

Terttu Parkatti

Self-rated and Clinically Measured
Functional Capacity among Women
and Men in Two Age Groups
in Metal Industry

UNIVERSITY OF JYVÄSKYLÄ

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STUDIES IN SPORT, PHYSICAL EDUCATION AND HEALTH 25

Terttu Parkatti

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To the memory of my mother

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Diss.

The purpose of the study was to analyze self-rated functional capacity and associated factors among two age groups of male and female employees in the metal industry, as well as to study the association between clinically measured and self-rated functional capacity. 246 employees working in the metal industry were studied by means of questionnaires and laboratory tests. The results showed that the older persons low-rated their capacity more often than the younger. Differences in self-rated functional capacity were also found between sex groups. Young men, especially, differed from their age peer women in rating their functional capacity as "good" more often. Among the women and the older men higher occupational status was associated with a higher self-rating of functional capacity. Among the younger men the trend was reversed. One possible explanation for this unexpected result among the younger men may be the contradiction between the realities and what they see as the purposes of their lives. A physically active life style among the younger women, a good ability to carry on the activities of daily life among all the groups studied, high health status, and high occupational status together with the absence of symptoms among the women were all associated with good self-ratings of functional capacity. Several laboratory tests, although partly different within the different groups, showed the same trend as the self-rating thus, perhaps, indicating the disparate importance of the functions measured for the different groups. The explanatory factors of self-rated functional capacity also varied according to group being more physical among the women and the older men and including mental balance and occupational status among the younger men. This study revealed some interesting differences between the groups studied and also the need for more thorough research into self-rated functional capacity.

self-rating, functional capacity, age, sex, occupation, health, physical activity, ADL

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PREFACE

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Terttu Parkatti

1. INTRODUCTION

During the last few years there has been an increased interest in the assessment of functional capacity and self-rating of health in health research. The growing need for new methods in assessing health, in addition to the indicators based on pathological changes, is due to increasing average life expectancy which ensures a growing number of persons 65 years of age and older in all industrialized countries. With increasing age functional capacity decreases and individual's chances of falling ill increase so that daily activities and work demand relatively more effort than before.

Until today functional capacity has mostly been measured in laboratory (e.g. Clark 1960, Fozard and Thomas 1975, Hollingsworth et al. 1965, Jalavisto 1965, Heron and Chown 1967, Dirken 1972, Morgan and Fevens 1972, Heikkinen et al. 1974, Furukawa et al. 1975, Heikkinen et al. 1984), and only few research reports have dealt with self-rated functional capacity as such (Eskelinen et al. 1985). Subjective health status, in itself, has though been the object of several studies (e.g. Friedsam and Martin 1963, Maddox and Douglas 1973, Singer et al. 1976, Fillenbaum 1979, Ferraro 1980, Linn and Linn 1980, Taylor 1981, Thomae et al. 1981, Mossey and Shapiro 1982, Murray et al. 1982, Cockerham et al. 1983, Kaplan and Camacho 1983, Lehr 1983, Jylhä et al. 1986).

The use of self-rated health in earlier studies has, in many cases, been based on the need for a simple tool for assessing health in population studies where a clinical assessment is too time-demanding and expensive to arrange. The importance of self-rated functional capacity and health lies not only in its usefulness as a substitute for clinical measurements; it is also important for the information it provides about the wholeness of an individual, only part of which is illuminated by clinical tests. Further, personal experiences are important as a guide to an individual's participation in various activities and the search for health services. The above mentioned demographic trend in aging implies an increasing need for social and health services, and in predicting these needs information gathered from self-rated functional capacity can serve as a useful tool.

The purpose of this study was designed to supplement existing knowledge about people's health status from the point of view of self-rated functional capacity. Self-rated functional capacity and associated factors among two age groups of male and female employees in the metal industry were studied. The association of age, sex, socioeconomic

status (including level of education and occupational status), health and certain living habits with clinically measured functional capacity is well documented. In this study the main object was their association with self-rated functional capacity. Further, the second main object of interest was to study the association of clinically measured functional capacity with self-rated functional capacity. Most clinical measurements are time-demanding and expensive to use in large epidemiological studies. It is hoped that the results of this study will show whether self-rated functional capacity might have any practical application as a tool in e.g. health care planning, guidance to early rehabilitation or changing environmental factors, living habits or working conditions.

2. ASSESSING FUNCTIONAL CAPACITY

The two world wars and the needs of industry have had an effect on the development of assessments of functional capacity. Soon after the First World War, the first serious attempt to develop a functional diagnosis was made. However, it was not used before the Second World War, when the United States Army developed a system of functional assessment in relation to the rehabilitation of injured soldiers.

A further development was introduced by Sokolew (1958) who prepared a detailed method of functional assessment using, together with clinical findings, the activities of daily living (ADL) score, an assessment of psychological, social and economic factors, and the ability to work. At that time the WHO also paid attention to functional assessment among health indicators, emphasizing degree of fitness as a basis for the need for geriatric services (WHO 1959).

During the 1970s and in the beginning of the 1980s the functional capacity of people of working age was the object of a number of researchers (e.g. Dirken 1972, Kiiskinen et al. 1980, 1981, Parkatti 1981). Calculating indices was a popular method not only among the above-mentioned researchers but also among others (e.g. Damon 1977, Morgan and Fevens 1972, Heikkinen et al. 1974, Furukawa et al. 1975, Suominen 1978, Ries et al. 1981). Lately, more effort has been put into interdisciplinary projects with the object of producing knowledge about functional capacity in different cohorts, and the development of person's functional capacity during the course of an individual's life (e.g. Svanborg 1980, Heikkinen et al. 1984, Jylhä et al. 1986, Era 1987, Pohjolainen 1987).

The limitations of calendar age as an indicator of personal development are at their most obvious in working life. This has been proven by the numerous social policy demands for the functional assessment of an individual instead of calendar age. WHO's Regional Office for Europe (1963) recommended that methods be developed for the determination of biological age to provide a more rational basis for dealing with the retirement and employment of older workers. Pressures to develop indices of functional age that could serve as criteria for the determination of the time of retirement have also come from labour unions and from workers who wish to continue to work beyond a specified chronological age (Schaie and Parr 1983). McFarland (1973) has emphasized the need for the development of functional age measurements in industrial geron-

tology. The need for the assessment of functional age first arose out of the shortage of labour after World War II, and people already retired were requested to return to work in the aeroplane industry (McFarland 1943). On the basis of these experiences McFarland's (1973) conclusion was that employment decisions in mid- and late career should be based on an individual's level of functioning rather than calendar age. Probably the most famous approach in industrial gerontology is that of Dirken (1972); the development of a yardstick for the assessment of functional age in industrial workers. The proposal by Heron and Chown (1967) to adapt a functional age profile was also made on the basis of study concerning functional age in different occupational groups.

Approaches to the question of functional capacity vary according to discipline. In gerontology the research objective is the study of change in functional capacity with increasing age (e.g. Heikkinen et al. 1984). In the occupational medicine research is directed towards employees' functional capacity in respect to the demands of their jobs (e.g. McFarland 1973, Heron and Chown 1967, Dirken 1972, Kiiskinen et al. 1981, Ilmarinen et al. 1985). In the case of geriatric medicine the activities of daily living has been of greatest interest (e.g. Katz et al. 1963, Shanas 1962, Lawton and Brody 1969, Lawton 1971, Reynolds et al. 1974, Kaufert et al. 1979).

The operationalized health indicators are also considered to include performance, meaning the capacity or actual functional level of the individual whose health is being assessed (e.g. Jette 1980). If we consider health, according to Allardt (1976), as a functional resource, research into functional capacity is of great importance in health studies.

3. FUNCTIONAL CAPACITY AND ASSOCIATED CONCEPTS

In various health fields the term function has been used to describe the characteristic action of body parts, such as the function of the shoulders, the performance of organs, such as kidney function, as well as the performance of an individual, e.g. in respect to the activities of daily living. There is, however, a considerable conceptual and semantic confusion in the use of this term (Jette 1985). In defining the concept of function Jette (1985) starts from the concept of health as defined by the World Health Organization. Like so many others, he criticizes this definition as being overly abstract and difficult to measure. Instead, he pays attention to the definition of health in measurable terms and classifies the results of earlier attempts into three conceptual categories: physical manifestations, symptoms or feeling states, and functional status. For clinical or research use Jette and Cleary (1987) divide the concept of function into three distinct dimensions. The term physical function represents an individual's sensory-motor performance. Walking, climbing stairs, performing housework and shopping are examples of physical function. A person's affect and effectiveness in coping with life's stresses represent the emotional function dimension. Level of anxiety, life satisfaction, and happiness are all components of emotional function. The third dimension, social function, encompasses an individual's social interaction and the performance of social roles or obligations. Jette and Cleary (1987) use parenting and being employed outside the home as examples of an individual's function in social roles.

Physiological, psychological and social functions are also seen in the categorization of functional capacity used by Heikkinen et al. (1984). They have presented a hierarchical model of physical, mental and social capacities, which together, form an individual's functional capacity. The term functional capacity thus describes the general capacity of a person.

Ilmarinen (1985) has described the concept of functional capacity from the point of view of an occupational researcher. According to him functional capacity represents those individual characteristics of a person, which affect their strain of work. The concept of functional capacity, however, differs from that of working capacity in that functional capacity refers to an individual's ability to meet the demands of everyday life and thus include the concept of working capacity.

According to Puroola (1979) working capacity has very complicated connections with social reality. It is always based on the achievements of balance between the demands of circumstances and the premises of individuals. Thus working capacity can be defined as a relationship without any conflict, between individuals' internal systems (functional capacity) and their occupations.

Functional ability is also used to describe a person's ability to work or care for their personal needs. The concept activities of daily living (ADL) has been used with equal meaning, specially in reference to the elderly and disabled. (e.g. Katz 1963, Shanas 1962, Lawton and Brody 1969, Reynolds et al. 1974, Kaufert et al. 1979). ADL has further been divided into basic ADL consisting of bathing, dressing, going to the toilet, getting around, continence, and feeding (see Katz 1963), and instrumental ADL consisting of the ability to use the telephone, go shopping, prepare food, house-keep, do laundry, use public transportation, take responsibility for own medication, and handle finances (see Lawton 1972). In measuring the functional abilities for self-maintenance the term disability has also been used, e.g. the Index of Disability by Shanas et al. (1968), and in the functional disability assessment of Jette and Cleary (1987) according to which functional disability represents aberrations in an individual's usual performance with the focus on the person's behavior rather than on the performance of body parts or organ systems. Functional disability refers to deviations from the normal or customary functioning of an individual within any of the three functional dimensions described above. Disability refers to a loss in function or performance of an individual and can be differentiated clearly from the impairments that are aberrations in organ or body systems. (Jette and Cleary 1987). The social point of view of the functional disability concept is also seen in other definitions. Sullivan (1971) and Steward et al. (1977) consider functional disability to refer to functional limitations in the performance of normal daily role activities as a result of illness or injury. (See also Maddox and Douglas 1973). In assessing the functional abilities for self-maintenance the concepts of physical health (e.g. Belloc et al. 1971, Liang 1986) and functional health (e.g. Lichtenstein and Thomas 1987) have also been used.

Self-rated functional capacity, which is the main object of this study, is an individual's own appraisal of his or her functional status. Studies on self-rated functional capacity as such are not available but in the field of health studies in which large populations are needed, such as studies concerned with programme and policy issues, instruments that can be self-administered have been developed. Measures of physical health status which have frequently been used in studies of elderly populations include both those based on respondents' wholly subjective appraisals of their health status, so-called perceived health status measures, and those related to functional status, based on sets of activities respondents

report they can or cannot do with/without assistance (see Lichtenstein and Thomas 1987). Lichtenstein and Thomas (1987) note the difference between these two type of measures. The second type, which is based on sets of activities, are viewed as more "objective" in that the relevant behavior can be externally verified. A measure of the first type is often a single question, "Compared to other persons of your age, would you say your health is excellent, good, fair, or poor?"

Tripp-Reimer (1984) emphasized the importance of both professional and client's perspective in assessing health status. He uses the terms emic and etic the former to show the subjective perspective of the client and the latter to show the biomedical perspective. To facilitate a synthesis of emic and etic perspectives Tripp-Reimer (1984) used the health grid shown in figure 1.

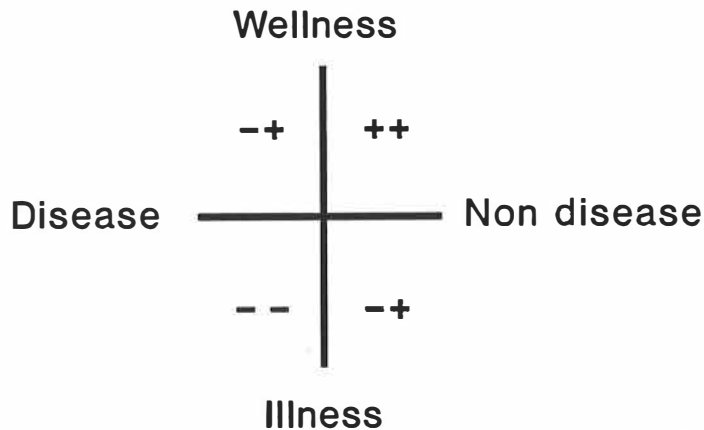


Figure 1. Health grid by Tripp-Reimer (1984).

The horizontal axis consists of the disease to nondisease continuum presenting the objective interpretation of the health state by a scientifically trained practitioner. The vertical axis ranges from illness at the bottom to wellness at the top presenting the subjective perception and experiences of an individual and social group to the health state. Tripp-Reimer considers this grid to be a valuable tool in synthesizing the health state from the perspectives of both the provider and the client.

Perceived measures of health have also been used in efforts to predict mortality (e.g. La Rue et al. 1979, Mossey and Shapiro 1982, Kaplan and Camacho 1983).

4. FACTORS ASSOCIATED WITH FUNCTIONAL CAPACITY

4.1. Functional capacity and age

The levels of functions seem to change with the passage of time. The clearest age changes in human functioning are seen in the physiological and psychophysiological functions. Average changes over time in the performance of different organ systems proceed at different rates. The range of individual values is large at any chronological age (e.g. Heikkinen et al. 1982). Intra-individual variation in functional level is also greater the older the persons in question. As a result of this decline in physiological functions stress tolerance decreases so that the overall reserve capacity of 60-year-old persons is already about one tenth of that of 20-year-old persons. In stress situations especially the differences are clearly to the advantage of younger persons. (e.g. Smith and Gilligan 1986)

Each organ system loses functional capacity at a distinct and separate rate (Shock (1979). The essential factors for human physiological functioning are musculoskeletal, neurological, cardiovascular, and pulmonary functions. The heart muscle decreases in mass and contractibility. While the heart becomes less efficient resistance to blood flow also increases due to changes in vessel walls which limit their expansion, thus resulting in increased blood pressure (e.g. Smith and Gilligan 1986).

During rest there is relatively little difference between young and old in lung functioning. During exercise, however, a decreased vital capacity demands a greater breathing rate to meet the blood oxygenation demands. The decrease in lung functions is due to a decrease in the elasticity of lung tissue as well as the stiffness of the thoracic cage. A decline in alveolar ventilation and in blood perfusion of the lung tissue may also occur (e.g. Campbell and Lefrak 1978, Smith and Gilligan 1986).

Nerve conduction velocity declines with the passage of time, and this slowing may reflect changes at the synapse as well as in the nerve fibre itself (e.g. Smith 1982). These changes are manifested as an increase in the reaction time for muscle contraction (e.g. Spirduso 1980). With increasing age the number and size of muscle fibers decrease causing a loss in muscle mass with a parallel decline in muscular strength (e.g. Campbell et al. 1973).

These processes of decline in the neuromuscular system usually constitute limiting factors for physical activity and working capacity. Smith and Gilligan (1986) also emphasize the importance of these changes, i.e. decrease in muscle mass and decline in nerve conduction rate, as limiting factors in the activities of daily living and recreation among older adults.

Changes in psychological functions and abilities are also inevitable with increasing age. There is evidence to suggest that the ability to cope with psychological stress decreases with increasing age (e.g. Palmore et al. 1979). However, there is not remarkable change in overall intelligence with increasing age. Earlier findings suggesting a decline in intelligence with increasing age have recently appeared to be invalidated by numerous methodological problems (e.g. Hultsch and Deutsch 1981, McPherson 1983).

With increasing age reactions become slower (e.g. Kimmel 1974, Rotella and Bunker 1978, Spirduso and Clifford 1978, Heikkinen et al. 1984), and people have difficulties in dividing their attention (e.g. Walsh 1975). There is also a change towards increased carefulness and a diminished willingness to take risks (e.g. Berg and Mårtensson 1977). A reduction with age also occurs in cognitive complexity, even in the absence of the pressure of time, requiring the older person to function on the basis of simpler ideas. Some researchers (e.g. Bromley 1981) consider normal aging to have the effect of making cognition less abstract, less general or, conversely, more concrete and particular. The cohort-effect is, however, supported by the fact that the older generation has a lower level of education and have had less practice in abstract cognition and complicated ideas.

Although many human functions show a decline, they can, however, be maintained by continuous training. The age related declines observed in physiological functions resemble those associated with disease. In fact about 50 per cent of what is commonly called aging may be the result of underuse (e.g. Smith and Gilligan 1986). For example, Suominen (1978) found a favorable connection between a physically active life style and many physiological parameters. Training also may keep up and even increase the cognitive functioning of older people (e.g. Labouvier-Vief and Gonda 1976).

4.2. Functional capacity and sex

In spite of the fact that women live longer than men, the health restrictions on their social functioning are more significant than those of men among elderly Finnish people (e.g. Kalimo 1981). Occupational tasks may differ a lot between women and men, and so have an effect

on the development of their functional capacity. Differences also exist in other areas of life, such as leisure activities, which, taken together, are associated with functional capacity. In particular among very old persons, the ability of women to walk is much more restricted than that of men (e.g. Heikkinen et al. 1981). Jylhä (1985) has reported older women having more difficulties in coping with the activities of daily living than their male age partners. Her observations corresponded to those of Murray et al. (1982) and Waldron (1983). Differences in functional capacity have also been found between sex groups in laboratory measurements. Heikkinen et al. (1976) reported sex differences in digit symbol, reaction time, and balance tests among 69-year-old women and men. A number of differences in muscle strength between women and men have also been found. Women have less muscle strength than men (Wilmore 1982), but the decline with increasing age in women's muscle strength is slower than that of men (Murray et al. 1985).

The results of laboratory measurements should not be compared between the sex groups according to the criteria of the one or the other. It is important, however, to know about the differences between the sexes, e.g. for health care policy and planning, planning recreational facilities, etc.

4.3. Functional capacity and level of education

Level of education is one important and often used indicator of the socio-economic status of an individual. Socio-economic status is known to be related to health status and mortality rates (e.g. METELI 1977, Palmore 1982), but the association between functional capacity and level of education has been documented in a few studies only (e.g. Kiiskinen et al. 1980, Heikkinen et al. 1984).

Most research results concern cognitive functions (see, e.g. Mc Pherson 1983). Level of education may also explain the association between cognitive functions and occupational status. It has even been assumed that a high cognitive capacity is an important factor in selecting individuals to different occupations which will further develop their skills and functional ability (Heikkinen et al. 1989). For instance female white collar workers seemed to perform better than the blue collar ones in various tasks demanding a good short term memory for numbers or digits, or a high level of manual dexterity (e.g. Kiiskinen et al. 1981). Most of them appeared to be in secretarial work, which included stimuli similar to the tests used in the laboratory measurements. Differences in functional capacity between persons of different educational background or occupational status have also been explained by assuming that persons with a higher level of education and

occupational status are more highly motivated (e.g. Parkatti 1981).

Education has also been found to be associated with other than simply cognitive functions. The performance levels of certain sensorimotor functions have been shown to differ with socio-economic status and level of education (e.g. Welford 1980). Pohjolainen (1987) found a higher level of education to be associated with cognitive capacity, sensory functions, leisure activities and self-rated health. Quite recently Era (1987) has observed, that good performances in many sensory, psychomotor and motor functions were associated with long education and high occupational status. Long education has also been found to be connected with good psychomotor speed among 50-60-year-old women (Rantanen et al. 1987).

4.4 Functional capacity and occupational status

It is well known on the basis of several studies that occupational status is associated with the health and functional capacity of people. Kiiskinen et al. (1980) found in their study concerning the functional aging of 40-50-year-old men in two industrial enterprises that long pre-occupational education and high occupational status were linked with good functional capability in certain physiological and psychomotor tests. They summarized their results in two models: "1) premature aging: short education, low occupational status, manual work, smoking, physically passive leisure time, and 2) maintenance of youthful vigor: long education, managerial or skilled manual work, non-smoking and physically active leisure time". Deterioration in functional capabilities seems to be related to environmental influences and life-style. These results corresponded to those of Heikkinen et al. (1975) which suggested that industrial and mining workers were biologically older than persons in service and office occupations. Their index of biological age was constructed on the basis of tests of vital capacity and vibratory and auditory thresholds. Kiiskinen et al. (1981) also later studied employees in another branch of industry, the machine industry, and found the same trend in functional capacity tests.

In the METELI-study, which concerned working conditions, mental well-being, living habits, and health among occupational groups in the metal industry in 1973-1983, results also showed that employees with lower occupational status had more diseases and reported more presumed stress symptoms than white collar workers (Leino et al. 1984). The researchers concluded that the results could not be explained simply on the basis of the various selections which may have taken place during the working life of these people in different branches of metal industry but, rather, by factors related to health wearing or supporting

living styles, and, especially, to working conditions. Recently, there have been attempts to explain occupational differences in health and mortality conceptually at a more general level than that of specific living styles. The hypothesis that stress resulting from the lack of harmony between an individual's goals and his or her chances of reaching them contributes to functional disorders and ill health, represents this kind of framework (e.g. House et al. 1979, Antonowsky 1980, Hasan 1989).

A study to determine the criteria for retirement ages in municipal occupations has been carried out at the Institute of Occupational Health in Helsinki. Results concerning health, the capacity to work, and working conditions showed that poor working capacity was associated with the physical demands of the jobs, certain factors relating to physical and chemical loading, insufficient opportunities to satisfy one's psychological needs at work, and feelings of overloading caused by responsibility, haste, or paced work (Tuomi et al. 1985). The results concerning employees' functional capacity, including cardiorespiratory, musculoskeletal, and psychological capacities, proved that those employees doing physical work had lower physical and mental capacities than those doing predominantly mental work. The results support those of earlier studies concerning the association between occupational status and functional capacity, and the researchers (Ilmarinen et al. 1985) suggest that physical work neither maintains nor improves physical functional capacity but, rather, causes it to deteriorate.

4.5. Functional capacity and health

In theories on well-being (e.g. Allardt 1976, Karisto 1984) health has been investigated as a resource for functioning. Similarly Kirjonen (1980) considered functional capacity to represent the positive dimension of health connected with the general goals of human life while illness is the negative dimension. The emphasis of the association between functional capacity and health is also seen in Parsons' (1951) social definition of health in which he proposes health to be a state of optimum capacity for the performance of the role and tasks for which a person has been socialized. Conversely, illness is a reduction in a person's capacity to perform the expected roles (compare with the term functional disability, page 18).

Between functional capacity and health status there seems to be a reciprocal influence. First, with increasing age, functional capacity tends to decrease as the result of several anatomical and physiological changes. This leads to a decreased reserve capacity and increases the possibilities of stress-related diseases. Secondly, there are diseases, e.g. heart inadequacy and illnesses of the locomotor system that decrease functional capacity. Connections between health status and

cognitive functioning have also been found. The ability to perform intellectual and memory tasks, measured by the means of the Wechsler Adult Intelligence Scale (Wechsler 1958, 1975), is reduced by certain pathological conditions such as high blood pressure and cardiovascular diseases (e.g. Wilkie and Eisdorfer 1971). Coleman (1983) found that the level of cognitive functioning was associated with a number of health indices such as physical functioning, mobility of joints, co-ordination, sensory functioning and lung capacity, but he also points out that these findings illustrate not only how physical and cognitive decline may be related, but also how, separately, they may reflect increasing vulnerability of the organism with age. The rapid and marked loss of cognitive ability preceding death, known as "terminal drop", is mostly the result of disease (e.g. Savage et al. 1973, Hultsch and Deutsch 1981, McPherson 1983). Recent research results among the Finnish population also support earlier findings about the association between functional capacity and health status (e.g. Heikkinen et al. 1984, Era 1987).

4.6. Functional capacity and certain aspects of life style

There is general agreement on the importance of physical exercise for the maintenance of individual vitality. Although documentation about the favourable physiological as well as psychological effects of physical exercise exists (e.g. Morgan 1977, Suominen 1978, Morgan 1981, Folkins and Sime 1981, Shephard 1986, Smith and Gilligan 1986), there is a lack of evidence of the effect of physical exercise on the aging process itself and on longevity (Morgan 1986). Several research reports have shown that physically active persons have better physical and functional capacity than their inactive counterparts (e.g. Drinkwater et al. 1975, Suominen 1978, Lehr 1978, Shephard 1978, Spirduso and Clifford 1978). From the psychological point of view, Morgan (1986) concluded, on the basis of the recent literature, that individuals with certain personality characteristics gravitate towards sport rather than involvement in sport modifying personality. Though not increasing longevity, the better overall functioning of the more physically active, however, benefits their quality of life.

Physical activity is very often accompanied by a number of other healthy living habits such as appropriate nutrition, non-smoking, and controlled alcohol consumption. Recent research results suggest that habitual smoking and drinking produce functional alterations similar to those caused by aging per se (e.g. Mellström et al. 1981, Mellström et al. 1982).

