



VIRPI LIUKKONEN

Non-standard Employment and Health
with Respect to Sense of Coherence
and Social Capital



ACADEMIC DISSERTATION

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ACADEMIC DISSERTATION

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To my family

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Abstract

Non-standard employment has become an integral feature of labor markets in developed countries in recent decades at the same time as demands for flexibility of the labor force have increased. In the broadest sense of the concept, non-standard employment may be defined as any work where the criteria of the standard employment relationship, i.e. full-time, permanent salary employment with open ended contract, are not fulfilled. This dissertation examines the relationship between non-standard employment and health.

The studies are based on data obtained from three prospective cohort studies. In the Health and Social Support Study a representative sample of Finnish working age population was followed up for five years. In the Finnish Public Sector Study a cohort of permanent employees and in the Temporaries in Municipal Jobs Study a cohort of non-permanent employees was followed up for four years.

According to the results of the baseline survey, health is unevenly distributed along the core-periphery labor market structure in the Finnish workforce. Comparison of permanent and fixed-term employees did not reveal significant differences in self-rated health, chronic disease and depression. The first step of increase in health problems was seen between the fixed-term employees and the group that included various atypical employees and the unemployed receiving earnings-related allowance or participating in subsidy programs. A further step was observed between this group and the unemployed receiving only the low basic allowance.

In the follow-up study of municipal permanent and non-permanent employees, work-related sources of social capital at baseline, measured by trust in labor market (employment contract) and trust in co-worker support, and combined social job capital were associated with health at the end of the follow-up. Fixed-term employment was associated with better self-rated health and less psychological distress in women when compared with permanent employees. Trust in receiving support from co-workers was associated with better self-rated health in women. Low level of social job capital, i.e. the combination of subsidised employment with no trust in co-workers' support, was associated with poor health in women.

Another longitudinal study of municipal employees showed that different employment trajectories carry different health risks. Among women with initially fixed-term contracts trajectories toward the periphery of the labor markets were

associated with poorer self-rated health at end of the follow-up, while trajectories towards permanent employment were associated with low psychological distress at end of the follow-up. On the other hand, poor self-rated health at baseline was associated with a trajectory toward unstable employment.

Employment trajectories were also associated with changes in sense of coherence. The scores mainly improved more in employment trajectories directed to more stable employment than in trajectories directed to less stable employment. Particularly marked effects of employment trajectory on sense of coherence were seen in employees aged less than 30 years.

The study focused on sample attrition showed differences between standard and non-standard employees. Low sense of coherence predicted non-response in fixed-term employees and poor self-rated health predicted non-response and exit from the cohort in permanent employees.

In conclusion, when studying association between employment status and health it is important to classify employment status as accurately as possible. Different employment trajectories carry different risks to health, and cumulative exposure to different labor market positions from the beginning of the working careers needs explorations in particular in order to identify possible risk of adverse health effect in workers. Better knowledge and awareness of the risks also enable targeted occupational health interventions.

Tiivistelmä

Epätyypilliset työsuhteet ovat viime vuosikymmenien aikana yleistyneet samaan aikaan kun vaatimukset työvoiman joustavuudesta ovat lisääntyneet. Epätyypillisillä työsuhteilla tarkoitetaan laajimmillaan kaikkia sellaisia työsuhteita, jotka eivät täytä tyyppillisen eli vakinaisen, toistaiseksi solmitun ja kokoaikaisen palkkatyösuhteen määritelmää. Tämän väitöskirjan tavoitteena on tutkia epätyypillisten työsuhteiden yhteyttä työntekijöiden terveyteen.

Väitöskirja perustuu kolmesta pitkittäistutkimuksesta saatuun aineistoon. Suomen työikäistä väestöä edustava satunnaistettu otos on Health and Social Support -tutkimuksesta, jossa seuranta-aika oli viisi vuotta. Kunta-alan vakinaisen henkilöstön kohortti on Kunta10 -tutkimuksesta ja ei-vakinaisen henkilöstön kohortti on Tilapäisenä kunnan töissä -tutkimuksesta, joissa molemmissa seuranta-aika oli neljä vuotta.

Tulosten mukaan työikäisessä väestössä määräaikaisten työntekijöiden terveys ei eronnut seurannan alussa merkitsevästi vakinaisten työntekijöiden terveydestä koetun terveyden, kroonisten sairauksien tai masennuksen suhteen. Sen sijaan muunlaisia epätyypillisiä töitä tekevien, työllistettyjen ja ansiosidonnaisella työttömyyspäivärahalla olevien terveys oli huonompi kuin vakinaisten työntekijöiden. Kaikkein huonoin terveys oli peruspäivärahalla olevilla työttömillä.

Kunta-alalla työskentelevien vakinaisten ja ei-vakinaisten työntekijöiden seurantatutkimuksessa analysoitiin työhön liittyvän sosiaalisen pääoman yhteyttä terveyteen käyttäen mittareina luottamusta työmarkkinoihin eli työsuhdetta ja luottamusta työkavereilta saatuun tukeen. Seurannan alussa määräaikaisessa työsuhteessa olleiden naisten koettu terveydentila oli parempi ja psyykkinen rasittuneisuus vähäisempää neljän vuoden seurannan kohdalla verrattuna seurannan alussa vakinaisessa työsuhteessa oleviin naisiin. Seurannan alussa koettu luottamus työkavereilta saatuun tukeen oli yhteydessä parempaan terveydentilaan seurannan lopussa naisilla. Naistyöntekijät, joilla oli seurannan alussa vähiten työhön liittyvää sosiaalista pääomaa (työllistetyt, jotka eivät luottaneet työkavereilta saatuun tukeen) kokivat terveytensä seurannassa huonommaksi kuin paljon sosiaalista pääomaa omaavat (vakinaisessa työsuhteessa olevat, jotka luottivat työkavereilta saatuun tukeen).

Toisessa seurantatutkimuksessa todettiin erilaisilla työurilla olevan vaikutusta työntekijöiden terveyteen ja elämänhallinnan tunteeseen. Määräaikaisilla kunta-

alan naistyöntekijöillä työttömäksi joutuminen ja epävakaa työuralla oleminen oli yhteydessä huonoon terveydentilaan seurannan lopussa, kun taas vakinaisen työsuhteen saaneilla oli vähemmän psyykkistä rasittuneisuutta seurannan lopussa. Lisäksi tutkimuksessa todettiin, että seurannan alussa huonoksi koettu terveydentila oli yhteydessä epävakaiseen työuraan ja työttömäksi joutumiseen. Väestökohorttia ja kunta-alan ei-vakinaisia työntekijöitä tutkittaessa elämänhallinnan tunteen kehitys oli pääsääntöisesti parempi työntekijöillä, joiden työura kehittyi vakaampaan suuntaan.

Seurantatutkimuksen katoon vaikuttavat tekijät olivat erilaiset eri työntekijäkohorteissa. Määräaikaisista työntekijöistä he, joiden elämänhallinnan tunne oli seurannan alussa korkeampi, vastasivat seurantatutkimuksessa aktiivisemmin. Vakinaisilla työntekijöillä huono koettu terveys seurannan alussa oli yhteydessä sekä vastaamatta jättämiseen sekä kunta-alan työntekijäkohortista poistumiseen.

Tutkittaessa epätavallisten työsuhteiden yhteyttä terveyteen on tärkeää luokitella erilaiset työsuhteet mahdollisimman tarkasti. Tutkittu tieto ja tietoisuus työmarkkina-asemaan ja työuriin liittyvistä haitallisista terveysvaikutuksista auttaa kohdentamaan työterveyshuollon tukitoimia niitä tarvitseville.

List of original publications

The dissertation is based on the following original publications, which are referred to in the text by Roman numerals I-V.

- I Virtanen P, Liukkonen V, Vahtera J, Kivimäki M and Koskenvuo M (2003): Health inequalities in the workforce: the labour market core-periphery structure. *International Journal of Epidemiology* 32: 1015–1021.
- II Liukkonen V, Virtanen P, Kivimäki M, Pentti J and Vahtera J (2004): Social capital in working life and the health of employees. *Social Science and Medicine* 59: 2447–2458.
- III Virtanen P, Vahtera J, Kivimäki M, Liukkonen V, Virtanen M and Ferrie J (2005): Labor market trajectories and health: a four-year follow-up study of initially fixed-term employees. *American Journal of Epidemiology* 161: 840–846.
- IV Liukkonen V, Virtanen P, Vahtera J, Suominen S, Sillanmäki L and Koskenvuo M (2010): Employment trajectories and changes in sense of coherence. *European Journal of Public Health* 20: 293–298.
- V Liukkonen V, Virtanen P, Kivimäki M, Pentti J and Vahtera J (2008): Sense of coherence and attrition during four-year follow-up in cohorts of permanent and non-permanent Finnish employees. *BMC Public Health* 8: 88.

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Abbreviations

BDI	Beck Depression Inventory
CI	Confidence Interval
GHQ	General Health Questionnaire
GLM	General Linear Model
ISCO	International Standard Classification of Occupations
LOT-R	Life Orientation Test Revised
SD	Standard Deviation
SOC	Sense of Coherence

1 Introduction

Over the past 30 years, the growth of non-standard employment has become an essential part of labor markets in developed countries (e.g. De Grip et al. 1997, Letourneux 1998, Benach et al. 2000, Aronsson 2001, Sutela et al. 2001, Quinlan et al. 2001, De Cuyper et al. 2008, Benach et al. 2010a). Earlier, permanent employment was the norm in the industrialized world. Based on this standard, societies were built on the assumption that most people work on a permanent basis throughout their working age; this applied to the labor laws as well as to social security systems and occupational safety and health care.

With the growth of non-standard employment and unstable careers there has been increasing concern about their possible adverse health effects. The concern has also been raised that the potential effect on population health may be enormous although on individual level the effect may be moderate (Benach et al. 2000). It is obvious that changes in the labor market also necessitate changes in occupational safety and health services (Aronsson 2001, Quinlan et al. 2001, Benach et al. 2002a).

Research on the associations between non-standard employment and health, however, has yielded inconsistent and contradictory results. Heterogeneity of non-standard employment is one obvious reason for the findings. This emphasizes the importance of researching the structures of the labor market as the basis of health related studies. The rapidly changing structures increase the number of employees who during their lifetime are exposed to different occupations, workplaces, employment contracts and labor market positions, voluntarily or involuntarily. The effects of different labor market careers on health are so far largely unknown.

Health inequalities among standard and different non-standard employees in cross-sectional studies may be partly explained by health-related selection. Health-related selection may operate several times during working histories, and is a problem to be also considered in follow-up studies. Sample attrition may also cause health-related selection, and possible bias related to it may impair the interpretation of the results of longitudinal studies, in particular those based on surveys. Such studies are becoming more complicated, as the instability of work life is increasing difficulties to reach non-standard employees. When studying employee cohorts it is important also to trace those employees who have left their workplaces.

The associations between employment status and health can be explained in the frames of a number of different biomedical, sociological and psychological models, including stress theory, material deprivation theory and latent functions theory (Tomba et al. 2007, Janlert and Hammarström 2009). Moreover, the change of the labor market has raised questions about eventually reduced significance of working life as a source of social capital which, in turn, has been considered important to health. The change can also be detrimental to development of employees' sense of coherence, which is important for coping with stress.

In this dissertation, social capital and sense of coherence have been chosen as the theoretical concepts and empirical constructs for understanding the relationship between non-standard employment and employees' health. Their theoretical nature is outlined in Chapters 2.7 and 2.8. Chapters 2.2, 2.3 and 2.4 deal with definitions, heterogeneity and prevalence of non-standard employment, Chapter 2.5 reviews previous research concerning associations between health and non-standard employment, and Chapter 2.6 presents findings on working conditions in non-standard jobs. As the empirical articles of the dissertation are mainly based on follow-up settings, the matter of sample attrition is also discussed in Chapter 2.9.

In conclusion, despite the relatively large body of research there are numerous unanswered questions related to associations between non-standard employment and health. This dissertation presents evidence of the associations between non-standard employment and health in Finland around the turn of the millennium.

2 Review of the literature

2.1 The core-periphery structure in the labor market

The global restructuring of production and associated changes in economy have led to intensifying competition, unpredictability of the markets and increased pressures for cost-containment in organizations. Moreover, a particular feature of the Western societies is the change from industrial society to information, or post-industrial, society. These changes have been accompanied by profound changes in the labor markets in recent decades. The development may be condensed into the flexibility concept.

The search for greater flexibility means among other things that organizations tend to reduce the core of permanent staff and by letting the non-standard buffer workforce grow. In other words, the labor market seems to be differentiated along a core-periphery structure (Atkinson 1984, Aronsson 1999a, Kalleberg 2000, Aronsson et al. 2002). The core consists of permanent employees, who carry out the key activities of the organization. This core employment is surrounded by a widening field of various types of non-standard employment, and the outermost circle consists of the unemployed (Atkinson 1984, Purcell and Purcell 1998, Aronsson 1999a, Aronsson et al. 2002, Virtanen M et al. 2002, Kalleberg 2003).

Core-periphery labor market structure is composed of different dimensions (Purcell and Purcell 1998, Aronsson et al. 2002, Deery and Jago 2002). The assumption is that core employees with permanent employment have relatively high security, advancement opportunities and other benefits, while on the periphery employees in various kinds of non-standard job arrangements have less security, fewer benefits and high risk of unemployment. On the other hand it is possible that non-standard workers even constitute, both numerically and strategically, the core component of a company's workforce (Walsh and Deery 1999).

The unemployed are also a heterogeneous group, and in the core-periphery structure there is a continuum from underemployment to long-term unemployment. Underemployment refers to a situation in which a worker is employed, but wants to do more paid work (Bartley and Ferrie 2001). Unemployment may be also interrupted by various re-employment programs or vocational training courses, resulting in a

labor market status somewhere in the middle ground between genuine employment and genuine unemployment. The unemployed can be classified into different classes according to the duration of unemployment and benefit levels, and the outermost periphery is the long-term unemployed with minimal compensation.

It is obvious that nowadays there is extensive heterogeneity both within the core and within the peripheral workforce (Hunter et al. 1993, Aronsson 1999a, Walsh and Deery 1999, Aronsson et al. 2002). The traditional division of the workforce into the employed and the unemployed is not precise enough to describe the ever greater complexities of modern working life, and even the division into permanent and other employees is quite crude.

2.2 Standard and non-standard employment

Historically, permanent employment was the norm only in the labor markets of developed countries some decades in the mid-1900s. Earlier, non-standard employment was also common in Western societies and, despite the decrease in the middle of the 20th century, it never entirely disappeared. In the rest of the world standard full-time permanent employment has never been the norm, and in developed countries, too, non-standard employment increased again during the 1970s and 1980s and remains at a relatively high level (De Grip et al. 1997, Letourneux 1998, Kalleberg 2000, Kalleberg et al. 2000, Quinlan et al. 2001, De Cuyper et al. 2008, Chung et al. 2010).

In most definitions, standard employment is defined as full-time, permanent employment with an open ended contract and with benefits in addition to salary, e.g. health insurance, occupational health service and paid holiday (Bielenski 1999, Kalleberg et al. 2000, Hadden et al. 2007). Non-standard employment, by contrast, has been defined in several ways. The terminology of non-standard employment also varies (e.g. Kalleberg 2000, Kalleberg et al. 2000, Hadden et al. 2007, De Cuyper et al. 2008). In European research the terms temporary, fixed-term and non-permanent employment are used interchangeably (De Grip et al. 1997, De Cuyper et al. 2008). According to the OECD (2002, p.170) temporary employment is 'dependent employment of limited duration' and fixed-term employment means that temporary employees have contracts that have a specified duration or a predetermined ending date. According to Brewster et al. (1997) non-permanent employment is a phrase used to cover any form of employment other than permanent open-ended contracts. In the USA and Canada the term contingent employment or 'any arrangement which differs from full time, permanent, wage and salary employment' (Polivka and Nardone 1989) is used most prevalently (De Grip et al. 1997, Kalleberg 2000, Connelly and Gallagher 2004, De Cuyper et al. 2008). Use of 'casual employment' is limited to Australia and New Zealand (Campbell and Burgess 2001, Wooden

and Warren 2004, De Cuyper et al. 2008) where it refers mainly to the absence of entitlements and benefits and lack of protection (Campbell and Burgess 2001, De Cuyper et al. 2008).

The term may also refer to the possible advantages or risks connected with non-standard employment. 'Flexible employment' highlights the positive influences of such employment whereas 'precarious' tends to evoke a more negative picture. De Grip et al. (1997) defined flexible employment as employment outside regular full-time jobs. The concept of precarious employment is defined as the lack of regulations that support the standard employment relationship (Benach and Muntaner 2007), and precarious employment can also be considered to be a multidimensional construct defined according to dimensions such as temporality, powerlessness, lack of benefits and low income (Hadden et al. 2007). Numerous other terms for non-standard employment can be found in labor market research, such as 'atypical work', 'marginal employment', 'peripheral employment', 'insecure work', 'alternative employment', 'nontraditional employment arrangements' and 'alternative work arrangements' (De Grip et al. 1997, Kalleberg 2000, Rodriguez 2002, De Cuyper and De Witte 2005, Hadden et al. 2007). In research reports these terms are often used without more detailed information about employment contracts.

Within these definitions, there is also large heterogeneity in the forms of non-standard employment, for instance, seasonal work, project work, on-call work, temporary help agency employment, independent contracting and part-time employment (i.g. Kalleberg 2000, Aronsson et al. 2002, Benach and Muntaner 2007, Ferrie et al. 2008). Heterogeneity of the definitions, the terminology and the forms of employment make comparison of the research from different countries difficult. In general terms, it is merely possible to state that any work where the criteria of standard employment relationship is not fulfilled are non-standard (Hadden et al. 2007), and in a particular study it is necessary to describe the national context and the group of non-standard employees under study.

2.3 Prevalence of standard and non-standard employment

The standard, i.e. traditional open-ended permanent contract is still the most common form of employment contract in the European Union. According to the Second European Working Conditions Survey in the 15 European Union countries in 1995, 85% of employees (aged 15 years or over) had permanent contracts, (also including part-time contracts, Letourneux 1998). In 2005 a corresponding study in 27 European Union countries showed that on average 78% of employees had a permanent contract (Parent-Thirion et al. 2007), and according to the findings from the Fifth European Working Conditions Survey in 2010 covering 34 countries the proportion was around 80% (European Working Conditions Survey).

The growth of non-standard employment began in the industrialized countries in Europe in the 1980s and continued into the mid-1990s (e.g. De Grip et al. 1997, Letourneux 1998, De Cuyper et al. 2008). Levels and growth rates have varied by country. In the 11 European Union countries in 1983, 4% of all employees were on temporary contracts, and in 1991 the figure was 9% according to the Eurostat Labour Force Survey (De Grip et al. 1997). According to the Second European Working Conditions Survey in the 15 European Union countries in 1995, 15% of all employees worked in precarious jobs, and the lowest prevalence was in Austria and Luxembourg (9%) and the highest in Spain (40%) and France (22%) (Letourneux 1998, Benavides et al. 2000). In 2005, a corresponding study in 27 European Union countries showed that 14% of employees had temporary contracts, but 7% of employees reported having no employment contract at all. In 2010, 14% of the employees still had temporary contracts (European Labor Force Survey, Eurostat statistics). These figures of standard and non-standard employees in Europe include only paid employment. Total workforce also includes the self-employed; their proportion has remained constant over the last 20 years at about 14% (European Working Conditions Survey).

