker to pensioner is indeed accompanied with many changes associated to well-being.

#### **Lifestyle changes among ageing workers**

The results of the study suggest that in general, involvement in various activities remained quite stable over the follow-up with a slight drop at the time of retirement transition. Studying was the exception: the prevalence of frequent involvement in studying decreased steadily over the whole follow-up period. Also health behaviour was quite unchanged. Among women, there was some increase in alcohol use from 1981 to 1992, but after this the proportion of women who consumed no alcohol at all increased. On the other hand, physical exercise increased strongly, among both men and women. The positive trend in health behaviour is in accordance with many Finnish health survey studies (Helakorpi et al. 2005; Sulander 2005). Physical exercise in particular became more and more popular among Finns from the late 1970s (Prättälä et al. 1994; Aromaa et al. 2004), and thus the huge increase in physical activity during the follow-up may also be explained by this increase on the national level, indicating that period effect is involved.

There were some major differences in the interest in activities between the lifestyle study and the well-being study. It seems quite obvious that the difference is based on the subjects of the two studies: in the lifestyle study, all the participants were occupationally active up to 1992 but in the well-being study, the respondents who had already retired were also included. The drop in activities from occupationally active years to the transition stage in the lifestyle study may indicate an increasing conflict between a person's capacities and the demands of work during the last years of a work career.

The increase in activity level after a work career indicates that when people retire they usually try out some new activities. The decrease in activities which followed the transition period indicates that in the long run, the level of activity might diminish to its previous

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level. This is in concordance with Kelly's (1987) idea that the most valued personal activities are acquired during one's life course, and are usually long-standing. Thus permanent changes do not happen easily. On the other hand, it is possible that the whole idea of the active third age when people are finally free to express themselves and do whatever they like (Laslett 1989), creates pressure to take part in this new lifestyle.

### **Health and ageing**

Our study indicated that perceived health improved strongly from the working stage to the transition stage. The highest prevalence of good health (the composed measure of limiting longstanding illness and self-rated health) was among those who used to do mentally demanding work and who retired due to old age. The lowest prevalence was among those who retired due to disability, especially from physically demanding or mixed work. On the other hand, morbidity increased during the follow-up: the prevalence of cardiovascular, musculoskeletal, respiratory, and mental diseases increased from the baseline up to the pensioner stage. The strongest increase was in the case of cardiovascular diseases among men. These findings indicate that the occurrence of diseases and perceived health might be uncorrelated. There is similar evidence from research and, in addition, the relation between these two domains of health might decrease with advancing age (Pinquart 2001). It has also been suggested (Hoeymans et al. 1997) that at an older age, people may just change their conceptualization of health from a physical status to a more personal or socially orientated one. All these facts suggest that health is indeed a multidimensional concept including medical, psychological and social dimensions (Purola et al. 1974).

The strong increase in the proportion of those who reported good health during the follow-up is more difficult to explain, since no similar results were found in the literature. One possible explanation is the time when the improvement of health occurred, namely at the transition stage when the majority of the participants had retired and thus the improvement may be an indication of the end of the demands caused by working life. This is certainly the case among those who experienced an early exit from work. For instance, Saurama's (2004) study indicates that for them, early exit was a release from straining work or decreased personal resources. For those who managed to continue up till old age pension, an additional explanation is that they consider themselves lucky to "survive" over the retirement years and they compare themselves to those who became ill or disabled.

### **Functional capacity and ageing**

Our findings demonstrated that functional capacity changed in many respects over the follow-up period. Total functional capacity decreased more among men than among women. Among men, the main changes were in cognitive and motoric domains, whereas among

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women there was only a minor decrease in physical and psycho-emotional dimensions. The results of the general linear model confirmed that the type of work, age, and occupational status had the biggest impact on functional capacity. It is evident that occupation and the type of work affect well-being even after retirement. The level of functional capacity in particular was higher in those who used to be in mentally demanding work. These results are in concordance with other studies (Rautio et al. 2001; Rautio et al. 2005). Fortunately, our results also indicate that differences in functional capacity caused by occupational history might decrease over time.