5. FACTORS ASSOCIATED WITH SELF-RATING OF FUNCTIONAL CAPACITY AND HEALTH

5.1. Age, sex and socio-economic status

It has been found in research into self-rated health that after about sixty years of age people begin to rate their health as better than that of their age peers (Shanas et al. 1968, Cockerham et al. 1983). Selection has been suggested as one reason for this. The older the age group in question, the more selected the individuals are. Tornstam (1973) has explained the phenomenon by the concept of aspiration level. This means that in spite of decreasing objective health status an individual's aspiration level concerning health decreases with age. In other words the requirements for good health diminish with decreasing health. Therefore old persons may rate their health as good in spite of their symptoms and disabilities. This concept of aspiration level can also be applied to the self-rating of functional capacity. The changes in aspiration level may not, however, necessarily be on a descending scale but, in respect to certain functions also ascending.

In addition to age, sex has also been found to be a factor explaining self-rated health. Maddox (1964), and Brown and Rawlinson (1975) reported associations between self-rated health, socioeconomic status and sex. Their results show that "optimism" in health assessment was more probable in the oldest males of higher socio-economic status. Jylhä (1985) also found an association between self-rated health and experience of life among both men and women, but more so among men. She reported good self-rated health to be connected with frequent social contacts and experience of life more strongly among men than among women.

In a certain point of time older generation have a lower level of education than younger generation. There are also other factors and experiences in the life courses of older people that are specific to their age cohorts, e.g. war, post-war shortages, urban migration. These factors may have certain effects on people's attitude and beliefs and, further, on their self-ratings of health and functional capacity. Older people probably compare their comfortable life of today with the poor times they have lived through and rate their present condition on the basis of their historical background. Therefore cohort effects must

always be taken into consideration when different age groups are studied (e.g. Schaie and Parr 1983).

5.2. Health status

Clinically assessed health status and the number of perceived symptoms have also been found to be associated with self-rated health by several researchers (e.g. Maddox and Douglas 1973, Mechanic 1974, Wan 1976, La Rue et al. 1979, Cockerham et al. 1983, Jylhä 1985, Jylhä et al. 1986). Those who have more symptoms or chronic diseases usually rate their health as poorer than those with less symptoms and diseases. Tornstam's (1975) observations, were, however, that general health status had no direct influence on self-perceptions. He examined several symptoms together with four different kinds of self-perception. On the basis of his results he found, when a specific symptom was able to have a damaging effect on a particular self-perception, that this was true only for younger individuals. Younger individuals still have rather high aspiration levels, as against older ones. This is why the same symptom can cause a damaging effect on self-perception in younger individuals but leaves older individuals unaffected. Tornstam mentions three characteristics of health variables, as determinants of self-perceptions:

- ”1) Health variables are of different levels of importance and are important in different ways for various attitudes or self-perceptions.
- 2) objective health status is of greatest importance through subjective health status, which, in turn, is influenced by aspiration level.
- 3) when health variables are important for some self-perceptions, the health variable often appears as a component in interaction with another variable or as a conditioning variable”

Kaplan and Camacho (1983) also emphasize the multitude of confounding factors associated with self-rated health. As was true in the study of Kiiskinen et al. (1980) concerning clinically measured functional capacity, Kaplan and Camacho found that individuals with low perceived health tend to engage in more high risk behaviors such as smoking and alcohol consumption, tend to be more isolated, and, in general tend to be at higher risk in respect of many other variables.

When health status have been studied, responses have tended to be a function of how much of a person's life is disrupted by their health status (e.g. Cockerham et al. 1983). Di Cicco and Apple (1960) found health to be important only as it became poor health and interfered with daily activities and the maintenance of independence among older people.

5.3. Psychological factors

An individual's behavior can be controlled either internally or externally. External control means that a person believes their personal affairs to be controlled mostly by the factors independent of themselves such as luck, chance, destiny or other people. Individuals controlled internally believe that they can affect their personal affairs and lives themselves (e.g. Ruth and Ruoppila 1983). Individuals' responsibility to affect their own affairs influences the choice of object of comparison. "The architect of his own fortune" chooses objects of comparison, or at least some of them, below himself because this way it is possible to avoid guilt and the feelings of shame which would appear with experience of relative deprivation (social compare to a reference group) (see e.g. Stouffer et al. 1949, Merton and Kitt 1950, Homans 1974). According to reference group theory (Kelley 1952) a person's functioning and expectations reflect the norms of the group they belong to. Reference group theory has found a practical use, e.g. in Fillenbaum's (1979) suggestion that identification of relevant normative reference groups (sex, age, living area) and information about the standards of those groups should result in more accurate information about a person's objective health status when only a subjective assessment is available.

Introspection (a tendency to think about oneself, and one's motivation and feelings) is emphasized by Mechanic (1986) as an important orientation in the behavior accompanying illness. His studies support the hypothesis that attention to self increases the prevalence of reported psychological and physical symptoms and negative self-evaluations. He suggests that more introspective individuals probably know themselves better and perhaps have a better understanding of the influences that affect them than their less introspective counterparts, but that they are also more uncomfortable with themselves and their life situations. They are more prone to react to threatening situations and more likely to define many common, self-limited bodily sensations and symptoms.

Possible changes in self-expression and self-esteem are associated with an individual's health status and physical capacity (Berg and Mårtenson 1977, Ruth and Ruoppila 1983). According to Kata (1976) self-esteem is an important personality resource and criteria of psychic well-being. High self-esteem increases an individual's happiness and effective functioning, while low self-esteem is a fundamental factor restricting a person's functional capacity.

Alanen et al. (1984) recently described the psychological well-being, including the dimensions of positive mental health, personal trait anxiety, social fears and self-respect, of men in three age groups. They found that the middle-aged (50-55 yrs) men had the lowest psychological well-being. In addition, within the age groups, the white collar workers

were better than the blue collar workers. Heikkinen and Leskinen (1987) constructed a factor they defined as mental balance by combining the above-mentioned dimensions and found this to be the best predictor of successful interaction of all the components of social functional capacity among men.

5.4. Environmental factors

The self-rating of health and functional capacity are not affected only by individual factors but also by the surrounding society and the attitudes predominant in it. In the performance-oriented society of today young and middle-aged people hold negative attitudes towards aging, old people and their fragility with the result that older people behave stereotypically. Lehr (1983) states that in order to remain healthy, competent, and even to survive an elderly person has to violate the norms defined by societal expectations of his behavior. Self-expression may acquire negative features in old age partly because of the attitudes prevalent in an individual's environment and partly on the basis of weakening resources to cope, which causes a sense of failure and a feeling of inadequacy.

A number of ethnic groups in the United States has been exploited in studies concerning cultural variation in patterns of health as well as aging. The effects of cultural background have been documented by several researchers. Zborowsky (1952) found differences in relation to response to pain between Italian, Jewish, and Irish people and Americans of the third generation. The Americans of the third generation and those with Irish roots were more restrained in their responses than those with Italian or Jewish roots, who also differed from each other. Zola (1966) compared the symptoms of subjects who were Irish or Italian by birth and found that the Irish denied the effect of symptoms on their relationship with other people while the Italians considered their symptoms as one of the most damaging fact in their human relations. The norms and values of the dominant culture are an important consideration for ethnic groups. This has been shown by results in which the same symptoms may lead to different conclusions as to health (e.g. Shanas et al. 1968, Linn et al. 1980).

6. FRAMEWORK OF THE STUDY

During the last decade self-assessed health has gained increased acceptance as an object of independent study in addition to more traditional clinical testing. Traditionally, especially in the natural sciences, including medical research, subjectivity has been regarded as harmful and confusing in many ways (see Rimpelä 1982). Now that multidisciplinary approaches have become more common in research, subjective factors relating to an individual's health and functional capacity are of great importance.

Subjective factors have frequently been used in geriatric medicine in the assessment of the activities of daily living among the elderly. Self-administered instruments have also been developed for large population studies, mainly to meet the needs of program and policy issues. Recently, the importance of personal experience as a guide to participation in various activities as well as the use of health services has also been much better accepted among researchers, and measurements based on self-appraisals have gained in interest along with clinically measured parameters.

A decrease in functional capacity is associated with increasing age. Important dimensions of functional capacity for an individual are the ability to carry on the activities of daily life, the ability to work and various abilities related to the use of leisure time. During the course of life the importance of these dimensions will vary according to individual life situations.

For a more thorough understanding of self-ratings of functional capacity and health it is important to know something about the process by which self-ratings are formed. An individual's orientation and objectives in life are factors which belong to the process by which self-ratings of functional capacity are formed. Orientation and objectives are in continuous interaction with self-rated functional capacity. Individual functioning also interacts closely with surrounding society. Pehunen and Lahtela (1982) call this "life functioning" and note that as it develops it realises the basic relations between individuals and their social surroundings. The most important of these relations are work life, education, family, social and recreational activities. During the course of life these relations change according to the changes that take place in an individual's life, e.g. marriage, retirement etc.

This study was made along multidisciplinary lines in order to gain

information about self-rated functional capacity. Multidisciplinary involves a number of problems but remains the only way to a mass knowledge about the functioning of individuals. Problems arise, for example, in selecting a scientific basis for the study framework. On the basis of the literature a working model for this study is presented in figure 2. The main object of this study, self-rated functional capacity, was studied here with special reference to psychophysiological functioning. Clinically assessed health as well as clinically assessed functional capacity were expected to be associated with self-rated functional capacity. According to previous studies age group, sex, socioeconomic status and living habits were other possible associated factors.

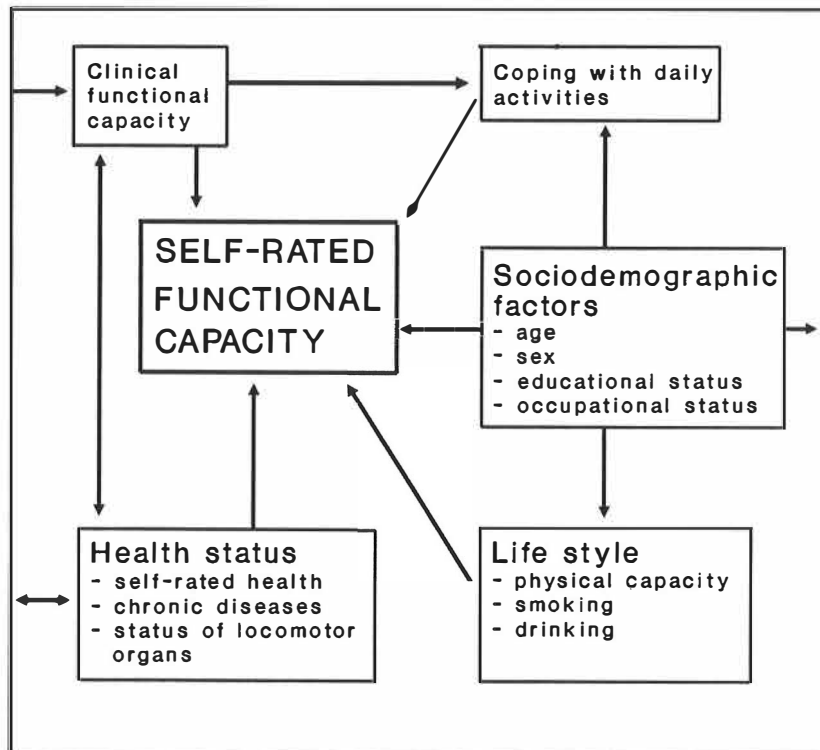


Figure 2. Schematical description of the working model of the study.

7. PURPOSE AND PROBLEMS

The main purpose of this study was to gain information about self-rated psychophysiological functional capacity and associated factors among two age groups of male and female employees in the metal industry. The object was to determine the best predictors of self-rated functional capacity in the groups studied. In addition interest was directed towards the association between self-rated and clinically measured functional capacity.

The objectives of the study can be summarized as follows:

1. To determine what differences exist in self-rated functional capacity between two age groups.
2. To determine what differences exist in self-rated functional capacity between sex and occupational groups in the study population.
3. To investigate associations between self-rated functional capacity and health status, living style and clinically measured functional capacity.
4. To determine the best predictors of self-rated functional capacity in the study population.

8. MATERIAL AND METHODS

8.1. Subjects

The subjects were drawn from the original 902 subjects (293 women and 609 men) who participated in the first stage of the 1973 METELI-study (METELI 1974).

This sample was representative of all the categories of employees at the plant, whose total payroll was then about 4500. The population was stratified by age, sex and occupational status before the disproportionate random sampling took place. The second stage of the METELI study was carried out in 1978 when a functional assessment was also included into the test battery. 748 persons (84 %) of those who were studied in 1973 took part in the second stage of the study. Of those 748 persons 198 women and men from the youngest age group (born in 1946 or later) participated in the laboratory tests of functional capacity. A year later 143 persons from the oldest age group (born in 1925 or earlier) were tested using the same test battery. Of this total of 341 young and old persons, 247 participated in the tests in 1984.

8.2. Participation and non-participation during 1978-1984

The participation of the subjects is presented in figure 3. During the follow-up eight persons (2.6 %) had died and three persons (1.0 %) could not be contacted. Altogether 223 (68 %) persons participated in the laboratory measurements and additional 24 persons (7.1 %) answered the questionnaires. Those belonging to the older age group participated more actively (75 %) in the laboratory examinations than those in the younger group (60 %).

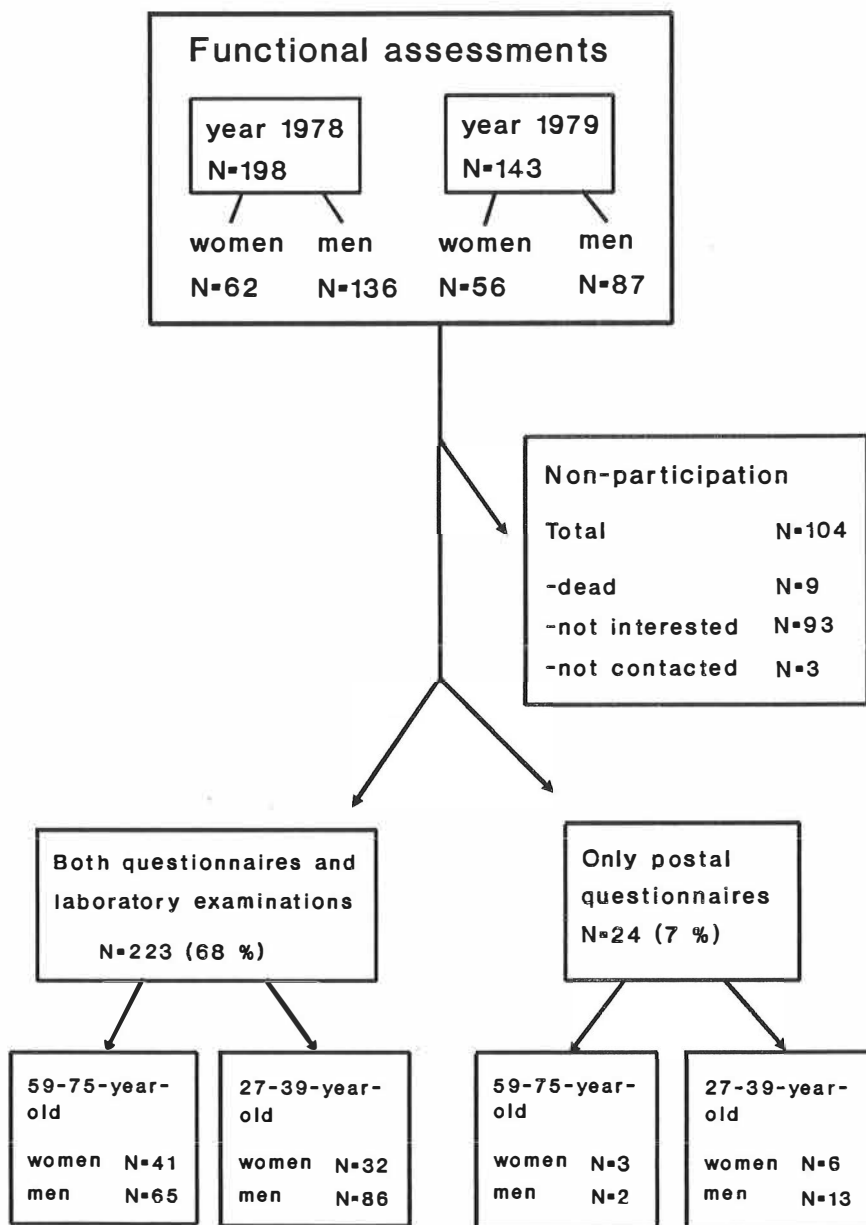


Figure 3. Participation of the subjects.

8.3. Questionnaire and laboratory examinations

8.3.1. Questionnaires

Two structured questionnaires were included in the study. Information about family, education, occupational history, living habits, diseases and symptoms as well as self-ratings of health and functional capacity was collected by the first of them (Appendix 1) and data on psychic wellbeing by a second that had earlier been constructed by Heikkinen et al. (1984). The latter questionnaire included items about life changes, self-realization, personal trait anxiety, social fears, coping, self-respect, the purpose of life. It was given to the subjects after the laboratory examination to be completed and returned by mail. The first questionnaire was sent to the subjects together with the invitation to attend a laboratory examination at which time it was returned.

The initial questionnaire included three types of questions concerning self-ratings of health, locomotor organs, physical functional capacity, psychological functional capacity, and working capacity. The subjects were asked in each case how they would rate 1) their overall status 2) their status compared to that of their age peers, and 3) what changes had occurred in their status during 1978-1984. The questions were rated on a five point scale 1) from very good to very bad 2) from much better to much worse, and 3) from "change to much better" to "change to much worse". Second, the subjects' descriptions of a healthy person as well as of a functionally capable person were mapped by open questions. With a slight modification the classification of the responses was carried out according to Baumann (1961), who had used content analysis in her study concerning health and physical fitness. In Baumann's study themes reflecting three general orientations to health and physical fitness emerged. The first type of response indicated a general feeling of well-being and was called the "feeling-state orientation". The second type identified health with the absence of general or specific symptoms of illness and was called the "symptom orientation". The third type consisted of responses phrased in terms of what a person who is healthy and in good physical condition should be able to do, and was called "performance orientation". In addition, in the present study there were a few responses in which both feeling-state and symptom orientations came up. Third, the subjects were asked to rate their ability to carry out daily activities including the ability to walk and run certain distances, to climb a flight of stairs without pausing to rest, to carry shopping of a specified weight for half a kilometer without pausing to rest, to lift a burden of a specified weight, and to do a bout of heavy cleaning work. From the data collected from the psychological wellbeing questionnaire a new summed variable, mental balance constructed earlier by Heikkinen and Leskinen (1987), was calculated (see

also Lindholm and Tulla 1982) including self-realization, personal trait anxiety, social fears, and self-respect. The separate variables included in mental balance are described in appendix 2.

8.3.2. Laboratory examinations

The functional tests took place in standardized laboratory conditions and were supervised by trained personnel applying written instructions. The flow-sheet for the laboratory examinations is described in figure 4.

The clinical status of the locomotor system examined by a physiotherapist (METELI 1975) and the data for maximal oxygen uptake and muscle strength measurements were taken from the METELI follow-up study of 1983. In addition, certain data from the 1983 METELI questionnaire (Leino et al. 1984) were used. The list of variables which included into this study from the METELI data is given in appendix 3.

1. Entrance interview

The questionnaire was returned by the subjects when attending the laboratory examinations. It was checked, and completed if necessary, when the subjects arrived.

2. Cognitive performance

The subjects performed the digit span and digit symbol WAIS subtests, the former measuring concentration and short term memory and the latter learning and short term memory. The instructions were given according to the manual (Wechsler 1958, 1975).

3. Manipulative dexterity

Manipulative dexterity was tested by the Purdue pegboard test (Science Research Associates, Chicago) modified (Kiiskinen et al. 1981) so that ten open holes were to be filled with a peg, barrel ring and washer one at a time. The subject was allowed three practice attempts. Time taken to accomplish the task in seconds was accepted as the test result.

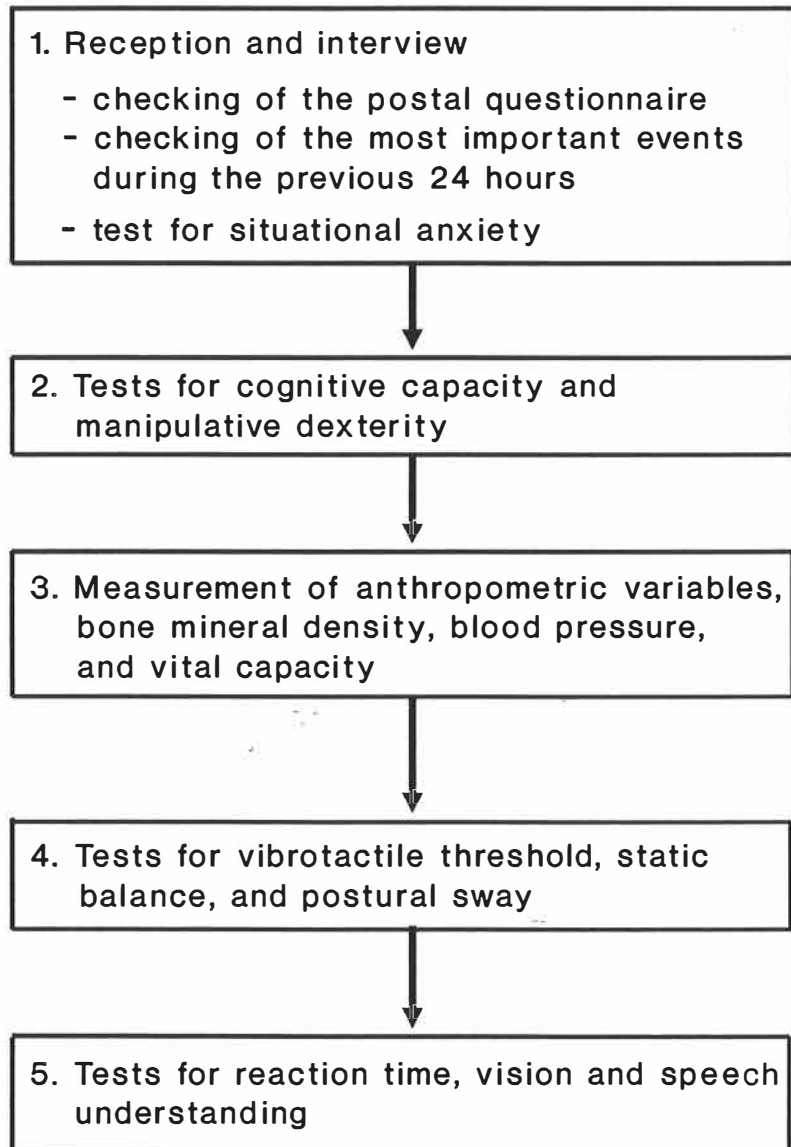


Figure 4. Flow-sheet for the laboratory examinations.

4. Anthropometric measurements

The anthropometric measurements were performed for body height, total body weight, skeletal widths (radio-ulnar and femur condyle widths) and skinfold thickness at four sites (biceps, triceps, subscapular, and suprailiac). The skeletal widths were measured on both sides of the body with a John Bull skinfold caliber having a constant pressure of 10 g/mm².

From the results, body mass index (weight/height²), skeletal weight (von Döbeln 1966), fat-free weight (von Döbeln 1959), optimal weight (fat-free weight \times 1.2), and the percentage of body fat (Durnin and Womersley 1974) were determined.

5. Vital capacity

Vital capacity was measured using Mijnhard Volutest VT 1 Spirometer. The best one of three trials was accepted as a test result.

6. Vibrotactile threshold

The threshold for sensing vibration was measured on the inner malleolus of dominant leg by using an apparatus constructed at the department of Health Sciences (Heikkinen et al. 1984).

The measurement was taken using an ascending technique at a frequency of 100 Hz. The threshold value was defined on the basis of the acceleration of a conductor which dropped onto the skin with a force of 30 p. The diameter of the circular conductor was 15 mm. Three measurements were taken and their mean value accepted as the test result.

7. Postural control

The functioning of the postural system was analyzed by a special force-platform constructed at the Department of Health Sciences (Era and Heikkinen 1985). The horizontal position of the body's center of gravity was recorded by comparing the vertical forces at each corner of the platform with each other while the subject was standing on the platform. The signals were converted into digits and analyzed by a computer. Postural control was measured in four different positions: 1) both feet adjacent, slightly apart, hands on hips and gaze fixed straight ahead, 2) the same position with eyes closed, 3) one foot behind the other, hands on hips, and gaze fixed straight ahead, 4) the same position with eyes closed. The subject was asked to stand steady and without sway as long as possible. The duration of the test was 10 seconds.

Balance was also measured with the subject standing on the floor on one leg, hands on hips with the sole of the free foot against the side of

the supporting leg, and eyes closed. The elapse of time in seconds was recorded until movement of the foot or hands detected.

8. Reaction time

Reaction time was assessed using the Digitest 100 apparatus for a 3-choice reaction time test with light stimulus. The test was administered by hand. Three practices and twelve measurements were performed, and the mean value of the five best test results was accepted as the result.

9. Visual test

The subjects were interviewed before the visual tests about possible eye diseases, eye operations and use of spectacles. The accommodation and adaptation capacity of both lenses were measured using a hand optometer (Dr. Schober).

10. Speech understanding

The test used for measurement of speech understanding was constructed at the Department of Health Sciences, University of Jyväskylä (Heikkinen et al. 1984). The test contained tasks to be performed according to interrupted spoken instructions and six tasks to be performed according to masked spoken instructions for disturbed speech. The level of difficulty varied between the different tasks. The interrupted speech was produced by cutting off the sound of the voice electrically and thus removing a part of the information. The cut-off was done at a frequency of 8 Hz with an on/off-ratio of 70/30 - 40/60 per cent. The test with masked speech was done by masking normal speech with background noise of varying intensity (a tape recording of voices in the university cafeteria). The subject heard a cassette recording of the tasks through loudspeakers. The test was interpreted as correctly understood if the subject performed the task correctly.

8.3.3. Reliability and validity

The reliability of the questionnaire concerning those questions never used previously was measured by means of a requestionnaire one month after the first questionnaire. Correlation coefficients are shown in table 1.