In the United States the growth of non-standard employment began earlier than in Europe, and the proportion of non-standard employment has consistently been nearly one-third of the total workforce since 1995 when all kinds of non-standard jobs are included (US Bureau of Labor Statistics 1995, Benach et al. 2000, Kalleberg et al. 2000, Cummings and Kreiss 2008). In Australia, where non-standard employment has originally been more widespread than in Europe, the rate of casual employment grew from 16% in 1984 to 27% in 2002 (Wooden 2001, Wooden and Warren 2004).

On the other hand Doogan (2005) has argued that there has been a significant increase in long term employment on the European labor markets according to the statistics from 1992 to 2002, but when job tenure is used as a measure the fact may be missed that there can be high level of non-standard employment in the same labor market (Conley 2008).

Globally, the picture of the types of non-standard employment is heterogeneous, and there are divergent national developments. The increase may also have leveled off in recent years. Anyway, compared to earlier decades, the growth of non-standard employment in developed countries is evident, and there is reason to assume that no substantial decrease will occur in the near future.

2.4 Trends in non-standard employment in Finland

In Finland the growth of non-standard employment began in the mid-1980s and continued into the mid-1990s. In 1984 the share of non-permanent employment was 11% (13% in women and 9% in men) of employees aged 15-74, by 1990 the

figures had risen to 15% (18% in women and 12% in men). Finland faced a severe economic recession between 1991 and 1995, and according to the Labor Force Surveys during this time unemployment in Finland rose from 3% and peaked at 16%. In the late 1990s the economy recovered, but in 1997 unemployment was still 13%. Non-standard employment reached its peak in 1997, when 18% of employees (21% of women and 15% of men) were working as non-permanent employees. In the late 1990s and during the 2000s the number of fixed-term employees has slowly decreased, and 16% of employees (20 % of women and 13% of men) were working in non-permanent jobs in 2003. In 2010, 16% of employees (19% of women and 12% of men) were still working in non-permanent jobs. As regards, numbers of permanent employees, in 1984, according to the Quality of Work Life Survey, 89% of employees had permanent contracts (including part-time contracts), and in 1990 the figure was 85%. The Labour Force Survey of 1997 showed that 82% of employees had permanent contracts, in 2003 as well as in 2010 the figure was 84%. (Labour Force Survey, Quality of Work Life Survey, Sutela et al. 2001, Palanko-Laaka 2005, Lehto and Sutela 2008).

In Finland the most common form of non-standard employment is fixed-term employment, while the other forms, for example on-call and temporary agency work, have been quite rare. Compared to other EU countries, the share of fixed-term employment is high, especially among women and the gender gap in the prevalence is large in Finland. Fixed-term employment is most common in the public sector, especially in the fields of education, social work and health care, which means that many of the employees are highly trained. Non-standard employment is usually not desired; in 1997 only 7% of employees reported that they had chosen fixed-term employment voluntarily. (Sutela et al. 2001, Palanko-Laaka 2005, Lehto and Sutela 2008).

The legal status of non-standard employees varies between countries (Cohany 1996). In the European Union, the regulations on employment contracts and the social security legislation are fairly protective in most of the Member States. In Finland the status of fixed-term employees was also improved during the 1990s and the 2000s: the legislation regarding the grounds for fixed-term employment is more rigid and they have more commonly the right to sickness benefit and family leaves and annual paid holiday (Palanko-Laaka 2005).

2.5 Non-standard employment and health

Research has shown that unemployment and underemployment are associated with low well-being, poor mental health, poor physical health and mortality (e.g. Bartley 1994, Jin et al. 1995, Dooley et al. 1996, Weber and Lehnert 1997, Dooley 2003, Grzywacza and Dooley 2003, McKee-Ryan et al. 2005). Some of the non-

standard employees share many labor market characteristics with the unemployed, and increasing levels of non-standard employment have raised concerns about the health and well-being of employees (Benach et al. 2000, Benach et al. 2002b, Benach and Muntaner 2007). The results of the research on non-standard employment and health have been inconsistent and even contradictory (Ferrie et al. 2008). However, most of the studies have been cross-sectional.

The cross-sectional studies associate non-standard employment with different individual complaints, such as fatigue, backache, muscular pains, headache, pain, sleeplessness, stomach symptoms, musculoskeletal symptoms, problems with mental well-being and psychological distress (Letourneux 1998, Klein-Hesseling and van Vuuren 1999, Martens et al. 1999, Benavides et al. 2000, Aronsson et al. 2002). In the study on Finnish municipal employees, women with fixed-term and subsidised employment contracts had more psychological distress than those with permanent contracts (Virtanen P et al. 2002). According to an interview study, Australian casual employees had more health complaints than permanent workers (Bohle et al. 2004). Korean studies have also shown associations between precarious employment and poor self-rated health (Kawachi 2008, Kim et al. 2008), and in a study of Dutch employees psychological health was poorest among temporary agency workers (Kompier et al. 2009).

A couple of studies have yielded opposite findings, i.e. health among non-standard employees has proven out a relatively good. In a Swedish hospital temporary employees had fewer somatic complaints than permanent employees (Sverke et al. 2000), and temporary employees in Finnish hospitals had better self-rated health and lower sickness absence rates than permanent employees (Virtanen M et al. 2001). A Finnish study covering a wider group of municipal employees showed better self-rated health and less chronic disease among the fixed-term employees (Virtanen P et al. 2002).

In the studies on hospital personnel mentioned above, non-significant differences between non-permanent and permanent employees were found when psychological distress (Sverke et al. 2000, Virtanen M et al. 2001) or prevalence of diagnosed chronic diseases (Virtanen M et al. 2001) were used as outcomes. Non-significant findings have also been obtained for back pain and sleep disturbances (Aronsson et al. 2002) and fatigue and headache (Benach et al. 2004). In a British study atypical employment was not associated with poor self-rated health or psychological distress (Bardasi and Francesconi 2004). In a Spanish study fixed-term contract was not associated with poor mental health, whereas associations were seen with more flexible forms of employment (Artazcoz et al. 2005).

There are only few longitudinal studies on the associations of non-standard employment and health. Temporary agency workers had increased risk of upper extremity disorders (Silverstein et al. 1998) and work-related non-traumatic soft-

tissue disorders (Silverstein et al. 2002) in the prospective studies conducted in the USA. The employees in Germany with fixed-term contracts at baseline had poorer self-rated health at one year follow-up than those who had permanent contracts, but not in the United Kingdom (Rodriguez 2002). A register-based prospective study from Finland showed higher overall mortality and increased deaths from alcohol related causes and smoking-related cancer in initially fixed-term municipal employees compared with permanent employees (Kivimäki et al. 2003). In a Finnish register-based study antidepressant use increased as the stability of the temporary job contracts decreased (Virtanen M et al. 2008). In another Finnish study those temporary employees who either felt the insecure situation unsatisfactory or who worked in temporary work involuntarily, had a higher risk of mortality than permanent employees (Nätti et al. 2009). Temporary employment was related to non-optimal self-rated health and psychological distress in a 12-year follow-up study in Sweden (Waenerlund et al. 2011).

In addition, a few studies have examined the association between changes in employment status and health. In the abovementioned study the German employees who had worked on fixed-term contracts both at baseline and at follow-up were more likely to report poor self-rated health than those with permanent contracts at both time points, whereas those moving from permanent to fixed-term or from fixed-term to permanent employment did not differ from the reference group (Rodriguez 2002). In a Finnish prospective cohort study with four-year follow-up among hospital employees, continuous fixed-term employment or fixed-term to permanent employment were not associated with changes in health measured by diagnosed chronic diseases, work ability and psychological distress (Virtanen M et al. 2003a). In the same study the change from fixed term to permanent employment was followed by an increase in medically diagnosed sickness absence. In a Finnish register-based prospective study employees who moved from temporary to permanent employment had lower mortality than those who remained in temporary employment during the study period (Kivimäki et al. 2003). In a Swedish longitudinal study obtaining permanent employment after an unstable labor market position was associated with lower probability of psychological symptoms (Reine et al. 2008). A Dutch two-year follow-up study found evidence that that a positive change in employment contract (i.e. moving towards more stable employment) was associated with a better quality of working life and better psychological health, whereas the opposite was true for a negative contract change (i.e. towards less stable employment), but only in the case of on-call employees (Kompier et al. 2009).

In a review covering the research up to 2003, the meta-analyses suggested an association between temporary employment and psychological morbidity, but the association seems to depend on employment instability and labor market (Virtanen M et al. 2005). The same review also showed that temporary employees had a higher

risk of occupational injuries, but their sickness absence was lower. The review concerning the psychological effects of temporary employment concluded that the research is inconclusive (De Cuyper et al. 2008). The review of health effects concluded that while temporary employees are initially selected for good health, in the long term they may have poorer mental and physical health (Ferrie et al. 2008).

Health inequalities between standard and non-standard employees may be partly explained by health related selection into non-standard employment and unstable career, i.e. reverse causality. Health selection is a process in which healthy people are more likely to move up and unhealthy people to move down the social and occupational hierarchy (Blane 1985). There is also a selection process excluding unhealthy individuals from the workforce (Li and Sung 1999). In occupational epidemiology, this selection phenomenon is called the healthy worker effect (Carpenter 1987, Bartley 1988, Li and Sung 1999). The healthy worker effect is composed of different factors. The healthy worker hire effect reflects that an individual must be relatively healthy in order to be employable in a workforce, which leads to a difference in health status between workers and general population. The healthy worker survivor effect means that less healthy employees interrupt or change the work. Moreover, the healthy worker effect is believed to wear off over time, and appears to exert its greatest effect during the period shortly after employment starts. Wearing off of selection is assumed to be more important among permanent employees than non-standard employees, while healthy worker survivor effect may operate more strongly among non-standard employees (Virtanen M et al. 2005).

Studies have confirmed this health-related selective mechanism for the labor force mobility re-entry into work of the unemployed (Claussen et al. 1993, Bartley and Owen 1996) and from employment to unemployment (Maastkaasa 1996, Ferrie 1997, Leino-Arjas et al. 1999, Schuring et al. 2007, Böckerman and Ilmakunnas 2009). Health-related selection seems also to occur also in mobility between fixed-term and permanent employment, among hospital employees good health measured by self-rated health and psychological distress predicted mobility to permanent employment status (Virtanen M et al. 2002).

As reviewed above, the results of earlier studies on the relationship between standard employment and health have yielded inconsistent and even contradictory results. However, longitudinal studies are still rare, and in cross-sectional studies there is no opportunity to assess any causal relationship between employment situation and health. In earlier research the definition of non-standard employment has also differed across studies. Furthermore, possible confounding factors, even gender and socio-economic status, are poorly controlled for in many studies. In conclusion, research on the associations of non-standard employment with health awaits in particular evidence from long-term follow-up studies.

2.6 Non-standard employment and job characteristics

Whether the growth of non-standard employment is a matter of concern also depends on the quality of non-standard jobs. Non-standard jobs are often associated with many 'bad job' characteristics, and these features have been suggested as potential psychosocial and material pathways through which non-standard employment can damage health. Associations have been found between non-standard jobs and, for example, a high degree of job insecurity, lower compensation, insufficient occupational training and career planning, a lack of prospects for promotion, greater demands and lower control over the work process, poorer working conditions, more hazardous work, lack of safety training, limited availability of personal protective equipment, and less support from superiors and other workers than permanent employees (De Grip et al. 1997, Letourneux 1998, Aronsson 1999b, Benach et al. 2000, Ferrie 2001, Aronsson et al. 2002, Benach et al. 2002b, Virtanen M et al. 2003b, Saloniemi et al. 2004a, Benach and Muntaner 2007, Cummings and Kreiss 2008, Ferrie et al. 2008).

In the Second European Survey on Working Conditions temporary employees were exposed to poor working conditions, for example painful or tiring positions, repetitive tasks, loud noise and vibrations more than permanent employees (Letourneux 1998). The review published in 2001 found evidence that precarious employment is associated with deterioration in occupational health and safety in terms of injury rates, disease risk, hazard exposures, or worker knowledge of occupational health and safety and regulatory responsibilities (Quinlan et al. 2001). As regards the psychosocial work environment, the Second and Third European Surveys on Working Conditions non-permanent employees found to have more job dissatisfaction but lower levels of work stress than permanent employees (Benavides et al. 2000, Benach et al. 2004). In a Finnish study with four-year follow-up, fixed-term employees reported lower levels of workload, job security and job satisfaction at baseline, and change from fixed-term to permanent employment was followed by an increase in job satisfaction (Virtanen M et al. 2003a). In the USA non-standard employment also markedly increases workers' exposure to bad job characteristics measured by pay and access to health insurance and pension benefits (Kalleberg et al. 2000). In a more recent study Kompier et al. (2009) found that permanent employees had better jobs, whereas temporary agency workers and on-call workers had more 'bad work characteristics', but there were no differences between employees with temporary contracts and those with permanent contracts. Another study also found that there were no major differences in work conditions between fixed-term and permanent workers, but permanent employees were more commonly exposed to high strain jobs than fixed-term employees (Saloniemi et al. 2004b). Non-standard employment may also have some positive aspects, such as the opportunity to control

one's work schedules or to gather experiences from different sorts of work (Brewster et al. 1997, Bielenski 1999, Kawachi 2008). Moreover, non-standard employment may be a stepping stone to permanent employment (Nätti 1993, Bielenski 1999). However, the growth of non-standard employment is mostly driven by employers' interests, and most employees would prefer a standard job (Kalleberg et al. 2000, Sutela et al. 2001).

Non-standard employment has been associated with perceived job insecurity. Research on the associations of job insecurity with both poor physical and mental health may be considered as confirmed in these studies (Kinnunen and Nätti 1994, Ferrie et al. 1998, De Witte 1999, Sverke et al. 2000, Bohle et al. 2001, Ferrie et al. 2002, Sverke et al. 2002, Virtanen P et al. 2002, Cheng and Chan 2008, Ferrie et al. 2008). Insecurity may be considered an inherent feature of any non-standard employment contract. According to Ferrie (2001), job insecurity can also be externally attributed, i.e. it can be defined by researchers in case of threat of downsizing or closure of the firm. However, the definitions of job insecurity are based on subjective perceptions; it can be defined as 'the discrepancy between the level of security a person experiences and the level she or he might prefer' (Hartley et al. 1991, Hartley 1999) or 'losing the job or some important feature of it' (Greenhalgh and Rosenblatt 1984). Bartley and Ferrie (2001), separate job security, or the ability to remain in a particular job, from employment security, or the ability to remain in paid employment, even if this is a succession of jobs. Some researchers claim that job insecurity is an overall concern about the future continuation of the job (De Witte 1999). According to Antonovksy (1987a) job security must be considered at four levels: the individual worker's belief that he will not be dismissed, the worker's confidence that his type of work will not to become redundant in the future, the viability of the enterprise and the confidence in the continuity of the social system. Hartley (1999) wrote that having a temporary or fixed-term contract should be called employment or labor market insecurity rather than job insecurity, because it is a feature of the interaction between the individual and labor market, not a concern about losing a particular job.

Job insecurity can be understood in the framework of the psychological contract, i.e. the unwritten promises and expectations between employer and employee (Rousseau 1995). It is assumed that the various formal job contracts also mean different psychological contracts regarding mutual rights and responsibilities in terms of employment relations, and among non-standard employees job security is not a part of their psychological contract (Hartley 1999). On the other hand, the changing structures of the labor markets have increased perceptions of job insecurity among permanent employees (Virtanen M et al. 2002, Scott 2004, Ferrie et al. 2008). De Witte and Näswall (2003) have presented two hypotheses: according to the intensification hypothesis non-standard employment and perceived insecurity strengthen each other's effects since both can be considered as stressors, and according

to the violation hypothesis perceived job insecurity is especially negative among permanent workers due to their stronger psychological contract. The research on these hypotheses is scarce, and there is no evidence for the intensification hypothesis while for the violation hypothesis there is some evidence in cross-sectional studies (Virtanen P et al. 2002, De Witte and Näswall 2003, Bernhard-Oettel et al. 2005, Mauno et al. 2005, De Cuyper and De Witte 2005, De Cuyper and De Witte 2006). A recent longitudinal study with self-rated general and mental health as the outcomes did not support the violation hypothesis or the intensification hypothesis (Virtanen P et al. 2011a).

Similar employment situations may be experienced differently by different individuals, and the degree of job insecurity may also vary. Bernhard-Oettel et al. (2005, 2008) found that differences among individuals are important for understanding the implications of different types of alternative employment contracts. Voluntariness seems to be a central factor, and employees who work involuntarily in non-standard work are likely to be more dissatisfied than permanent employees (De Cuyper et al. 2008). Individuals' views on the importance of work in their lives are also important, and the younger generation of workers may have different expectations and values regarding work than the older generation (Loughlin and Barling 2001).

The multidimensional nature of employment status is also reflected in attempts to include for example, the dimensions of continuity, vulnerability, protection and income within one theoretical model (Lewchuk et al. 2003, Benach and Muntaner 2007).

2.7 Social capital and health with regard to work life

Social capital attracted attention in health research during the 1990s. It has been claimed to lead to health inequalities, and many studies have shown that high level of social capital is positively associated with various indicators of general health outcomes (e.g. Kawachi et al. 1997, Kawachi et al. 1999, Veenstra 2000, Hyypä and Mäki 2001, Islam et al. 2006, Kim et al. 2006). The results, however, are less consistent in studies that relate social capital to psychological well-being. One review (De Silva et al. 2005) presented evidence for an inverse relation between social capital and common mental disorders, but in another review (Whitley and McKenzie 2005) found no strong evidence that social capital protects against psychiatric illness. According to more recent studies, social capital is associated with better mental health cross-sectionally (Hamano et al. 2010) as well as longitudinally (Giordano and Lindström 2011).

Social capital has been defined in different ways but there is much overlap between the definitions (Bourdieu 1985, Coleman 1990, Putnam 1993, Portes 1998, Kawachi 1999). Bourdieu and Coleman have both described social capital more as an

individual feature, whereas Putnam emphasizes the character of social capital as a community level resource. Kawachi (1999), referring to Coleman (1990) and Putnam (1993), wrote that social capital refers to those features of social relationships, such as levels of interpersonal trust, and the norms of reciprocity and mutual aid that facilitate collective action for mutual benefit. Bourdieu's concept of social capital instead focuses on the advantages to possessors of social capital and stresses that social relations increase the ability of an actor to further his/her interests and to define him/herself as member of a social class. Different forms and dimensions of social capital have also been identified, for example, it is assumed to consist of structural and cognitive component (Harpham et al. 2002). Differences in the definitions and conceptualization of social capital lead to differences in how it is measured (Lochner et al. 1999, Macinko and Starfield 2001, Baum and Ziersch 2003, Shortt 2004). Some researchers take the position that social capital should be measured at community level, because it is a feature of the social structure (Lochner et al. 1999). Many researchers advocate an individual level measures (Brehm and Rahn 1997, Baum and Ziersch 2003), and in empirical research social capital has been measured mainly by individual level questions. In sum, no consensus has so far been reached on how to measure social capital.