The changes in functional capacity over the follow-up were clearly not as negative as would be expected from previous research on ageing (Savinainen 2004; Sulander 2005). The decrease in functional capacity from the working stage to retirement transition may reflect the increasing conflict between the requirements of work and the functional capacities of ageing workers (Ilmarinen 2001). Likewise, the improvement in functional capacity after the transition stage could reflect the impact of retirement. A similar result was found also in another Finnish study by Malmberg and associates (2002). In their follow-up study from 1981 to 1996, the age group of 44-48 years (in 1981) showed the strongest increase in disability over a ten-year follow-up, but during the following years, the increase in disabilities stopped, or, as in the case of inability to walk 2 kilometres, the proportion of disabled decreased.

Decreasing physical functioning is evident as a person grows older. This has been an almost trivial result in gerontological research, and the results of this study are in accordance with them. However, changes in the other domains of functional capacity were not self-evident. The results indicated that women retained their functional capacity over the follow-up but among men, functional capacity decreased between 1985 and 1997.

### **Subjective well-being and ageing**

Subjective well-being remained stable over the follow-up. This finding is not completely concordant with studies indicating the positive impact of retirement on well-being (Drentea 2002; Mein et al. 2003). Involvement in activities and physical functioning both had a positive effect on well-being. These findings corroborate the activity theory of ageing (e.g. Lemon et al. 1972) and the results of recent longitudinal studies (Menec 2003; Lampinen 2004). The diverging time effects of these factors on well-being add an interesting dimension to this discussion. While the importance of activities became stronger as time passed, the effect of physical functioning steadily lost its significance as a contributor to well-being. This connection may mean that well-being is not necessarily completely tied to good physical functioning, at least not in the case of “younger elderly” people.

The results of the general linear model also suggest that activity level and functioning have complementary effects on well-being. The weakening of functioning may be

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compensated by increasing activities, and vice versa. These findings are in concordance with research on age-related changes and personal ways of coping with these changes, for instance the theories of selective optimisation with compensation (SOC) (Baltes et al. 1990), resilience (Staudinger et al. 1993) or replacing lost activities (Duke et al. 2002). In the case of decreasing functional capacity a person may be forced to develop compensatory capacities, or to drop activities which are too demanding and to select more appropriate ones which are compatible to their reduced capacities. The question is how to maximise gains and minimise losses. (Baltes et al. 1990; Wiese et al. 2002).

The capability approach of Amartya Sen (1993;1997) offers another interesting view to this discussion, that is, the importance of personal values. The main focus in the capability approach is on the ability to live a valued life and make such choices that contribute toward this goal. The most important functions are ones which are essential to a person for carrying out the activities that are most valuable to him or her. (Sen 1993; 1997) Thus, in the case of weakening functional capacity, a re-orientation of valued activities might contribute to maintaining well-being.

### 6.3. The question of early retirement

The results of the early exit study suggested that early retirement had multiple causes and besides health and physical functioning, the quality of work at the working stage had an important preventive impact on the early retirement process twelve to sixteen years later. Involvement in activities also had a preventive effect on early retirement.

The results of this study confirm the idea of the push factors (Kohli et al. 1991): occupational factors have an important role in the early retirement process. Work should also be meaningful for ageing employees, with opportunities to influence one's work and to develop oneself. Interestingly, involvements in various activities were also important in preventing too early transition. This result contrasted with the pull factor view of retirement which states that the desire to do new activities may be one reason to retire (Schultz et al. 1998). It is obvious that when still occupationally active, employees may have ideas about activities they can begin after retirement, but when the time comes, involvement in new activities is no longer important. Similar results have been found elsewhere also (Behr et al. 2000).

### 6.4. The effect of ageing

The results of this study suggest that the effects of ageing are not as simple as is often expected. The many-sided mechanisms of ageing, that is, increasing variability between individuals with regard to age, multidirectionality of change, the contextualization of social

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processes, and potential for plasticity, i.e. potential for different developmental paths than those exhibited at present, (Fozard et al. 1993; Pratt et al. 1994), were all obvious among the participants of this study.