Table 1. *Test and retest reliability correlation coefficients (N=18).*

Test	Correlation coefficient r
Ability to walk without resting	.976
Ability to run without resting	.953
Ability to climb a flight of stairs	1.000
Ability to carry shopping	.850
Ability to lift a burden	.849
Ability to do a bout of heavy cleaning work	.692
Self-ratings of	
-observation	.736
-memory	.760
-concentration	.270
-coping with stress	.665
-taking initiatives	.666
-adopting new ideas	.562

The reliability of those questions concerning the activities of daily living was very good especially in respect of walking, running and climbing the steps. The reliability of the dimensions of psychic functional capacity was relatively high with the exception of concentration.

The reliability of the laboratory measurements is shown in table 2.

Table 2. *Reliability values for reproduced measurements (N=38)
(Parkatti 1980).*

Test	Correlation coefficient r
Vibratory threshold	.876
Near sight	.885
Balance (sec.)	.700
Vital capacity	.893
Digit symbol	.833
Digit span	.823
Manipulative dexterity	.801
Reaction time	.663

The validity of the questionnaires and laboratory tests was not studied in this research. It was attempted to ensure high validity by using questions familiar from earlier studies. The validity as well as

reliability of the questions concerning psychological functional capacity had previously been studied by Lindholm and Tulla (1982) and found to be reasonably high.

8.3.4. Statistical methods

The percentage and frequency distributions together with appropriate statistics (mean, variance, skewness, range) were used in the evaluation of the suitability of the variables for further analyses. Reclassification and the construction of new variables was done where warranted by the contents.

Analysis of variance and least-significant difference analysis (LSD) were used for multiple comparisons of means between the various sub-groups of the subjects. In the basic analyses of the contents the interdependence of the variables and their relation to the background control variables was studied on the basis of cross-tabulations, and depending on measurement level of variables, Pearson's correlation coefficients or polychoric correlation coefficients. In addition to conventional cross-tabulations the analysis of frequency data was also done by log-linear models.

Standardized T-points were calculated from the absolute test results of the laboratory measurements. This operation allows for the comparison of different measurements of functional capacity (Valkonen 1974).

In the construction of the mental balance index principal component analysis was used to find the coefficients for the different dimensions of mental balance. The new weighted index was formed according to the following formula: mental balance = 44.78 + .66 x positive mental health - .84 x personal trait anxiety - .73 x social fears + .76 x self-respect.

Stepwise regression models were formed for the different groups studied to find the best predictors of self-rated functional capacity.

Statistical analyses were executed by SPSS-X, GLIM and LISREL programmes (Jöreskog and Sörbom 1981, GLIM 3.77 Reference Manual 1985, SPSS-X User's Guide 1988, Aitkin et al. 1989).

9. RESULTS

9.1. Subjects' backgrounds

The majority of the subjects were either married or lived in an open marriage. About one third of the group of older women was widowed and one fifth unmarried. The details of the civil status of the subjects are shown in table 3. Educational background of the studied persons is shown in table 4. As a whole the younger subjects had a higher educational level.

Table 3. *Civil status of the subjects in different age and sex groups.*

Civil status	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
Married or in open marriage	86.5	32	89.9	89	40.9	18	92.4	61
Unmarried	10.8	4	7.1	7	20.5	9	1.5	1
Widowed	-	-	-	-	29.5	13	1.5	1
Divorced	2.7	1	3.0	3	9.1	4	4.5	3

Information about the occupational status of the subjects is shown in table 5. Over 90 percent of the older age group were retired. The former occupational status is given in table 6.

Table 4. *Educational level in different age and sex groups.*

Level of formal education	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
Less than primary	-	-	1.0	1	2.3	1	6.1	4
Primary	70.3	26	74.7	74	79.5	35	81.8	54
Secondary	24.3	9	16.2	16	13.6	6	4.5	3
High school graduate	5.4	2	7.1	7	4.5	2	1.5	1
University graduate	-	-	1.0	1	-	-	6.1	4

Table 5. *Occupational status of subjects in 1984.*

Occupational status	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
Not working	-	-	1.0	1	97.7	42	92.4	61
White collar	64.9	24	43.4	43	-	-	3.0	2
Blue collar	35.1	13	55.6	55	2.3	1	4.6	3

Table 6. *Occupational status of subjects in 1978.*

Occupational status	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
White collar	67.6	25	34.7	34	45.5	20	37.9	25
Blue collar	32.4	12	65.3	65	54.5	24	62.1	41

9.2. Self-rated functional capacity

9.2.1 Overall functional capacity in different age and sex groups

The various dimensions of functional capacity showed very similar trends. Therefore all the details are not presented here, but functional capacity is described as self-rated overall functional capacity, physical functional capacity and psychological functional capacity. The results of the descriptions of a functionally capable person are also presented. Associations between self-rated functional capacity and age, sex, occupational status, health and activities of daily living were analysed by loglinear models. Figures which are presented in text are based on percentage shares. Frequency tables and the estimates of parameters are shown in appendix 4.

According to the loglinear model association was found between age and self-rated functional capacity (figure 5) so that the younger men rated their capacity more often as "good" than the older persons.

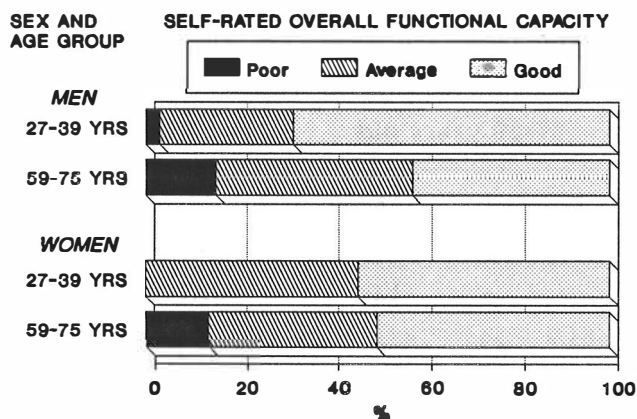


Figure 5. Percentage share of self-rated overall functional capacity in different age and sex groups. (Frequencies and loglinear model in appendix 4, table 1)

When the subjects were asked to compare themselves to their age peers the share of "better" and "worse" ratings was increased among the older subjects. Instead, association with sex was not found (figure 6). A slight tendency, though not statistically significant, to "optimism" is seen among the older women and men one fifth of them rating their functional capacity as better than that of their age peers'.

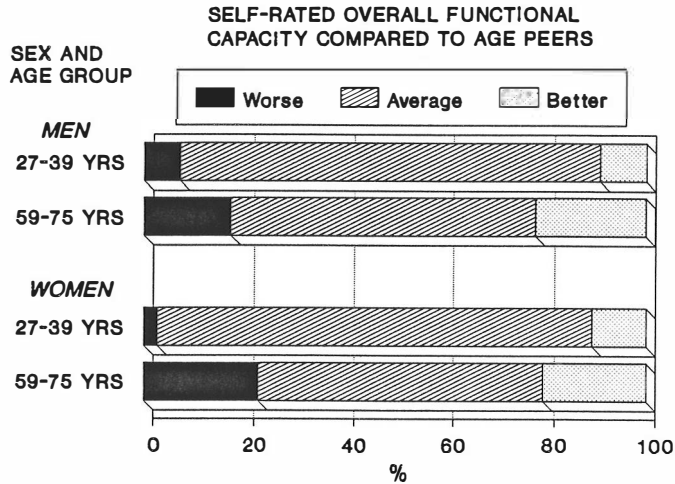


Figure 6. Percentage share of self-rated overall functional capacity compared to age peers in different age and sex groups. (Frequencies and loglinear model in appendix 4, table 2)

The subjects' opinions of a person with good functional capacity was solicited by an open-ended question and four types of responses were found. In most cases a person with good functional capacity was described positively (feeling-state oriented). "A person who has a good functional capacity is alert, vital and active" (a 36-year-old man). "Always new wind in their sails" (a 70-year-old woman). The second type of a response phrased what a person with a good functional capacity should be able to do (performance oriented). "She can carry on her usual daily activities without feeling tired and takes difficulties as a challenge" (a 30-year-old woman). "She can run and work from dawn till dusk without feeling exhausted and still feels fine" (a 72-year-old woman). In some fewer cases functional capacity was described as a state free of obstacles, e.g. an illness (symptom oriented). There were also some responses which combined positive descriptions with those detailing the absence of an obstacle to functioning. A more detailed description of the distribution of the responses in the age and sex groups is shown in table 7.

Table 7. *Description of a functionally capable person in different age and sex groups.*

Description	27-39 years old				59-75 years old			
	Women (N=32)		Men (N=88)		Women (N=40)		Men (N=61)	
	N	%	N	%	N	%	N	%
Feeling-state oriented	18	48.6	46	46.5	23	52.3	32	48.5
Performance oriented	14	37.8	39	39.4	16	36.4	24	36.4
Symptom oriented			2	2.0	1	2.3	4	6.1
Feeling-state + symptom oriented			1	1.0			1	1.5
No response	5	13.5	11	11.1	4	9.1	5	7.6

9.2.2. Physical and psychological functional capacity in different age and sex groups

The results of the various dimensions within the physical as well as psychological functional capacities showed the same trend. Hence, summed indices were formed from both of them (the summed up scores were grouped into three classes, good, average, poor, each of which including one third of the observations). It can be seen that physical functional capacity (figure 7) is more easily rated as "bad" than psychological capacity (figure 8). The figures also show that the differences between the young and old men were clearer than those between the young and old women. According to the loglinear model, self-rated physical functional capacity was associated only with age but not with sex, so that the proportion of those who rated their physical functional capacity as "good" was smaller in the older age group (figure 7). Regarding self-rated psychological functional capacity the same result was found (figure 8).

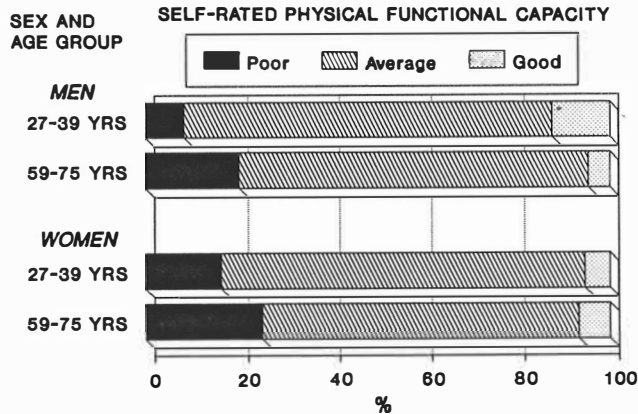


Figure 7. Percentage share of self-rated physical functional capacity in different age and sex groups. (Frequencies and loglinear model in appendix 4, table 3)

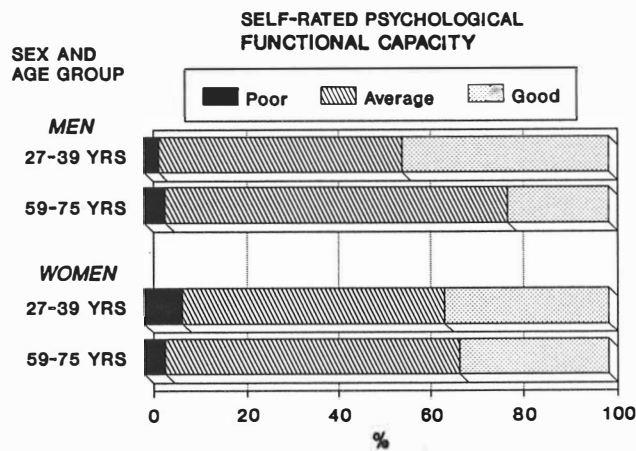


Figure 8. Percentage share of self-rated psychological functional capacity in different age and sex groups. (Frequencies and loglinear model in appendix 4, table 4)

The means and standard deviations of mental balance and its four dimensions are presented in table 8. The results show that the composite score for mental balance was best among the younger men and worst among the older women. A number of differences between the groups in the different dimensions of mental balance were also found. With regard to positive mental health, the men in both age groups had the advantage over the women with the older women having the lowest positive mental health. Further, in respect to personal trait anxiety, the

younger men had a lower level of anxiety than the younger women. In addition, the men had higher self-respect than the women.

Table 8. *Mental balance and its different dimensions in different age and sex groups (means, standard deviations and results of analysis of variance (AV) and LSD analysis).*

	27-39 years old		59-75 years old		AV p
	a Women (N=34) x̄ SD	b Men (N=86) x̄ SD	c Women (N=35) x̄ SD	d Men (N=56) x̄ SD	
Mental balance ¹	36.5 ± 15.3	42.1 ± 15.5 ^(b-c)	33.3 ± 13.1	39.9 ± 16.1	.07
Positive mental health ¹	51.2 ± 6.2	52.0 ± 6.8 ^(b-c)	48.5 ± 5.7 ^(c-d)	52.1 ± 7.6	.10
Personal trait anxiety ²	39.0 ± 7.4 ^(a-b)	35.6 ± 6.7	37.8 ± 7.1	36.3 ± 7.5	.09
Social fears ²	41.4 ± 9.4	37.8 ± 10.2	41.5 ± 9.6	40.5 ± 9.2	.12
Self-respect ¹	25.8 ± 4.2 ^(a-b)	27.3 ± 3.5 ^(b-c)	25.4 ± 4.3 ^(c-d)	27.2 ± 3.5	.03

1) low score = bad result

2) low score = good result

* p<.01

Correlations between symptoms (see Appendix 1, page 7) and mental balance showed that a high number of symptoms was associated with high personal trait anxiety and a high rate of social fears while fewer symptoms had high correlations with good positive mental health and high self-respect (Table 9).

Mental balance had fairly high correlation with the various dimensions of self-rated functional capacity (Appendix 5) and was therefore selected for further analysis as an explanatory factor of self-rated functional capacity.

Table 9. *Correlation coefficients between symptoms and mental balance in different age and sex groups.*

	27-39 years old		59-75 years old	
	Women (N=34) r	Men (N=86) r	Women (N=35) r	Men (N=56) r
Mental balance ¹	-.110	-.365***	-.158	-.560***
Positive mental health ¹	.329*	-.201*	-.356*	-.110
Personal trait anxiety ²	-.431**	.420***	.139	.487***
Social fears ²	.167	.286**	.232	.365**
Self-respect ¹	-.359*	-.082	-.018	-.098

1) low score = bad result

2) low score = good result

* p<.05

** p<.01

*** p<.001

9.3. Self-rated functional capacity and occupational status

The subjects were classified into white and blue collar groups (white collar = monthly paid, blue collar = manual workers). In these two occupational groups the results of overall functional capacity were different for the women and the men. According to the loglinear model a high self-rating of overall functional capacity was associated with high occupational status among the women (figure 9). On the other hand, figure 10 shows that among the men especially among blue collar workers age was associated with self-rated functional capacity. The proportion of those who rated their capacity as "good" was greater among the younger and the proportion of those who rated it as "poor" greater among the older men.

Among the women the occupational status was not associated with self-rated physical functional capacity according to the model. Instead, the results showed that the younger women rated their capacity mostly as "average" whereas the older women rated theirs as "good" or "poor" in both occupational groups (figure 11). In addition, the share of "poor" ratings was greater, though not statistically significantly, among blue as compared to white collar workers. Among the men age but not occupation was associated with self-rated physical functional capacity according to the loglinear model, the younger men having a "good" rating more often than the older men (figure 12). The figure also shows that young blue collar men rate their capacity as "good" more often than the others.

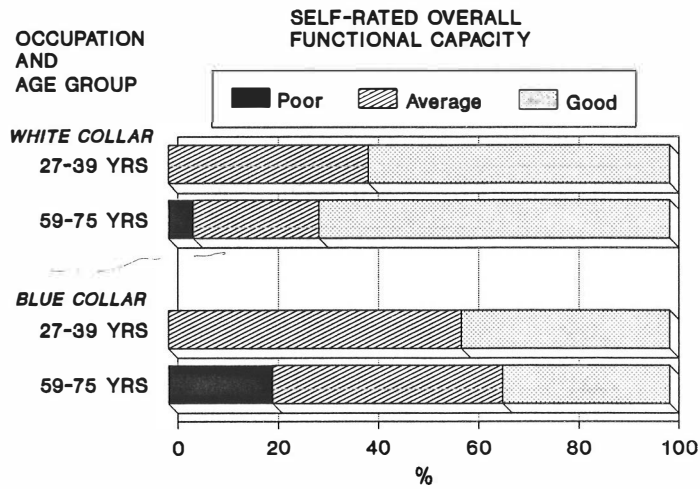


Figure 9. Percentage share of overall functional capacity in different age and occupational groups among women. (Frequencies and loglinear model in appendix 4, table 5)

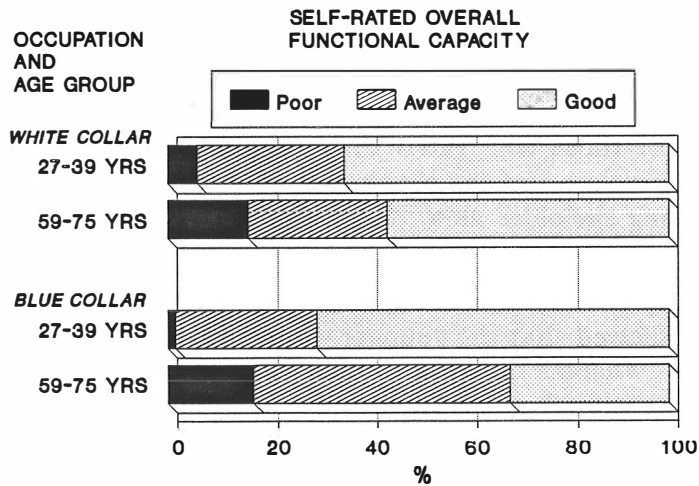


Figure 10. Percentage share of self-rated functional capacity in different age and occupational groups among men. (Frequencies and loglinear model in appendix 4, table 6)

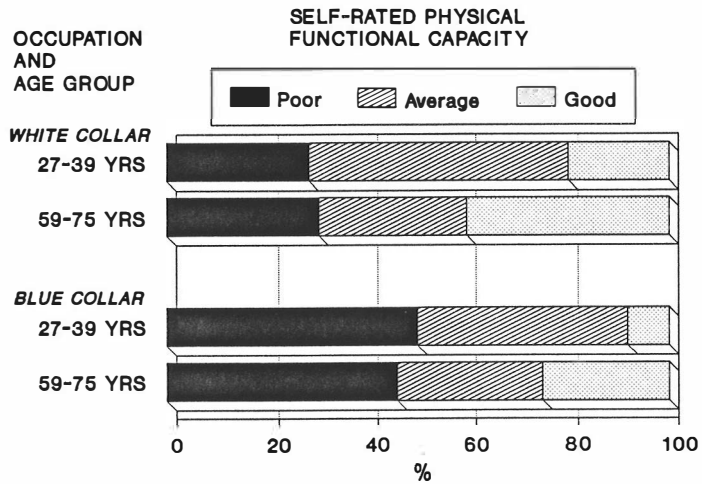


Figure 11. Percentage share of self-rated physical functional capacity in different age and occupational groups among women. (Frequencies and loglinear model in appendix 4, table 7)

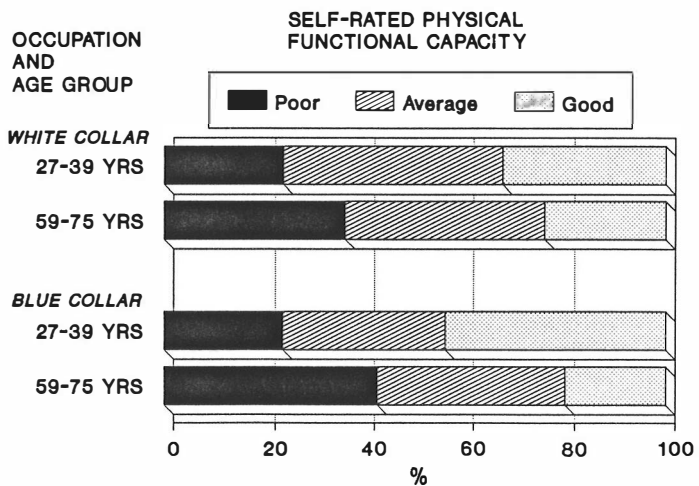


Figure 12. Percentage share of self-rated physical functional capacity in different age and occupational groups among men. (Frequencies and loglinear model in appendix 4, table 8)

The loglinear model did not show any association between occupational status and self-rated psychological functional capacity either among the women (figure 13) or the men (figure 14). Instead, an association was found between self-rated psychological capacity and age, the younger men rating their capacity mostly as "good" or "average" and the older, especially blue collar workers, as "poor".

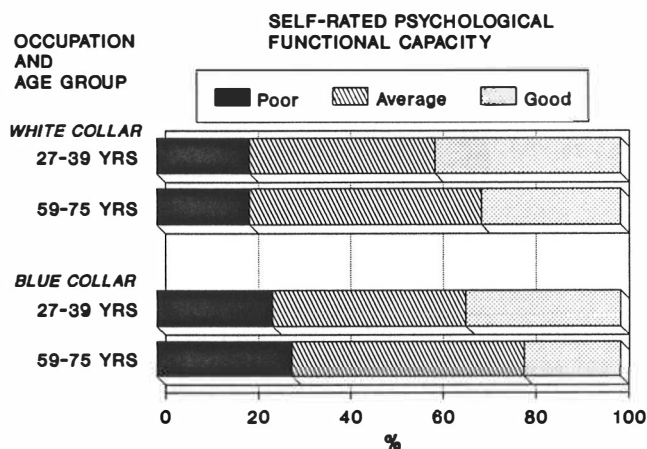


Figure 13. Percentage share of self-rated psychological functional capacity in different age and occupational groups among women. (Frequencies and loglinear model in appendix 4, table 9)

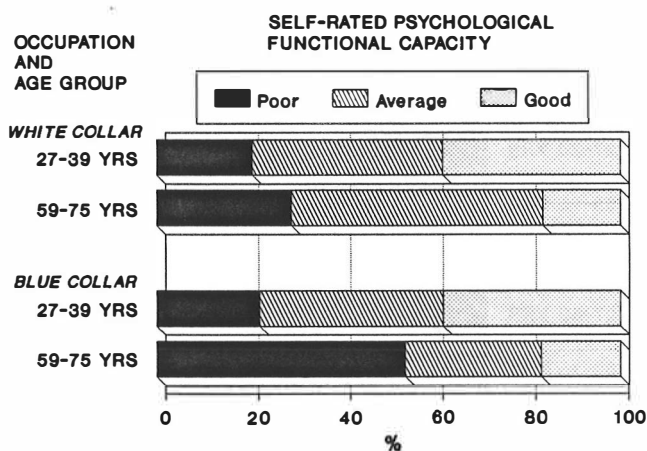


Figure 14. Percentage share of self-rated psychological functional capacity in different age and occupational groups among men. (Frequencies and loglinear model in appendix 4, table 10)

The means and standard deviations of the various dimensions of mental balance among the different occupational groups are shown in tables 10 and 11. Among the women the analysis of variance showed differences between occupational groups in positive mental health. LSD analysis showed that both young and old white collar workers had higher positive mental health than the older blue collar workers (Table 10). Among the men differences in mental balance were found between the younger white and blue collar workers. In addition, the younger white collar workers had less social fears than the older blue collar workers (Table 11).

Table 10. *Different dimensions of mental balance in different age and occupational groups among women (means, standard deviations and results of analysis of variance (AV) and LSD analysis).*

	27-39 years old				59-75 years old				AV p
	a		b		c		d		
	White collar (N=20) \bar{x}	SD	Blue collar (N=7) \bar{x}	SD	White collar (N=13) \bar{x}	SD	Blue collar (N=10) \bar{x}	SD	
Mental balance ¹	38.1	± 14.7	31.7	± 17.4	34.3	± 14.6	32.0	± 11.4	.63
Positive mental health ¹	52.0	± 6.3** ^(a-d)	48.9	± 5.7	50.5	± 5.8* ^(c-d)	45.9	± 4.5	.03
Personal trait anxiety ²	38.0	± 6.9	41.2	± 8.3	38.6	± 6.8	36.9	± 7.5	.54
Social fears ²	40.5	± 8.7	43.3	± 11.1	42.5	± 9.0	40.4	± 10.3	.79
Self-respect ¹	26.7	± 3.6	23.9	± 5.1	26.0	± 2.4	24.9	± 5.6	.30

1) low score = bad result * p<.05
2) low score = good result ** p<.01

Table 11. *Different dimensions of mental balance in different age and occupational groups among men (means, standard deviations and results of analysis of variance (AV) and LSD analysis).*

	27-39 years old		59-75 years old		AV p
	a	b	c	d	
	White collar (N=29) x̄ SD	Blue collar (N=49) x̄ SD	White collar (N=19) x̄ SD	Blue collar (N=19) x̄ SD	
Mental balance ¹	47.1 ± 15.2	39.2 ± 15.1 ^{*(a-b)}	38.1 ± 16.9	41.7 ± 15.5	.13
Positive mental health ¹	53.1 ± 7.2	51.4 ± 6.5	52.2 ± 5.5	52.1 ± 9.1	.77
Personal trait anxiety ²	34.5 ± 7.2	36.1 ± 6.4	37.5 ± 7.9	35.5 ± 7.3	.48
Social fears ²	35.3 ± 9.9 ^{*(a-d)}	39.1 ± 10.2	40.3 ± 9.2	40.6 ± 9.3	.15
Self-respect ¹	27.7 ± 3.6	27.1 ± 3.4	27.2 ± 3.6	27.2 ± 3.4	.88

1) low score = bad result

2) low score = good result

* p<.05

9.4. Self-rated overall functional capacity and some life style factors

Physical activity was chosen as the life style factor for this study and the data gathered are presented for the different age and sex groups in appendix 6.

Self-rated overall functional capacity showed high correlations with the self-ratings of physical and psychological functional capacity in all the age and sex groups except for physical functional capacity in the older women's group (appendix 7) and was selected to represent self-rated functional capacity in further analyses.