The workplace has been suggested nowadays to represent an important source of social capital, as defined for example by Putnam (Kawachi 1999). The working-age population spends most of their time in work, and work offers a significant group to which to belong. Research on social capital in work settings is still rare. In a cross-sectional study in Russia the quality of work relations as an indicator of social capital was associated with life expectancy and mortality (Kennedy et al. 1998). The frequency with which an employee socially meets with workmates was associated with better self-rated health in a cross-sectional study in Canada, but willingness to turn to a coworker in times of trouble was not so associated (Veenstra 2000). In a Finnish cross-sectional study poor self-rated health was associated with the lowest quartile of individual level workplace social capital, assessed with an eight-item measure (Kouvonen et al. 2006). Later they found in a longitudinal study that low level of social capital and decline in social capital were associated with impairment in self-rated health and depression (Kouvonen et al. 2008, Oksanen et al. 2008). A cross-sectional study in a Japanese workplace (Suzuki et al. 2010) found that low social capital measured by individual perceptions of mistrust and lack of reciprocity was associated with poor self-rated health.

Social capital can influence health through many pathways (Macinko and Starfield 2001). Putnam (2000) has argued that social capital may in theory have psychological and biological effects conducive to health. There is also support for a stress buffering mechanism (Kawachi and Berkman 2001, Stafford et al. 2008). In

the workplace context, Sapp et al. (2010) found that social capital may also modify the effects of stress on health behaviors.

It has been speculated that social capital has been dwindling in Western societies (Putnam 1995, Putnam 1996, Kawachi 1999, Putnam 2000). In the trend toward more flexible labor markets, in many organizations the staff comprises a core of permanent employees and fluctuating number of non-standard employees. This development apparently means that workplace social capital is nowadays declining. Trust is commonly included in the empirical measurements of social capital. In the workplace context trust in co-worker support is a source of social capital, and such trust may be weaker among non-standard than among standard employees. It is also assumed that non-standard employment arrangements reduce collective trust in social justice and reciprocity in the labor market (Siegrist 2001). Social capital at the labor market level may be conceptualized as an element of labor market citizenship, or social contracts concerning working life (Suikkanen and Viinamäki 1999). From the employee's point of view, one way to measure trust in the labor market can be the employment contract.

2.8 Sense of coherence and health with regard to work life

Sense of coherence is a concept based on Antonovsky's (1979, 1987b) salutogenic, i.e. health-oriented theory. It is thought to be a health promoting resource, and important for understanding individual differences in coping with stress. There is a lot of research evidence that strong SOC is positively associated with various aspects of health, especially with perceived and mental health (Kivimäki et al. 2000, Suominen et al. 2001, Surtees et al. 2003, Flensborg-Madsen et al. 2005, Eriksson and Lindström 2006, Kouvonen et al. 2010).

According to Antonovsky (1979, 1987b), the health-oriented theory seeks to explain by successful coping why some people are located at the positive end of the health-disease continuum. SOC describes individual's orientation to life and capacity to respond to stressful situations. It is defined as 'a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected' (Antonovsky 1979, p. 10). Individuals with strong SOC perceive life as comprehensible, manageable and meaningful, which helps them to stay healthy despite encounters with stressors. SOC develops during childhood, adolescence and the first decade of adult life. Favorable development of SOC can be achieved only when generalized resistance resources for SOC are present. These resources may be both internal and external. The most important external general resistance resources include childhood living conditions, education, wealth, work-related

factors and social support, whereas internal resources include, for example, physical, biogenetic, cognitive and emotional characteristics. At about the age of 30 SOC becomes a dispositional orientation which is believed to stay relatively stable having once grown strong (Antonovsky 1979, 1987a). Antonovsky thought that major crises, such as unemployment, can undermine a mediocre or weak SOC, but a strong SOC remains either stable or it is only temporarily weakened.

Empirical studies have supported the assumption that an initially strong SOC is more stable than low SOC (Nilsson et al. 2003, Hakanen et al. 2007, Feldt et al. 2011). On the other hand, Eriksson and Lindström (2005) conclude in their review that SOC seems not to be as stable as Antonovsky assumed. For example, adverse life events weaken SOC irrespective of its initial level (Volanen et al. 2007). The level of SOC also tends to rise throughout life (Volanen et al. 2007, Feldt et al. 2011). Some studies support the hypothesis that SOC is more stable among individuals over 30 years than among younger adults (Feldt et al. 2007, Richardson et al. 2007, Feldt et al. 2011), but not all studies do so (Feldt et al. 2003, Vastamäki et al. 2009).

Antonovsky (1987a, 1987b) argued that work offers an opportunity to participate in socially valued decision-making, and if it does not include excessive overload or underload and the employment is perceived as secure, work represents a positive resource. Antonovsky also wrote that employment-related experiences and the characteristics of the actual working environment may modify SOC. A Finnish study showed that good organizational climate and low job insecurity are associated with strong SOC in one year follow-up (Feldt et al. 2000). On the other hand, strong SOC may protect against the adverse effects of certain work characteristics, and cross-sectional studies have shown that employees with strong SOC experience fewer stress symptoms (Albertsen et al. 2001) and fewer psychosomatic symptoms and emotional exhaustion (Feldt 1997), which was also found in a one-year follow-up study (Feldt et al. 2000). Longitudinal studies have also found that strong SOC predicts low sickness absence in women (Kivimäki et al. 2000), and low SOC is associated with disability retirement (Suominen et al. 2005) and intention to retire (Volanen et al. 2010). However, in a five-year follow up study SOC did not predict psychological complaints or physical symptoms (Kivimäki et al. 2000).

Some studies have examined the association between employment status and SOC. In a Swedish cross-sectional study after two years of factory closure those employees who were re-employed had significantly stronger SOC than those who were still unemployed (Hanse and Engström 1999). In a Finnish cross-sectional study the unemployed subjects had lower SOC than the employed subjects (Volanen et al. 2004). In a longitudinal study women with several entries into work had a lower SOC in follow-up than those with stable careers (Virtanen P et al. 2003). In a five-year follow-up study among technical designers, participants who had been employed throughout follow-up had stronger SOC at both measurement times when

compared to participants who had experienced unemployment and/or been laid off during follow-up (Feldt et al. 2005a). In a longitudinal study, stable career measured by possible unemployment experiences and frequent changes of job, was associated with better SOC at follow-up (Feldt et al. 2005b) and according to a study among unemployed people those who participated in an intervention program improved their SOC significantly, and the change was greatest among the individuals who were re-employed at follow-up (Vastamäki et al. 2009). In the study concerning the effects of adverse life events on SOC, losing one's job was also found to weaken SOC (Volanen et al. 2007). Increasing unemployment seems to weaken SOC even at the population level (Nilsson et al. 2003). On the other hand in a study on managers, career disruptions, measured by periods of unemployment, layoffs, and redundancies, did not cause statistically significant changes in SOC (Mauno et al. 2011).

There is also some evidence of reverse causality i.e. the selection hypothesis. Low SOC in women at the end of one's studies predicted several entries to work (Virtanen P et al. 2003) and individuals with strong SOC were more often reemployed among unemployed (Vastamäki et al. 2009). In a study on managers low SOC at baseline predicted unemployment experiences seven years later (Mauno et al. 2011).

Changes in working life, increase of flexibility and non-standard employment may influence SOC and consequently employees' health. According to Antonovsky, work represents a positive resource when it includes participation in socially valued decision-making when the workload is appropriate, and when there is perceived security. It is probable that non-standard employment does not meet these requirements and is not conducive to the development of SOC. However, previous research concerns only differences between unemployed versus employed people and there are no studies on associations between different employment status and SOC.

2.9 Sample attrition in employee cohorts

A considerable decline in response rates obtained in surveys worldwide has been reported, including Europe and Finland (De Heer 1999, Atrostic et al. 2001, Tolonen et al. 2006, Ekholm et al. 2009). Sample attrition refers to drop-out of the members of the sample in the course of a study. Sample attrition is one of the main methodological problems in longitudinal studies, and is considered to be problem especially in research on non-standard employment (Aronsson 2001, Benach and Muntaner 2007).

Sample attrition causes loss of power due to diminishing numbers of participants, but it can also produce bias in the findings and affect the generalizability of the findings to the target population. A declining response rate will not introduce bias if

non-response occurs randomly, but non-response may introduce bias if the exposure of interest is associated with willingness to participate in a study.

A common finding of longitudinal studies among working age people is that participants tend to differ from drop-outs in their socio-demographic and health characteristics. Women tend to participate in follow-up more actively than men (e.g. Bucholz et al. 1996, Van Loon et al. 2003, Ronckers et al. 2004), although there are some findings to the contrary (Goldberg et al. 2001, Pirzada et al. 2004). Probability of responding increases with age (Van Loon et al. 2003, De Graaf et al. 2000, Caetano et al. 2003, Oleske et al. 2007) and non-respondents have been reported to have a lower socioeconomic status (Bucholz et al. 1996, Badawi et al. 1999, De Graaf et al. 2000, Goldberg et al. 2001, Van Beijsterveldt et al. 2002, Van Loon et al. 2003, Pirzada et al. 2004) in most studies. Non-respondents also tend to have poorer physical health and more psychiatric disorders than respondents (Goldberg et al. 2001, Van Loon et al. 2003, Oleske et al. 2007). Health related characteristics of the personality, such as SOC, have not been studied much, even if they are an obvious source of bias due to variation in response.

There are different reasons for non-participating among people, including those who refuse to participate, those who cannot be contacted or those who have died or are unable to reply due to severe illness. It is also important to distinguish such different reasons, because the mechanism of non-participation may influence the nature of the attrition bias (Badawi et al. 1999, Van Beijsterveldt et al. 2002, De Graaf et al. 2000). When studying a workplace cohort, turnover of workers (e.g. transfer to other workplaces, layoffs and outsourcings, retirement) is a remarkable reason for attrition. Nowadays there are more temporary job contracts and higher turnover between organizations and occupations and it is important to also trace those employees who left their workplaces, and then an important reason for attrition is difficulties in finding individuals' place of residence and address.

A few longitudinal population-based studies have taken account of working situation when investigating sample attrition. Employed people tend to participate more actively than unemployed people (Caetano et al. 2003), but it seems that the reason is that the unemployed are more difficult to trace and are more likely to die, but do not refuse to participate more often (Badawi et al. 1999). There is no research on sample attrition among non-standard employees.

2.10 Non-standard employment and health: theoretical considerations

The studies on non-standard employment and health are mainly descriptive analyses of the associations, and the possible theoretical frameworks are not made explicit or are described quite briefly. The health effects of non-standard employment may be viewed against stress theory. Work stress is defined as harmful physical and

emotional responses that occur when requirements of the job do not match the capabilities, resources or needs of the worker (Muntaner et al. 2006). Chronic stress may lead to adverse changes in the physiological system and to physical symptoms, and in the long run also to diseases. Moreover, stress may be associated with risky health-related behavior (Bosma et al. 1998, Mc Ewen 1998). The experience of non-standard employment may be an important source of stress (Tompä et al. 2007). According to a Finnish longitudinal study employees with unstable career had higher allostatic load, a long-term negative consequence of physical responses to stress, than participants with a stable career history (Kinnunen et al. 2005).

The best known work stress models are the theory of demands and control (Karasek and Theorell 1990) and the theory of effort-reward imbalance (Siegrist 1996, Siegrist 1998, Siegrist et al. 2004). According to the demands-control model, job strain occurs when the demands are high and control over the work process is low. The effort-reward imbalance model emphasizes the role of reciprocity between individual effort and rewards at work, in other words the employee investing effort in the work also expects to get rewards. Both models have been applied in research showing that work-related stress is associated with health problems (Siegrist 1996, Bosma et al. 1998, Siegrist 1998, Van der Doef and Maes 1999, Kivimäki et al. 2002, Peter et al. 2002).

The social support model is also closely connected to the stress model, and the extended demand-control model also includes social support. Social support means help received from others, and according to the theory this support protects people from the possibly pathogenic effects of stressful events (Cohen and McKay 1984, Muntaner et al. 2006). The association between social relationships and health is well demonstrated. Cross-sectional and also prospective studies have shown an increased risk of morbidity and mortality among individuals with a small quantity or poor quality of social relationships (House et al. 1988, Stansfeld et al. 1997, Stansfeld et al. 1998). In work life, it is reasonable to raise the question about the influence on increased non-standard employment to the social support system of the workplace (Aronsson 2001).

Material deprivation might constitute a direct pathway linking non-standard employment and health, as has been found in studies concerning the relationship between unemployment and health (Tompä et al. 2007, Janlert and Hammarström 2009). Non-standard employment may, like unemployment, cause inadequate income and various forms of material deprivation. The effects of material deprivation may be mediated by stress. It is also possible that the beneficial latent functions provided by work, including time structure, social contact, collective purpose, identity/status and activity (Jahoda 1982), are less evident in non-standard work.

The development of theoretical models is important for understanding the complex interactions between employment status and health, and many researchers

have highlighted the lack of a comprehensive theory and considered the suitability of the established concepts (Aronsson 1999a, Connelly and Gallagher 2004, Benach and Muntaner 2007, Menéndez et al. 2007, Tompa et al. 2007, De Cuyper et al. 2008). There have been attempts to develop the theory. Tompa et al. (2007) argued that precariousness of work affects health through three pathways, namely stress, material deprivation and exposure to physical hazards in the work environment. They describe the eight dimensions of precariousness: degree of certainty of continuing work, control over work processes, legal and institutional protection, adequacy of income and benefits, work-role status, socio-economic environment at work, risk of exposure to physical hazards and training and career advancement opportunities. More recently, Benach et al. (2010b) presented a micro-level model, which shows potential pathways relating employment and working conditions to health inequalities: unequal distribution of harmful working conditions, material deprivation and economic inequalities and several psychological, behavioral and psychopathological pathways. They also constructed a macro-social theoretical framework to explain how employment and working conditions affect health inequalities through the role of welfare state and labor market policies (Muntaner et al. 2010).

2.11 Conclusions

Research on the associations between non-standard employment and health has yielded inconsistent and contradictory results. Longitudinal studies on the topic are still few, likewise research on associations between different employment trajectories and health.

Definitions of employment status vary, and the studies commonly combine a wide range of different types of non-standard employment. Here may lie one possible explanation for the inconsistent results. Possible confounding factors, for example gender and socio-economic status have been controlled for insufficiently in many studies, and this may also partly explain some of conflicting results in the research. In particular, there is need for longitudinal studies on the associations between non-standard employment and health to explore potential causal associations. Health related selection must also be considered while interpreting the results.

Most studies have been descriptive analyses of the associations without theoretical considerations. The relationship between non-standard employment and employee health may be viewed against stress theory. From this perspective, workplace social capital can be considered as a potential coping resource to stress for employees (Kawachi and Berkman 2001, Stafford et al. 2008), but research on social capital in work settings is still rare. Similarly, the effect of SOC is based, above all, on efficient and flexible handling of stress (Antonovsky 1987b).

3 Aims of the study

The overall aim of the present study was to extend the understanding of the significance of non-standard employment to health. The specific research questions were as follows:

1. Are there differences in associations between labor market status and health according to the labor market core-periphery structure?
2. Are work-related sources of social capital measured by trust in labor market and trust in co-worker support associated with health of permanent and non-permanent employees?
3. Are employment trajectories associated with health in a four-year follow-up period?
4. Are employment trajectories associated with changes in sense of coherence?
5. Does sample attrition among permanent and non-permanent employees depend on the sense of coherence and self-rated health?

4 Materials and methods

4.1 Participants

The participants were taken from three prospective cohort studies. A representative sample of the Finnish working aged people (I, IV) was derived from the Health and Social Support Study. The permanent municipal employees were from the Finnish Public Sector Study (II, V) and non-permanent municipal employees were from the Temporaries in Municipal Jobs Study (II, III, IV,V).

The Health and Social Support Study (the HeSSup Study) is a prospective cohort study on psychosocial factors and health in the Finnish working-age population. The population consisted of a random sample of four age groups (20–24, 30–34, 40–44, and 50–54 years) from the Finnish Population Register Centre. The total sample of 64,797 individuals also included two additional samples, one from the population of the city of Turku and the adjacent communities and another from the Swedish-speaking population in Finland. The study was conducted in 1998 with a postal survey that yielded 25,901 participants (response rate 40%) who gave their consent to subsequent linkage with health registries. The participants represented the age and gender adjusted Finnish population relatively well (Korkeila et al. 2001). The follow-up questionnaire was sent in 2003 to all participants still living in Finland, and the number of respondents was 19,269 (response rate 80%).

The Finnish Public Sector Study is a prospective cohort study of employees representing the personnel of ten Finnish towns (Espoo, Naantali, Nokia, Oulu, Raisio, Tampere, Turku, Valkeakoski, Vantaa, and Virrat). The study questionnaire was distributed through the organizations to all full-time permanent employees who were at work at the time of survey in the eight towns participating in the study in 1997. In the small towns the entire municipal personnel was included in the study, while in the three largest towns, a random sample of about 1,500 employees was used. A total of 6,442 employees returned to the initial survey, giving a response rate of 67%. After exclusion of respondents found to be on a non-permanent contract ($n=461$), the sample included 5,981 permanent employees. In 2001 a follow-up survey was sent out to those 4,930 permanently employed respondents who were still

employed in the municipal sector. The follow-up survey yielded 3,998 respondents (response rate 81%).

The Temporaries in Municipal Jobs Study (the TMJ Study) is a prospective cohort study carried out among employees on a non-permanent job contracts in the service of eight Finnish towns (same towns than in the Finnish Public Sector Study) in November 1997. A postal survey with a participation rate of 57%, yielded 2,194 respondents who reported having a fixed-term contract (i.e. a termination date as part of their contract) and 682 subsidised employees (i.e. individuals whose unemployment had been interrupted by a six-month work contract funded through a governmental re-employment program). In 2002 a follow-up survey was posted to the respondents of the initial survey whose addresses (94%) were found in the population register. Response rates were 76% (n=1,563) among fixed-term employees and 73% (n=467) among the subsidised workers.