The importance of various activities and functional capacity in well-being changed as people grew older. This may mean that functional capacity is not the only mediator of well-being among the elderly. In gerontological research, difficulties in walking (denoted as mobility) have often been considered a key issue in maintaining well-being (e.g. Lampinen 2004). It is reasonable to assume that the ability to walk is a pre-requisite for many activities but there are also hobbies and activities which don't presume good locomotion. There is criticism against the emphasis of physical independency in maintaining well-being. Kenneth and Mary Gergen (2000) speak of the "Dark Ages of ageing" by which they mean excessive emphasis on the individualistic tradition and tendency to equate personal worth with productivity in determining the well-being of the elderly. The Gergens (2002) also introduce the idea of positive ageing where the focus is - instead of finding predictors of successful ageing or fixing the universal truths about ageing - on how physical health, emotional well-being, active engagement in life and meaningful relationships all reinforce each other and contribute to positive ageing.

The age-related changes in functional capacity, health and activities were not always decreasing. Changes did happen in both directions (for better or for worse). The association between perceived health and morbidity gets weaker while ageing. This indicates that the health of ageing people is not completely dependent on the number of various diseases that are almost inevitable later in life. People are not completely "prisoners" of their weakening bodies. Instead, there seems to be a massive change in the reference level, people just have to adjust to changing situations. There are many concepts which try to illustrate this phenomenon, e.g. gerotranscendence, introduced by Lars Tornstam (1997), or selective optimization with compensation (Baltes et al.1990).

Various losses are an inevitable part of life but people seem to be more adaptable to changes than is often thought. Human ability to take things as they come - whether we call it resilience (Brandtstädter et al. 1994), gerotranscendence, or selective optimization with compensation (Baltes et al.1990) - may be the key element in the process which we call successful ageing.

### **6.5. Implications for actual discussion on the lengthening of working careers**

The results of this study confirmed that meaningful work, good functional capacity, and interest in various free time activities all acted as buffers against early exit from work life. The fact that the personal experiences of the meaning of work and occupational factors

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had an effect on transition to retirement even after 16 years should once again remind us of the importance of work characteristics.

The meaning of free time activities in maintaining well-being strengthened whereas the role of functional capacity decreased as the study participants passed from the last occupationally active years to retirement. Various activities at the workplace or with colleagues could be the bait which might encourage older workers to continue in their work even in jobs which are strenuous, heavy, and less meaningful.

The passage from work to retirement had a positive impact on health and functional capacity. It is apparent that sometimes work was experienced as too strenuous and the transition to retirement brought longed for relief. On the other hand, the question may be about survival; for many it is important to retire while still healthy, and retirement transition might have been the time to re-estimate one's resources. The study results support the view that it should be possible to ease working pace at the working stage. This might lower the threshold between work and retirement and instil confidence in the individual that there is time to enjoy retirement also a few years later.

The results indicated clearly that both perceived health and functional capacity increased greatly from the baseline until the transition stage, i.e. during the period when the majority of the respondents retired. Also these findings may be interpreted as clear indicators of the fact that work is often experienced as too demanding during the last years of a work career and retirement brings along relief. To apply this result to ageing workers and to early retirement would mean that when functional capacity declines, it should be possible to adjust a person's work environment in such a way that after the day's work is done he or she has resources left to take part in the activities that are personally important.

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The ageing of the labour force and the falling employment rates of older workers have forced policy makers in industrialized countries to find means to increase the well-being of elderly workers and to lengthen their work careers.

The aim of this study was to longitudinally examine how various components of well-being change as individuals grow older, and what effect retirement transition has on these factors and on their relationships.

The transition from work life to retirement and the following years as a pensioner were associated with many changes in health, functional capacity, subjective well-being, and lifestyle. The study results support the view that it should be possible to ease working pace during the last years of a work career. This might lower the threshold between work and retirement and instil confidence in the individual that there is time to enjoy retirement also a few years later.

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