The positive association of intensive physical activity with self-rated functional capacity was pronounced among the younger women (figure 15); the proportion of those rating their functional capacity as "average" was smaller among the physically active ones. Among the men, age was associated both with physical activity and self-rated functional capacity according to the model (figure 16).

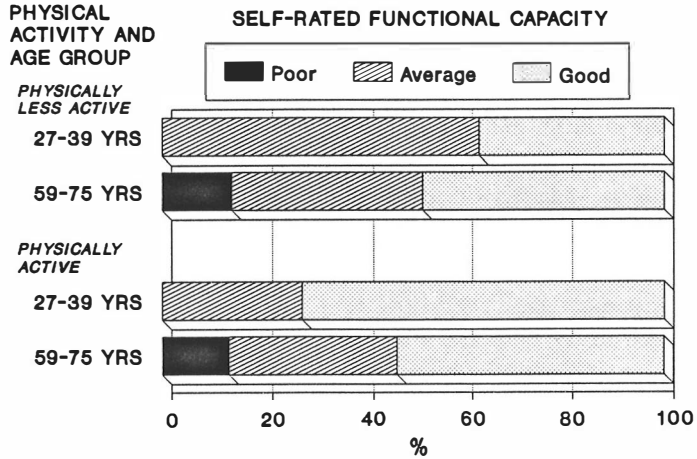


Figure 15. Percentage share of self-rated functional capacity according to physical activity among women. (Frequencies and loglinear model in appendix 4, table 11)

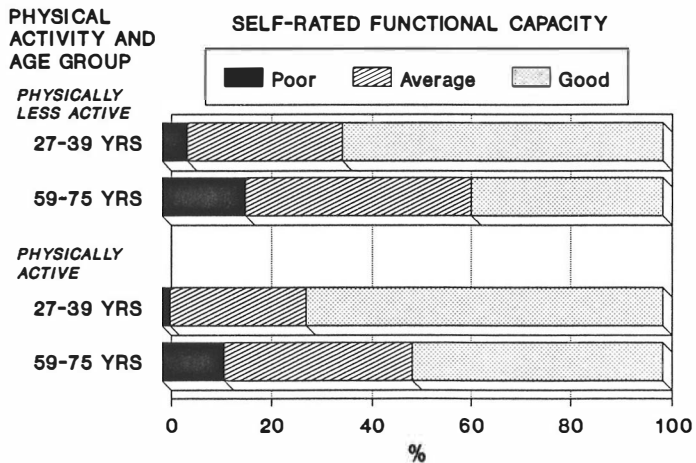


Figure 16. Percentage share of self-rated functional capacity according to physical activity among men. (Frequencies and loglinear model in appendix 4, table 12)

9.5. Self-rated overall functional capacity and health status

The data for health status in the different age and sex groups are presented in appendix 8. Because health status was associated with occupational status, the association between self-rated functional capacity and health status was analysed separately according to occupational status.

The loglinear models showed that among the women self-rated functional capacity was associated only with occupational status (figure 17) and not with the prevalence of chronic diseases. Instead, among the men, regardless of occupational status, the knowledge of their own chronic diseases decreased the share of those who rated their overall functional capacity as "good" (figure 18).

Among the women the share of "good" ratings of functional capacity was greater among the white collar workers without symptoms and the share of "poor" ratings greater among the blue collar workers with symptoms (figure 19), whereas among the men the loglinear model showed that, regardless of occupational status, symptoms were associated with the lowest assessments of self-rated functional capacity (figure 20).

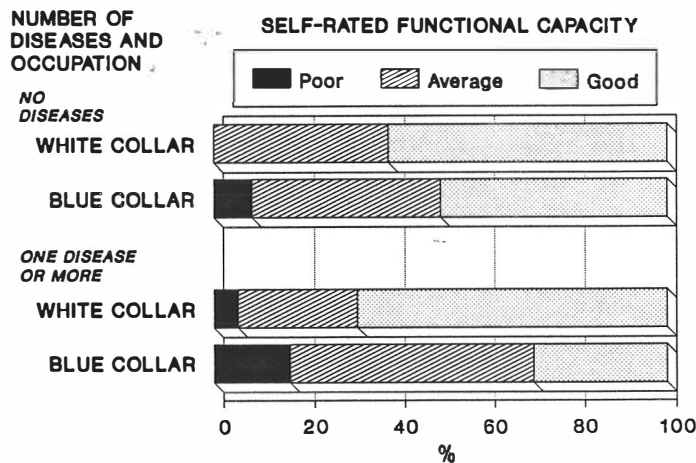


Figure 17. Percentage share of self-rated functional capacity according to prevalence of chronic diseases in different occupational groups among women. (Frequencies and loglinear model in appendix 4, table 13)

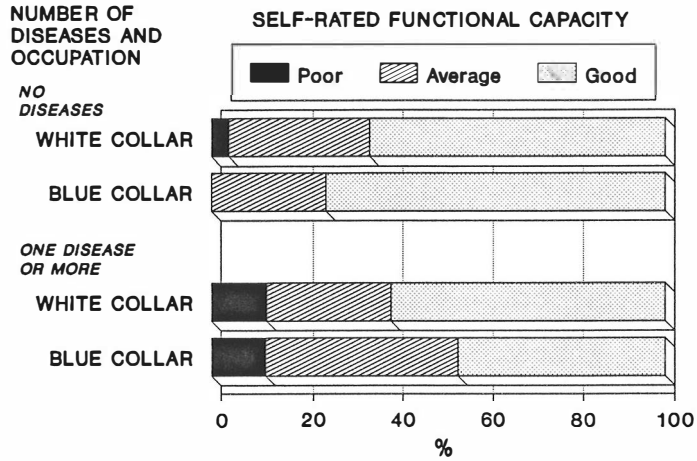


Figure 18. Percentage share of self-rated functional capacity according to prevalence of chronic diseases in different occupational groups among men. (Frequencies and loglinear model in appendix 4, table 14)

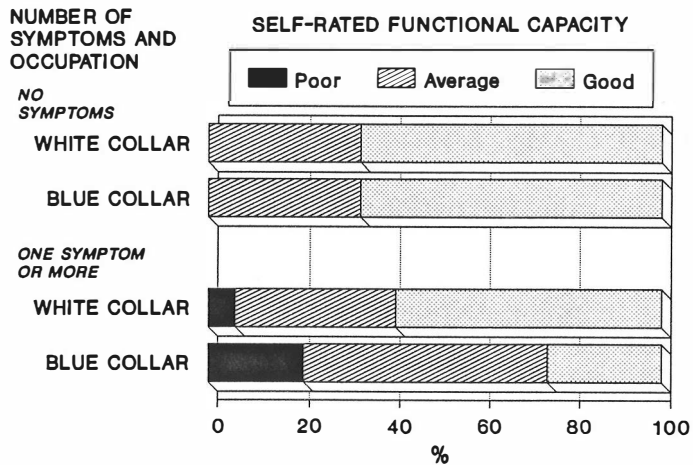


Figure 19. Percentage share of self-rated functional capacity according to prevalence of symptoms in different occupational groups among women. (Frequencies and loglinear model in appendix 4, table 15)

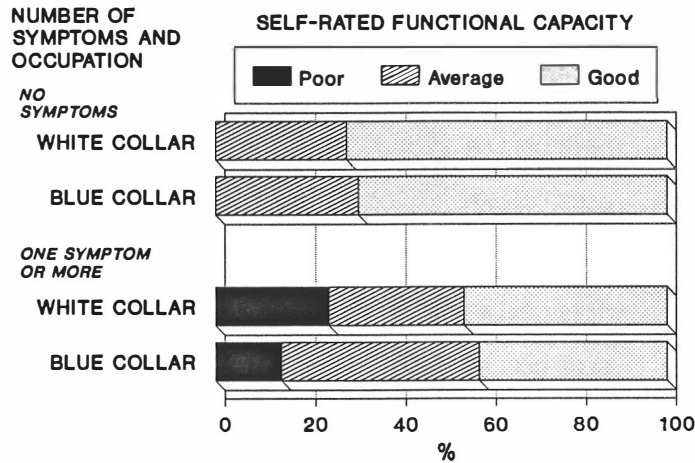


Figure 20. Percentage share of self-rated functional capacity according to prevalence of symptoms in different occupational groups among men. (Frequencies and loglinear model in appendix 4, table 16)

9.6. Self-rated functional capacity and coping with daily activities

The data concerning the performance of daily activities in the different age and sex groups are presented in appendix 9. Because the activities had relatively high intercorrelations (Appendix 10), walking and carrying shopping were selected for further analyses as representing the two different kinds of daily activities (getting around and lifting) involved in this study.

According to loglinear models a good ability to walk without pausing to rest was associated with good overall functional capacity both among the women (figure 21) and the men (figure 22). Similarly, the good ability to carry shopping for half a kilometer without pausing to rest was associated with a good self-rating of functional capacity among the women (figure 23). Figure 24 shows the same among the older men but the loglinear model, however, showed association only between self-rated functional capacity and age.

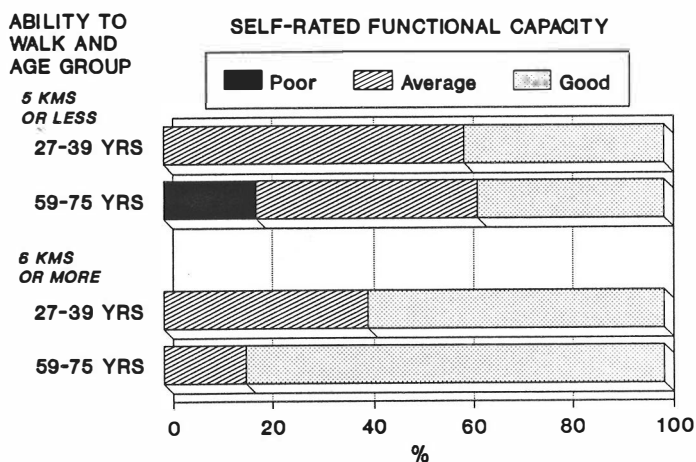


Figure 21. Percentage share of self-rated overall functional capacity according to ability to walk in different age groups among women. (Frequencies and loglinear model in appendix 4, table 17)

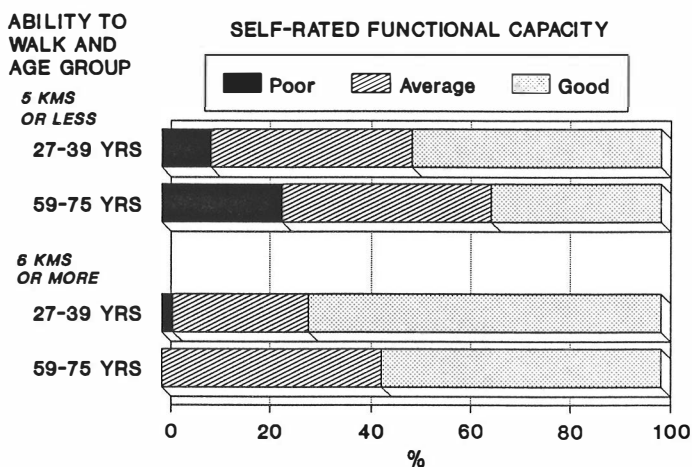


Figure 22. Percentage share of self-rated overall functional capacity according to ability to walk in different age groups among men. (Frequencies and loglinear model in appendix 4, table 18)

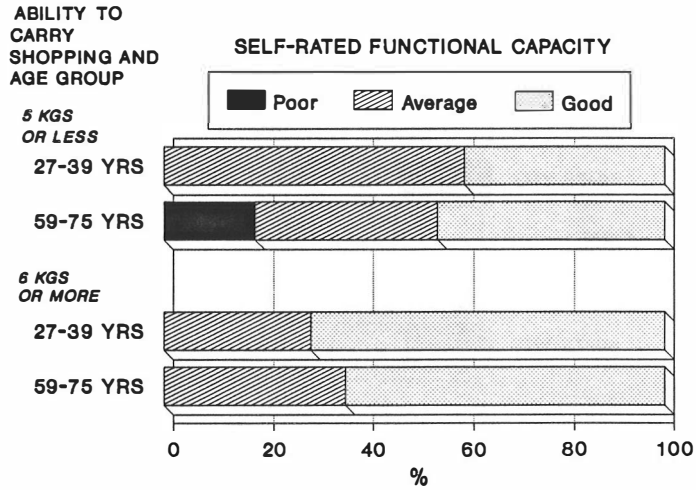


Figure 23. Percentage share of self-rated overall functional capacity according to ability to carry shopping in different age groups among women. (Frequencies and loglinear model in appendix 4, table 19)

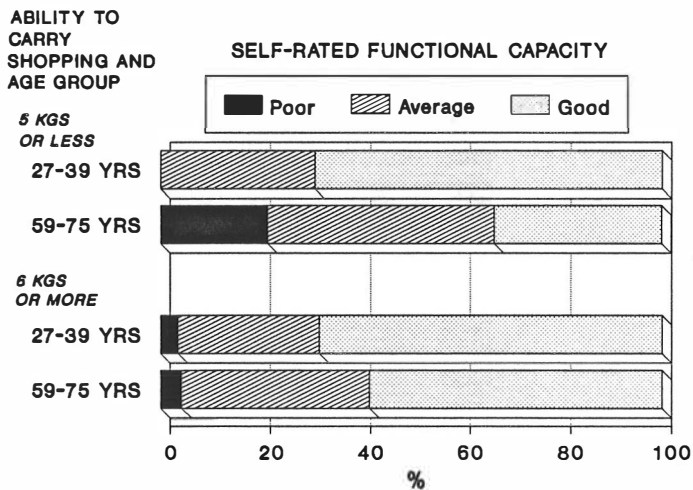


Figure 24. Percentage share of self-rated overall functional capacity according to ability to carry shopping in different age groups among men. (Frequencies and loglinear model in appendix 4, table 20)

9.7. Self-rated and clinical functional capacity

The clinical assessment of functional capacity consisted of several physiological and psychophysiological tests the means and standard deviations of which are presented for the different age and sex groups in appendix 11.

For a more particular examination of the relations of self-rated functional capacity to the laboratory measurements, the absolute test results were converted to T-points, which are shown in respect to self-rated functional capacity in figures 25-28. In the different age and sex groups there appeared to be some differences as to which tests gave good results in the laboratory measurements among those with good self-rated functional capacity.

The laboratory tests which most clearly showed the same trend with self-rated functional capacity were, in order of importance, reaction time, vibratory threshold, speech understanding, digit symbol and diastolic blood pressure among the younger women; the various blood pressure measurements and lens accommodation among the younger men; digit symbol, digit span and balance among the older women; digit span, diastolic blood pressure, digit symbol and near sight among the older men. Among the younger women there were more laboratory tests which showed the same trend with self-rated functional capacity than among the other groups. Among the most important tests showing the same trend as self-rated functional capacity, the digit symbol and diastolic blood pressure tests (systolic blood pressure in the case of the older women) were common in all groups. In addition, digit span was common to both older age groups.

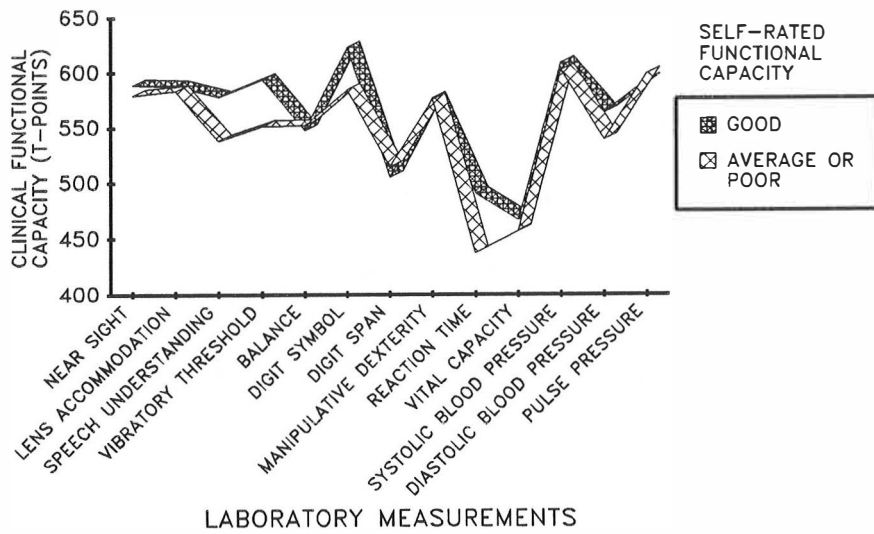


Figure 25. Clinically measured functional capacity (T-values) according to self-rated functional capacity among 27-39-year-old women.

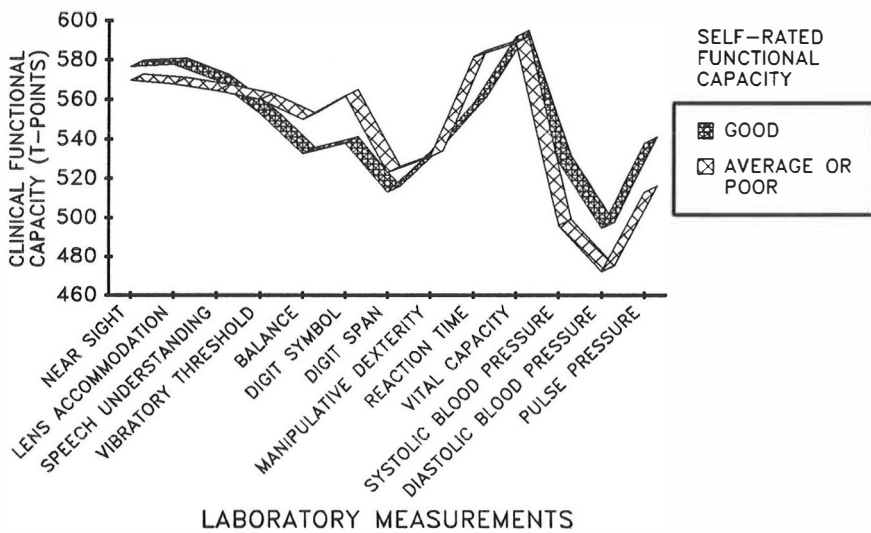


Figure 26. Clinically measured functional capacity (T-values) according to self-rated functional capacity among 27-39-year-old men.

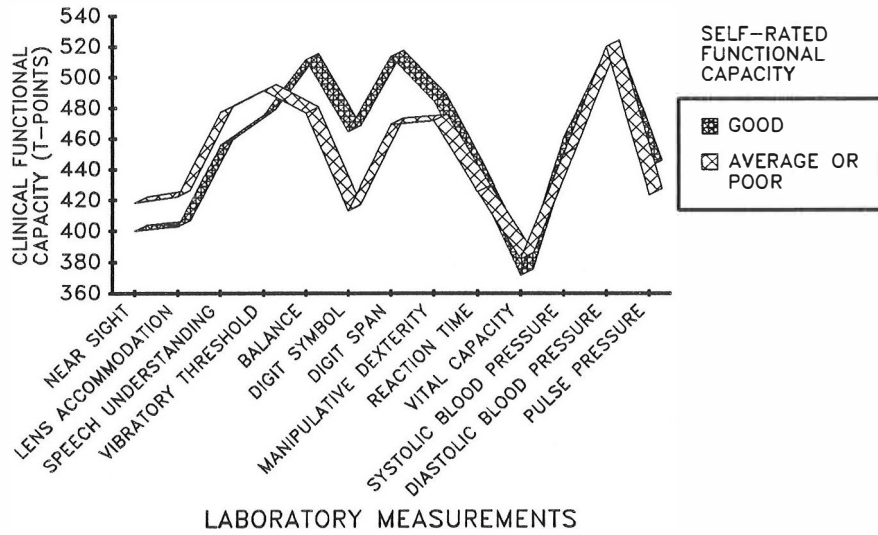


Figure 27. Clinically measured functional capacity (T-values) according to self-rated functional capacity among 59-75-year-old women.

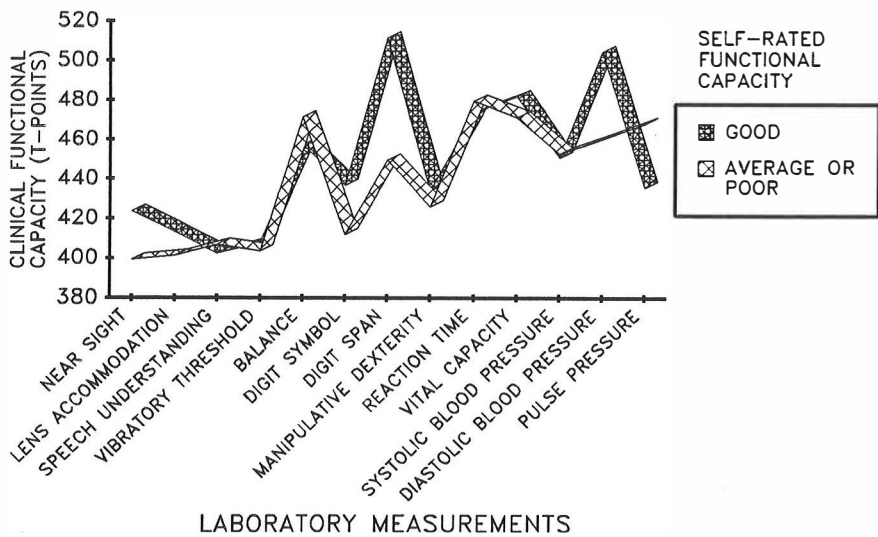


Figure 28. Clinically measured functional capacity (T-values) according to self-rated functional capacity among 59-75-year-old men.

9.8. Predictors of self-rated functional capacity

For further analysis of the associated factors of self-rated functional capacity a regression model was constructed. On the basis of correlations and the relevance of their content to self-rated overall functional capacity ten independent variables were selected for the model. These were age, occupational status, symptoms, status of locomotor organs, intensity of physical activity, walking, carrying shopping, mental balance, maximal oxygen uptake, and body flexion.

A stepwise technique was used, according to which only the statistically significant independent variables are accepted at a five per cent risk level. Among the younger women the ability to carry shopping and the intensity of physical activity were statistically significant predictors of self-rated functional capacity explaining 64 per cent of total variation (table 12). Among the younger men mental balance and occupational status explained 29 per cent of total variation (table 12). In the older age groups, the ability to carry shopping and maximal oxygen uptake explained 86 per cent of total variation among the women whereas among the men the intensity of physical activity and age explained 41 per cent of total variation (table 13).

Table 12. *Regression model predicting self-rated functional capacity among 27-39-year-old women and men. Regression coefficients (b), standard errors in brackets and standardized regression coefficients (β).*

Independent variables	27-39 years old			
	Women (N=37)		Men (N=99)	
	b	β	b	β
Carrying shopping	-.50 (.16)	-.51**		
Intensity of physical activity	-.38 (.13)	-.50**		
Mental balance			-.03 (.007)	-.55***
Occupational status			-.36 (.16)	-.29*
CONSTANT	4.74 (.52)		3.83 (.46)	
R ²	.64		.29	

* p<.05

** p<.01

*** p<.001

Table 13. *Regression model predicting self-rated functional capacity among 59-75-year-old women and men. Regression coefficients (b), standard errors in brackets and standardized regression coefficients (β).*

Independent variables	59-75 years old			
	Women (N=44)		Men (N=66)	
	b	β	b	β
Carrying shopping	-1.14 (.20)	-.76***		
Maximal oxygen uptake	.004 (.001)	.32*		
Intensity of physical activity			-.35 (.12)	-.47**
Age			-.08 (.03)	-.42*
CONSTANT	3.17 (.96)		8.61 (1.97)	
R ²	.86		.41	

* p<.05

** p<.01

*** p<.001

10. DISCUSSION

10.1. Assessment of self-rated functional capacity

Over the years several indices of health have been developed for different purposes. Self-rated health has long been an object of research, especially among the elderly. Although functional capacity has generally been considered as one dimension of health, and has increasingly been studied clinically, the self-rating of functional capacity has been the main object of only few research projects (e.g. Eskelinen et al. 1985). Health is, however, a multidimensional concept and should be measured as such. This study of self-rated functional capacity was thus designed to supplement existing knowledge about people's health status.

The research design in this study was influenced by earlier studies of self-rated health since no earlier studies of self-rating in respect of functional capacity were available. The formulae for some of the questions concerning self-rated health were drawn from earlier studies. New questions and new formulations were also constructed. The purpose was to study self-rated functional capacity multidimensionally starting with a general question as to what people thought their functional capacity was like, and then continuing to more specific questions about the state of the locomotor organs, working capacity and, finally, to specific details of physical and psychological functional capacity. To get more concrete information about the functional capacity of the target population the capacity to carry on daily activities such as walking, jogging, carrying shopping, lifting a burden, heavy cleaning work, were also measured. In the final analyses, however, the activities of daily living were used as independent variables (see Lichtenstein and Thomas 1985 page 19).

The difficulty of formulating questions concerning the activities of daily living was also met. The reason for this was the difference in age between these two age groups. As we already know on the basis of clinical measurements, age groups may differ a lot from each other in respect to some tasks while in others no substantial differences are seen. These differences and similarities should be known when formulating questions. In any case, it is questionable to compare the different age groups, at least using the results of one group as the criteria for another. It is, however, useful to know the performance levels in all age groups.

The important information from the practical point of view is the level of an individual's capacity and what effect it has on that person's life.

The rules according to which an individual evaluates and assesses his or her own functional capacity are not as well known as the criteria for clinical measurements. They are difficult to verbalize. The general question of what people think their functional capacity is like, is obviously more abstract than the question of how well they think they can carry out their daily activities.

Taking into consideration that a general question concerning one's functional capacity is difficult to answer, the subjects in this study answered rather commendably the open-ended question concerning the description of a functionally capable person. The variation in zero response was between 8-14 per cent depending on the group. The reason for the high response rate was obviously the interview at the beginning of the laboratory tests when the subjects were asked by the interviewer to consider the unanswered questions again. The response percentage is usually much lower in open-ended questions.