4.2 Specification of the samples

In Study I, the sample was derived from the first phase of the HeSSup Study. The representative nation-wide random sample (matched for general population comparisons after exclusion of the over-represented Swedish-speaking and Turku sub-samples) consists of 21,101 adults. Study I comprised those 15,468 respondents who were at work or seeking a job. A set of questions on labor market status was used as criteria for inclusion in the study and for the classification of employment status. On the basis of the questions the employed respondents were classified into three groups: permanent employees, fixed-term employees and atypical employees. Permanent employees (n=11,255) included wage-earners with a permanent contract and all entrepreneurs, the self-employed and farmers. Fixed-term employees (n=1,666) included all those whose contract would expire at a given point in time and atypical employees (n=562) included other non-permanent workers. The unemployed respondents were also classified into three groups: unemployed with earnings-related income, subsidised employees and unemployed with low basic income. Unemployed with earnings-related income (n=715) comprised the unemployed who were in receipt of earnings-related allowance. Eligibility for earnings-related allowance continues for 500 working days, i.e. about 2 years. Subsidised employees (n=305) included respondents whose unemployment had been interrupted with a six-month work contract funded through a governmental re-employment program. Unemployed with low basic income (n=965) included job seekers who were entitled to a basic allowance at a lower and fixed level.

Study II included 3,998 permanent employees from the Finnish Public Sector Study, and 1,563 fixed-term employees and 467 subsidised employees from the TMJ Study who participated in the follow-up survey.

The cohort of Study III included those employed female respondents of the TMJ Study who reported having a fixed-term contract ($n=1,791$). In the follow-up survey seven percent of the employees ($n=121$) could not be located. Thus the cohort of this study consisted of 1,670 female employees who had a fixed-term contract at baseline. Their response rate for the follow-up survey was 78% ($n=1,306$). In the follow-up survey, respondents were asked to report their labor market situation at four points in time - January 1999, January 2000, January 2001 and spring 2002. Labor market trajectories were described according to exposure to unstable employment during follow-up, a destination employment status at the end of follow-up, and a variable that combined exposure and a destination employment status.

In Study IV the participants were derived from the HeSSup Study ($n=9,623$) and the TMJ Study ($n=1,898$). Respondents who answered the question about labor market situation and to SOC questionnaire both at the baseline and at the follow-up were eligible for inclusion in this study. The participants were placed in the category of having a permanent job, having a fixed-term job or being unemployed both at baseline and in follow-up. In the TMJ cohort there were 1,479 fixed-term employees and 419 unemployed at baseline, and at follow-up 829 of them had a permanent contract, 785 had a fixed-term contract and 284 were unemployed. In the HeSSup cohort there were 7,572 permanent employees, 1,038 fixed-term employees and 1,013 unemployed at baseline, and at follow-up the corresponding figures were 8,018, 678 and 927. The TMJ cohort was classified into six and the HeSSup cohort into nine employment trajectories according to employment status at baseline and at follow-up.

The cohort in Study V was based on participants of the Finnish Public Sector Study and the TMJ Study at the baseline, 5,981 permanent employees from the Finnish Public Sector Study and 2,194 fixed-term employees and 682 subsidised employees from the TMJ Study.

Participants are presented in detail in Table 1.

4.3 Measures

4.3.1 Type of employment contract

In the HeSSup Study the information on employment status at baseline and at follow-up time was obtained from the questionnaires. In the Finnish Public Sector Study employment status was obtained from the employers' records. Baseline status of the participants of the TMJ Study was also obtained from employers' records, while their status at follow-up was elicited with the questionnaires.

Table 1. The design and descriptive statistics of the participants at baseline by study (I–V).

Characteristics	I	II	III	IV	V
Study design	Cross-sectional	Prospective	Prospective	Prospective	Prospective
The sample (n)	15 468 ^a	6028 (3998 ^b + 2030 ^c)	1 306 ^c	9623 ^a 1898 ^c	5981 ^b 2876 ^c
Permanent employees (%)	72	66		79	100
Fixed-term employees (%)	11	26	100	11 78	76
Atypical employees (%)	4				
Unemployed (%)	13 ^d	8 ^e		10 22 ^e	24 ^a
Women (%)	55	80	100	54 84	76 81

^a The cohort of the HeSSup Study

^b The cohort of the Finnish Public Sector Study

^c The cohort of the TMJ Study

^d Unemployed with earnings-related income 5%, subsidised employees 2% and unemployed with low basic income 6%

^e Subsidised employees

In the Finnish Public Sector Study and in the TMJ Study only the full-time workers were included. Among the participants of the HeSSup Study, the inclusion criterion was more than 19 weekly working hours.

4.3.2 Employment trajectories

In Study III the participants were classified into different employment trajectories according to exposure to unstable employment during follow-up, a destination employment status at the end of follow-up, and the way in which exposure and a destination employment status were combined. At baseline, all participants had fixed-term contracts. Respondents were placed in the category of having a permanent job, having a fixed-term job, or being unemployed at each point of the follow-up (January 1999, January 2000, January 2001, and spring 2002). The exposure variable was constructed by giving permanent employment, fixed-term employment, and unemployment values of 0, 1, and 2 respectively, for each year from 1998 to 2002 inclusive and by adding the values to obtain a score (range, 1–9). Respondents with scores of 1–3 were classified as having low exposure, those with scores of 4 or 5 moderate exposure and those with scores of 6–9 high exposure to unstable employment. A destination employment status was classified on the basis of employment status at the end of follow-up in 2002: permanent, fixed-term, or unemployed. Combined mobility comprised six categories formed as follows: the group of respondents with a permanent destination employment status was split at the median of the exposure score (2/3) into those with low and high exposure. Corresponding dichotomization was made for respondents with a fixed-term destination employment status (split value 5/6 exposure points) and for those who were unemployed (6/7 exposure points).

In Study IV participants were classified into different employment trajectories basing on employment status at baseline and at follow-up. Thus the TMJ cohort was stratified into six employment trajectories: fixed-term to permanent, fixed-term to fixed-term, fixed-term to unemployment, unemployment to permanent, unemployment to fixed-term and unemployment to unemployment, and the HeSSup cohort into nine trajectories: the same as in the TMJ cohort and in addition permanent to permanent, permanent to fixed-term and permanent to unemployment.

4.3.3 Health indicators

Self-rated health (I, II, III, IV, V) was the respondents' overall assessment of their health on a 5-point scale (1=poor, 2=fairly poor, 3=average, 4=fairly good, 5=good). The measure was dichotomized by grouping response scores 1–3 into the category of poor self-rated health and scores 4–5 into the category of good self-rated health. Self-rated health has proved to be a well-validated and reliable measure of health status (Manderbacka et al. 1998, Idler and Benyamini 1997).

Diagnosed chronic diseases (I) were derived from a list of 26 chronic diseases and an option for 'some other disease', and the respondents were asked to check 'diseases diagnosed by a doctor' (yes/no). From this information, a dichotomous variable was formed, assessing whether the respondent has a disease or not.

Depression (I, IV) was assessed using the 21-item version of the Beck Depression Inventory (BDI, Beck et al. 1961). This questionnaire has been established as a valid and reliable method for detecting depressed respondents. A dichotomous variable was constructed with a score >9 indicating depression.

Psychological distress (II, III, IV) was measured by the 12-item version of the General Health Questionnaire (GHQ, Goldberg 1972) in which respondents rate each of the 12 items on experienced symptoms (1=not at all, 2=the same as usual, 3=rather more than usual or 4=much more than usual). Those who reporting 3 or 4 in at least four items of the total measure were identified as distressed. The General Health Questionnaire is a well-established screening measure for minor psychiatric morbidity (Goldberg et al. 1997).

4.3.4 Social capital

Researchers have adopted a variety of different approaches to assess social capital. Macinko and Starfield (2001) recommend the use of conceptually clear measures, such as interpersonal trust and membership in groups. Putnam stressed that trust is an integral part of the definition of social capital. Social trust (which is also described as civic trust and interpersonal trust) is commonly included in the empirical measurement of social capital (Putnam 2000). For example Kawachi et al. (1997) used the proposition 'Most people can be trusted' in the measurement of

social capital. The Social Support Questionnaire quite evidently comprises a crucial constituent of social capital. The Social Support Questionnaire (Sarason et al. 1983) is one of the established methods of assessing trust in co-worker support. On the other hand an employment contract offers a measure of trust in the labor market situation on the basis of the stability attributed to the type of employment.

The two indicators of social capital used in working life (II) in this study were trust in the labor market, measured by the employment contract, and trust in co-worker support.

Trust in the labor market was assessed on the basis of the stability attributed to the type of employment contract in the baseline survey. A permanent contract was considered to be indicative of a high level of employment security, a fixed-term contract of moderate and a subsidised contract of a low level of employment security.

Trust in co-worker support was assessed on the basis of the short version of the Social Support Questionnaire, which is a valid and reliable measure (Sarason et al. 1983, (Sarason et al. 1987). The instrument includes six items, identifying spouse, other relative, friend, coworker and someone else as possible sources of social support. Social contact was defined as a source of support if the respondent chose it in one or more items. The dichotomous variable (whether or not the respondent mentioned the source) was used as the indicator of support from co-workers.

The two sources of social capital at work were combined into the three-class variable of 'social job capital', defined as 'high' for permanent employees who trusted in co-worker support, 'low' for subsidised employees who did not trust in co-worker support, and 'intermediate' for the rest of the respondents.

4.3.5 Sense of coherence

SOC (IV, V) was assessed using the 13-item version of the Orientation to Life Questionnaire devised by Antonovsky (1987b, 1993). The questions ask the respondents to check their level of agreement with items on a seven-point semantic differential scale with two anchoring phrases. After reversing the scores of the five negatively worded items, the sum of all items provides a score ranging from 13 to 91, higher scores indicating a stronger SOC. In Study V the respondents were divided into three groups (the highest quartile, the two middle quartiles, the lowest quartile) on the basis of their mean SOC.

4.3.6 Background variables

Demographic variables gender, age and marital status and other background variables included in the analyses were obtained from the questionnaires unless otherwise stated.

In the HeSSup Study socio-economic status was measured by education (I, IV) and categorized into four classes: no vocational education, vocational school, college and university. In the Finnish Public Sector Study and in the TMJ Study socio-economic status was based on occupations (II, III, IV, V). In the Finnish Public Sector Study respondents' occupations were derived from employers' records and in the TMJ Study occupation based on respondents' own report in the questionnaire. In Study II, Study IV and Study V occupations were classified according to the International Standard Classification of Occupations (ISCO) into the four classes: professionals (ISCO major groups 1–2), associate professionals (group 3), clerks (group 4) and manual workers (groups 5–9) (Statistics Finland 1987). In Study III occupations were classified into non-manual (groups 1–4) and manual (groups 5–9) workers.

Body mass index (I) was calculated from self-reported information on participants' height and weight. Body mass index of at least 27 kg/m² indicated overweight.

Alcohol consumption (I) was measured from self-reported information: the respondents reported their habitual frequency and amount of beer, wine and spirits consumed per week. This information was transformed into grams of absolute alcohol. Alcohol intake was classified to the three classes: non-drinking, moderate drinking (1–175 g weekly in women and 1–263 g weekly in men) and heavy drinking.

Smoking (I) was elicited with a question about the number of cigarettes smoked daily and was classified into the three classes: non-smoking, daily smoking 1–19 cigarettes, daily smoking >20 cigarettes).

The measure for perceived social support (I) was the social network size (number of close personal relationships), and was classified to the three classes: small 0–10, intermediate 11–20, and large >20 (Antonucci 1985).

Dispositional optimism and pessimism (I) were measured by using the revised Life Orientation Test (LOT-R, Scheier et al. 1994). The measure includes six statements, of which three are worded positively for optimism, and three are worded negatively to indicate pessimism. After reversing the scoring for the negatively worded items, item scores were summed to yield an overall optimism score with high scores representing greater optimism. We categorized optimism scores into three groups (the highest quartile, the two middle quartiles and the lowest quartile).

4.4 Statistical analyses

Logistic regression models (odds ratios and their 95% confidence intervals) were used to analyze the association between labor market status and health (I), associations between social capital in the working life, measured by trust in labor market and trust in co-worker support, and health (II), association between labor market trajectories and health at follow-up and associations between SOC, demographic characteristics

and self-rated health and two types of attrition (V). The models were adjusted for potential confounding factors, e.g. age, marital status and socio-economic status. The interaction terms were applied to test for gender differences in the associations between employment status and health (I and II).

Multinomial logistic regression analyses were used to examine the effect of health at baseline on subsequent career (III).

In Study IV the change in SOC from Time 1 to Time 2 by trajectory was studied with general linear models (GLM) with gender, age group, socio-economic status, self-rated health, and mental health as covariates. If statistically significant, the covariate and the interaction between the covariate and the trajectory were included in the final model. In pairwise comparisons, Tukey's HSD adjustment was used to control for Type 1 error.

5 Results

The main results of this study are presented in accordance with the research questions. Cross-sectional associations between employment status and health were examined in Study I. Associations between social capital in the working life, measured by trust in labor market and trust in co-worker support, and health in a four-year follow-up study were investigated in Study II. Study III examined the associations of employment trajectories with health in a four-year follow-up setting. Changes in sense of coherence on different employment trajectories were explored in Study IV. Sample attrition in cohorts with initially permanent and non-permanent employment status was examined in Study V.

5.1 Labor market status and health

Associations between labor market status and health in a cross-sectional study (Study I) are presented in Table 2. Compared with permanent employees, the odds for poor health were highest among the unemployed with low basic income across all health indicators and in both men and women in the models controlled for age, marital status, socio-economic status, overweight, smoking, alcohol consumption, social network size and optimism. High odds were also found among the less disadvantaged unemployed and the employed with atypical contracts. Among subsidised employees there was an association with depression in men and with poor self-rated health and diseases in women. Among the unemployed with earnings-related income there was association with disease and depression in men and with poor self-rated health and depression in women. Among atypical employees there was an association with chronic disease and depression in both men and women. No significant differences were found between permanent and fixed-term employees. There was a significant interaction between sex and type of employment in depression. Unemployed men, irrespective of their type of unemployment, had higher odds than women (test for interaction with sex $p=0.014$ for unemployed with earnings-related income and $p < 0.001$ for the unemployed in subsidy programs as well as those receiving the low basic allowance).

Table 2. Odds ratios and 95% confidence intervals^a for health outcomes according to labor market status in men and in women in the HeSSup Study

	Poor self-rated health	Disease	Depression
Men			
Permanent employees (n=5290)	1	1	1
Fixed-term employees (n=583)	0.97 (0.75–1.26)	0.98 (0.81–1.19)	0.89 (0.67–1.17)
Atypical employees (n=270)	1.34 (0.97–1.86)	1.33 (1.02–1.73)	1.41 (1.01–1.97)
Unemployed with earnings-related income (n=207)	1.06 (0.75–1.50)	1.45 (1.07–1.95)	2.09 (1.50–2.92)
Subsidised employees (n=95)	1.42 (0.87–2.32)	1.10 (0.71–1.69)	2.13 (1.33–3.42)
Unemployed with low basic income (n=463)	2.38 (1.89–3.00)	1.95 (1.57–2.44)	3.43 (2.73–4.33)
Women			
Permanent employees (n=5965)	1	1	1
Fixed-term employees (n=1 083)	0.85 (0.68–1.05)	1.11 (0.96–1.29)	0.99 (0.83–1.18)
Atypical employees (n=292)	1.28 (0.91–1.81)	1.38 (1.06–1.75)	1.50 (1.13–1.99)
Unemployed with earnings-related income (n=508)	1.28 (1.02–1.62)	1.07 (0.89–1.30)	1.42 (1.14–1.76)
Subsidised employees (n=210)	1.66 (1.17–2.33)	1.46 (1.08–1.97)	0.98 (0.69–1.39)
Unemployed with low basic income (n=502)	2.31 (1.84–2.89)	1.48 (1.21–1.81)	1.99 (1.61–2.46)

^a Adjusted for age, marital status, socio-economic status, overweight, smoking, alcohol consumption, social network size and optimism

5.2 Prospective follow-up of employees

The longitudinal studies provided an opportunity to investigate changes in health and in sense of coherence. In the Finnish Public Sector Study and in the TMJ Study follow-up time was four years, and in the HeSSup Study five years.

5.2.1 Employment contract, trust in co-worker support and combined social job capital and health

Associations between work-related sources of social capital, measured by trust in labor market (employment contract) and trust in co-worker support and combined social job capital and health in a prospective follow-up study (Study II) are presented in Table 3.

Fixed-term contract at baseline was associated with better self-rated health and with less psychological distress at the end of follow-up when compared with permanent employment in women. The first difference remained statistically significant (odds ratio 0.77, 95% confidence interval: 0.63, 0.93) and the latter difference reached statistical significance (odds ratio 0.78, 95% confidence interval: 0.65, 0.92) when adjusted for marital status, occupational status, income and baseline level of health outcome in question in addition to age. In men with initially fixed-term contracts, the odds ratios were also indicative of better self-rated health and lower psychological distress, but the associations were not statistically significant. The association between type of employment contract and health did not depend

on gender (p-value for interaction for self-rated health 0.903 and for psychological distress 0.153).

Table 3. Odds ratios and 95% confidence intervals^a for poor self rated health and psychological distress at end of the four-year follow-up in men and in women according to employment contract, trust in co-worker support and combined social job capital^b

	Men		Women	
	Poor self-rated health	Psychological distress	Poor self-rated health	Psychological distress
Employment contract				
Permanent	1	1	1	1
Fixed-term	0.76 (0.53–1.09)	0.73 (0.50–1.05)	0.75 (0.63–0.89)	0.86 (0.73–1.01)
Subsidised	1.24 (0.78–1.96)	1.19 (0.74–1.90)	1.20 (0.94–1.54)	0.93 (0.72–1.19)
Trust in co-worker support				
Yes	1	1	1	1
No	0.97 (0.72–1.31)	0.96 (0.70–1.32)	1.24 (1.08–1.42)	1.00 (0.87–1.14)
Social job capital				
High	1	1	1	1
Intermediate	0.90 (0.65–1.26)	0.99 (0.69–1.41)	1.11 (0.96–1.29)	0.99 (0.85–1.15)
Low	1.15 (0.66–2.00)	1.32 (0.75–2.34)	1.44 (1.09–1.90)	0.93 (0.70–1.24)

^a Adjusted for age

^b Social job capital was defined as 'high' for permanent employees who trusted in co-worker support, as 'low' for subsidised employees who did not trust in co-worker support, and as 'intermediate' for the rest of the respondents

Trust in co-worker support was more common among permanent employees (23% in men and 38% in women), than in fixed-term employees (22% and 28% respectively) and least common in subsidised employees (11% and 13% respectively). Trust in co-worker support was associated with better self-rated health in women in an age-adjusted model. When adjustments were made for marital status, occupational status, income and baseline health in addition to age, the associations became statistically non-significant.

Combined social job capital, which combines type of employment contract and trust in co-worker support, the combination of subsidised job contract and no trust in co-worker support (i.e. the lowest category of social job capital) was associated with poorer self-rated health than the combination of permanent employment and trust to co-worker support (the highest social job capital category) in women in an age-adjusted model. When adjustments were made for marital status, occupational status, income and baseline health in addition to age, the associations became statistically non-significant.