Knowledge of the reliability of the questions concerning self-assessment exist on the basis of previous studies. Eskelinen et al. (1985) studied employees' self-assessed working capacity and health and their results indicated a generally good degree of reliability to both parameters at group level. Thus they endorse the use of the questionnaire in comparing the various occupational groups.

According to Heyman and Jeffers (1963) self-ratings are comparatively stable over time. In addition Lichtenstein and Thomas (1987) observed that both perceived and functional health measures (ADL) remain fairly stable over the course of one year, with functional health status exhibiting significantly greater stability than perceived health. According to their experience changes in perceived health over a one-year period are less prominent in the direction of poorer health status than are changes in functional health. In the present study the reliability coefficients of questions measuring the activities of daily life also showed very high correlations between test and retest over one month.

The clinical tests which were used in this study had all been used previously in a number of studies. Their reliability is relatively high with the exception of the balance test measured by standing on one foot with the eyes closed.

10.2. Generalizability of the results

In this study the subjects were drawn from the youngest and the oldest groups of the METELI study. Industry presents a rather multifarious selection of types of work and working environments. According to the

METELI researchers (1977) those working in the metal industry were considered to represent the main social strata in the Finnish society.

In 1978, when functional capacity was included, the rate of participation was 84 per cent out of the original METELI sample. In 1984 77 per cent of this proportion participated in the functional capacity measurements. It is generally accepted that drop-outs from follow-up studies are usually among the worst performing subjects. Therefore the results picture the subjects as better than they are in reality. The nonparticipation rate was relatively large in this study. The differences between the nonparticipants and participants were therefore carefully studied in respect to health, occupational status and age. Among the older subjects the number of nonparticipants was so small that no conclusions about health status affecting the nonparticipation rate could be drawn. In the younger age group the subjects' willingness was probably not affected by their health status. In the older age group death and in the younger age group a personal shortage of time and migration away from the area are the main factors explaining nonparticipation.

10.3. Self-rated functional capacity and age

With regard to self-rated health, which has frequently been the object of health research, mostly older people have so far been involved. The advantage of this study is the participation of two age groups thus permitting a gerontological perspective into the study.

In self-rated functional capacity, including overall functional capacity and its dimensions, a small difference was found between the age groups with the older having more "poor" ratings than the younger. When the subjects were asked to compare themselves to their age peers a slight tendency to "optimism" among the older age groups was also seen in the various dimensions of self-rated functional capacity. Earlier studies support these results (e.g. Shanas et al. 1968, Cockerham et al. 1983) and, according to some reports on self-assessed health (e.g. Cockerham et al. 1983) people begin to define their health as much better than others of their age soon after the sixth decade. The ratings become even better the older the people in question. This has been explained by selection or aspiration level as was referred to earlier in the overview of the literature. Thus, appraisals of health and functional capacity seem to be linked.

Lehr (1983) stated that the negative attitude of younger age groups to older people are causing stereotypical behavior by the elderly, and to be able even to survive the elderly have to violate these norms. While it seems at present, on the basis of this study, that the elderly themselves do not think very negatively of their functional capacity, we should nonetheless support positive thinking in a society in which

the percentage share of older people is continuously increasing. After all, it is the assessment of one's own functional capacity that among older people guides perceptions of the need for social services as well as for participation in activities designed to maintain/improve health and functional capacity among different age groups. The better the self-ratings are the less probable is the need for health and social care services and the more probable the need for organized activities which, for their part, support functional capacity.

An interesting fact is that the demands of a functionally capable person seem to be quite high among this study population, even among the older members e.g., a 72-year-old lady's response: "She can run and work from dawn till dusk without exhaustion and feels fine". In addition to these performance oriented responses, feeling-state oriented ones also had their sight set high in their opinions about functionally capable people, e.g.: "a functionally capable person is alert, vital and active", "always new wind in their sails". Baumann (1961) interpreted this tendency by reference to a highly performance-oriented industrialized society two decades ago in her study. Today, youthfulness, fitness, and being active are very dominant values in our society, and may go far towards explaining the responses obtained here.

The self-assessment of one's health by elderly persons appears to be based largely on comparison with peers (e.g. Maddox 1962, Shanas et al. 1968, Fillenbaum 1979). Since a self-assessed measure is a relative scale, even if an individual's health deteriorates resulting in more frequent illness or more health expenditure, a person's view of his or her health relative to that of others of the same age may not change or indeed may improve if the health of the comparison group is perceived as declining faster (Lichtenstein and Thomas 1987).

In this study two age groups were studied. In fact, they were not only two different age groups but two groups with different historical backgrounds. This was also seen in the results so that, e.g. the older women were relatively more satisfied with their functional status than the younger. This is very logical if we look at their life experience. The older people may have experienced more poverty and poor living conditions, and more illnesses in their youth. With these experiences behind themselves they may feel very satisfied with their present relatively comfortable life situation, which is then also reflected in a good self-rating of functional capacity. Another example of the differences between age groups, which may be due to a different personal history background, was seen in self-rated ability to do heavy cleaning work. About the same percentage share of younger and older women reported some difficulties with cleaning work. However, the hypothesis on the basis of knowledge about the older women's lower clinically measured functional capacity, was that they would have most difficulties.

10.4. Self-rated functional capacity and sex

Differences were also found between sex groups in self-rated functional capacity. Young men differed from their age peer women and also from all other groups in rating their functional capacity, including its different dimensions, as "good" more often than did the others. Differences between the women and the men were also seen in mental balance. Higher personal trait anxiety and a higher amount of social fears were found among the women, whereas high positive mental health and high self-respect were associated with the men. With respect to the index of mental balance, the men, particularly the younger men, had better results than the women. These differences may be the result of a different personality structure based on higher self-esteem and a stronger belief in their own abilities among men. On the other hand, modesty and realism have often been cited as the characteristic traits of women. However, differences may also be due to the test battery. The questionnaire included emotionally loaded statements which may have different meanings for women and men. In addition, the variance of the scores among different dimensions of mental balance was quite large. Therefore carefulness in drawing conclusions should be kept in mind.

Interestingly, the women showed smaller differences between the age groups than the men. This difference is also familiar from the study of Marin (1988) concerning gender differences in sport and movement in Finland. This may also be due to the different personality structures of women and men, with women having a better ability to adapt to prevailing circumstances.

Worth noting was the result that different factors predicted self-rated functional capacity among the younger men compared to the others. Women's and older men's self-ratings were predicted by factors of a more physiological nature to be discussed more thoroughly later. Instead, younger men's self-ratings were predicted by mental balance which is of a more psychological nature. The important role of social position in the younger men's lives was seen in that occupational status was another significant predictor of self-rated functional capacity.

10.5. Self-rated functional capacity and occupational status

Among the women occupation seemed to be associated with the self-ratings much as it had earlier been found to be associated with clinical functional measurements. Thus the white collar workers had higher self-rated functional capacity than the blue collar workers. Although

the younger blue collar men had higher self-ratings than their white collar age peers the trend was reversed among the older age groups. As was discussed earlier these different age groups have different historical backgrounds which cannot fail to influence on the differences found between them. With regard to the older male blue collar workers it is likely that their occupational status has also effected on the frailty of these workers, and is thus reflected in their self-ratings of functional capacity. Hasan's (1989) study, which shows that low socioeconomic status is associated with ill health and high mortality rates, firmly supports this conclusion.

The unexpected result among young blue collar men may be due to a contradiction between the objectives as they see them and the realities of their lives. The young blue collar worker still believes in his life possibilities and is full of energy. The older blue collar men have learned the realities of life and their own limitations. However, the older white collar men, who have lived through the same historical time as their blue collar counterparts, showed more positive self-ratings of functional capacity. This is likely to be connected to the success associated with higher social status. This result, however, also corresponds with some earlier research results concerning physical factors e.g. muscle strength in different occupational groups. According to Viitasalo et al. (1985) younger men of low occupational status have more muscle strength than their age peers of higher occupational status. Physically demanding work did not, however, seem to maintain muscle strength over the years and, consequently, among the older age groups a reverse result obtained. The reason for this was supposed to be the favourable effects of leisure physical activity among the higher occupational groups. However, the basic reason for these differences is probably the social status and the possibilities which it allows for a successful life.

Occupational status was also clearly associated with mental balance and its dimensions. Mostly the white collar workers had higher mental balance than blue collar workers. The older female blue collar workers had the lowest mental balance having lower positive mental health and self-respect and more social fears than the others. As to personal trait anxiety the younger blue collar women and the older white collar women had the highest level of anxiety. The reason for this result may be the life situation of these groups. The younger blue collar women may be overloaded with responsibilities in work and family life and the older white collar women, instead, stressed with rapid changes in working life. Among men the white collar status was even more clearly associated with good mental balance compared to women. Thus high social status seem to support at least these dimensions of psychological well-being.

10.6. Self-rated functional capacity and other associated factors

Physical activity was the only life style factor in this study which was associated with self-rated functional capacity. The number of smokers and smoked cigarettes per day as well as the number of heavy drinkers was so small that associations with self-rated functional capacity were not found. Instead, the physically active rated their functional capacity better than the inactive among women.

The effects of physical activity was also reflected in daily activities so that walking was associated with self-rated functional capacity among both sex groups, as well as carrying shopping among women, so that those who were better able to walk and carry shopping rated their capacity better. Walking and carrying shopping are activities which individuals are faced with in every day life and in the process of coping with which they discover their physical limitations.

Low health status, measured by the prevalence of chronic diseases and the number of symptoms, was also associated with low ratings of functional capacity as has been reported earlier by several researchers (e.g. Mechanic 1974, Wan 1976, Webster and Logie 1976, Tissue 1978, Anttila 1989). Age, health, occupational status and self-rated functional capacity are, however, associated with each other in complicated ways. Age and occupational status were separately found to be associated with self-rated functional capacity but the number of subjects studied prevented the simultaneous analysis of all these variables in order to establish their order of importance in respect to the self-rating of functional capacity. In addition, descriptions of a healthy person were very similar to those of a functionally capable person. The conclusion drawn from these results is that people evaluate their health on the basis of their functional capacity. Perhaps after all, the self-rating of health could substituted for the self-rating of functional capacity. That would even be logical, since functional capacity is generally considered as one dimension of health.

10.7. Clinically measured functional capacity and self-rating of functional capacity

The association of laboratory test results with self-rated functional capacity were studied by comparing the T-points of the laboratory test results with the self-ratings. Several tests having the same trend as the self-ratings were found, but were partly different in the different groups. This difference might be explained by the disparate importance of the functions measured for the different groups. There were also factors

common to all groups one of which was the digit symbol which measures short term memory and is important in every day life. Blood pressure was the other important factor common to all groups. The association is not easily explained because blood pressure, even if it is high, does not necessarily cause any symptoms; people can have high blood pressure without knowing it themselves. This association between self-ratings and blood pressure, in this study, may be affected by the other factors associated with blood pressure, e.g. stress symptoms, mental balance etc. which also appeared to have important associations with self-rated functional capacity.

When the explanatory factors for the regression model were taken into consideration, the laboratory measurements used in this study did not play an important role as independent factors of self-rated functional capacity. Fortunately, the data from the METELI-health study collected the year before were available, and maximal oxygen uptake appeared to be a good predictor of self-rated functional capacity among the older women. By applying less strict criteria body flexion had also been incorporated into the regression model as a predictor of functional capacity among the younger women. As far as muscle strength is concerned, these results support the earlier findings of Mälkiä (1983), according to which absolute muscle strength is associated with individuals' own ratings of their physical fitness. In addition the personal perception of one's own health, especially when average or low, was associated with low strength in the trunk muscles in the same study (Mälkiä 1983). Similarly muscle strength is not meaningless when it comes to the ability to carry shopping, which was the best predictor of functional capacity among women. Maximal oxygen uptake, which was the other predictor of self-rated functional capacity among the older women, may also be a hindrance in everyday life when it is low. These results seem to support the idea that the importance of functional capacity and health is not understood before it is restricted and causes difficulties.

The ecological validity of the other laboratory measurements may not have reached a level which would enable them to play so important a role as predictors of self-rated functional capacity as the above-mentioned tests. Among the men the laboratory tests were not statistically significant in predicting self-rated functional capacity.

10.8. Conclusions

According to the results of this study a person with good self-rated functional capacity is physically active, with good health status and rates highly their capacity to carry out the activities of daily life. Differences in self-rated functional capacity existed between age and sex

groups in favour of the younger subjects, and within the age groups in favour of the younger men and older women with the exception of mental balance among the older women. Differences also existed between occupational groups among women so that a higher occupational status was associated with a good, self-rating of functional capacity. Instead among the younger men the blue collar workers rated their functional capacity higher than their white collar counterparts.

The explanatory factors of self-rated functional capacity varied according to the group, being more physical among the women and the older men (intensity of physical activity) and including a psychological factor as well as occupational status among the younger men. Thus women and older men are more likely to be restricted in their physical capacities. The importance of mental capacity and occupation were, on the other hand, emphasized among the younger men.

The descriptions of a healthy person and a functionally capable person correlated highly in this study. Though the concept of functional capacity was explained at the beginning of the questionnaire it may, however, be more difficult to understand than the more familiar concept of health. The respondents, however, very often identified a healthy person on the basis what that person can or cannot do. This is logical enough since many studies consider functional capacity to be one dimension of health. This leads to suggest that it might be sufficient to continue to use the concept of self-rated health rather than that of functional capacity in the future. Research into self-rated functional capacity is not yet, however, at the stage to permit a thorough understanding of concept as a whole, and more research is needed before any decisions to abandon this concept are made.

A number of challenges are open to researchers in this field:

- 1) To gather information about self-rated psychological and social functional capacity in addition to that of psychophysiological capacity studied here.
- 2) To devise and construct new laboratory measurements with higher ecological validity.
- 3) To apply more sophisticated methods, e.g. among qualitative methods, in analysing self-rated functional capacity.
- 4) To carry out further research into specific areas, e.g. mental balance, which has so far been neglected. In this connection it would be useful to gather more specific information about mental balance and associated factors in various age, sex and occupational groups. More specific information about those people who rate their functional capacity as good but do not perform well in laboratory tests and vice versa would also be of great interest.
- 5) To make the concept of function itself the target of further research.

SUMMARY

In recent years functional capacity has increasingly been studied as one dimension of health. This interest has, however, been addressed to clinically measured functional capacity, and thus knowledge about self-rated functional capacity has been lacking so far. As the subjective perception of an individual has gradually gained more acceptance in scientific studies and the importance of personal experience as a guide to an individual's participation in various activities in addition to the use of health services has been taken into account along with objectively measured parameters, interest in self-rating has grown. This study of self-rated functional capacity was designed to supplement existing knowledge about people's health status.

The purpose of this study was to gain information on self-rated functional capacity and associated factors among two age groups of male and female employees in the metal industry. Further, the object of interest was to study the association between clinically measured and self-rated functional capacity.

The subjects were drawn from the original 902 subjects (293 women and 609 men) who participated in the first stage of the 1973 METELI-study. This sample was representative of all the categories of employees at the plant, whose total payroll was then about 4500. The population was stratified by age, sex and occupational status before the disproportionate random sampling took place. The second stage of the METELI study was carried out in 1978 when a functional assessment was also included in the test battery. 748 persons (84 %) of those who were studied in 1973 took part in the second stage of the study. Of those 748 persons, 198 women and men from the youngest age group (born in 1946 or later) participated in the laboratory tests of functional capacity. A year later 143 persons from the oldest age group (born in 1925 or earlier) were tested using the same test battery. Of this total of 341 young and old persons, 247 participated in the tests in 1984.

The data were collected by two questionnaires and laboratory tests. Information about family, education, occupational history, living habits, diseases and symptoms as well as self-ratings of functional capacity were collected by one and data on psychological well-being, including items about life changes, self-realization, personal trait anxiety, social fears, coping, self-respect and purpose of life, by the other questionnaire. The laboratory examination included the functioning of the senses, lungs

and circulation as well as certain psychophysiological functions.

The results showed that age was associated with self-rated functional capacity with the older persons rating their capacity more often as "poor" than the younger, especially men. When the subjects were asked to compare themselves to their age peers a slight tendency to "optimism" was seen among the older age group. This finding is in support of the theory of declining health aspirations which also seems to apply to functional capacity. The differences between age groups were obviously connected with the different historical backgrounds of the subjects so that the more modest demands of the older subjects were reflected in the relatively good ratings of functional capacity.

Differences in self-rated functional capacity were also found between sex groups. Young men, especially, differed from their age peer women in rating their functional capacity as "good" more often. Further, the women showed smaller differences between age groups than the men. This trend is also supported by earlier studies.

Among the women, occupation seemed to be associated with the self-ratings much as it was earlier found to be associated with the clinical functional measurements. Thus, the white collar workers had higher self-rated functional capacity than the blue collar workers. Although the younger blue collar men had higher self-ratings than the younger white collar workers the trend was reversed among the older age group. The unexpected result among young blue collar men may be due to a contradiction between the objectives as they see them and the realities of their lives. The younger blue collar men still believe in their life possibilities and are full of energy. The older blue collar men have learned the realities of life and their limitations. The higher self-ratings of functional capacity among the older white collar men compared to that of their blue collar counterparts may be due to their higher social status and the possibilities which it allows for a successful life.

A physically active life style among the younger women, a good ability to carry on the activities of daily life among all the groups studied, high health status as measured by the prevalence of chronic diseases and the number of symptoms among the men, and high occupational status together with the absence of symptoms among the women were all associated with good self-ratings of functional capacity.

Several laboratory tests showed the same trend as the self-ratings of functional capacity, but they were partly different in the different groups. The differences might be explained by the disparate importance of the functions measured for the different groups. Digit symbol, which measures short-term memory and learning, and blood pressure were for all groups the common factors which showed the same trend with self-rated functional capacity.

The differences between the groups was also seen in respect to

the explanatory factors of self-rated functional capacity. They varied according to group being more physical among the women and the older men (intensity of physical activity, ability to carry shopping, maximal oxygen uptake) and including the psychological factor of mental balance as well as occupational status among the younger men.

This study revealed some interesting results some of which might deserve a more thorough research. It would be of great interest to study those individuals who perform well in laboratory tests and yet, nonetheless, rate their functional capacity low. Mental balance in different age, sex and occupational groups would also merit further study. To this end new methods would also need to be developed. Finally, the concept of function itself might also be a fruitful target of future research.

TIIVISTELMÄ

Mielenkiinto toimintakyvyn tutkimiseen yhtenä terveyden osa-alueena on lisääntynyt. Tutkimuskohteena on kuitenkin ollut kliininen, laboratoriossa mitattu toimintakyky, ja tieto koetusta toimintakyvystä on hyvin puutteellista. Kun yksilön subjektiivinen kokemus on vähitellen hyväksytty myös tieteellisen tutkimuksen kohteeksi ja yksilön omat tuntemukset on kliinisten mittausten rinnalla alettu ottaa huomioon sekä terveystalvelujen että vapaa-ajan harrastusten käytön säätelijöinä, mielenkiinto subjektiivisten arvioiden mittaamiseen on kasvanut. Tämä koettua toimintakykyä selvittävä tutkimus on suunniteltu siten täydentämään tietoamme ihmisten terveydentilasta.

Tutkimuksen tarkoitus oli kartoittaa metalliteollisuudessa työskentelevien, kahteen ikäryhmään kuuluvien naisten ja miesten kokemaa toimintakykyä sekä siihen yhteydessä olevia tekijöitä. Lisäksi mielenkiinnon kohteena oli koetun ja kliinisesti mitatun toimintakyvyn väliset yhteydet.

Tutkittavat olivat METELI-terveystudkimukseen osallistuneiden vanhimpaan ja nuorimpaan ikäryhmään kuuluvia henkilöitä. METELI-tutkimuksen ensimmäiseen vaiheeseen osallistui vuonna 1973 902 henkilöä (293 naista ja 609 miestä). Tämä näyte oli saatu käyttämällä ositettua otantaa iän, sukupuolen ja ammattiaseman mukaan. Tutkimuksen toisessa vaiheessa vuonna 1978 tutkittiin 748 henkilöä niistä, jotka olivat olleet tutkittavina vuonna 1973. Näistä 748 henkilöstä 198 nuorimpaan ikäryhmään (27-39-vuotiaat) kuuluvaa naista ja miestä osallistui toimintakykymittauksiin laboratoriossa. Vuotta myöhemmin 143 vanhimpaan ikäryhmään (59-75-vuotiaat) kuuluvaa naista ja miestä osallistui samanlaisiin toimintakykymittauksiin. Näistä yhteensä 341 nuoresta ja vanhasta henkilöstä 247 osallistui vuonna 1984 mittauksiin, joiden tuloksia tässä työssä esitetään.

Tutkimusaineisto koottiin kahdella kyselylomakkeella sekä laboratoriomittauksin. Toinen kyselylomake sisälsi tiedot perheestä, koulutuksesta, ammattihistoriasta, elintavoista, terveydentilasta sekä koetusta toimintakyvystä. Toisella lomakkeella kartoitettiin psyykkistä toimintakykyä kuten elämänmuutoksia, itsensä toteuttamista, piirreahdistusta, sosiaalisia pelkoja, elämäntilanteiden hallintaa, itsearvostusta ja elämäntarkoitusta. Laboratoriomittauksiin kuului aistien, keuhkojen, verenkierron sekä eräiden psykofysiologisten toimintojen testejä.

Tulosten mukaan ikä oli yhteydessä koettuun toimintakykyyn siten, että vanhemmat henkilöt kokivat toimintakykynsä useammin huonoksi

kuin nuoret. Verratessaan toimintakykyään ikätovereihin vanhemmat olivat "optimistisempia" kuin nuoret. Tämä tulos on sopusoinnussa aspiraatioteorian kanssa, jonka mukaan hyvälle terveydelle asetetut vaatimukset vähenevät iän mukana. Ikäryhmien välisissä eroissa kuvastuneet myös ryhmien erilainen historiallinen tausta, siten että vanhempien henkilöiden vähäisemmät vaatimukset heijastuvat heidän suhteellisen hyvissä arvioissaan toimintakyvystään.

Eroja oli myös sukupuolten välillä. Erityisesti nuoret miehet erosivat ikäisistään naisista ja myös muista arvioiden toimintakykynsä useimmiten hyväksi. Lisäksi naisten keskuudessa ikäryhmien väliset erot olivat pienempiä kuin miesten vastaavat erot. Tämä tulos on tuttu myös aiemmista tutkimuksista.

Naisten molemmissa ikäryhmissä sekä vanhempien miesten ryhmässä ammattiasemalla oli yhteyttä koettuun toimintakykyyn samaan tapaan, kuin sillä on aiemmin todettu olevan yhteyttä kliiniseen toimintakykyyn: toimihenkilöt arvioivat toimintakykynsä selvästi useammin hyväksi kuin työntekijät. Sen sijaan nuoret miestyöntekijät arvioivat toimintakykynsä paremmaksi kuin samanikäiset miestoimihenkilöt. Tämä poikkeava tulos saattaa kuvastaa heidän itselleen asettamiensa tavoitteiden ja niiden saavuttamismahdollisuuksien välillä olevaa ristiriitaa. Vanhemman ikäryhmän miestyöntekijöiden tuloksissa puolestaan on jo nähtävissä sosiaalisen aseman asettamat rajoitukset menestyä elämässä.

Fyysinen aktiivisuus nuorten naisten ryhmässä, jokapäiväisistä toimista helposti selviäminen kaikissa tutkituissa ryhmässä, hyvä terveydentila ja korkea ammattiasema naisten ryhmässä olivat yhteydessä hyväksi koettuun toimintakykyyn.

Useiden laboratoriomittausten tulokset olivat samansuuntaisia kuin koettu toimintakyky, mutta ryhmittäin esiintyi vaihtelua. Merkkikoe, joka mittaa lyhytaikaista muistia ja oppimista, sekä verenpaine olivat kaikissa ryhmässä testejä, joissa saivat hyviä tuloksia ne tutkittavat, jotka myös arvioivat toimintakykynsä hyväksi.

Ryhmien väliset erot näkyivät myös koettua toimintakykyä ennustavissa tekijöissä, jotka olivat naisten ja vanhojen miesten ryhmässä fyysisiä (fyysinen aktiivisuus, ostosten kantaminen, hapenotto), nuorten miesten ryhmässä mielen tasapaino sekä ammattiasema.

Tässä tutkimuksessa oli tutkittavien ryhmien välillä mielenkiintoisia eroja, joista osa kaipaa yksityiskohtaisempia jatkotutkimuksia. Oltiin tarpeen selvittää, keitä ovat ne henkilöt, jotka saavat hyviä tuloksia laboratoriomittauksissa, mutta arvioivat kuitenkin toimintakykynsä huonoksi ja päinvastoin. Samoin mielen tasapaino on kiinnostava jatkotutkimusten kohde. Lisäksi itse toiminnan käsitteen perusteellinen selvittäminen saattaisi antaa paremman perustan koetun toimintakykyn ymmärtämiselle. Näitä tarkoituksia varten tarvitaan myös erilaisia mittausten menetelmiä.