5.2.2 Labor market trajectory and health

Associations between labor market trajectory and health in female employees with initially fixed-term job contracts (Study III) are presented in Table 4. Unemployment as a destination employment status at the end of follow-up was associated with higher

risk of poor self-rated health at the end of follow-up when compared with fixed-term employment status. Having high exposure to unstable employment during follow-up was associated with higher risk of poor self-rated health compared with moderate exposure to instability. The combination of unemployment as a destination employment status and low exposure to unstable employment was also associated with poor self-rated health. Combined permanent employment as a destination employment status and low exposure to unstable employment was associated with low psychological distress at the end of follow-up.

Those who had poor self-rated health at baseline had a higher risk of unemployment as a destination employment status (odds ratio 2.00, 95% confidence interval: 1.16, 3.43) in multinomial logistic regression models, adjusted for age, occupational status, and marital status compared with participants whose self-rated health was good. Corresponding odds ratios were 1.82 (95% confidence interval: 1.14, 2.92) for high exposure to unstable employment and 2.66 (95% confidence interval: 1.34, 5.28) for the combination of high exposure and unemployment as a destination employment status.

Table 4. Odds ratios and 95% confidence intervals^a for poor self rated health and psychological distress at end of the four-year follow-up according to destination employment status, exposure to unstable employment and their combination in female employees with initially fixed-term job contracts in the TMJ Study cohort

	Poor self-rated health	Psychological distress
By destination		
Permanent contract	1.09 (0.77–1.53)	0.82 (0.61–1.09)
Fixed-term contract	1	1
Unemployment	2.54 (1.47–4.39)	1.60 (0.98–2.64)
By exposure		
Low exposure	1.13 (0.80–1.61)	0.88 (0.66–1.19)
Moderate exposure	1	1
High exposure	2.38 (1.46–3.87)	1.38 (0.89–2.13)
Destination and exposure combined		
Permanent contract and low exposure	0.92 (0.59–1.43)	0.68 (0.46–0.98)
Permanent contract and high exposure	1.38 (0.92–2.07)	0.96 (0.68–1.34)
Fixed-term contract and low exposure	1	1
Fixed-term contract and high exposure	1.75 (0.92–2.07)	1.02 (0.50–2.11)
Unemployment and low exposure	4.00 (1.84–8.66)	1.67 (0.81–3.46)
Unemployment and high exposure	2.00 (0.99–4.07)	1.56 (0.83–2.92)

^a Adjusted for age, marital status and occupational status and baseline level of the health outcome in question

5.2.3 Employment trajectory and change in SOC

At Time 1, the mean level of SOC in the TMJ cohort was 65.02 [standard deviation (SD) = 11.00] and in the HeSSup cohort 65.33 (SD = 11.12). During follow-up the average SOC score increased 2.83 points in the TMJ cohort ($p < 0.001$) and 1.44 points in the HeSSup cohort ($p < 0.001$).

Associations between employment trajectories and changes in SOC in the TMJ cohort are shown in Table 5 and in the HeSSup cohort in Table 6 (Study IV). The TMJ cohort was classified into six and the HeSSup cohort into nine employment trajectories according to employment status at baseline and at the follow-up time. The changes of SOC score by trajectory differed significantly (p -value for the TMJ cohort 0.015 and for the HeSSup cohort <0.001).

The baseline SOC and the estimated marginal means of the changes in SOC by employment trajectory in the TMJ cohort are presented in Table 5. In the young age group SOC developed most favorably on the trajectory from unemployment to fixed-term employment and least favorably among participants who were unemployed at both times. Pairwise comparisons were tested for all trajectories but only significant results are presented here. According to the comparisons the improvement was significantly greater on the trajectory from unemployment to fixed-term employment than on the trajectory from fixed-term employment to unemployment ($p=0.038$). Among older participants SOC developed most favorably on the trajectory from unemployment to permanent employment and least favorably on the trajectory from fixed-term employment to unemployment, and according to the pairwise comparisons this difference was statistically significant ($p=0.036$).

Table 6 shows the results of the HeSSup cohort. In the young age group SOC developed most favorably on the trajectory from permanent to fixed-term employment and least favorably on the trajectory from permanent employment to unemployment. Pairwise comparisons were tested for all trajectories but only significant results are presented here. According to the comparisons when compared to the trajectory from permanent employment to unemployment the improvement in SOC was significantly greater on the trajectories from permanent to fixed-term employment ($p=0.009$), from fixed-term to permanent employment ($p=0.023$), from unemployment to permanent employment ($p=0.009$) and from fixed-term

Table 5. SOC at baseline (means and standard deviations) and changes in SOC during four-year follow-up (estimated marginal means and 95% confidence intervals) by employment trajectory in the TMJ Study cohort

Employment trajectory	SOC at baseline	Changes in SOC	
		Age under 30 year ^a	Age over 30 year ^b
Fixed-term to Permanent	66.78 (10.15)	5.74 (3.69–7.79)	4.03 (3.17–4.90)
Fixed-term to Fixed-term	65.35 (10.89)	2.05 (0.27–3.84)	3.55 (2.60–4.50)
Fixed-term to Unemployment	62.60 (11.92)	-0.29 (-4.69–4.12)	1.00 (-1.15–3.16)
Unemployment to Permanent	63.27 (10.45)	5.33 (1.71–8.95)	5.64 (3.38–7.90)
Unemployment to Fixed-term	62.93 (10.60)	7.49 (3.83–11.15)	2.80 (0.73–4.88)
Unemployment to Unemployment	60.75 (13.00)	-0.63 (-7.24–5.98)	2.97 (1.40–4.53)
p for difference	< 0.001	0.003	0.050

^a Adjusted for gender, occupational status, psychological distress and the interaction between trajectory and gender

^b Adjusted for psychological distress

to fixed-term employment ($p=0.012$). Among older participants SOC developed most favorably on the trajectory from unemployment to permanent employment, whereas the trajectory from fixed-term employment to unemployment proved least advantageous. According to the pairwise comparisons the increase was significantly greater among participants on the trajectory from unemployment to permanent employment than among participants who were permanently employed ($p=0.029$) or unemployed ($p=0.008$).

Table 6. SOC at baseline (means and standard deviations) and changes in SOC during five-year follow-up (estimated marginal means and 95% confidence intervals) by employment trajectory in the HeSSup Study cohort

Employment trajectory	SOC at baseline	Changes in SOC	
		Age under 30 year ^a	Age over 30 year ^b
Permanent to Permanent	66.20 (10.69)	3.79 (2.58–5.01)	2.24 (1.95–2.53)
Permanent to Fixed-term	63.69 (11.11)	6.32 (3.49–9.16)	3.57 (1.72–5.41)
Permanent to Unemployment	63.82 (11.34)	-3.37 (-7.95–1.22)	2.86 (1.74–3.99)
Fixed-term to Permanent	64.62 (10.30)	4.81 (3.23–6.38)	2.09 (0.94–3.24)
Fixed-term to Fixed-term	65.43 (12.10)	5.92 (3.52–8.31)	2.28 (0.47–4.09)
Fixed-term to Unemployment	62.02 (11.04)	1.19 (-3.89–6.27)	-0.22 (-2.56–2.11)
Unemployment to Permanent	61.88 (12.79)	5.58 (3.49–7.68)	4.62 (3.37–5.88)
Unemployment to Fixed-term	63.15 (11.12)	2.02 (-0.56–4.59)	2.03 (-0.11–4.17)
Unemployment to Unemployment	59.60 (13.43)	1.57 (-1.24–4.38)	0.78 (-0.10–1.65)
p for difference	< 0.001	0.001	< 0.001

^a Adjusted for depression

^b Adjusted for depression and the interaction between trajectory and depression

5.3 Attrition during follow-up of employee cohorts

The associations between sociodemographic characteristics, self-rated health and sense of coherence with participation in a four-year follow-up study (V) in the cohorts of permanent and non-permanent employees are presented in Table 7 (loss to follow-up) and Table 8 (non-response in follow-up). Adjustments were made for age, sex, occupational status and baseline level of self-rated health.

5.3.1 Loss to follow-up

In the cohort of permanent employees those who were lost during follow-up consisted of employees who were no longer in the service of the same employer as at baseline; i.e. either they had died or had retired due to age or illness, or had moved to another workplace. Loss was most probable in the youngest age group and among the professionals. Poor-self rated health was associated with loss to follow-up.

In the cohort of non-permanent employees the loss consisted of employees whose addresses were not found in the population register. Among fixed-term employees loss was least common in the oldest age group and among associate professionals. There were no significant associations among subsidised employees.

5.3.2 Non-response in follow-up

In the cohort of permanent employees the odds for responding were higher among older age groups compared with the youngest and among associate professionals compared with professionals. Participation was less likely among men and among manual workers. Moreover, poor-self rated health was associated with non-response in follow-up.

In the cohort of non-permanent employees the odds for responding were higher among women than men and in the oldest age group compared to the youngest. Non-response at follow-up was associated with low SOC among the fixed-term employees but not among the subsidised employees.

Table 7. Odds ratios and 95% confidence intervals^a for being respondent vs being lost in the follow-up^b among permanent employees in the Finnish Public Sector Study and among non-permanent employees in the TMJ Study by characteristics at baseline

	The Finnish Public Sector Study cohort	The TMJ Study cohort	
	Permanent employees (n=1051)	Fixed-term employees (n=145)	Subsidised employees (n=38)
Gender			
Men	1	1	1
Women	0.84 (0.70–1.01)	1.02 (0.63–1.66)	1.03 (0.44–2.46)
Age group			
17–29	1	1	1
30–49	5.45 (3.81–7.78)	1.43 (0.98–2.09)	0.77 (0.32–1.84)
50–64	2.15 (1.50–3.08)	2.43 (1.16–5.09)	1.52 (0.49–4.76)
Occupational status			
Professionals	1	1	1
Associate professionals	1.69 (1.38–2.07)	2.06 (1.27–3.50)	0.28 (0.03–2.55)
Clerks	1.54 (1.18–2.02)	1.29 (0.68–2.41)	0.63 (0.07–5.63)
Manual workers	1.37 (1.15–1.63)	1.40 (0.89–2.17)	0.23 (0.29–1.77)
Self-rated health			
Good	1	1	1
Poor	0.66 (0.56–0.77)	0.75 (0.47–1.19)	1.27 (0.54–2.97)
Sense of coherence			
High	1	1	1
Intermediate	1.02 (0.85–1.22)	1.02 (0.66–1.57)	1.16 (0.38–3.56)
Low	0.94 (0.76–1.16)	0.68 (0.41–1.14)	0.37 (0.13–1.10)

^a Adjusted for age, sex, occupational status and baseline level of self-rated health

^b Among permanent employees those who were no longer in the service of the same employer as at baseline and among fixed-term and subsidised employees those whose addresses were not found in the Finnish Population Register Centre

Table 8. Odds ratios and 95% confidence intervals^a for being respondent vs. being non-respondent in the follow-up among permanent employees in the Finnish Public Sector Study and among non-permanent employees in the TMJ Study by characteristics at baseline

	The Finnish Public Sector Study cohort	The TMJ Study cohort	
	Permanent employees (n=932)	Fixed-term employees (n=486)	Subsidised employees (n=177)
Gender			
Men	1	1	1
Women	1.58 (1.34–1.86)	1.68 (1.29–2.19)	1.63 (1.04–2.54)
Age group			
17–29	1	1	1
30–49	2.23 (1.50–3.31)	1.07 (0.85–1.36)	0.83 (0.53–1.30)
50–64	2.51 (1.67–3.78)	1.52 (1.02–2.27)	1.92 (1.06–3.48)
Occupational status			
Professionals	1	1	1
Associate professionals	1.25 (1.01–1.54)	0.87 (0.66–1.16)	0.59 (0.25–1.43)
Clerks	1.27 (0.94–1.71)	0.99 (0.68–1.48)	0.61 (0.27–1.38)
Manual workers	0.79 (0.66–0.94)	0.82 (0.62–1.07)	0.55 (0.25–1.20)
Self-rated health			
Good	1	1	1
Poor	0.82 (0.69–0.96)	1.20 (0.88–1.63)	0.99 (0.64–1.54)
Sense of coherence			
High	1	1	1
Intermediate	1.08 (0.89–1.30)	0.93 (0.72–1.21)	1.10 (0.67–1.83)
Low	0.99 (0.79–1.23)	0.69 (0.50–0.94)	0.94 (0.54–1.63)

^a Adjusted for age, sex, occupational status and baseline level of self-rated health

6 Discussion

Non-standard employment and unstable careers have become an integral feature of modern working life. The new insights into the research of non-standard employment of the present study are as follows. The cross-sectional analysis is the first one at population level to demonstrate gradient-like health differentials following the core-periphery stratification in the labor market. In prospective follow-up studies of health, support was found for both causation and selection hypotheses. The study showed that different employment trajectories may carry different health risks, and on the other hand there is health related selection to trajectories. Sample attrition may bias the results of longitudinal studies, and this study added to the knowledge about the attrition in different employee cohorts.

6.1 Health differentials and the labor market core-periphery structure

This population-based study found gradient-like health differentials following the core-periphery stratification in the labor market, and, rather than between the employed and the unemployed, it seems that health inequalities prevail across different labor market groups among the employed and the unemployed. Earlier studies on the topic have used less detailed stratification of the labor market status.

Fixed-term employees seemed to be as healthy as permanent employees with respect to self-rated health, depression and disease. This is in line with some earlier cross-sectional studies concerning fixed-term or temporary employees, in which they have as many or fewer health problems than permanent employees (Sverke et al. 2000, Virtanen M et al. 2001, Virtanen P et al. 2002, Artazcoz et al. 2005). Some studies have reported poorer health in non-standard employees (Kim et al. 2008, Kawachi 2008) possibly due to the broader spectrum of atypical contracts included in those studies. An advantage of the present study was that the confounding factors were controlled more comprehensively than in earlier studies.

The result of this cross-sectional study may indicate health-based selection into fixed-term employment. This selection is likely to occur from more atypical employment or unemployment rather than from permanent employment. The study was carried out in the labor market characterized by relatively high unemployment,

and employers were more able to choose the healthiest workers (Bartley and Ferrie 2001).

The health difference between fixed-term and atypical employees accorded with previous studies considering more atypical employees, such as casual employees (Bohle 2004), employees with precarious employment (Kim et al. 2008, Kawachi 2008) and temporary agency workers (Kompier et al. 2009). Differences in health outcomes may be due to differences in the stability of employment contracts. Fixed-term employees in Finland have relatively well regulated contracts, but atypical employment covered various contracts which, in addition to poor employment security, probably yielded low income.

Poor health of the unemployed (Jin et al. 1995, Dooley et al. 1996, Weber and Lehnert 1997, Dooley 2003, Grzywacza and Dooley 2003, McKee-Ryan et al. 2005) was also confirmed in this study. Moreover, the study showed among the unemployed health differences related to the level of the allowance. The poor health of those receiving only low basic allowance may be interpreted as support even for the material deprivation hypothesis. There is also the hypothesis that financial strain is a major source of poor health among the unemployed (Weich and Lewis 1998) and it has been found that the level and conditions of unemployment benefits affect the perceived health status of the unemployed (Rodriguez 2001, Rodriguez et al. 2001).

The relatively good health of the subsidised employees can be partly explained by health-related selection. Some of the unemployed receiving low basic allowance are not able to work even as subsidised employees (Juntunen et al. 2002), i.e. the long-term unemployed with better health are probably selected for re-employment programs more frequently. However, it is possible that participants benefitted from the subsidised re-employment programs, also with respect to well-being and health.

There was a highly significant gender difference in the association between unemployment and depression. A recent Swedish study found no gender differences in the associations of unemployment with mental health, but the health outcome was psychological distress (Hammarström et al. 2011). Artazcoz et al. (2007) have argued that when studying associations between work and health, the gender perspective should also be attended to. One explanation for the findings of this study may be seen in the difference between men and women in orientation to work-life. Work can also provide non-financial benefits, latent functions, such as structure to the day and social contact (Jahoba 1982, Janlert and Hammarström 2009). The role of these benefits is likely to differ by gender, and among women family roles could replace the rewards that were once provided by the job.

The consistent findings across all health outcomes, self-rated health which incorporates a variety of physical, emotional and personal components, diseases which are an indicator of permanent health problems, and the BDI which reflects poor mental health more sensitively than the question about diagnosed psychiatric

diseases, may be interpreted as lending support to the reliability of the comparative setting.

6.2 Social capital in working life is associated with health

In this study, work-related sources of social capital, measured by trust in labor market (employment contract), trust in co-worker support, and combined social job capital, were associated with health. Studied with these variables, low level of social job capital (i.e. combination of subsidised job contract and no trust in co-worker support) was associated with poor self-rated health. The result concurs with earlier and also later findings obtained in the workplace context, albeit with different measures of social capital (Kennedy et al. 1998, Veenstra 2000, Kouvonen et al. 2006, Oksanen et al. 2008, Suzuki et al. 2010). In this study the association was found only in women, unlike in other studies where women and men have been studied separately (Kennedy et al. 1998, Kouvonen et al. 2006).

According to this study, fixed-term employment at baseline was associated with better self-rated health and less psychological distress at end of the follow-up compared with permanent employment. The results were parallel in both genders, but reached statistical significance only for women. The finding is contrary to an earlier finding showing that fixed-term employment predicts poor self-rated health, but in that study the follow-up time was only one year, and the result from Germany could not be replicated in the British part of the sample (Rodriguez 2002). In a 12-year follow-up study in Sweden temporary employment also predicted poor self-rated health and psychological distress, but in this study 'temporary employment' covered all possible forms of non-standard employment (Waenerlund et al. 2011). In these studies they did not distinguish between women and men, but gender was controlled for by adjusting in analyses. However, two Finnish studies showed higher risk of mortality among fixed-term municipal employees (Kivimäki et al. 2003) and in non-standard employees in a representative sample of the workforce (Nätti et al. 2009).

The results must be interpreted taking into account that the present study concerned municipal employees, while the study population in Germany consisted of participants in a household study and the Swedish study followed up a birth cohort. During the study period the Finnish economy was recovering from recession, and although the unemployment rate was still relatively high, fixed-term employees' opportunity to get new contracts was good in municipalities. This may partly explain the relatively positive development of their health. On the other hand the growing number of fixed-term personnel probably means an increased workload and responsibilities for permanent employees, and they probably suffered more from the general intensification of work in the public sector than their non-permanent

co-workers. In fact, a Finnish study has found that in the public sector permanent employees are exposed to high strain jobs more commonly than fixed-term employees, and fixed-term employment was not associated with low job control, high job demands or social exclusion in the working community (Saloniemi et al. 2004b). Fixed-term employees in hospitals also reported lower level of workload compared with permanent employees (Virtanen M et al. 2003a). In addition the follow-up time was relatively short, and health-related selection in fixed-term employees and the wearing off of such selection in permanent employees, are likely explanations for the relatively positive development of their health.

The trust in receiving support from co-workers was associated with better self-rated health in women. This result concurs with the evidence that women benefit more from social networks (Gore and Golten 1991). As expected, subsidised employees trusted in co-worker support least often. On the other hand, subsidised employment offers to many an opportunity to extend their support network. The nature of the social relations at work is also important in the theory of Antonovsky (1987a), and a worker's sense of coherence is strengthened if the work fosters confidence and a feeling of security and supports communicability in social relations.

However, when background variables and baseline health were added to the statistical models, associations between health and low level of social job capital and trust in receiving support from co-workers were statistically non-significant in both women and in men. One possible explanation for this result is the relatively short follow-up.

6.3 Health-related selection into employment trajectories and health effects of the trajectories

The study provided evidence of health-related selection into employment trajectories. When studying employment trajectories among women with initially fixed-term contracts, poor self-rated health at baseline increased the probability of becoming unemployed. This is in line with earlier findings that poor health increases the risk of unemployment (Bartley and Owen 1996, Mastekaasa 1996, Ferrie 1997, Leino-Arjas et al. 1999, Schuring et al. 2007, Böckerman and Ilmakunnas 2009). An earlier study has shown healthy worker hire effect among hospital fixed-term employees, and good self-rated health and low psychological distress predicted obtaining a permanent job contract (Virtanen M et al. 2002). In this study the healthy worker survivor effect, i.e. the out-selection of less healthy workers was demonstrated among non-standard employees. Although this phenomenon has received very little research attention, in theory it may be linked to flexibility of the labor market in terms of employee protection (Furåker and Berglund 2008) and stigmatization and discrimination of sick individuals.

According to the results the trajectories themselves carried different health risks in women with initially fixed-term contracts. The results showed that the trajectory towards unemployment and high exposure to unstable trajectory predicted poor self-rated health at follow-up. This result showed that the loss of a fixed-term job may also be a health risk. Although the result revealed novel information concerning health of fixed-term employees in the new labor market, the result must be considered against the Finnish labor market discussed above. During rapid economic growth and improved employment prospects many fixed-term employees were on the bridge to the permanent employment, not in a blind alley with negative outcomes for health.

The trajectory from fixed-term to permanent employment combined with low exposure to unstable employment predicted low psychological distress. There are some studies showing the parallel results (Reine et al. 2008, Kompier et al. 2009) but among hospital employees the trajectory from fixed-term to permanent did not predict low psychological distress (Virtanen M et al. 2003a). In this study it was possible to compare core- and periphery-directed trajectories with stable fixed-term contracts throughout follow-up. In earlier studies fixed-term employees have been compared with permanent employees with an unknown length of tenure. This may be an explanation for different results regarding psychological distress although both hospital permanent employees (Virtanen M et al. 2003a) and municipal permanent employees (Saloniemi et al. 2004b) have reported more work stress than fixed term employees. In this study the trajectory from fixed-term to permanent employment did not predict better self-rated health, which concurs with Rodriguez (2002).

Adjustment for initial health diminished the effect of reverse causation, but in the present design the possibility of health-related selection during follow-up could not be controlled out. In addition to selection at entry to work, frequent labor market transitions increase risks of health-based selection into unemployment and out of the labor force during the work life course.

6.4 Employment trajectory is associated with the development of sense of coherence

This longitudinal study suggests that employment trajectory plays a significant role in the development of an individual's SOC. The results mainly supported the hypothesis of more favorable development of SOC among those with stabilizing trajectories, and the trajectories from unemployment to permanent employment were associated with a clear improvement in SOC. This result concurs with earlier results that a career without unemployment experiences is associated with better SOC at follow-up (Virtanen P et al. 2003, Feldt et al. 2005a, Feldt et al. 2005b, Volanen et al. 2007) and re-employment among the unemployed improves SOC (Vastamäki et al. 2009). In a study of managers' careers, disruptions did not cause statistically significant

changes in SOC (Mauno et. al 2011), possibly due to good employment prospects. Studies on the association between employment position and SOC concern almost exclusively differences between unemployment versus employment. In the present study the detailed measurement of participants' employment positions enabled the construction of a comprehensive spectrum of trajectories on the labor market.

According to the study, fixed-term employment had no negative effects on SOC, on the contrary, among young individuals the most favorable change in SOC was seen in the trajectory from unemployment to fixed-term employment in the TMJ Study and in the trajectory from permanent to fixed-term employment in the HeSSup Study. As stated above, the Finnish economy was growing rapidly during the follow-up time, and employment prospects were generally good. Non-standard employment has been associated with many bad job characteristics, but it is probable that fixed-term employees in Finland can participate in socially valued decision-making, workload is in balance and employment is not perceived to be too insecure. In such conditions it is possible that people on fixed-term contracts and do not experience deterioration of SOC.

Particularly strong effects of employment trajectory on SOC were seen in employees aged less than 30 years. This result is in line with studies showing that SOC is more stable among individuals over 30 years (Feldt et al. 2007, Richardson et al. 2007, Feldt et al. 2011), rather than those with non-significant difference between age groups (Feldt et al. 2003, Vastamäki et al. 2009). In the latter studies, the number and age structure of participants probably limited the ability to show significant differences between age groups. In our study the trajectories from fixed-term and permanent employment to unemployment were associated with clear decline in SOC among employees aged less than 30 years. Among older participants the trajectory from permanent employment to unemployment was associated with not such poor development of SOC. A possible explanation for this is that their SOC had stabilized earlier in life. An alternative explanation may be related to earnings: older permanent employees commonly receive an earnings related allowance paid by their unemployment fund for 500 working days, and for them unemployment does not mean immediate financial difficulties and may be not so detrimental to SOC. However, the fluctuations in SOC seem to depend on the type of employment trajectory throughout adult life.

The results of this study support Antonovsky's theory that employment-related experiences may modify an individual's SOC, and that unemployment is a particularly unfavorable life situation (1987a, 1987b). Antonovsky was especially concerned about unemployment among the young and thought that attention should be paid to their working conditions. It has been found that good employment prospects are important for the improvement of SOC in particular when going from studies to work (Virtanen P and Koivisto 2001). If the early career of young employees

is less favorable, they are unable to develop their SOC to the optimum level and their resources for resisting health endangering strain may remain permanently at a low level. According to the theory, changes in SOC may be long-lasting among young and the achieved level of SOC plays a role in the stability of the SOC. Stability is hypothesized to be higher among people with a high SOC than those with a low SOC. If SOC stabilized at a high level, employees are more likely to be able to cope successfully with stressful life events. It has been found that unemployment had a fairly low impact on health in the presence of strong SOC (Hanse and Engström 1999).

6.5 Sample attrition and bias in employee cohorts

The longitudinal data and different employee cohorts provided an opportunity to explore sample attrition, distinguishing the loss to follow-up survey and non-response to the follow-up survey. In the cohort of permanent employees the loss was due to exit from the workplace, whereas in the cohorts of fixed-term and subsidised employees it was due to unlocated address.

In the present study, low SOC predicted low response rate in the cohort of fixed-term employees. Among fixed-term and subsidised employees contact failure tended to be more common in those with low SOC, but this association did not reach statistical significance. Little has so far been known about the role of psychological factors in predicting attrition. Recently a study on the association between the Five Factor Model and missing data found that higher levels of openness, agreeableness and conscientiousness were associated with fewer missing study data (Jerant et al. 2009).

According to the results poor self-rated health predicted sample attrition in the cohort of permanent employees, both with regard to non-response and to exit from the cohort. Poor subjective health has been shown to predict sample attrition (Van Loon et al. 2003, Oleske et al. 2007), but there are no earlier studies which distinguish the types of attrition. In this study it was not possible to distinguish between voluntary and involuntary turnover.

As in earlier research (e.g. Bucholz et al. 1996, Van Loon et al. 2003, Ronckers et al. 2004) women responded more actively to the follow-up study both among the permanent and among the fixed-term and subsidised employees. The loss to follow-up did not depend on gender, as also in earlier studies (Badawi et al. 1999, De Graaf et al. 2000).

In older age groups, the loss during follow-up was smaller and they responded more actively than the youngest age group. This result was expected, since most of earlier studies on working age participants report increased response activity with age. Also in accordance with an earlier study (Goldberg et al. 2001), manual workers

were less likely to respond to the follow-up survey, but the result was statistically significant only among permanent employees. Regarding those lost during follow-up, professionals were lost more often than associate professionals, clerks and manual workers among permanent employees. A potential explanation for this finding is that professionals more often change jobs voluntarily.

The associations between SOC and sample attrition during follow-up do not permit conclusions as to whether there was SOC-related participation bias in the initial surveys of the present study. It is also possible that the effect of SOC would turn out differently in surveys conducted among unselected populations.

These findings show that sample attrition due to health and SOC may differ between non-standard and standard employees. Studies which distinguish the different reasons for attrition are also needed. However, this study showed that it is possible to trace over 90% of employees through the Finnish Population Register Centre.

6.6 Methodological considerations

The major strength of the present study was that the data was obtained from three prospective cohort studies. The data of the HeSSup Study came from a large population sample that offered statistical power for separate analyses. The spectrum of employment statuses among the participants in this study represents the respective groups in the Finnish labor force in 1998 quite well. A random sample from the whole population is optimal in terms of the generalizability of the results to the total workforce of a certain country. The TMJ Study and the Finnish Public Sector Study offered an opportunity to focus the analysis on the public sector, where fixed-term contracts are particularly common in Finland.

The prospective follow-up study designs gave an opportunity to investigate the directions of causal associations between employment position and health. There was cross-sectional design only in Study I. Causal inference also remains challenging in longitudinal studies, as non-standard employees may differ from standard employees in characteristics that also influence health outcomes. Such confounding factors were carefully controlled for in the studies. Moreover, an essential strength of this study was the adjustment of the regression models for initial health. This diminishes the possibility of health related selection but one cannot entirely escape the issue. The follow-up periods in studies were relatively short, and the results should be classified as short-term associations. However, the study as a whole reveals novel aspects of health and well-being in different employment trajectories.

In this study the two cohorts comprised predominantly women working in the public sector, which limits the generalizability of the results. It is possible that a corresponding study would produce different results in the private sector, where

the contractual and economic conditions of non-standard employment are different. On the other hand, Virtanen P et al. (2006) in their cross-sectional study found that the health differences between permanent, fixed-term and atypical employees were similar in both sectors in Finland.

The national and the economic contexts also limit the generalizability of the results. The studies were carried out in Finland, which is a Northern European post-industrial society, during a time of rapid economic growth, and in a labor market characterized by fairly high unemployment and increasing non-permanent employment.

By virtue of the detailed data on participants' employment situations, it was possible to disentangle a spectrum of trajectories relevant to today's labor market. On the other hand, the numbers of respondents were relatively small in some trajectories, and this may have led to Type II error, which should be considered while interpreting the results.

In the HeSSup Study, the response rate in the initial survey (40 per cent) was satisfactory, taking into account that the participants were asked to give their consent to access to several register data and to follow-up surveys. In the non-response analysis only minor differences were found in sociodemographic and health-related issues (Korkeila et al. 2001). In the follow-up survey the response rate was as high as 80%. In sum, the HeSSup Study yielded enough responses for the analyses and conclusions of the present study. In the Public Sector Study and the TMJ Study the response rates in both the initial and the follow-up surveys were quite high as regards to the rates obtained in corresponding contemporary studies.

We cannot rule out the possibility that health-related non-response to the surveys has affected the results. The cohorts were likely 'normalized' because of non-response, and consequently sample attrition led to an underestimation rather than an overestimation of the observed associations between labor market trajectories and health and sense of coherence.

The use of self-rated data may also be considered a limitation of the dissertation. Concerning particularly Study III, there is the question as to how precisely the respondents recalled their employment positions during the follow-up years.

The relevance of the indicators of social capital used in this study, i.e. trust in co-worker support and trust in labor market, may be questioned. The choice, the Social Support Questionnaire, measures in a methodologically standardized, valid and reliable way the trust of individuals in one another to get support from different interpersonal relationships. From this perspective trust, as measured in this study, may be seen as an indicator that provides a relevant reflection of social capital in the case of co-worker relations. Employment contract, on the other hand, may be considered an element of trust in one's status as a labor market citizen. Measurement of social capital is still in the development stage. Researchers have taken different

approaches and adopted varying methods to assess social capital. The ways of measuring social capital are also diverse. Some studies use a single question while others apply different question series. For example, Kouvonen et al. (2006) developed a measure that assesses social capital specifically in the work context on the basis of eight items selected from different question series. On the other hand, measurement of social capital is tied to the context and culture and, therefore, the same instrument cannot be used in all studies.

6.7 Implications for further research

The conceptual and the empirical knowledge of non-standard employment as a correlate of health is still limited. Definitions and classification of non-standard employment differ, and it is not easy to compare the findings of diverse studies. In order to understand differences in health and wellbeing between different employment statuses, each study should make more explicit the definitions and classifications used, and attempts at uniform and universal definitions should be continued.

Although gender difference was not a special focus the present study, there were findings that suggest that the health effects of non-standard employment may be gender specific. There are only few studies examining women and men separately, and the results have been inconsistent (Ferrie et al. 1995, Ferrie et al. 1998, McDonough 2000). In most studies the analyses have simply been adjusted for gender. It is necessary to learn more knowledge about gender differences in the research of non-standard employment and health (Artazcoz et al. 2007).

The context in which non-standard employment is studied should be taken into account. Between countries there are large differences, for example, in the labor market situation, national legislation protecting non-standard employees, social security for the unemployed, active labor market policy programs and access to health care among the temporarily employed and unemployed people. The review by Virtanen M et al. (2005) showed that the proportion of the peripheral workforce and the unemployment rate probably have some effect on the association between temporary employment and health.

Concerning the theory, a micro-level model (Benach et al. 2010b) and a macro-level model (Muntaner et al. 2010) of employment relations and health inequalities have recently been presented. The explicit theoretical model is important, as it provides an instrument for understanding the causal links and pathways through which non-standard employment may affect workers' health.

A prospective cohort study is the best observational design to examine the causal associations between employment status and health. However, work careers may, in addition to standard employment, include several passages in different

non-standard positions, as well as non-employment due to unemployment and other reasons. To capture the dynamics of the work career, data with successive measurement of the positions are needed. Given such data, trajectory analysis, or 'group based modeling of development' (Nagin 1999), offers an advanced method to analyze working life courses as a whole. The method has been used in particular in the field of developmental psychology, and has only recently been applied in the research of employment trajectories (Hynes and Clarkberg 2005, Virtanen P et al. 2011b). It opens up new ways for understanding the diversity of various employment careers and their implications for health.

7 Summary and conclusions

Nowadays the labor market is structured into a core of standard employment, encircled by different non-standard forms of employment. This core-periphery structure seems to incorporate health differences among the working age population: in the sample stratified into permanent employees, fixed-term employees, atypical employees, unemployed with earnings related income, unemployed in subsidy programs and unemployed with low basic income, there were no significant differences in self-rated health, chronic disease and depression between permanent and fixed-term employees. The first step of increase in health problems was seen between the fixed-term employees and the group including atypical employees and the unemployed receiving earnings-related allowance or participating in subsidy programs. A further step was observed between this group and the unemployed receiving only the low basic allowance.

In the follow-up study of municipal employees, fixed-term employees had better self-rated health and less psychological distress than permanent employees, and trust in receiving support from co-workers was associated with better self-rated health in women. These findings were interpreted in the frame of work-related sources of social capital. Lowest level of social job capital, or the combination of subsidised employment and no trust to co-worker support, was associated with poor health but only in women.

Employment trajectories may carry different health risks. Among women with initially fixed-term contracts the trajectories pointing toward the periphery of the labor markets were associated with poorer self-rated health, while the trajectories pointing toward permanent employment were associated with low psychological distress at follow-up. In the study on changes in sense of coherence, the scores mainly improved more in employment trajectories directed to more stable employment than in trajectories directed to less stable employment. On the other hand, poor self-rated health at baseline was associated with a trajectory towards unstable employment among women with initially fixed-term contracts.

Among non-standard employees sample attrition may be attributable to different factors than among permanent employees and should be taken into account for when estimating bias due to non-participation in occupational cohorts. In this study low SOC predicted non-response in fixed-term employees and poor self-rated

health predicted sample attrition with regard to non-response and exit in permanent employees.

One of the most significant changes in the labor market in developed countries in recent decades has been the increase in non-standard employment. In the 2000s it seems that the increase started to even out, but non-standard employment is a substantial and persistent element of the labor market nowadays. Due to the increase and the diverse forms of non-standard employment, it is expected that work histories will be more complex in the future, which may have health consequences for employees.

The main conclusions of this study are that health inequalities vary according to the core-periphery structure in the labor market, and employment trajectories may carry different health risks while on the other hand there is health related selection into non-standard employment and unstable career. The study showed that it is important to classify employment status as accurately as possible when studying the association between employment status and health and sense of coherence. Detailed measurement of participants' employment positions, which enabled the construction of a comprehensive spectrum of trajectories on the labor market was a major contribution to the body of research in the field.

Fixed-term employment did not seem to be associated with poor health in cross-sectional or in short follow-up studies in Finland. It is obvious that fixed-term employment is often a chance to enter a favorable cycle, where there is health related selection first to fixed-term employment and to permanent employment, and a further trajectory to permanent employment predicts better mental health and SOC. On the other hand in non-standard employment there is also a possibility of a detrimental cycle in the labor market if poor health predicts a trajectory to unemployment, and a trajectory to unemployment is a risk for poor health and SOC. Cumulative exposure to different labor market positions from the beginning of the working careers needs to be explored, in particular in order to identify a possible risk of adverse effects on workers' health. More detailed knowledge and awareness of the risks also provides opportunities to targeted occupational health interventions.

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Original publications

Health inequalities in the workforce: the labour market core–periphery structure

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Objectives	To explore health inequalities between six labour market groups ranging from permanent employees to the long-term unemployed receiving minimum daily allowance.
Methods	A sample of 15 468 employees or job seekers from a population survey. Their perceived health, diseases, and depression were measured.
Results	Compared with permanent employees, the odds for poor health were highest among the unemployed with low incomes irrespective of adjustments, across all health indicators and in both men and women. High odds were also found among the less disadvantaged unemployed and the employed with atypical contracts, but not among fixed-term employees.
Conclusions	Rather than between the employed and the unemployed, it seems that health inequalities prevail across different labour market groups within the employed and the unemployed. Future studies should employ a more detailed classification of employment situation.
Keywords	Atypical employment, unemployment, depression, health status, inequality, Finland

The last decades of the 20th century saw two major changes in the labour markets of all Western societies, i.e. a sharp increase in the jobless rate and a breakdown of the traditional industrial structures, which began to give way to more diverse employment patterns. For a growing part of the workforce, post-industrial organizations have necessitated (or opened up an opportunity for) a career that involves more or less continuous movement between different occupations, work places, and job contracts, each with their sources of material and psycho-social well-being as well as distress and environmental health hazards. Frequent labour market passages also increase the probability of health-based selection.