REFERENCES

- AITKIN, M., ANDERSON, D., FRANCES, B. AND HINDE, J. (1989) *Statistical Modelling in GLIM*. Oxford Science Publications, Clarendon Press, Oxford.
- ALANEN, E., KINNUNEN, V. and LESKINEN, E. (1984) Eri ikäisten miesten psyykkisen hyvinvoinnin rakenteen kuvailusta ja selittämisestä LISREL-mallien avulla. Reports from the Department of Psychology, University of Jyväskylä 265.
- ALLARDT, E. (1976) *Hyvinvoinnin ulottuvuuksia*. WSOY, Porvoo, Helsinki.
- ANTONOWSKY, A. (1980) *Health, stress and coping*. Jossey-Bass, San Francisco.
- ANTTILA, S. (1989) Koettu terveydentila yleissairaalahoitoon, vanhainkotihoitoon ja kuolleisuuden ennustajana maaseudun vanhuksilla. *Sosiaalilääketieteellinen Aikakauslehti*, 26: 165–172.
- BAUMANN, G.A. (1961) Diversities in conceptions of health and physical fitness. *Health and Human Behavior* 2: 39–46.
- BELLOC, N.B., BRESLOW, L. and HOCHSTIM, J.R. (1971) Measurement of physical health in a general population survey. *American Journal of Epidemiology* 93: 328–336.
- BERG, S. and MÄRTENSON, E. (1977) *Vanhuuden psykologia*. WSOY, Juva.
- BROMLEY, D.B. (1981) Some effects of aging on ordinary (written) language. In: Gilmore, A.J.J., Svanborg, A., Marois, M., Beattie, W.M. and Piotrowski, J. (eds.) *Aging: a challenge to science and society*, vol. 2. Medicine and social science pp. 99–104. Oxford University Press, Oxford.
- BROWN, J.S. and RAWLINSON, M. (1975) Relinquishing the sick role following openheart surgery. *Journal of Social Behavior* 16: 12–27.
- CAMPBELL, E.J. and LEFRACK, S.S. (1978) How aging affects the structure and function of the respiratory system. *Geriatrics* 33 (6): 68–74.
- CAMPBELL, M.J., McCOMAS, A.J. and PETITO, F. (1973) Physiological changes in aging muscles. *Journal of Neurology, Neurosurgery and Psychiatry* 36: 174–182.

- CLARK, J.W. (1960) The aging dimension: a factorial analysis of individual differences with age on psychological and physiological measurements. *Journal of Gerontology* 15: 183-187.
- COCKERHAM, W.C., SHARP, K. and WILCOX, J.A. (1983) Aging and perceived health status. *Journal of Gerontology* 38: 349-355.
- COLEMAN, P.B. (1983) Cognitive functioning and health. In: Birren, J.E., Munnichs, H.T. and Marois, M. *Aging: a challenge to science and society*. Vol. 3. pp. 57-67, Oxford University Press, Oxford.
- DAMON, A. (1977) Predicting age from body measurements and observations. *Aging and human development* 3: 169-173.
- DiCICCO, L. and APPLE, D. (1960) Health needs and opinions of older adults. In: Apple, D. (ed.) *Sociological studies of health and illness*. pp. 26-39. McGraw-Hill Book Comp. Inc., New York, Toronto, London.
- DIRKEN, J.M. (1972) (ed.) *Functional age of industrial workers*. Wolters-Noordhof, Groningen.
- DRINKWATER, B.L., HORWATH, S.M. and WELLS, C.L. (1975) Aerobic Power of females ages 10 to 68. *Journal of Gerontology* 30: 385-395.
- DURNIN, J.V.G.A. and WOMERSLEY, J. (1974) Body fat assessed from total body density and its estimation from skinfold thickness: Measurements on 481 men and women aged from 16 to 72 years. *Brittish Journal of Nutrition* 32: 77-97.
- von DÖBELN, W. (1959) Anthropometric determination of fat-free body weight. *Acta Medica Scandinavica* 165: 37-41.
- von DÖBELN, W. (1966) Kroppstorlek, energiomsättning och kondition. In: Luthman, G., Åberg, U. and Lundgren, N. (eds.) *Handbok i ergonomi*. pp. 245-253. Almqvist & Wiksell, Stockholm.
- ERA, P. and HEIKKINEN, E. (1985) Postural sway during standing and unexpected disturbance of balance in random samples of men of different ages. *Journal of Gerontology* 40: 287-295.
- ERA, P. (1987) Sensory, Psychomotor and motor functions in men of different ages. *Scandinavian Journal of Social Medicine*. Suppl. 39.
- ESKELINEN, L., KOHVAKKA, A., MERISALO, T. et al. (1985) Työkyky ja terveydentila työntekijöiden arvioimana ja kliinisesti määriteltynä. *Työterveyslaitoksen tutkimuksia* 3: 2, 149-163.
- FERRARO, K.F. (1980) Self-rating of health among the old-old. *Journal of Health and Social Behavior*, 21: 377-383.
- FILLENBAUM, G.G. (1979) Social context and self-assessment of health among the elderly. *Journal of Health and Social Behavior* 20: 45-51.
- FOLKINS, C.H. and SIME, W.E. (1981) Physical fitness training and mental health. *American Psychologist* 36: 376-389.

- FOZARD, J.L. and THOMAS, J.C.Jr. (1975) Psychology of Aging. In: Howells, J.G. (ed.) *Modern Perspectives in the Psychiatry of Old Age*. pp. 107–169. Brunel/Mazel Inc. New York, NY.
- FRIEDSAM, H.J. and MARTIN, H.W. (1963) A comparison of self and physicians health ratings in an older population. *Journal of Health and Social Behavior* 4: 179–183.
- FURUKAWA, T., INOUE, M., KAJIYA, F. et al. (1975) Assessment of biological age by multiple regression analysis. *Journal of Gerontology* 30: 422–234.
- GLIM 3,77 Reference Manual (1985), Numerical Algorithms Group, Oxford.
- HASAN, J. (1989) Social class, disease and death. An essay in social medicine. *Proceedings of the Society for Hornphysiology* No 6.
- HEIKKINEN, E., KIISKINEN, A., KÄYHTY, B. et al. (1974) Assessment of biological age. *Gerontologia* 20: 33–43.
- HEIKKINEN, E., SEPPÄNEN, B., and RIMPELÄ, M. (1975) Biological age, and health risk indicators among 25–57-year old men in two parts of Finland. *Scandinavian Journal of Social Medicine* 3: 105–110.
- HEIKKINEN, E., SUOMINEN, H., PARKATTI, T. et al. (1976) Påverkan av 8 veckors fysisk träning på vissa variabler i fysisk prestationsförmåga och biologisk ålder. In: Steen, B. and Svanborg, A. (eds.) *Nordisk Gerontologi*, pp. 230–232. Astra Läkemedel Ab, Södertälje.
- HEIKKINEN, E., ARAJÄRVI, R-L., JYLHÄ, M. et al. (1981) *Eläkeikäiset Tampereella. Kansanterveystieteen julkaisuja M 65, Tampere.*
- HEIKKINEN, E. (1982) Assessment of functional aging. In: Viidik, A. (ed.) *Lectures on gerontology. Vol.1, Part B*, pp. 481–516. Academic Press, London.
- HEIKKINEN, E., ARAJÄRVI, R-L., ERA, P. et al. (1984) Functional capacity of men born in 1906–1910, 1926–30 and 1946–50. A basic report. *Scandinavian Journal of Social Medicine. Suppl. 33.*
- HEIKKINEN, E., SUOMINEN, H., ERA, P. and LESKINEN, A.L. (1989) Variations in aging parameters, their sources, and possibilities of predicting physiological age. In: Balin, A.K. (ed.) *Determination of Human Biological Age* (in Press).
- HEIKKINEN, R-L. and LESKINEN, A-L. (1987) Sosiaalinen toimintakyky II. *Gerontologia* 2, 37–43.
- HERON, A. and CHOWN, S. (1967) *Age and function*. Churchill, London.

- HEYMAN, D.K. and JEFFERS, F.C. (1963) Effects of time laps on consistency of self-health and medical evaluations of elderly persons. *Journal of Gerontology* 18: 160-164.
- HOLLINGSWORTH, J.W., HASHIZUME, A. and JABLON, S. (1965) Correlations between tests of aging in Hiroshima subjects - an attempt to define "physiological age". *Yale Journal of Biology and Medicine* 38: 11-26.
- HOMANS, G.C. (1974) *Social behavior. Its elementary forms.* Harcourt Brace Jovanovich Inc., New York.
- HOUSE, J.S., WELLS, J.A., LANDERMAN, L.R. et al. (1979) Occupational stress and health among factory workers. *Journal of Health and Social Behavior* 20: 139-160.
- HULTSCH, D.F. and DEUTSCH, F. (1981) *Adult Development and Aging.* McGraw-Hill Book Company, New York.
- ILMARINEN, J., LUOPAJÄRVI, T., NYGÅRD, C-H. et al. (1985) Kunnallisten työntekijöiden toimintakyky. In: Ilmarinen, J. (ed.) *Työ, terveys ja eläkeikä kunta-alalla. Työterveyslaitoksen tutkimuksia* 3: 2, 212-238.
- JALAVISTO, E. (1965) The role of simple tests measuring speed of performance in the assessment of biological vigour: Factorial study in the elderly women. In: Welford, A.T. and Birren, J.E. (eds.) *Behavior, aging, and nervous system.* pp. 353-365. Charles C. Thomas, Springfield, Ill.
- JETTE, A.M. (1980) Health status indicators: their utility in chronic disease evaluation research. *Journal of Chronic Diseases* 33: 567-579.
- JETTE, A.M. (1985) State of the art in functional status assessment. In: Rothstein, J.M. (ed.) *Measurement in Physical Therapy*, pp. 137-168. Churchill Livingstone Inc. New York, NY.
- JETTE, A.M. and CLEARY, P.D. (1987) Functional disability assessment. *Physical Therapy* 67: 1854-1859.
- JYLHÄ, M. (1985) Oman terveyden kokeminen eläkeiässä. *Acta universitatis Tamperensis ser. A vol 195, Tampere.*
- JYLHÄ, M., LESKINEN, E., ALANEN, E. et al. (1986) Self-rated health and associated factors among men of different ages. *Journal of Gerontology* 41: 710-717.
- JÖRESKOG, K.G. and SÖRBOM, D. (1981) Analysis of linear structural relationships by maximum likelihood and least squares methods. *Research Report 81-8, University of Uppsala. Uppsala.*

- KALIMO, E. (1981) Eläkeikäisten toiminnan rajoitukset ja terveydentila Suomessa. In: Sahi, T., Heikkinen, E., Huunan-Seppälä, A. and Kalimo, E. (eds.) Vanheneminen ja vanhusten huolto, pp. 103–115. Kansaneläkelaitoksen julkaisuja A:16. Helsinki.
- KAPLAN, G.A. and CAMACHO, T. (1983) Perceived health and mortality: A nine year follow-up of human population laboratory cohort. *American Journal of Epidemiology* 117: 292–304.
- KARISTO, A. (1984) Hyvinvointi ja sairauden ongelma. Kansaneläkelaitoksen julkaisuja M:46, Helsinki.
- KATA, K. (1976) Psykkisestä hyvinvoinnista ja onnellisuudesta pohjoismaissa. Research group for comparative sociology. Research Reports 12, University of Helsinki.
- KATZ, S., FORD, A.B., MOSKOWITZ, R.W. et al. (1963) Studies of illness in the aged. The index of ADL: A standardized measure of biological and psychosocial function. *Journal of American Medical Association* 185: 914–919.
- KAUFERT, J.M., GREEN, S., DUNT, M.D. et al. (1979) Assessing functional status among elderly patients. A comparison of questionnaire and service provider ratings. *Medical Care* 17: 807–817.
- KELLEY, H.H. (1952) Two functions of reference groups. In: Swanson, G.M., Newcomb, T.M. and Hartley, E.L. (eds.) Readings in social psychology. pp. 410–414. Rinehart and Winston Inc., New York.
- KIISKINEN, A., HEIKKINEN, E., PARKATTI, T. et al. (1980) Functional aging of 40–50-year-old men in two industrial enterprises. *Scandinavian Journal of Social Medicine, Suppl.* 14: 12–23.
- KIISKINEN, A., ERA, P. and PARKATTI, T. (1981) Functional age of relatively young and old female and male employees in the machine industry. *IRCS Medical Science* 9: 6–7.
- KIMMEL, D. (1974) Adulthood and aging. John Wiley & Sons Inc., New York.
- KIRJONEN, J. (1980) Liikunnan merkitys ja motiivit. In: Heikkinen, E. and Vuori, I (eds.) Liikunta ja terveys, pp. 71–91. Tammi, Helsinki.
- La RUE, A., BLANK, L., JARVIK, L. and HETLAND, M. (1979) Health in old age: how do physicians' ratings and self-ratings compare? *Journal of Gerontology* 34: 687–691.
- LABOUVIER-VIEF, G. and GONDA, J.N. (1976) Cognitive strategy training and intellectual performance in the elderly. *Journal of Gerontology* 31: 327–332.
- LAWTON, M.P. and BRODY, E.M. (1969) Assessment of older people: Self maintaining and instrumental activities of daily living. *The Gerontologist* 9: 179–188.

- LAWTON, M.P. (1971) The functional assessment of elderly people. *Journal of American Geriatric Society*. 19: 456-481.
- LAWTON, M.P. (1972) Assessing the competence of older people. In: Kent, D., Kastenbaum, R. and Sherwood, S. (eds.) *Research planning and action for the elderly*. Behavioral Publications, New York.
- LEHR, U. (1978) Körperliche und geistige Aktivität – eine Voraussetzung für ein erfolgreiches Altern. *Zeitschrift für Gerontologie* 11: 290-299.
- LEHR, U. (1983) Stereotypes of aging and age norms. In: Birren, J.E., Munnichs, J.M.A., Thomae, H. and Marois, M. (eds.). *Aging: a challenge to science and society*. vol 3. Behavioral sciences and conclusions. pp. 101-112. Oxford University Press. Oxford.
- LEINO, P., HÄNNINEN, V., TOIVONEN, L. et al. (1984) Työolot, psyykinen hyvinvointi, elintavat ja terveydentila metalliteollisuuden ammatiasemaryhmissä 1973-83 (METELI) Kansanterveyden julkaisuja M 82, Tampere.
- LIANG, J. (1986) Self-reported physical health among aged adults. *Journal of Gerontology* 41: 248-260.
- LICHTENSTEIN, R.L. and THOMAS, J.W. (1987) A comparison of self-reported measures of perceived health and functional status in an elderly population. *Journal of Community health* 12: 213-230.
- LINDHOLM, S. and TULLA, T. (1982) Psyykkisestä toimintakykyisyydestä ja siihen yhteydessä olevista tekijöistä 31-35-, 51-55-, ja 71-75-vuotiailla jyvaskyläläisillä miehillä. *Psykologian pro gradu-tutkielma*, Jyvaskylän yliopisto.
- LINN, B.S. and LINN, M.W. (1980) Objective and self-assessed health in the old and very old. *Social Science and Medicine* 14A: 311-315.
- MADDOX, G.L. (1962) Some correlates of differences in self-assessments of health status among the elderly. *Journal of Gerontology* 17: 180-185.
- MADDOX, G.L. (1964) Self-assessment of health status, a longitudinal study on selected subjects. *Journal of Chronic Diseases* 17: 449-460.
- MADDOX, G.L. and DOUGLASS, E.B. (1973) Self-assessment of health: a longitudinal study of elderly subjects. *Journal of Health and Social Behavior* 14: 87-93.
- MARIN, M. (1988) Gender-differences in sport and movement in Finland. *International Review for Sociology of Sport* 23:(4) 345-359.
- McFARLAND, R.A. (1943) The older worker in industry. *Harvard Business Review*, summer: 505-520.

- McFARLAND, R.A. (1973) The need for functional age measurement in industrial gerontology. *Industrial Gerontology* 19: 1-19.
- McPHERSON, B.D. (1983) *Aging as a Social Process*. Butterworths, Toronto.
- MECHANIC, D. (1974) Discussion of research program on relations between stressful life events and episodes of physical illness. In: Dohrenwend B.S. and Dohrenwend B.P. (eds.). *Stressful life Events* pp. 87-98, Wiley, New York.
- MECHANIC, D. (1986) The concept of illness behavior: culture, situation and personal predisposition (editorial) *Psychological Medicine* 16: 1-7.
- MELLSTRÖM, D., RUNDGREN, Å. and SVANBORG, A. (1981) Previous alcohol consumption and its consequences for ageing, morbidity and mortality in men aged 70-75. *Age and Ageing* 10: 277-286.
- MELLSTRÖM, D., RUNDGREN, Å., JAGENBURG, R. et al. (1982) Tobacco smoking, ageing and health among the elderly: A longitudinal population study of 70-year-old men and an age cohort comparison. *Age and Ageing* 11: 45-58.
- MERTON, R.K. and KITT, A.S. (1950) Contributions to the theory of reference group behavior. In: Merton R.K. and Lazarsfeld, P.(eds.) *Continuities in social research: Studies in the scope and method of "the american souldier"*. pp.40-105. The Free Press, Glencoe, Ill.
- METELI. (1974) Työolot, terveystutkimuksen mittausohjeisto. Liikunnan ja kansanterveyden julkaisuja 10.
- METELI. (1975) Terveystutkimuksen mittausohjeisto. Liikunnan ja kansanterveyden julkaisuja 10.
- METELI. (1977) Ammattiasema, työolot ja sairastavuus metalliteollisuuden henkilöstöryhmissä. Liikunnan ja kansanterveyden julkaisuja 18, Jyväskylä.
- MORGAN, W.P. (1977) Anxiety reduction following acute physical activity. *Psychiatric Annals* 9: 36-45.
- MORGAN, W.P. (1981) Psychological benefits of physical activity. In: Nagle, F.J. and Montoye, H.J. (eds.) *Exercise, Health and Disease*, pp. 299-314. Charles C. Thomas, Springfield.
- MORGAN, W.P. (1986) Athletes and nonathletes in the middle years of life. In: McPherson, B.D. (ed.) *Sport and Aging. The 1984 Olympic Scientific Congress Proceedings vol. 5*, pp. 167-186. Human Kinetics Publishers, Inc., Champaign Illinois.
- MORGAN, R.F. and FEVENS, S.K. (1972) Reliability of the adult growth examination: a standardized test of individual aging. *Perceptual and Motor Skills* 34: 415-419.

- MOSSEY, J.M. and SHAPIRO, E. (1982) Self-rated health: a predictor of mortality among elderly. *American Journal of Public Health* 72: 800-808.
- MURRAY, J., DUNN, G. and TARNOPOLSKY, A. (1982) Self-assessment of health: An exploration of the effects of physical and psychological symptoms. *Psychological Medicine* 12: 371-378.
- MURRAY, M.P., DUTHIE, E.H., GAMBERTS, S.R. et al. (1985) Age related difference in knee muscle strength in normal women. *Journal of Gerontology* 40, 275-280.
- MÄLKIÄ, E. (1983) Eräät lihasten suorituskykymittaukset fyysisen toimintakykyisyyden kuvaajana suomalaisessa aikuisväestössä. *Kansaneläkelaitoksen julkaisu* AL:3.
- PALMORE, E. (1982) Predictors of the longevity difference: A 25-year follow-up. *The Gerontologist* 22: 513-518.
- PALMORE, E., CLEVELAND, W., NOWLIN, J. et al. (1979) Stress and adaptation in later life. *Journal of Gerontology* 34 (6): 841-851.
- PARKATTI, T. (1980) Kahden teollisuudenalan kolmessa eri ammattiasemassa työskentelevien 40-50-vuotiaiden miesten toimintakykyisyys ja funktionaalinen ikä, elintavat ja terveydentila sekä näiden väliset yhteydet. *Liikuntahygienian ja kansanterveyden lisensiaattityö*. Jyväskylän yliopisto, Jyväskylä.
- PARKATTI, T. (1981) Kahden teollisuuslaitoksen keski-ikäisten miesten toimintakykyisyys. In: Sahi, T., Heikkinen, E., Huunan-Seppälä, A. and Kalimo, E. (eds.) *Vanheneminen ja vanhusten huolto*. pp. 62-68. *Kansaneläkelaitoksen julkaisu* A:16.
- PARSONS, T. (1951) *The social system*. Free Press, New York 1951.
- PEHUNEN, R. and LAHTELA, K. (1982) Vanhenevan yksilön toimintakyky ja persoonallisuus: Kuvausjärjestelmän kehittäminen. *Kansaneläkelaitoksen kuntoutustutkimuskeskus* Turku.
- POHJOLAINEN, P. (1987) Toimintakykyisyys, terveydentila ja elämäntyyli 71-75-vuotiailla miehillä. *Studies in Sport, Physical Education and Health* 23, University of Jyväskylä.
- PUROLA, T. (1979) Työkyvyttömyyden ongelmasta. In: Sahi, T., Huunan-Seppälä, A. and Raitasalo, R. (eds.) *Työkyvyttömyys - tutkimuksen tehtävät ja mahdollisuudet*. *Kansaneläkelaitoksen julkaisu* A:15. pp. 17-27, Helsinki.
- RANTANEN, T., ERA, P., PARKATTI, T. et al. (1987) Associations of physical activity with sensory and psychomotor performance in middle-aged women. *Jyväskylä Congress on movement and sport in women's life*. August 17.-21.1987 Jyväskylä, Finland. Abstract.

- REYNOLDS, W.J., RUSHING, W.A. and MILES, D.L. (1974) The validation of functional status index. *Journal of Health and Social Behavior* 15: 271–283.
- RIES, W., PÖTHIG, D., HUNECKE, I. and SAUER, I. (1981) Untersuchungen über das biologische Alter von Menschen. *Zeitschrift für Altersforschung* 36: 255–262.
- RIMPELÄ, M. (1982) Koettu on todellista – siis tieteellisesti tutkittavissa. *Sosiaalilääketieteellinen Aikakauslehti* 19: (4) 201–205.
- ROTELLA, R.J. and BUNKER, L.K. (1978) Field dependence and reaction time in senior tennis players (65 and over). *Perceptual and Motor Skills* 46: 485–486.
- RUTH, J.-E. and RUOPPILA, I. (1983) Psykkiset vanhenemismuutokset ja vanhuuden kokeminen. In: Ruth, J.-E. and Heikkinen, E. (eds.) *Vanhuus Suomessa*. pp. 154–196. Weiling & Göös, Espoo.
- SAVAGE, R.D., BRITTON, P.G., BOLTON, N. and HALL, E.H. (1973) *Intellectual functioning in the Aged*. Methuen, London.
- SCHAIE, K.W. and PARR, J. (1983) Concepts and criteria for functional age. In: Birren, J.E., Munnichs, M.M., Thomae, H. and Marois, M.(eds.) *Aging: a challenge to science and society*. vol.3. Behavioral sciences and conclusions. pp. 249–263. Oxford University Press, Oxford.
- SHANAS, E. (1962) *The health of older people. A social survey*. Harvard University press. Cambridge, Massachusetts.
- SHANAS, E. TOWNSEND, P., WEDDERBURN, D. et al. (1968) *Old people in three industrial societies*. Atherton Press, London.
- SHEPHARD, R.J. (1978) *Physical activity and aging*. Croom Helm, London.
- SHEPHARD, R.J. (1986) Physical Activity and aging in post-industrial society. In: McPherson (ed.) *Sport and Aging. The 1984 Olympic Scientific Congress Proceedings*, vol. 5, pp. 37–43. Human Kinetics Publishers, Inc., Champaign, Illinois.
- SHOCK, N.W. (1979) Physiological and chronological age. In: Dietz, A.A. (ed.) *Aging – its chemistry. Proceedings of the third Arnold O. Beckman Conference in Clinical Chemistry*, pp. 3–24. The American Association for Clinical Chemistry, Colorado Springs.
- SINGER, E., GARFINKEL, R., COHEN, S.M. et al. (1976) Mortality and mental health: evidence from the Midtown Manhattan restudy. *Social Science and Medicine* 10: 517–525.
- SMITH, D.O. (1982) Physiological and structural changes at the neuromuscular junction during age. In: Giacobini, E., Filogamo, C., Giarobini, G. and Vernadakis A. (eds.). *The Aging Brain: Cellular and molecular mechanisms of aging in the nervous system*. Raven Press, New York.

- SMITH, E. and GILLIGAN, C. (1986) Exercise, sport, and physical activity for the elderly: Principles and problems of programming. In: McPherson, B.M. (ed.) Sport and Aging. The 1984 Olympic Scientific Congress Proceedings, vol. 5, pp. 91-105. Human Kinetics Publishers, Inc., Champaign Illinois.
- SOKOLEW, J. (1958) Functional approach to disability evaluation. *Journal of the American Medical Association*. 167: 1575-1584.
- SOLOMONEN, K.A. and NUMMI, J. (1971) Nivelten liikkeiden mittaaminen. *Suomen Lääkärilehti* 20: 1953-1974.
- SPIRDUSO, W.W. and CLIFFORD, P. (1978) Replication of age and physical activity effects on reaction and movement time. *Journal of Gerontology* 33: 26-30.
- SPIRDUSO, W.W. (1980) Physical fitness, aging and psychomotor speed: A Review. *Journal of Gerontology* 35: 850-865.
- SPSS-X User's Guide (1988).
- STEWART, D.A., WARE, J.E. and BROOK, R.H. (1977) The meaning of health: understanding functional limitations. *Medical Care* 15: 939-952.
- STOUFFER, S.A., SUCHMAN, E.A., DeVINNEY, L.C. et al. (1949) The american souldier: Adjustment during army life. Vol 1. Princeton University Press, Princeton.
- SULLIVAN, D.K. (1971) A single index of mortality and morbidity MSMHA Health Reports 86: 347-354.
- SUOMINEN, H. (1978) Effect of physical training in middle-aged and elderly people with special regard to skeletal muscle, connective tissue, and functional aging. *Studies in Sport, Physical Education and Health* 11. University of Jyväskylä.
- SVANBORG, A. (1980) Övergripande beskrivning av H 70. *Läkartidningen* 77: 3730-3734.
- TAYLOR, R.C. (1981) Self-reports and self-estimates of health. In: Kinnard, J., Brotherston, J. and Williamsom, J. (eds.) The provision of care for the elderly. pp. 200-211. Churchill Livingstone, Hong Kong.
- THOMAE, H., LEHR, U. and SCHMITZ-SCHERZER, R. (1981) "Perceived" vs "objective" health status in longitudinal perspective. In: Abstracts, vol. 2, Thematic sessions, 40. XII International Congress of Gerontology, July 12-17, 1981. Hamburg.
- TISSUE, T. (1972) Another look at self-rated health among the elderly. *Journal of Gerontology* 27: 91-94.
- TORNSTAM, L. (1973) Att åldras. Socialgerontologiska perspektiv. Uppsala.
- TORNSTAM, L. (1975) Health and self-perception. *Gerontologist* 15: 264-270.