The traditional division of the workforce into employed and unemployed is not sensitive enough to describe the ever greater complexities of modern working life. For the purposes of studying the associations between labour market status and health, we would need to have a more detailed analysis of employment situations. However, the simple dichotomy of unemployed versus employed does provide an adequate starting point for specifying the scope of this article.

Unemployment and health

Various indicators from behavioural risks through psychological distress to mortality have been used to establish the associations of unemployment with poor health.^{1,2} It seems that a complex set of causal and selective processes lies behind the health inequalities between the employed and unemployed populations.^{3–5} Psychological and physiological reactions may be even greater in the anticipation phase than after actual job loss.⁶ The onset of unemployment may comprise the stages of a traumatic crisis: adaptation mechanisms soon slow down the deterioration of both mental and physical health. Social support and safety nets—although their permeability varies even between different welfare states—prevent the majority of those without a paid job from falling into extreme material deprivation and psycho-social marginalization.^{7,8}

The 'industrial' prototype of an unemployment episode with clear-cut exit from and re-entry to permanent work is rare. The spell of unemployment is often interrupted by various re-employment programmes or vocational training courses, resulting in a labour market status somewhere in the middle ground between genuine employment and genuine unemployment. Moreover, employment policy measures may blur the 'natural' process of health-based selection to and from unemployment, and the social and health care services provided may slow down the 'natural' deterioration of health.^{9,10} However, specific health effects may depend on ways in which these services

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are administered and perceived by the recipients,^{11,12} and on the level and conditions of unemployment benefits.¹³

In sum, figures on past unemployment provide only a relatively crude measure of 'unemployment exposure'. Socioeconomic contexts and re-employment prospects are probably just as significant to the well-being of the unemployed as the corresponding factors and perceptions, i.e. job insecurity, are to employed individuals.¹⁴

Precarious work and health

Perceptions of job insecurity are common among employees with non-permanent contracts.¹⁵ In the post-industrial 'flexible' labour markets, the shrinking core workforce is surrounded by a widening field of precarious work between permanent jobs and overt unemployment.^{16,17} Precarious employment usually refers to specific types of job contract, such as fixed term employment, temporary wage workers, sole traders, and part time working.¹⁶ Such employment may have various socioeconomic disadvantages and psychological features with adverse health effects, and poor health may increase the risk of falling into a more precarious career.

The concept of job insecurity can be applied to both permanent and precarious jobs. However, most empirical research has relied on insecurity attributed to or perceived by permanent employees, also reviews on job insecurity^{18,19} have only mentioned briefly the question of employment security among fixed-term and other employees with unstable labour market status. The job insecurity concept and methods of assessing it should be developed to discern job-loss insecurity from job-feature insecurity,^{20,21} and even then there is reason to ask whether job insecurity is the best theoretical approach to understand the new workplace reality.²² Research on the associations between precarious employment and health is still scarce. Most of the few studies that have been published have compared permanent and fixed-term wage earners,^{15,23–25} but there are no unequivocal results.

Study question

The breakdown of labour market statuses along the core-periphery axis is a neglected issue in research on health inequalities among the unemployed and among employed people. We expect a robust association between unemployment and poor health, but suspect that in order to reveal the health-related divisions and processes in post-industrial working life a more detailed articulation of labour market statuses is required. To address this issue, we explore the health of the total workforce with reference to the relative hierarchy of different statuses, expecting that such analysis might reveal new health gradients between and within the unemployed and the employed work force.

Material and Methods

Setting and sample

The population sample is drawn from the first phase of the Health and Social Support project (HeSSup), a longitudinal cohort study on psychosocial factors and health in the Finnish working-age population. The study was launched in 1998, shortly after the Finnish economy had recovered from a deep recession. However, the jobless rate, which had reached a record figure of 16.6% in

1993, was still at 11.4%.²⁶ It was clear that unemployment was no longer a cyclical phenomenon but an integral part of the labour markets. Large parts of the workforce were now involved in various re-employment programmes. Moreover, in the wake of the recession, the number of non-permanent jobs had increased: in 1993 10% of men and 15% of women had a fixed-term contract, in 1997 the figures were 16% and 21%.²⁷

A random sample ($n = 52\,739$) from the Finnish Population Register Centre, stratified according to gender and four age groups (20–24, 30–34, 40–44, and 50–54 years), were asked to participate in the HeSSup-project. A total of 21 101 people answered the baseline questionnaire. The response rate (40%) was satisfactory taking into account that the participants were asked to give their consent for access to several register data and to follow-up surveys. The participants recruited represented relatively well the age- and gender-adjusted Finnish population.²⁸ The present study is based on the data obtained from this survey.

Respondents' labour market status

This study comprises those 15 468 respondents who were at work or seeking a job. A set of questions concerning labour market status was used as criteria for inclusion in the study and for classification of status as follows.

1 A multi-choice question inquired about main activity in relation to work with 12 options. Those engaged in full time work (≥ 20 h/week), those getting earnings-related unemployment allowance (see below, including laid-off employees), and those getting basic unemployment allowance (see below) were included in this study, while students, pensioners, full-time mothers and fathers, and other non-working respondents were excluded.

2 Wage earners' labour market status was further explored with a multi choice question which specified the following options: permanent, deputizing, or locum, fixed-term, subsidized, temporary (hired), freelance, probation, seasonal work, on-call work, apprenticeship, other non-permanent situation.

3 If there was any discrepancy between the previous items (e.g. unemployed in one and subsidized in another), a separate question ('Are you currently unemployed or laid-off?') was used to make the final decision on employment status.

On the basis of this set of questions the employed respondents were classified into three groups.

Permanent employees

Wage-earners with a permanent contract and all entrepreneurs, the self-employed, and farmers.

Fixed-term employees

Including deputizing, locum, and fixed-term employment, i.e. all those whose contract was going to expire at a given point in time.

Atypical employees

A residual group comprising temporary (hired), freelance, probation, seasonal, on-call, apprenticeship, and other non-permanent workers.

Further information requested from the employed respondents included spells of unemployment or lay-off during past 3 years and length of the employment in the current work place. The unemployed respondents were also classified into three groups.

Compensation-income unemployed

This category comprised the unemployed who were in receipt of earnings-related daily allowance. The system of earnings-related benefits is based on voluntary membership of unemployment funds collected during periods when people are working. The daily allowance depends progressively on income level prior to redundancy. Eligibility for earnings-related allowance continues for 500 working days, i.e. about 2 years. If this period expires, the employee will have to work for more than 10 months without interruption in order to regain eligibility.

Subsidy unemployed

This category comprises those respondents who reported that they were employed under a scheme to re-employ long-term unemployed job seekers. Eligibility for this scheme requires that the person has been out of work for a minimum of 12 months, but in most cases this will be a much longer period. Re-employment lasts for 6 months, and follow-up studies²⁹ have shown that after this period more than 90% of the participants will remain out of work. In other words, although the subsidy unemployed are working, their labour market status of 'interrupted unemployment' is perhaps most appropriately described as a sort of unemployment.

Low-income unemployed

Job seekers who are not in receipt of earnings-related allowance are entitled to a basic allowance at a lower and fixed level. It is paid out under the national unemployment insurance scheme to all job seekers for unlimited time. Recipients of this minimum allowance form the 'hard core' of unemployment within the labour market structure studied. At the individual level this means a situation characterized by a low income level, several years of unemployment experiences, and poor prospects for re-employment.

Health indicators

Presented with a list of 26 chronic diseases and an option for 'some other disease', the respondents were asked to check 'diseases diagnosed by a doctor' (yes/no). A dichotomous variable (no disease versus at least one disease) was formed.

Self-rated health was classified as good (good or fairly good) and poor (average, fairly poor or poor) health.

Depression was assessed using the 21-item version of Beck's Depression Inventory (BDI).³⁰ This questionnaire has been established as a valid and reliable method for detecting depressed respondents. A dichotomous variable was constructed with the score ≥ 10 indicating depression.

Background variables

In addition to gender and age group, other demographic variables included in the analysis were marital status (married or cohabiting versus not) and level of education (no vocational education, vocational school, college, university). The psychosocial factors measured were size of social network (small 0–10, intermediate 11–20, and large >20)^{31,32} and optimism-pessimism (three groups using Q1 and Q3 as cut-offs).³³ Health risk behaviours were assessed on the basis of overweight (body mass index >27 kg/m²), alcohol intake (non-drinking, moderate drinking [1–175 g weekly in women and 1–263 g weekly in men] and heavy drinking), and smoking (non-smoking, daily smoking 1–19 cigarettes, daily smoking ≥ 20 cigarettes).

Statistical methods

We used logistic regression analyses to study the association between employment status and health. The models were first adjusted for age, and then additionally for demographics, health risk behaviour, and psychosocial factors. Finally, all the background variables were controlled for in the fully adjusted model. Analyses were carried out separately for men and women. Gender differences in the associations between employment status and health were studied with *P*-values for interaction obtained from the regression models.

Results

Table 1 shows that 72% of the respondents in this study were permanently employed, 11% had a fixed-term contract, 4% an atypical contract, 5% were compensation-income unemployed, 2% subsidy unemployed, and 6% low-income unemployed. Permanent employees were older and more often married, the low-income unemployed were least educated, and fixed-term employees most educated. Health behaviour and psychosocial factors showed no association with employment status, with just one exception: a small social network was most common among the unemployed participating in subsidy programmes.

Among the employed respondents, in all 76% had no experience of unemployment or lay-off during the past 3 years. For the permanently employed the figure was 84%, for fixed-term employees 38%, and for atypical contract 27%. Two of three permanent employees had been in the current work place more than 5 years, whereas the career had lasted less than 2 years in almost two of three fixed-term and atypical contract employees (Table 1).

We started out by comparing the health of all the employed with all the unemployed participants irrespective of their specific labour market status. The demographics-adjusted odds ratios (OR) for poor health were 1.76 (95% CI: 1.47, 2.11) in unemployed men and 1.71 (95% CI: 1.46, 2.00) in unemployed women; the corresponding OR for chronic disease were 1.65 (95% CI: 1.40, 1.96) and 1.24 (95% CI: 1.09, 1.41), and for depression 2.89 (95% CI: 2.40, 3.47) and 1.51 (95% CI: 1.31, 1.75). As the latter figures indicate, the OR for depression was significantly higher in unemployed men.

A more detailed comparison with permanent employees revealed a health gradient over the spectrum of labour market statuses (Table 2). After adjusting for demographics, the highest odds for poor health were found in the low-income unemployed, irrespective of sex and the measure of health. Subsidy unemployed men suffered more often from depression, while their female colleagues suffered more often from poor self-rated health and chronic diseases. Among the compensation-income unemployed, men had elevated odds for chronic disease and depression and women elevated odds for poor self-rated health and depression. Employees in atypical jobs had more chronic diseases; women in this category also suffered from depression more often. No differences were found between permanent and fixed-term employees. Further adjustment for psychosocial factors and health risk behaviours had no effect on the associations between labour market status and health.

With respect to depression, a significant interaction was seen between sex and type of employment. Unemployed men, irrespective of their type of unemployment, had higher odds than

Table 1 Descriptive statistics (column percentages) for the participants according to labour market status

	Labour market status						P-value ^a
	Type of employment			Type of unemployment benefit			
	Permanent N = 11 255	Fixed-term N = 1666	Atypical N = 562	Compensation- income N = 715	Subsidy N = 305	Low-income N = 965	
Gender							
Men	47	35	48	29	31	48	<0.001
Women	53	65	52	71	69	52	
Marital status							
Married	77	62	58	70	58	43	<0.001
Single	23	38	42	30	42	57	
Age (years)							
20–24	8	35	45	14	30	34	<0.001
30–34	25	33	23	25	22	23	
40–44	33	19	19	31	22	22	
50–54	34	13	13	30	26	21	
Level of education							
Basic	24	19	30	33	36	40	<0.001
Vocational	26	24	37	30	34	34	
College	35	36	26	32	26	22	
University	15	21	7	5	4	4	
BMI^b (kg/m²)							
<27	77	77	75	78	73	78	0.514
≥27	23	23	25	22	27	22	
Smoking (cigarettes/day)							
No	73	72	71	72	74	71	0.642
<20	21	22	22	21	21	23	
≥20	6	6	7	7	5	6	
Alcohol intake							
No	17	17	17	18	17	16	0.652
Moderate	77	77	77	75	79	78	
Heavy	6	6	6	7	4	6	
Social network							
Small	34	36	34	32	41	38	0.003
Intermediate	44	43	46	43	40	40	
Large	22	22	20	25	19	22	
Optimism							
Pessimists	22	21	26	23	24	22	0.125
Neither	50	48	50	48	52	50	
Optimists	28	31	24	29	24	28	
Employed (years)^c							
0–1	11	61	63	N/A	N/A	N/A	
2–3	14	23	20	N/A	N/A	N/A	
4–5	9	7	6	N/A	N/A	N/A	
>5	69	9	12	N/A	N/A	N/A	

^a χ^2 test for significance of the difference between all labour market statuses.^b Body mass index.^c Length of the employment in the current work place.

women (test for interaction with sex $P = 0.014$ for compensation-income unemployed and $P < 0.001$ for low-income and subsidy unemployed). It is particularly important to note the low OR for depression in unemployed women participating in subsidy programmes.

Finally, we assessed whether the enhanced measure of labour market status fitted the data better than the dichotomous employed versus unemployed measure. The -2 log likelihood tests indicated that this was the case both in women (P -values for self-rated health 0.001, for disease 0.016, and for depression <0.001) and in men (corresponding P -values 0.022, <0.001 , and 0.024).

Discussion

In the flexible labour markets of post-industrial society, health inequalities do not necessarily follow the traditional division between employed and unemployed groups, but may also show a more complex pattern. This population-based study found gradient-like health differentials following the core-periphery stratification in the labour market. The first step of increased health problems was evident between fixed-term and atypical employees. A further step was observed between the unemployed receiving earnings-related allowance or participating in subsidy programmes, on the one hand, and the low-income

Table 2 Odds ratios (95% CI) for poor self-rated health, self-reported chronic disease diagnosed by physician, and depression according to labour market status

	Men			Women		
	Self-rated health	Disease	Depression	Self-rated health	Disease	Depression
Model 1						
Permanent employees	1	1	1	1	1	1
Fixed-term employees	0.94 (0.73, 1.22)	0.95 (0.78, 1.14)	0.96 (0.73, 1.26)	0.84 (0.68, 1.04)	1.12 (0.97, 1.27)	0.99 (0.83, 1.18)
Atypical employees	1.56 (1.13, 2.14)	1.39 (1.07, 1.81)	1.63 (1.17, 2.27)	1.42 (1.01, 2.00)	1.51 (1.18, 1.94)	1.64 (1.24, 2.17)
Compensation-income unemployed	1.25 (0.89, 1.75)	1.56 (1.16, 2.10)	2.49 (1.80, 3.45)	1.47 (1.17, 1.84)	1.16 (0.96, 1.40)	1.53 (1.24, 1.89)
Subsidy unemployed	1.78 (1.10, 2.87)	1.16 (0.76, 1.78)	3.01 (1.90, 4.77)	1.91 (1.36, 2.68)	1.58 (1.18, 2.12)	1.09 (0.77, 1.54)
Low-income unemployed	3.04 (2.45, 3.77)	2.15 (1.75, 2.65)	4.85 (3.92, 5.99)	2.74 (2.20, 3.42)	1.65 (1.36, 2.01)	2.24 (1.83, 2.76)
Model 2						
Permanent employees	1	1	1	1	1	1
Fixed-term employees	0.96 (0.74, 1.24)	0.97 (0.81, 1.18)	0.88 (0.67, 1.16)	0.84 (0.68, 1.04)	1.11 (0.97, 1.28)	0.98 (0.82, 1.16)
Atypical employees	1.34 (0.97, 1.84)	1.31 (1.01, 1.71)	1.39 (1.00, 1.96)	1.26 (0.89, 1.77)	1.36 (1.06, 1.75)	1.49 (1.13, 1.98)
Compensation-income unemployed	1.07 (0.76, 1.51)	1.47 (1.09, 1.98)	2.14 (1.54, 2.98)	1.31 (1.04, 1.64)	1.09 (0.90, 1.32)	1.44 (1.16, 1.78)
Subsidy unemployed	1.42 (0.87, 2.31)	1.09 (0.71, 1.68)	2.17 (1.35, 3.47)	1.63 (1.15, 2.29)	1.45 (1.08, 1.95)	0.98 (0.69, 1.39)
Low-income unemployed	2.37 (1.88, 2.97)	1.96 (1.58, 2.44)	3.43 (2.73, 4.29)	2.28 (1.82, 2.86)	1.46 (1.20, 1.78)	1.97 (1.60, 2.43)
Model 3						
Permanent employees	1	1	1	1	1	1
Fixed-term employees	0.97 (0.75, 1.26)	0.98 (0.81, 1.19)	0.89 (0.67, 1.17)	0.85 (0.68, 1.05)	1.11 (0.96, 1.29)	0.99 (0.83, 1.18)
Atypical employees	1.34 (0.97, 1.86)	1.33 (1.02, 1.73)	1.41 (1.01, 1.97)	1.28 (0.91, 1.81)	1.38 (1.06, 1.75)	1.50 (1.13, 1.99)
Compensation-income unemployed	1.06 (0.75, 1.50)	1.45 (1.07, 1.95)	2.09 (1.50, 2.92)	1.28 (1.02, 1.62)	1.07 (0.89, 1.30)	1.42 (1.14, 1.76)
Subsidy unemployed	1.42 (0.87, 2.32)	1.10 (0.71, 1.69)	2.13 (1.33, 3.42)	1.66 (1.17, 2.33)	1.46 (1.08, 1.97)	0.98 (0.69, 1.39)
Low-income unemployed	2.38 (1.89, 3.00)	1.95 (1.57, 2.44)	3.43 (2.73, 4.33)	2.31 (1.84, 2.89)	1.48 (1.21, 1.81)	1.99 (1.61, 2.46)

Model 1: Adjusted for age.

Model 2: Adjusted for age and demographics (marital status, socioeconomic status).

Model 3: Adjusted for age, demographics, health risk behaviours (overweight, smoking, alcohol) and psychosocial factors (social network, optimism).

unemployed receiving only basic daily allowance, on the other. The findings could not be attributed to differences in risk behaviour or psychosocial factors between labour market statuses.

Health differences among the non-permanent employees

Our findings are in line with an earlier investigation among Finnish municipal employees,¹⁵ which showed that fixed-term employees may have the same or fewer health problems than permanent employees. These results may indicate health-based selection in recruitment into fixed-term employment, although the healthiest fixed-term employees seem to be recruited into permanent posts.²⁵ We cannot rule out the possible health damaging effects of long lasting fixed-term employment either. Rather, the result raises questions about well-being and health during the processes of entries into and exits from fixed-term and other non-standard jobs.

The health difference observed between fixed-term and atypical employees gives reason to argue that the health effects of precarious employment depend upon stability of the formal contract. All the multiple employment situations defined here as 'atypical' share in common relatively poor security, both with respect to job features and to job loss. Health-related selection into atypical jobs, both from fixed-term posts and from unemployment, may also contribute to health differentials. The majority of the non-permanent employees had relatively well regulated fixed-term contracts, and the more atypical contracts were rare. Leaving aside the evident socioeconomic advantages, this feature of the Finnish working life also seems to have health-related advantages.