- TRIPP-REIMER, T. (1984) Reconceptualizing the construct of health: Intergrating emic and etic perspectives. *Research in Nursing and Health* 7: 101-109.
- TUOMI, K., WÄGAR, G., ESKELINEN, L. et al. (1985) Terveys, työkyky ja työolot kunnallisissa ammattiryhmissä. In: Ilmarinen, J. (ed.) *Työterveys ja eläke-ikä kunta-alalla*. Työterveyslaitoksen julkaisuja 3: 2, 95-132.
- VALKONEN, T. (1974) Haastattelun ja kyselyaineiston analyysi sosi-
aalitutkimuksessa. Oy Gaudeamus Ab, Helsinki.
- VIITASALO, J.T., VILJAMAA, K. and KOMI, P.V. (1977) Dy-
namometres for measurements of isometric trunk and leg forces. *Research Reports from Department of Biology of Physical Activity* 22, University of Jyväskylä.
- VIITASALO, J.T., ERA, P., LESKINEN, A.-L. and HEIKKINEN, E. (1985) Muscular strenght profiles and anthropometry in random samples of men aged 31-35, 51-55 and 71-75 years. *Ergonomics* 28: 1563-1574.
- WALSH, D.A. (1975) Age differences in learning and memory. In: Woodruff, D.S. and Birren, J.E. (eds.) *Aging: Scientific perspectives and social issues*. D. van Nostrand Company, New York.
- WALDRON, I. (1983) Sex differences in illness incidence, prognosis and mortality: Issues and evidence. *Social Science and Medicine* 17: 1107-1123.
- WAN, T.T.H. (1976) Predicting self-assessed health status: A multi-
variate approach. *Health Services Research* 11: 464-477.
- WEBSTER, I.W. and LOGIE, A.R. (1976) A relationship between functional age and health status in female subjects. *Journal of Gerontology*. 31: 546-550.
- WECHSLER, D. (1958) The measurement and appraisal of adult intelligence. William & Wilkins, Baltimore.
- WECHSLER, D. (1975) Wechslerin aikuisten älykkyyssasteikko. *Psykologien Kustannus Oy*, Helsinki.
- WELLFORD, A.T. (1980) Sensory, perceptual, and motor processes in older adults. In: Birren, J.E. and Sloane, R.B. (eds.) *Handbook of mental health and ageing*, pp. 192-213. Van Prentice-Hall Inc., Englewood Cliffs, New Jersey.
- WILKIE, F. and EISDORFER, C. (1971) Intelligence and blood pressure in the aged. *Science*, 172: 959-962.
- WILMORE, J.H. (1982) The female athlete: physique, body composition and physical profile. *Australian Journal of Sport Sciences* 2: 2-9.

- World Health Organization, Regional Office for Europe (1959): The public health aspects of the aging of the population. Report of an advisory group, Oslo 28. July - 2. August 1958, Copenhagen.
- World Health Organization, Regional Office for Europe (1963): Protection of the elderly and aged and the prevention of premature aging, Copenhagen.
- ZBOROWSKI, M. (1952) Cultural components in responses to pain. *Journal of Social Issues* 8: 16-30.
- ZOLA, J.K. (1966) Culture and symptoms - an analysis of patients' presenting complaints. *American Sociological Review* 31: 615-630.

APPENDIX 1

Questionnaire to be completed in at home

Dear respondent

The information sought by this questionnaire concerns your functional capacity and associated factors. This information will help us to interpret the results of a functional capacity study which will be carried out during this spring. We ask you to read each question carefully and answer it on the basis of your own knowledge and self-appraisal.

All the personal information gathered will be treated as highly confidential and used only by the researchers who will not be handling the information on the basis of individual subjects but as grouped statistical wholes.

At the beginning of the laboratory tests this questionnaire will be gone over and some additional questions will be asked. Thus you will have the opportunity to ask about unclear questions.

Bring the completed questionnaire with you to the laboratory tests.

Instructions

- a) Please answer the questions; 1) by circling the number of the alternative that best applies to you; or 2) by writing the information or number in the space reserved.
- b) If none of the alternatives applies exactly to you, then choose the one nearest.
- c) If you don't remember the exact information or number, offer your best estimate.
- d) If you circle the wrong alternative by mistake, cancel it by drawing horizontal lines through it.
- e) Please read any additional instruction carefully before answering.

Example 1. If you consider your health status to be good at present you would answer the question as follows:

What do you think your health status is at present?

1. good
2. fairly good
3. average
4. fairly poor
5. poor

Example 2. If you sleep about 8 hours a day, you would answer question number 62 as follows:

How many hours a day you sleep on average?

_____ hours

Example 3. If your functional capacity concerning your manual dexterity is fairly good, you would answer this part of question number 55 as follows:

	good	fairly good	average	fairly poor	poor
manual dexterity	1	2	3	4	5

Functional capacity study 1984

Questionnaire

1. Age _____ years.

2. What is your civil status?

- 1 married or in open marriage/cohabiting/living together
- 2 unmarried
- 3 widowed
- 4 divorced or separated

3. List the persons (e.g. mother, sister, spouse, children etc.) with whom you are living.

4. What kind of bilding do you live in?

- 1 own house
- 2 row house
- 3 flat
- 4 other, state _____

5. What is the floor area of your apartment?

_____ m²

6. What level of formal education have you received?

- 1 less than primary school
- 2 primary school
- 3 secondary school
- 4 high school
- 5 university

7. What different kinds of schools have you attended during your life and how long did each of them last?

- | | | | |
|---|-------------------------------|-------|--------|
| 1 | peripatetic | _____ | months |
| 2 | primary | _____ | years |
| 3 | additional classes of primary | _____ | years |
| 4 | secondary | _____ | years |
| 5 | vocational | _____ | years |

- 6 vocational training _____ years
- 7 different kind of middle grade schools (e.g. technical college commercial college etc.) _____ years
- 8. university (undergraduated) _____ years
- 9. university (graduate) _____ years

8. Have you changed your job for health reasons since last spring (METELI–health study 1983)?

- 1 yes
- 2 no

9. What is your present job or your last job? (be as precise as possible)?

10. How are you paid?

- 1 monthly or weekly
- 2 per hour only piece–work
- 3 per hour plus piece–work
- 4 piece–work only

The following question concerns manual workers only (not white collar workers)

11. What is your paygroup (1–5)?

_____ paygroup

The following questions concern your health status.

12. Regarding your health status at present, do you feel well?

- 1 yes
- 2 no

13. How do you rate your health status at present?

- 1 good
- 2 fairly good
- 3 average
- 4 fairly poor
- 5 poor

14. How do you rate your health status compared to that of your age peers?

- 1 much better
- 2 slightly better
- 3 about the same
- 4 slightly worse
- 5 much worse

15. **If you compare your health status six years ago (health study 1978) and now how much change has there been?**

- 1 a great improvement
- 2 a slight improvement
- 3 none
- 4 a slight decline
- 5 a considerable decline

16. **How would you describe a person with "good" health status?**

17. **During the past year, have you had any diseases lasting more than three months?**

- 1 no
 - 2 yes, state _____
-

18. **Do you have any diseases at this moment?**

- 1 no
 - 2 diseases lasting more than 3 months
state _____
 - 3 acute diseases
state _____
-

19. **How many times did you visit a nurse because of an illness or accident during the past year?** (Visits in the course of seeing a doctor at the same time are not counted.)

_____ times

20. **How many times did you visit the doctor because of an illness or accident during the past year?**

_____ times

21. **Have you ever visited specialists concerning your mental health** (e.g. mental health service, hospital, psychiatrist or other physician, psychologist, AA clinic, priest, centre for family counselling service)

- 0 no, and there has not been any need
- 1 no, but sometimes I have felt need for that
- 2 yes

22. How do you rate your mental health at present?

- 1 good
- 2 fairly good
- 3 average
- 4 fairly poor
- 5 poor

23. Which, if any of the following chronic diseases have been diagnosed or are being treated by a physician?

	No	Yes
Raised blood pressure, hypertension	0	1
Diabetes	0	1
Heart disease		
valvular affection	0	1
weak heart	0	1
heart stroke	0	1
heart nervous	0	1
angina pectoris, coronary		
heart disease	0	1
Lung asthma	0	1
Dilatation of the lung, bronchitis,		
chronic lung catarrh	0	1
Gastric ulcer	0	1
Gallstones, gall bladder disorders	0	1
Mental illness	0	1
Arthritis	0	1
Other diseases of the joints	0	1
Wearing disorders of back,		
other back diseases	0	1
Goiter, hyperthyroidism	0	1
Cerebral hemorrhage, apoplectic stroke	0	1
Epilepsy	0	1
Cancer	0	1
Chronic cutaneous eruption	0	1
Chronic cystitis, inflammation of the		
kidneys	0	1
Other chronic diseases, state		
_____	0	1
_____	0	1
_____	0	1

24. During the last two weeks, have you had any of the following symptoms and how often? (circle the relevant alternative on every horizontal line)

	no	occa- tionally	often	continuously or almost daily
Headache	1	2	3	4
Loss of memory	1	2	3	4
Loss of appetite	1	2	3	4
Heartburn	1	2	3	4
Abdominal pains	1	2	3	4
Nightmare	1	2	3	4
Sleeplessness	1	2	3	4
Dizziness	1	2	3	4
Tachycardia or irregular heartbeats	1	2	3	4
Tremor of the hands	1	2	3	4
Excessive perspiration without physical effort	1	2	3	4
Dyspnoea without physical effort	1	2	3	4
Lack of energy	1	2	3	4
Fatigue or feebleness	1	2	3	4
Anxiety or nervousness	1	2	3	4
Irritability or fits of anger	1	2	3	4
Melancholia or depression	1	2	3	4
Loss of sexual desire	1	2	3	4
Difficulties in urinating	1	2	3	4
Aches or pains in the joints or back trouble	1	2	3	4
Nausea or vomiting	1	2	3	4

25. Please state the names of all the medicines and tablets prescribed by a doctor that you are taking at this moment.

name of medicine	dose
_____	_____
_____	_____
_____	_____

26. Please state the names of all other medicines (medicines without a prescription, irregularly used medicines) you are taking at this moment

name of medicine	dose
_____	_____
_____	_____
_____	_____

The following question only concerns pensioners (65 or older)

27. Have you ever received pension because of your inability to work?

- 0 no
- 1 yes

If your answer was no, answer question number 29 next.

The next question concerns only those who receive/or have received a pension because of their inability to work.

28. What was the main disease or disability causing you to be put on a pension?

29. During the past year, have you had any trouble or symptoms in the

- 1 neck – shoulder area
- 2 lumbar –sackral area
- 3 upper extremities
- 4 lower extremities
- 5 elsewhere, state _____

30. How do you rate the status of your locomotor organs (joints, muscles, back, shoulders etc.) at present?

- 1 good
- 2 fairly good
- 3 average
- 4 fairly poor
- 5 poor

31. How do you rate the present status of your locomotor organs compared with that of your age peers?

- 1 much better
- 2 a little better
- 3 about the same
- 4 much worse

32. If you compare the status of your locomotor organs six years ago (health study 1978) and now, do you think there has happened any change

- 1 a great improvement
- 2 a slight improvement
- 3 none
- 4 a slight decline
- 5 a considerable decline

Next we ask some questions about your ability to work.

33. How do you rate your ability to work at present?

- 1 good
- 2 fairly good
- 3 average
- 4 fairly poor
- 5 poor

34. How do you rate your present ability to work compared with your ability six years ago (health study 1978)?

- 1 greatly improved
- 2 slightly improved
- 3 about the same
- 4 slightly worsened
- 5 considerably worsened

35. How do you rate your ability to work compared with that of your age peers?

- 1 much better
- 2 a little better
- 3 about the same
- 4 a little worse
- 5 much worse

The questions 36 and 37 concern only those who are currently working.

36. How would you rate your ability to work in respect of the physical demands of your job?

- 1 good
- 2 fairly good
- 3 average
- 4 fairly poor
- 5 poor

37. How would you rate your ability to work in respect of the psychological demands of your job?

- 1 good
- 2 fairly good
- 3 average
- 4 fairly poor
- 5 poor

38. How far do/did you have the possibility of using your knowledge and skills in your job?

- 1 very well
- 2 fairly well
- 3 to some extent
- 4 fairly poorly
- 5 very poorly

On the basis of their health status and physical and mental capacity individuals may have different abilities in performing various everyday tasks (work, housework, hobbies). The following questions concern your own functional capacity.

39. How would you rate your functional capacity at this moment?

- 1 good
- 2 fairly good
- 3 average
- 4 fairly poor
- 5 poor

40. How would you rate your functional capacity compared to that of your age peers?

- 1 much better
- 2 a little better
- 3 about the same
- 4 a little worse
- 5 much worse

41. How do you rate your present functional capacity compared with your functional capacity six years ago (health study 1978)?

- 1 greatly improved
- 2 slightly improved
- 3 about the same
- 4 slightly worse
- 5 much worse

42. How would you describe a person with good functional capacity?

43. Does your present functional capacity prevent you from doing something you would like to do (e.g. work, hobbies, being with friends etc.)

- 1 no
- 2 yes, state _____

The following question concern activities that form part of your daily life. If you have no experience of actually performing the activity in question, circle the best estimate you can make.

44. How far are you able to walk without pausing to rest?

- 1 about half a kilometer
- 2 1–2 kms
- 3 3–5 kms
- 4 6–10 kms
- 5 more than 10 kms

45. How far are you able to run without pausing to rest?

- 1 not able to run
- 2 about half a kilometer
- 3 1–2 kms
- 4 3–5 kms
- 5 6–10 kms
- 6 more than 10 kms

46. How able are you to climb a flight of stairs without pausing to rest?

- 1 without difficulty
- 2 with some difficulty
- 3 with a lot of difficulty
- 4 unable

47. How much shopping are you able to carry for half a kilometer without pausing to rest?

- 1 less than 2 kgs
- 2 2–5 kgs
- 3 6–10 kgs
- 4 more than 10 kgs

48. How heavy a burden (e.g. a sack) are you able to lift?

- 1 less than 10 kgs
- 2 10–24 kgs
- 3 25–49 kgs
- 4 50 kgs or more

49. Are you able to do heavy cleaning work (e.g. carrying and shaking carpets, cleaning windows)?

- 1 without difficulty
- 2 with some difficulty
- 3 with a lot of difficulty
- 4 unable

50. Are you satisfied with your present physical functional capacity?

- 1 very satisfied
- 2 satisfied
- 3 satisfied to some extent
- 4 unsatisfied
- 5 very unsatisfied

51. How important do you think it is to have good physical functional capacity?

- 1 very important
- 2 all the same
- 3 not meaningful

52. Have you plans to improve your physical functional capacity?

- 1 yes
- 2 no

53. Are you satisfied with your present psychological functional capacity?

- 1 very satisfied
- 2 satisfied
- 3 satisfied to some extent
- 4 unsatisfied
- 5 very unsatisfied

54. How important do you think it is to have a good psychological functional capacity?

- 1 very important
- 2 all the same
- 3 not meaningful

The next ten questions concern the different dimensions of your functional capacity.

55. How do you rate your functional capacity in the following areas?
(circle one alternative on each horizontal line)?

	good	fairly good	average	fairly poor	poor
observational ability and alertness	1	2	3	4	5
memory	1	2	3	4	5
ability to concentrate	1	2	3	4	5
manual dexterity	1	2	3	4	5
ability to cope with psychological stress	1	2	3	4	5
ability to take initiatives	1	2	3	4	5
ability to adopt new ideas	1	2	3	4	5
sight	1	2	3	4	5
hearing	1	2	3	4	5
balance	1	2	3	4	5

56. If you compare your functional capacity in the following areas six years ago (health study 1978) and now, what changes do you think have occurred?
(Circle one alternative on each horizontal line.)

	greatly improved	slightly improved	about the same	slightly worsened	considerably worsened
observational ability and alertness	1	2	3	4	5
memory	1	2	3	4	5
ability to concentrate	1	2	3	4	5
manual dexterity	1	2	3	4	5
ability to cope with psychological stress	1	2	3	4	5
ability to take initiatives	1	2	3	4	5
ability to adopt new ideas	1	2	3	4	5
sight	1	2	3	4	5
hearing	1	2	3	4	5
balance	1	2	3	4	5

57. Which of the following judgements best describes your attitude to aging?

- 1 I am afraid of it
- 2 I have not thought about it
- 3 I accept my aging as a normal process

58. If you compare yourself with your age peers, do you feel

- 1 more youthful than the others
- 2 much like everyone else
- 3 older than the others

The following questions are meant to clarify some of your living habits.

59. Do you consider your living habits (e.g. smoking, drinking, physical activity, food) as a whole

- 1 very healthy
- 2 healthy
- 3 a little unhealthy
- 4 very unhealthy

60. Do you consider your nutrition habits (quality of food, regularity of meals etc.)

- 1 very healthy
- 2 healthy
- 3 a little unhealthy
- 4 very unhealthy

61. Do you think you sleep and rest enough?

- 1 yes
- 2 no

62. How many hours do you sleep per a day on average?

_____ hours

63. During the past year have there been any changes in your living habits (circle one alternative on each horizontal line)

	no	stopped	increased	decreased
smoking	1	2	3	4
drinking	1	2	3	4
physical activity	1	2	3	4

64. Do you think your physical activity is sufficient counting all the physical strain you normally experience?

- 1 yes
- 2 no

65. How many hours a week you spend on physical activity on average?

- 0 none
- 1 _____ hours

66. Which one of the following descriptions best characterizes your present physical activity? (Circle only one alternative.)

- 1 I do no more physical activity than is necessary for carrying out my daily activities
- 2 I go outdoors and walk 1–2 times a week
- 3 I go outdoors and walk several times a week
- 4 I do physical activity leading to slight breathlessness and sweating 1–2 times a week
- 5 I do physical activity leading to slight breathlessness and sweating several times a week
- 6 I do physical activity leading to heavy breathlessness and sweating 1–2 times a week
- 7 I am involved in competitive sport and keep myself fit with regular training

67. Do you do gymnastics (e.g. at home or a club or suchlike)

- 1 almost never
- 2 1–2 times a week
- 3 3–6 times a week
- 4 daily

68. Here, different dimensions of physical fitness are listed. Rate your fitness for each dimension separately. (Circle one alternative on each horizontal line.)

	good	average	poor
breathing	1	2	3
circulation	1	2	3
muscles	1	2	3
joints and tendons	1	2	3

69. If you compare the different dimensions of your physical fitness six years ago (health study 1978) and now, what changes have occurred? (Circle one alternative on each horizontal line.)

	much improved	slightly improved	at the same level	slightly worsened	much worsened
breathing	1	2	3	4	5
circulation	1	2	3	4	5
muscles	1	2	3	4	5
joints and tendons	1	2	3	4	5

The following questions concern your social relations and social activity.

70. Which one of the following statements best describes your relationship with your neighbours?

- 1 our relationship is so close that we always help each other when help is needed
- 2 we often visit each other
- 3 I have a good relationship with my neighbours, but we seldom visit each other
- 4 we talk and say good-day to each other but never visit each other
- 5 I have nothing to do with my neighbours

71. How many friends do you have among your coworkers such that you visit each other (answer with number)

72. Do you have somebody in whom you can trust?

- 1 yes
- 2 no

73. How often do you tell your spouse about your daily experiences?

- 1 every day
- 2 more often than once a week
- 3 about once a week
- 4 more seldom than once a week
- 5 never

74. How would you rate your present sex life?

- 1 excellent
- 2 good
- 3 moderate
- 4 passable
- 5 poor

75. How many organizations, associations or clubs do you belong to as an active member?

76. How much time per week on the average do you spend on activity within organizations, associations or clubs (answer in figures).

_____ hours

77. How many times per month on the average do you go to cultural events (theatre, movies, concerts, art exhibitions etc) (answer in figures).

_____ times

78. **How many times per month on the average do you go out to a restaurant or dancing (answer in figures)?**

_____ times

79. **How many times per year on the average do you go to church or religious meetings?**

_____ times

80. **How many times during the past year did you go to events organized by different organizations (parties, lectures etc.)?**

_____ times

81. **What other events have you attended?**

state _____

_____ times

82. **Generally speaking, how satisfied are you with your social relationships and social activity?**

- 1 very satisfied
- 2 satisfied
- 3 satisfied to some extent
- 4 dissatisfied
- 5 very dissatisfied

The next few questions are for further information about your social relationships.

83. **How satisfied are you overall with your social relationships and various social activities? (Circle one alternative on each horizontal line.)**

	very satisfied	satisfied	satisfied to some extent	dis- satisfied	very dis- satisfied
family relationships	1	2	3	4	5
relationships with friends	1	2	3	4	5
participation in organizations	1	2	3	4	5
cultural activities	1	2	3	4	5
other state	1	2	3	4	5
_____	1	2	3	4	5

84. **How important it is for you to have good social relationships?**

- 1 very important
- 2 all the same
- 3 meaningless

85. How important it is for you to have a lot of social activity?

- 1 very important
- 2 all the same
- 3 meaningless

86. Next we give you a group of statements. Circle the number that accords with your opinion according to the instructions.

Circle the number that best accords with your opinion!

- 5 accords completely
- 4 accords relatively well
- 3 cannot say
- 2 does not accord very well
- 1 does not accord at all

To be able to work more effectively I used	1	2	3	4	5
to cut down associating with friends and having fun	1	2	3	4	5
I work hard	1	2	3	4	5
In my job I am only interested in the salary	1	2	3	4	5
Neat and clean dressing is an important part of my life	1	2	3	4	5
I like cooking	1	2	3	4	5
I like eating in new, unusual restaurants	1	2	3	4	5
Better quality is regularly worth the extra cost	1	2	3	4	5
I often buy things that cannot really be used	1	2	3	4	5
If a person has a happy family they don't	1	2	3	4	5
need much more in life	1	2	3	4	5
In our family we discuss things a lot together	1	2	3	4	5
In our family we do a lot together	1	2	3	4	5
Recently our family has tended to grow apart	1	2	3	4	5
I like to invite my friends home for supper	1	2	3	4	5
I like lively parties	1	2	3	4	5
I can easily enliven a boring situation	1	2	3	4	5
When I get a possibility to discuss things	1	2	3	4	5
with a stranger I mostly take advantage of it	1	2	3	4	5
Sex is the greatest source of happiness in human life	1	2	3	4	5
When I want to start a discussion with	1	2	3	4	5
an attractive person of the opposite sex	1	2	3	4	5
my natural shyness is a hindrance	1	2	3	4	5
It is important to me to get into contact with nature	1	2	3	4	5
Nature gives me peace of mind	1	2	3	4	5
Out on the lake I feel balanced	1	2	3	4	5
I cannot understand what makes people hike	1	2	3	4	5
in the mountains	1	2	3	4	5
Regular physical activity is important to me	1	2	3	4	5
I like to discuss political and social matters	1	2	3	4	5
I have a bad conscience if I don't	1	2	3	4	5
read the newspapers properly	1	2	3	4	5
I like to take part in demonstrations/	1	2	3	4	5
processions if I believe in what they represent	1	2	3	4	5
I get a lot from keeping abreast of the arts	1	2	3	4	5
I try to keep up with new information about different things	1	2	3	4	5
I feel a sense of wonder when I contemplate the fact of life	1	2	3	4	5
Actually I should go to church more often than I do	1	2	3	4	5
I believe that God effects my life	1	2	3	4	5

APPENDIX 2

MENTAL BALANCE

Consisted of four dimensions which were mapped on the basis of responses. Those asteristed were transformed for purposes of statistical analysis.

1. Positive mental health

1. * I have the opportunity to develop my own special interests
2. * In my present job I can use my knowledge and skills
3. * I can say that I have all possibilities of success
4. * I have an opportunity to continuously learn something new
5. * I am sufficiently noticed
6. * I am as happy now as I was in my youth
7. * I am making plans for several years ahead
8. * I am not afraid to disagree in any company
9. * I don't usually experience any difficulties in my human relationships
10. * I quickly adapt to new and surprising occasions
11. * I am completely satisfied with my sex life
12. My human relationships are formal and superficial. I think nobody really understands me
13. * I easily make new friends
14. I would like to change my job
15. * I am completely satisfied with my job

2. Personal trait anxiety

1. I feel fine
2. * I easily get tired
3. I would like to be as happy as others seem to be
4. * I find myself close to tears
5. * Things slip from my hands, because I am not able to make decisions quickly enough
6. I am cool
7. I am calm, cool and relaxed
8. * I think that difficulties tend to accumulate so that I cannot solve them
9. * I worry too much about things that are not really meaningful
10. I am happy
11. * I tend to take things too seriously
12. * I lack self-confidence
13. I feel settled

14. I try to avoid crises and difficulties
15. * I feel depressed
16. I feel satisfied
17. * I am bothered by trivial matters
18. * I take disappointments so seriously that I cannot get them out of mind
19. I am a balanced person
20. * I am irritated and strained when thinking of my present worries and hopes

3. Social fears

Cause of anxiety

1. Loneliness
2. Interaction with a stranger, e.g. asking a stranger the way
3. Transportation by public conveyance
4. Taking care of matters in banks, health centers, shops etc.
5. Speaking in public
6. Coming into a room in which everyone else is already seated
7. Persons in authority
8. Failure in marriage or other close relationships
9. Being stood up
10. Being betrayed
11. Personal criticism
12. Appearing foolish and ridiculous
13. Witnessing conflict between angry people
14. Own anger and loss of self-control
15. Going past a group of adolescents on the street
16. A decrease in own present standard of living
17. The present situation in the world

4. Self-respect

1. * I feel at least as valuable as anyone else
2. * I think I have many good qualities
3. In general, I tend to feel unsuccessful as a person
4. * I can perform as well as most people
5. I don't think I have much to be proud of
6. * I take a positive attitude toward myself
7. * Generally speaking I am satisfied with myself
8. Every now and then I feel totally useless
9. Sometimes I think that I am worthless

APPENDIX 3

Parameter	Measuring technique
Maximal oxygen uptake	based on submaximal bicycle ergometer test recommended by WHO; four increasing loads three minutes each, last load 85 % of subjects maximal capacity
Grip strength	best of two consecutive maximal isometric squeezings, both hands
Isometric strength of body extension and flexion	according to Viitasalo et al. 1977
Physical therapist's examination of the status of locomotor organs	according to Solonen and Nummi, 1971
Smoking	number of cigarettes, cigars and pipefuls a day
Alcohol drinking	heavy drinking: 1) more seldom than once a week 2) once a week or more often

APPENDIX 4

Frequency tables of different dimensions of self-rated functional capacity by age, sex and occupational groups, and loglinear models (estimates of parameters, their standard errors and results of goodness of fit test) pp. 113–122.

Table 1. *Self-rated overall functional capacity (SRFC) in different age and sex groups (figure 5 in text).*

Sex	Age group	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
Women	27-39 yrs	20	17	0
	59-75 yrs	22	16	6
Men	27-39 yrs	67	28	3
	59-75 yrs	28	28	10

Parameter	Estimate	S.E.				
GRAND MEAN	3.05	.14				
SRFC (2)	-.37	.14	Z =	0	0	0
SRFC (3)	-1.98	.25		0	0	0
AGE (2)	.10	.15		+1	0	-1
SEX (2)	.63	.14		-1	0	+1
Z	.50	.12				

Scaled deviance = 5.8, df = 6, p >.30

Table 2. *Self-rated overall functional capacity (SRFC) compared to age peers in different age and sex groups (figure 6 in text).*

Sex	Age group	SELF-RATED FUNCTIONAL CAPACITY		
		BETTER N	EQUAL N	WORSE N
Women	27-39 yrs	4	32	1
	59-75 yrs	9	25	10
Men	27-39 yrs	9	82	7
	59-75 yrs	14	39	11

Parameter	Estimate	S.E.
GRAND MEAN	1.28	.31
SRFC (2)	2.17	.29
SRFC (3)	-.42	.44
AGE (2)	.96	.39
SEX (2)	.96	.19
SRFC (2) AGE (2)	-1.15	.38
SRFC (3) AGE (2)	.33	.53
SEX (2) AGE (2)	-.59	.27

Scaled deviance = 1.04, df = 4, p >.90

Table 3. *Self-rated physical functional capacity (SRPhFC) in different age and sex groups (figure 7 in text).*

		SELF-RATED PHYSICAL FUNCTIONAL CAPACITY		
Sex	Age group	GOOD N	AVERAGE N	POOR N
Women	27-39 yrs	2	29	6
	59-75 yrs	3	30	11
Men	27-39 yrs	12	78	8
	59-75 yrs	3	49	13

Parameter	Estimate	S.E.				
GRAND MEAN	1.21	.25				
SRPhFC (2)	2.34	.25	Z =	+1	0	-1
SRPhFC (3)	.74	.28		-1	0	+1
AGE (2)	-.27	.13		+1	0	-1
SEX (2)	.70	.14		-1	0	+1
Z	.36	.14				

Scaled deviance = 8.39, df = 6, p >.20

Table 4. *Self-rated psychological functional capacity (SRPsFC) in different age and sex groups (figure 8 in text).*

		SELF-RATED PSYCHOLOGICAL FUNCTIONAL CAPACITY		
Sex	Age group	GOOD N	AVERAGE N	POOR N
Women	27-39 yrs	13	21	3
	59-75 yrs	11	28	5
Men	27-39 yrs	43	51	3
	59-75 yrs	14	48	3

Parameter	Estimate	S.E.				
GRAND MEAN	2.55	.16				
SRPsFC (2)	.67	.14	Z =	+1	0	-1
SRPsFC (3)	-1.75	.29		-1	0	+1
AGE (2)	.00	.14		+1	0	-1
SEX (2)	.69	.14		-1	0	+1
Z	.36	.12				

Scaled deviance = 9.35, df = 6, p >.10

Table 5. *Self-rated overall functional capacity (SRFC) in different age and occupational groups among women (figure 9 in text).*

Occupational status	Age group	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
White collar	27-39 yrs	15	10	0
	59-75 yrs	14	5	1
Blue collar	27-39 yrs	5	7	0
	59-75 yrs	8	11	5

Parameter	Estimate	S.E.
GRAND MEAN	2.59	.22
SRFC (2)	-.66	.32
SRFC (3)	-2.67	.73
OCCUP (2)	-.80	.33
AGE (2)	.16	.22
SRFC (2) OCCUP (2)	.98	.48
SRFC (3) OCCUP (2)	1.81	.89

Scaled deviance = 7.61, df = 5, p >.10

Table 6. *Self-rated overall functional capacity (SRFC) in different age and occupational groups among men (figure 10 in text).*

Occupational status	Age group	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
White collar	27-39 yrs	22	10	2
	59-75 yrs	15	7	3
Blue collar	27-39 yrs	45	18	1
	59-75 yrs	13	21	7

Parameter	Estimate	S.E.	Z =		
GRAND MEAN	2.83	.17			
SRFC (2)	-.42	.17	0	0	0
SRFC (3)	-1.93	.30	0	0	0
OCCUP (2)	.47	.17	+1	0	-1
AGE (2)	-.17	.18	-1	0	+1
Z (3)	.56	.15			

Scaled deviance = 4.75, df = 6, p >.50

Table 7. *Self-rated physical functional capacity (SRPhFC) in different age and occupational groups among women (figure 11 in text).*

		SELF-RATED PHYSICAL FUNCTIONAL CAPACITY		
Occupational status	Age group	GOOD N	AVERAGE N	POOR N
White collar	27-39 yrs	5	13	7
	59-75 yrs	8	6	6
Blue collar	27-39 yrs	1	5	6
	59-75 yrs	6	7	11

Parameter	Estimate	S.E.
GRAND MEAN	1.28	.40
SRPhFC (2)	1.02	.46
SRPhFC (3)	.69	.48
OCCUP (2)	-.21	.22
AGE (2)	.77	.47
SRPhFC (2) AGE (2)	-1.09	.60
SRPhFC (3) AGE (2)	-.50	.60

Scaled deviance = 6.72, df = 5, p >.20

Table 8. *Self-rated physical functional capacity (SRPhFC) in different age and occupational groups among men (figure 12 in text).*

		SELF-RATED PHYSICAL FUNCTIONAL CAPACITY		
Occupational status	Age group	GOOD N	AVERAGE N	POOR N
White collar	27-39 yrs	11	15	8
	59-75 yrs	6	10	9
Blue collar	27-39 yrs	28	21	15
	59-75 yrs	8	15	17

Parameter	Estimate	S.E.
GRAND MEAN	2.65	.19
SRPhFC (2)	-.08	.23
SRPhFC (3)	-.53	.26
OCCUP (2)	.57	.16
AGE (2)	-1.03	.31
SRPhFC (2) AGE (2)	.66	.41
SRPhFC (3) AGE (2)	1.15	.42

Scaled deviance = 2.04, df = 5, p >.80

Table 9. *Self-rated psychological functional capacity (SRPsFC) in different age and occupational groups among women (figure 13 in text).*

		SELF-RATED PSYCHOLOGICAL FUNCTIONAL CAPACITY		
Occupational status	Age group	GOOD N	AVERAGE N	POOR N
White collar	27-39 yrs	10	10	5
	59-75 yrs	6	10	4
Blue collar	27-39 yrs	4	5	3
	59-75 yrs	5	12	7

Parameter	Estimate	S.E.
GRAND MEAN	1.85	.25
SRPhFC (2)	.39	.25
SRPhFC (3)	-.27	.30
OCCUP (2)	-.22	.22
AGE (2)	.17	.22

Scaled deviance = 6.52, df = 7, p >.30

Table 10. *Self-rated psychological functional capacity (SRPsFC) in different age and occupational groups among men (figure 14 in text).*

		SELF-RATED PSYCHOLOGICAL FUNCTIONAL CAPACITY		
Occupational status	Age group	GOOD N	AVERAGE N	POOR N
White collar	27-39 yrs	13	14	7
	59-75 yrs	4	13	7
Blue collar	27-39 yrs	24	25	14
	59-75 yrs	7	12	22

Parameter	Estimate	S.E.
GRAND MEAN	2.58	.20
SRPhFC (2)	.05	.23
SRPhFC (3)	-.57	.27
OCCUP (2)	.58	.16
AGE (2)	-1.21	.34
SRPsFC (2) AGE (2)	.77	.43
SRPsFC (3) AGE (2)	1.54	.45

Scaled deviance = 4.62, df = 5, p >.30

Table 11. *Self-rated overall functional capacity (SRFC) according to physical activity (PA) in different age groups among women (figure 15 in text).*

SELF-RATED OVERALL FUNCTIONAL CAPACITY				
Physical activity	Age group	GOOD N	AVERAGE N	POOR N
Low	27-39 yrs	7	12	0
	59-75 yrs	14	11	0
High	27-39 yrs	13	5	0
	59-75 yrs	8	5	2

Parameter	Estimate	S.E.
GRAND MEAN	2.28	.25
SRFC (2)	.09	.30
SRFC (3)	-1.54	.52
PA (2)	.00	.31
AGE (2)	.15	.22
SRFC (2) PA (2)	-.83	.49
SRFC (3) PA (2)	-.59	.85

Scaled deviance = 7.25, df = 5, p >.20

Table 12. *Self-rated overall functional capacity (SRFC) according to physical activity (PA) in different age groups among men (figure 16 in text).*

SELF-RATED OVERALL FUNCTIONAL CAPACITY				
Physical activity	Age group	GOOD N	AVERAGE N	POOR N
Low	27-39 yrs	5	7	2
	59-75 yrs	3	2	3
High	27-39 yrs	42	16	1
	59-75 yrs	12	9	3

Parameter	Estimate	S.E.
GRAND MEAN	3.28	.17
SRFC (2)	-.87	.23
SRFC (3)	-2.95	.55
PA (2)	.42	.21
AGE (2)	-.40	.27
SRFC (2) PA (2)	.87	.35
SRFC (3) PA (2)	1.92	.66
PA (2) AGE (2)	-.98	.33

Scaled deviance = 1.60, df = 4, p >.80

Table 13. *Self-rated overall functional capacity (SRFC) according to prevalence of chronic diseases in different occupational groups among women (figure 17 in text).*

Occupational group	Diseases	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
White collar	None	16	10	0
	1 or more	13	5	1
Blue collar	None	6	5	1
	1 or more	7	13	4

Parameter	Estimate	S.E.	Z =		
SRFC (1)	-1.46	.33	+1	0	-1
SRFC (2)	-.71	.24	+1	0	-1
DISEASE (1)	-.06	.11	-1	0	+1
OCCUP (1)	-.12	.15	-1	0	+1
Z	-.76	.28			

Scaled deviance = 8.89, df = 6, p > .20

Table 14. *Self-rated overall functional capacity (SRFC) according to prevalence of chronic diseases in different occupational groups among men (figure 18 in text).*

Occupational group	Diseases	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
White collar	None	17	8	1
	1 or more	20	9	4
Blue collar	None	27	9	0
	1 or more	31	29	8

Parameter	Estimate	S.E.	Z =		
SRFC (1)	-1.66	.24	+1	0	-1
SRFC (2)	-.42	.17	-1	0	+1
DISEASE (1)	-.48	.12	+1	0	-1
OCCUP (1)	-.28	.08	-1	0	+1
Z	-.60	.21			

Scaled deviance = 5.98, df = 5, p > .30

Table 15. *Self-rated overall functional capacity (SRFC) according to prevalence of symptoms in different occupational groups among women (figure 19 in text).*

		SELF-RATED FUNCTIONAL CAPACITY			
Occupational group	Symptoms	GOOD N	AVERAGE N	POOR N	
White collar	None	16	8	0	
	1 or more	10	6	1	
Blue collar	None	6	3	0	
	1 or more	6	13	5	

Parameter	Estimate	S.E.			
GRAND MEAN	1.79	.26			
SRFC (1)	-.19	.26	Z =	+1	0
SRFC (2)	-1.94	.46		0	0
OCCUP (1)	.14	.27		0	0
SYMPTOMS (1)	.61	.27		-1	0
Z	.93	.27			+1

Scaled deviance = 5.74, df = 6, p >.30

Table 16. *Self-rated overall functional capacity (SRFC) according to prevalence of symptoms in different occupational groups among men (figure 20 in text).*

		SELF-RATED FUNCTIONAL CAPACITY			
Occupational group	Symptoms	GOOD N	AVERAGE N	POOR N	
White collar	None	27	11	0	
	1 or more	9	6	5	
Blue collar	None	37	17	0	
	1 or more	20	21	7	

Parameter	Estimate	S.E.			
GRAND MEAN	3.15	.16			
SRFC (2)	-.83	.23			
SRFC (3)	-4.16	1.01			
OCCUP (2)	.56	.16			
SYMPTOMS (2)	-.79	.22			
SRFC (2) SYMPTOMS (2)	.76	.35			
SRFC (3) SYMPTOMS (2)	3.28	1.06			

Scaled deviance = 4.12, df = 5, p >.50

Table 17. *Self-rated overall functional capacity (SRFC) according to capacity to walk in different age groups among women (figure 21 in text).*

Walking Distance	Age group	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
5 kms	27-39 yrs	4	6	0
or less	59-75 yrs	12	14	6
6 kms	27-39 yrs	16	11	0
or more	59-75 yrs	10	2	0

Parameter	Estimate	S.E.
GRAND MEAN	1.37	.37
SRFC (2)	.22	.34
SRFC (3)	-.90	.47
WALKING (2)	1.51	.43
AGE (2)	1.11	.36
SRFC (2) WALKING (2)	-.92	.48
SRFC (3) WALKING (2)	-2.36	1.12
WALKING (2) AGE (2)	-1.90	.49

Scaled deviance = 4.06, df = 4, p >.30

Table 18. *Self-rated overall functional capacity (SRFC) according to capacity to walk in different age groups among men (figure 22 in text).*

Walking Distance	Age group	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
5 kms	27-39 yrs	5	4	1
or less	59-75 yrs	14	17	10
6 kms	27-39 yrs	62	24	2
or more	59-75 yrs	14	11	0

Parameter	Estimate	S.E.
GRAND MEAN	1.35	.35
SRFC (2)	.10	.32
SRFC (3)	-.50	.37
WALKING (2)	2.72	.38
AGE (2)	1.36	.35
SRFC (2) WALKING (2)	-.88	.38
SRFC (3) WALKING (2)	-2.91	.74
WALKING (2) AGE (2)	-2.60	.41

Scaled deviance = 3.08, df = 4, p >.50

Table 19. *Self-rated overall functional capacity (SRFC) according to ability to carry shopping in different age groups among women (figure 23 in text).*

Shopping	Age group	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
5 kgs or less	27-39 yrs	8	12	0
	59-75 yrs	15	12	6
6 kgs or more	27-39 yrs	12	5	0
	59-75 yrs	7	4	0

Parameter	Estimate	S.E.
GRAND MEAN	2.18	.27
SRFC (2)	.04	.29
SRFC (3)	-1.26	.44
SHOPPING (2)	.26	.39
AGE (2)	.48	.28
SRFC (2) SHOPPING (2)	-.79	.50
SRFC (3) SHOPPING (2)	-1.68	1.11
SHOPPING (2) AGE (2)	-.90	.47

Scaled deviance = 4.89, df = 4, p > .20

Table 20. *Self-rated overall functional capacity (SRFC) according to ability to carry shopping in different age groups among men (figure 24 in text).*

Shopping	Age group	SELF-RATED FUNCTIONAL CAPACITY		
		GOOD N	AVERAGE N	POOR N
5 kgs or less	27-39 yrs	9	4	0
	59-75 yrs	14	19	9
6 kgs or more	27-39 yrs	58	24	3
	59-75 yrs	14	9	1

Parameter	Estimate	S.E.
GRAND MEAN	2.21	.28
SRFC (2)	-.87	.23
SRFC (3)	-2.95	.55
SHOPPING (2)	1.84	.29
AGE (2)	.66	.35
SRFC (2) AGE (2)	.87	.35
SRFC (3) AGE (2)	1.97	.66
SHOPPING (2) AGE (2)	-2.38	.39

Scaled deviance = 4.95, df = 4, p > .20

APPENDIX 5. *Correlations of mental balance with self-ratings of overall functional capacity, physical and psychological functional capacity.*

	Mental balance			
	27-39 years old		59-75 years old	
	Women (N=27)	Men (N=78)	Women (N=23)	Men (N=37)
	r	r	r	r
Overall functional capacity	-.226	-.354***	-.343*	-.373**
Physical functional capacity	.001	-.151	.140	-.277*
Psychological functional capacity	-.174	-.472***	-.499**	-.587

* p<.05

** p<.01

*** p<.001

APPENDIX 6. *Intensity of physical activity in different age and sex groups.*

	WOMEN				MEN			
	27-39 years		59-75 years		27-39 years		57-75 years	
	%	N	%	N	%	N	%	N
No more than is necessary for daily activities			14	6	14	14	12	8
Walking and being outdoors 1-2 times a week	27	10	7	3	17	17	15	10
Walking and being outdoors several times a week	23	9	45	20	8	8	37	24
1-2 times a week activity which causes breathlessness and sweating	38	14	18	8	27	27	22	14
Several times a week activity which causes breathlessness and sweating	6	2	14	6	21	21	12	8
Several times a week physical activity which causes breathlessness and sweating	6	2	2	1	10	10	2	1
Competitive sport and keeping fit with regular training					1	1		

The first three alternatives describe low and the four last high physical activity.

APPENDIX 7. *Correlations of self-rated overall functional capacity with self-ratings of physical and psychological functional capacity.*

	SELF-RATED OVERALL FUNCTIONAL CAPACITY			
	27-39 years old		59-75 years old	
	Women (N=37)	Men (N=98)	Women (N=44)	Men (N=65)
	r	r	r	r
Physical functional capacity	.303*	.279**	.159	.425***
Psychological functional capacity	.365*	.515***	.510***	.353**

* p<.05

** p<.01

*** p<.001

APPENDIX 8. *HEALTH STATUS with special reference to self-rated health, chronic diseases, and symptoms in different age and sex groups.*

Table 1. *Percentage share of self-rated health in different age and sex groups.*

Sex	Age	SELF-RATED HEALTH					
		GOOD		AVERAGE		POOR	
		%	N	%	N	%	N
Women	27-39 years	78	29	22	8	0	0
	59-75 years	41	18	45	20	14	6
Men	27-39 years	73	72	22	22	5	5
	59-75 years	29	19	50	33	21	14

Table 2. *Prevalence of chronic diseases in different age and sex groups.*

Sex	Age	CHRONIC DISEASES			
		NONE		ONE OR MORE	
		%	N	%	N
Women	27-39 years	70	26	30	11
	59-75 years	27	12	73	32
Men	27-39 years	62	61	38	38
	59-75 years	2	1	98	64

TABLE 3. *Prevalence of symptoms in different age and sex groups.*

Sex	Age	SYMPTOMS			
		NONE		ONE OR MORE	
		%	N	%	N
Women	27-39 years	65	24	35	13
	59-75 years	24	9	76	28
Men	27-39 years	73	71	27	26
	59-75 years	32	22	66	42

APPENDIX 9. *Ability to carry on the daily activities.*

Table 1. *Ability to walk without pausing to rest. Percentage distributions in age and sex groups.*

Ability to walk without resting	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
About 0.5 km	—	—	—	—	11.4	5	12.1	8
1-2 km	5.4	2	1.0	1	15.9	7	13.6	9
3-5 km	21.6	8	9.1	9	45.5	20	36.4	24
6-10 km	43.2	16	25.3	25	20.5	9	22.7	15
over 10 km	29.7	11	63.6	63	6.8	3	15.2	10

Table 2. *Ability to run without resting. Percentage distributions in age and sex groups.*

Ability to run without resting	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
Not able to run	5.4	2	1.0	1	63.6	28	54.6	36
About 0.5 km	45.9	17	15.2	15	27.3	12	31.8	8
1-2 kms	40.5	15	30.3	30	9.1	4	6.1	4
3-5 kms	8.1	3	21.2	21	—	—	6.1	4
Over 5 kms	—	—	31.3	31	—	—	—	—

Table 3. *Ability to climb a flight of stairs without pausing to rest. Percentage distributions in age and sex groups.*

Ability to climb the steps	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
Without difficulties	97.3	36	98.0	97	84.1	37	84.8	56
With some difficulties	2.7	1	1.0	1	11.4	5	10.6	7
With lots of difficulties	—	—	—	—	—	—	3.0	2
Not able	—	—	—	—	4.5	2	—	—

Table 4. *Ability to carry shopping for at least half a kilometer without pausing to rest. Percentage distributions in age and sex groups.*

Ability to carry shopping	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
Less than 2 kgs	5.4	2	1.0	1	13.6	6	7.6	5
2-5 kgs	48.6	18	12.1	12	61.4	27	56.1	37
6-10 kgs	37.8	14	30.3	30	22.7	10	28.8	29
Over 10 kgs	8.1	3	55.6	55	2.3	1	7.6	5

Table 5. *Ability to lift a heavy burden. Percentage distributions in age and sex groups.*

Ability to lift a burden	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
Less than 10 kgs	18.9	7	—	—	43.2	19	3.0	2
10-24 kgs	40.5	15	2.0	2	52.3	23	33.3	22
25-49 kgs	35.1	13	23.2	23	4.5	2	45.5	30
50 kgs or more	5.4	2	72.7	72	—	—	16.7	11

Table 6. *Ability to do a bout of heavy cleaning work. Percentage distributions in age and sex groups.*

Ability to carry on the cleaning work	27-39 years old				59-75 years old			
	Women		Men		Women		Men	
	%	N	%	N	%	N	%	N
Without difficulties	64.9	24	94.9	94	45.5	20	56.1	37
With some difficulties	35.1	13	3.0	3	38.6	17	33.3	22
With lots of difficulties	—	—	1.0	1	11.4	5	7.6	5
Not able	—	—	—	—	—	—	—	—

APPENDIX 10. *Intercorrelations of activities of daily living.*

1. Walking	1 1.000					
2. Jogging	.660	2 1.000				
3. Climbing the steps	-.706	-.979	3 1.000			
4. Carrying shopping	.595	.527	-.317	4 1.000		
5. Lifting a burden	.535	.031	-.447	.923	5 1.000	
6. Heavy cleaning work	.529	-.634	.760	-.375	-.366	6 1.000

APPENDIX 11. *Functional capacity of the subjects. Means and standard deviations of the clinical measurements in age and sex groups.*

	27-39 YEARS				59-75 YEARS			
	WOMEN (N=32)		MEN (N=86)		WOMEN (N=41)		MEN (N=64)	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
Near sight, left, d	-7.8 ± 2.9	-7.3 ± 2.6	-0.04 ± 1.9	-0.1 ± 1.9				
Near sight, right, d	-7.9 ± 2.9	-7.5 ± 2.9	-0.3 ± 1.4	-0.3 ± 1.6				
Lens adaptation, left, d	7.2 ± 1.7	6.9 ± 1.7	2.8 ± 0.9	2.6 ± 0.8				
Lens adaptation, right, d	7.2 ± 1.6	7.0 ± 1.7	3.1 ± 1.3	2.8 ± 1.03				
Speech understanding	10.5 ± 1.2	10.7 ± 1.0	7.8 ± 2.0	6.3 ± 2.8				
Perceptual threshold for vibratory stimulus, arbitrary units	129.1 ± 12.3	136.2 ± 15.4	152.7 ± 21.5	170.8 ± 24.9				
Static balance, sec.	16.0 ± 18.6	20.4 ± 23.5	4.1 ± 2.8	5.8 ± 11.2				
Posture control 1, mm	98.6 ± 32.6	109.6 ± 40.3	143.4 ± 66.0	189.2 ± 105.4				
Posture control 2, mm	198.2 ± 83.4	210.9 ± 95.8	259.4 ± 115.1	378.9 ± 202.3				
Posture control 3, mm	236.7 ± 58.5	282.2 ± 76.9	344.6 ± 101.3	525.0 ± 256.7				
Posture control 4, mm	701.5 ± 458.3	799.5 ± 382.3	1389.4 ± 714.5	1875.1 ± 1188.1				
Digit symbol, digits	59.7 ± 11.9	50.2 ± 11.8	33.9 ± 14.0	30.7 ± 9.7				
Digit span, numbers	9.6 ± 1.8	9.7 ± 1.57	9.4 ± 1.4	9.1 ± 1.9				
Manipulative dexterity, sec.	48.8 ± 5.7	54.5 ± 8.22	61.1 ± 12.0	68.1 ± 15.6				
3-choice reaction time, 1/1000 s	0.62 ± 0.100	0.510 ± 0.085	0.671 ± 0.105	0.611 ± 0.099				
Vital capacity, l	3.5 ± 0.6	4.9 ± 0.74	2.5 ± 0.5	3.6 ± 0.7				
Systolic blood pressure, mmHg	119.8 ± 13.0	136.8 ± 12.1	148.8 ± 21.1	149.5 ± 19.6				
Diastolic blood pressure, mmHg	79.9 ± 7.1	86.3 ± 8.9	83.3 ± 10.0	87.1 ± 11.0				
Pulsepressure, mmHg	40.0 ± 10.0	50.5 ± 10.6	65.5 ± 14.7	62.5 ± 16.9				
Height, cm	162.3 ± 52.7	176.5 ± 57.7	158.3 ± 67.2	172.1 ± 59.7				
Weight, kg	61.5 ± 9.9	76.8 ± 11.3	69.0 ± 9.8	78.5 ± 11.2				
Percentage of body fat	30.6 ± 4.6	22.1 ± 4.7	39.8 ± 4.8	28.0 ± 5.4				
Hand grip, kg	35.9 ± 11.4	40.6 ± 14.9	37.8 ± 15.7	40.3 ± 13.9				
Body extension, kg	67.3 ± 27.9	74.3 ± 32.9	71.2 ± 36.7	71.1 ± 30.7				
Body flexion, kg	49.5 ± 22.7	57.7 ± 28.7	52.4 ± 27.2	51.5 ± 24.5				
$\dot{V}O_2$ max, ml/kg x min	37.3 ± 9.5	37.0 ± 7.5	39.5 ± 7.4	36.6 ± 8.0				