Health differences among the unemployed

Although this study was carried out in a country with relatively high income replacement for the unemployed,^{34,35} psychosocial factors did not contribute to the association between unemployment and health. Instead of treating the unemployed as a single group or using a duration-based measure of unemployment, we distinguished between unemployed using income-based compensation, subsidized income, and fixed basic daily allowance, a measure sensitive to income differentials. The health effects of unemployment were strongest for those with greatest material disadvantage (unemployed with basic allowance). These findings are in line with the hypothesis of financial strain as a major source of poor health among the unemployed.³⁶

In this study it is not possible to distinguish between causal and selective processes in the association between unemployment and health. Nonetheless, the fact that the subsidy and compensation-income unemployed are in relatively good health gives grounds to underline the importance of employment and social policy measures. The impacts of these measures are most clearly apparent with respect to depression, and particularly the non-elevated depression rates among women in subsidized work. This may also indicate a gender difference in the mental health promoting effect of these re-employment programmes. A recent study in the US showed a corresponding association with government entitlement benefits.³⁷ It seems that the 'interruption' of unemployment less effectively alleviates the socioeconomic and psychological impact of unemployment among men. All in all, the highly significant gender difference in the association between unemployment and depression may indicate

that men's values are mainly work-oriented, while women may attach more importance to family and other spheres of life.

Our results showed poorest mental health in the long-term low-income unemployed. These findings, based on a dichotomized variable derived from Beck's Depression Inventory, were confirmed by using a sum score measure. For instance, in permanently employed men the estimated marginal mean, adjusted as model 2 in Table 2, was 4.93 (95% CI: 4.64, 5.21), while the respective figure in the low-income unemployed men was 9.47 (95% CI: 8.64, 10.30). Many prior studies on unemployment and mental health have applied the General Health Questionnaire (GHQ)³⁸ and found that the difference in psychological distress between the employed and unemployed partially wore off as the unemployment lengthened.³⁶ A potential explanation for the contradictory findings might be that the GHQ measure, in contrast to the BDI, assesses 'recent' experiences, and indicates, in addition to depression, also other aspects of mental well-being, e.g. anxiety and social dysfunction.

Most participants in the subsidized re-employment programmes come from the low-income unemployed group, which also comprises individuals who are unable to work even as subsidized employees.³⁹ Health-related selection mechanisms may also operate for entering re-employment programmes, as the odds for physician-diagnosed disease among subsidized men were relatively low. On the other hand, their 'paradoxically' high odds for poor self-rated health may reflect a situation where working in the subsidy programme after unemployment may reveal defects in participants' functional capacity that furthermore affect their health perceptions.⁴⁰

The basic allowance provides for no more than a minimal subsistence income, and there are more recipients of this type of allowance than those who receive compensation-income benefits among the Finnish unemployed. Thus, the high prevalence of mental health problems seen in the former group is an alarming finding (e.g. 48% of the age group 40–44 years were trapped in Beck's depression screen). The question of whether the high odds for disease is due to previous labour market disadvantages and occupational hazards rather than actual unemployment needs to be approached with longitudinal data in future studies. The 5-year follow-up data collected by the Health and Social Support project in 2003 will give opportunities to study the predictive associations of various labour market trajectories with employee health and well-being.

Methodology

The spectrum of employment statuses among the participants in this study represents quite well the respective groups in the Finnish labour force in 1998.²¹ Although not very high, the response rate in the initial survey of the HeSSup yielded enough responses for the analyses of the present study. Variations in the response rate according to labour market status or health may cause bias in comparison (e.g. depression causing more non-response among the long-term unemployed than among the permanently employed). However, the expected finding of poor health among the unemployed suggests that there is no major selection bias. Moreover, the consistent findings made across the whole range of outcomes—'self-rated health' which incorporates a variety of physical, emotional and personal components, 'diseases' which are an indicator of permanent health problems, and the BDI which reflects poor mental health more sensitively than the question about diagnosed psychiatric diseases—may be interpreted as lending support to the reliability of the comparative setting.

Conclusion

The significance of the macroeconomic context needs to be re-emphasized. Our study was carried out in a post-industrial labour market characterized by high unemployment, rapid economic growth, and increasing non-permanent employment. The results show that unemployment remains the major correlate of poor health in the workforce, but future research concerning working age people should also take into account the widening spectrum of employment situations and health inequalities within the workforce. Longitudinal designs are needed not only to describe the direction of effects, but also to provide evidence on the health promoting 'side effects' of employment policy measures, particularly the measures targeted at the most peripheral and disadvantaged members of the work force.

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KEY MESSAGES

- The health difference seen between employed and unemployed populations is also apparent during periods of concurrent rapid economic growth and relatively high unemployment.
- Both within the employed and within the unemployed, more peripheral labour market status indicates greater health problems.
- The labour market statuses of the employed and the unemployed should be defined in more detail in research as well as in planning employment and welfare policies.

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Social capital in working life and the health of employees

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Abstract

It is commonly assumed that social capital influences health, but only few studies have examined this hypothesis in the context of the workplace. The present prospective cohort study of 6028 public sector employees in Finland investigated social capital as a workplace characteristic which potentially affects employee health. The two indicators of social capital were trust in the labour market, measured by security of the employment contract, and trust in co-worker support. Self-rated health status and psychological distress were used as indicators of health. The combination of subsidised job contract and low co-worker support (i.e. the lowest category of social capital) was associated with poorer health prospects than the combination of permanent employment and high support (the highest social capital category) in an age-adjusted model, but this association disappeared in logistic regression analysis adjusted by sociodemographic background factors and baseline health. Fixed-term employment predicted better self-rated health and less psychological distress when compared with permanent employment. Co-worker support was most common in permanent and least common in subsidised employees and it was associated with better self-rated health in women. Our findings suggest only partial support for the hypothesis of work-related social capital as a health resource.

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Keywords: Social capital; Public sector employees; Non-permanent employment; Co-worker support; Self-rated health; Finland

Introduction

Social capital is a useful concept in explaining and understanding the international and inter-organisational variation in productivity and the quality of working life. It is commonly assumed that industries benefit from social capital because it facilitates co-operation and co-ordination. Can social capital also be considered a characteristic of the social collectivity in the workplace, which affects employee health?

The roots of social capital can be traced back to the classics of sociology, for instance Durkheim's ideas about social integration, alienation and anomie (Berkman, Glass, Brissette, & Seeman, 2000). The concept in its modern sense has been defined by Pierre Bourdieu and James Coleman, who have both described social capital as an individual feature. Bourdieu (1985, p. 248) describes social capital as "... the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance or recognition"; Coleman (1990, p. 302), for his part, writes: "It is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within

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the structure". More recently, Putnam (1993, p. 167) has elaborated upon Coleman's definition, but he emphasises the character of social capital as a community level resource. Putnam defines social capital as "... features of social organisations such as networks, norms, and social trust that facilitate co-ordination and co-operation for mutual benefit".

Differences in the way that social capital is conceptualised leads to discrepancies in how it is analysed and measured (Lochner, Kawachi, & Kennedy, 1999; Macinko & Starfield, 2001; Australian Bureau of Statistics, www.abs.gov.au; Office of National Statistics, www.statistics.gov.uk/social_capital; The World Bank Social Capital Thematic Group, www.worldbank.org/poverty/scapital). Some researchers take the position that social capital should be measured at community level, because it is a feature of the social structure (Lochner, Kawachi, & Kennedy, 1999). Several other researchers are in favour of an individual level analysis. Brehm and Rahn (1997), for instance, argue that social capital is manifested in the attributes and activities of individuals. In empirical research social capital has been measured mainly by individual level questions and statistics. Some articles do articulate the sources and consequences of social capital (Ruuskanen, 2001; Adler & Kwon, 2002), but there is no consistent conceptual framework for clarifying the methods of empirical research.

Putnam (2000) has argued that social capital may in theory have psychological and biological influences that promote people's health and improve the quality of life. In the field of empirical health research, studies from the USA (Kawachi & Kennedy, 1997a; Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997b; Kawachi, Kennedy, & Glass, 1999) have shown that increased mortality and poor self-rated health are associated with low social capital as measured by membership of groups, civic trust and helpfulness of others. There is some evidence for a positive association between social capital and good health (Veenstra, 2000). In particular, meeting socially with workmates and attendance of religious services is associated with better self-rated health. Veenstra's more recent study Veenstra (2002) revealed an inverse relationship between social capital and high mortality rate. In a Finnish study (Hyyppä, & Mäki, 2001a) carried out in one of the country's bilingual regions, a mortality difference was found between Swedish-speakers and Finnish-speakers. The higher mortality observed among the latter group was attributed to their lower level of social capital. Moreover, Hyyppä and Mäki (2001b) found that social capital—measured in terms of auxiliary friends and religious participation—was associated with good self-rated health. In a study among Russians, Rose (2000) found that social capital correlated positively with good self-reported physical and emotional health. In 2001, Macinko and Starfield

counted 10 empirical studies and 24 comments and theoretical texts on social capital and health. Since then the body of empirical research has continued to grow (e.g. Lochner, Kawachi, Brennan, & Buka, 2003), but more questions still remain open than have been answered.

Suspicion that social capital may be dwindling in Western societies has been voiced in particular by Putnam (1995, 1996), who demonstrated that the degree to which Americans trust each others has declined by about one-third since 1972. This may largely be attributed to changes sweeping the workplace and a related corrosion of social trust (Sennett, 1998). Factory closures, downsizing, outsourcing and re-engineering not only disrupt social ties, but also at the labour market level these trends manifest in the increasing jobless rate. Moreover, atypical employment has become more common. According to a survey in 15 European Union countries in 1995–1996, 15% of all employees are engaged in precarious jobs (Benavides, Benach, Diez-Roux, & Roman, 2000). The situation is similar in Finland, where this study was conducted: here 15% of women and 10% of men worked in non-permanent jobs in 1993, by 1997 the figures had risen to 21% and 16% (Sutela, Vänskä, & Notkola, 2001). The changes that are going on within the national labour market structure require ever-greater flexibility on the part of employees. This development is obviously detrimental to the accumulation of social capital.

Social capital at the labour market level may be conceptualised as an element of labour market citizenship, or social contracts concerning working life (Suikkanen & Viinamäki, 1999). These contracts have become increasingly vague in Western societies since the end of the 20th century. Permanent contracts, which offer relatively secure employment, both in the light of labour market statistics (Parjanne, 1998) and in terms of perceived security (Virtanen, Vahtera, Kivimäki, Pentti, & Ferrie, 2002), have become less common. Moreover, mass redundancies and precarious employment arrangements reduce collective trust in social justice and reciprocity in the labour market (Siegrist, 2001). On the other hand the intensification of working life makes it harder for people to maintain contact with family and friends, which increases the relative importance of the workplace as source of social capital. In all, these trends in development raise important questions about working life as source of social capital, and consequently as source of health and well-being.

There is an abundance of research into individual level job insecurity and health, and the results point at an association with low psychosocial well-being in the form of stress, psychosomatic disorders, work exhaustion, sickness absence and work dissatisfaction (Heaney, Israel, & House, 1994; Ferrie, Shipley, Marmot, Stansfeld, & Smith, 1995; Kivimäki et al., 1997;

Levenstein, Smith, & Kaplan, 2001) at least among permanent employees. In contrast, there is very little respective research among non-permanent employees. Our recent study showed higher psychological distress but better general health (as assessed in terms of self-rated health and the prevalence of diseases) for fixed-term employees than their permanent counterparts (Virtanen et al., 2002). Besides giving cause to discuss causal associations and health-related selection, these results provided a baseline for a longitudinal analysis. Once we had collected the follow-up data, we chose to ground our empirical analysis on the concept of social capital.

Social trust (which is also described as civic trust and interpersonal trust) is commonly included in the empirical measurement of social capital. It is often reported as the percentage of those who agree with the statement, “Most people can be trusted”. Social trust is one of the measures included in the index constructed by Putnam (2000), and the questionnaire developed by The World Bank Social Capital Thematic Group in 2002 (www.worldbank.org/poverty/scapital/index.htm) also includes the question, “Would you say that most people can be trusted or that you can’t be too careful in dealing with people?” The Social Support Questionnaire (Sarason, Levine, Basham, & Sarason, 1983) is one of the established methods in assessing how confident people feel that they will receive social support. Sample items of the questionnaire are “Whom can you really count on to help you feel more relaxed when you are under pressure or tension?” and “Whom can you really count on to care about you regardless of what is happening to you?” The words “really count on” refer to quite a strong sense of confidence and the word “whom” to interpersonal social contact. Although Sarason et al. do not use the concept of social capital, the measurement of trust in the Social Support Questionnaire quite evidently comprises a crucial constituent of social capital. We may reasonably assume then that this instrument can help us measure social capital. Although it can be argued that it lacks in diversity, our choice can be defended by reference to the arguments of Macinko and Starfield (2001, p. 113), who recommend the use of conceptually clear measures, “such as interpersonal trust and membership in groups, without grouping them together as representing a concept that has little or no demonstrated internal consistency or reliability”.

The association between social relationships and health is well demonstrated. Significant milestones include the studies by Cassel (1976) and Cobb (1976), which established the concept of social support as a theoretical and empirical tool. Prospective studies which controlled for baseline health status, consistently showed an increased risk in morbidity and mortality among persons with a low quantity, and sometimes low quality, of social relationships (Berkman & Syme, 1979;

House, Landis, & Umberson, 1988; Stansfeld, Rael, Head, Shipley, & Marmot, 1997; Stansfeld, Fuhrer, & Shipley, 1998). Today it is possible to view this research tradition in the context of social capital, even though there are also more recent studies, which do not apply the concept. For example, a Swedish study (Bygren, Konlaan, & Johansson, 1996) found that attendance at cultural events may have a positive impact on survival. A corresponding finding was reported in a Norwegian study (Dalgard & Håheim, 1998) for social participation. Furthermore, Rietschlin (1998) discovered that voluntary association membership was related to reduced psychological distress.

Besides family, work is an essential part of everyday life. Our aim in this study is to explore the positive influences of the working community within the theory of social capital. It is obvious that exclusion from the workforce limits the individual’s opportunities to enrich his or her social capital, particularly if there is nothing else to compensate for the lack, such as volunteer work. Or, adding just a few extra words to Bourdieu’s definition cited above: “Workplace social capital is the aggregate of the actual or potential resources *in the workplace and the labour market* which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance or recognition”.

This study focuses on social capital in working life. We study how employment security, or trust to labour market, and trust to co-worker support affect the health of an employee. After studying the associations separately, we study these two sources of social capital in combination. Our hypothesis is that the combination of low employment security with a low level of co-worker support is associated with the most adverse effects on health.

Material and methods

Participants

This study was carried out in eight Finnish towns involved in two ongoing cohort studies, the 10-Town Study and the Temporaries in Municipal Jobs Study (TMJ Study), both investigating the relationships between behavioural and psychosocial factors and health among municipal employees. In the 10-Town Study we sent out a questionnaire to all full-time permanent employees who were at work at the time of survey in the eight towns participating in the study in 1997 (for the three largest towns, a random sample of about 1500 employees was used). A total of 6442 full-time municipal employees replied to the initial survey, with a response rate of 67%. After exclusion of the respondents who said they worked on a non-permanent

contract ($n = 461$), the cohort of this study consisted of 5981 permanent employees. The respective survey was carried out among all employees of the same towns who in November 1997 had a non-permanent job contract. This survey (response rate 57%) yielded 2194 participants who reported having a fixed-term contract, i.e. their contract expired at a given point of time because of substitution or “for some other reason”, and 682 subsidised employees, i.e. men and women who had been out of work for more than 12 months and who were now on a 6–10-month work contract funded through a government programme to support and enhance the work ability of the long-term unemployed.

In 2001 a follow-up survey was sent out to those 4930 permanent respondents who were still employed in the municipal sector. The exit group of 1051 employees consisted of those who had died or retired because of age or illness, but mainly of those who had moved to another workplace. Thus, the participants of the follow-up survey represented personnel with an established status in their working communities. The TMJ follow-up survey was sent in 2002 to those 2693 respondents of the initial survey whose addresses were found from the population register. These follow-up surveys yielded the cohort of the present study, which consisted of 3998 established permanent employees (response rate 81%), 1563 employees with initially a fixed-term contract (response rate 76%), and 467 initially subsidised employees (response rate 73%).

Measurement of social capital at work

Indices of social capital were employment security and social support. The former was assessed on the basis of the stability attributed to the type of employment contract at the baseline survey. A permanent contract was considered to be indicative of a high level of employment security, a fixed-term contract of moderate and a subsidised contract of a low level of employment security.

Social support was assessed on the basis of the short version of the Social Support Questionnaire (Sarason, Sarason, Shearin, & Pierce, 1987), a valid and reliable measure of social support (Sarason et al., 1983) established in studies concerning health in working life (Kivimäki et al., 1997). The instrument includes six items, identifying spouse, other relative, friend, co-worker and someone else as possible sources of social support. Social contact was defined as a source of support if the respondent chose it in one or more items. The dichotomous variable (whether or not the respondent mentioned the source) was used as the indicator of support from each of the five sources. Heterogeneity of the social network was measured with the number of different sources of support and categorised into low (0–

1 sources), intermediate (2–3 sources) and high (4–5 sources) heterogeneity.

The two sources of social capital at work were combined into the three class variable of ‘social job capital’, defined as ‘high’ for permanent employees getting co-worker support, ‘low’ for subsidised employees not getting such support, and ‘intermediate’ for the rest of the respondents.

Health indicators

Two dichotomous variables describing the respondents’ health were constructed. Self-rated health was the respondents’ overall assessment of their health on a 5-point scale (1 = poor, 2 = rather poor, 3 = average, 4 = rather good, 5 = good). The measure was dichotomised by grouping the response scores 1–3 into the category of poor self-rated health and scores 4–5 into the category of good self-rated health. Self-rated health has proved to be a well-validated and reliable measure of health status (Lundberg & Manderbacka, 1996; Manderbacka, Lahelma, & Martikainen, 1998).

Psychological distress was measured by the 12-item version of the General Health Questionnaire (Goldberg, 1972) in which respondents rate each of the 12 items on experienced symptoms (1 = not at all, 2 = the same as usual, 3 = rather more than usual or 4 = much more than usual). Those who rated 3 or 4 in at least four items of the total measure were identified as distressed. The General Health Questionnaire is a well-established screening measure for minor psychiatric morbidity (Goldberg et al., 1997).

Background variables

Data on the respondents’ occupations were derived from employers’ records, and four categories were defined on the basis of the International Standard Classification of Occupations (ISCO, Statistics Finland, 1997): professionals (ISCO titles 1–2), associate professionals (title 3), clerks (title 4) and manual workers (titles 5–9). Marital status was dichotomised on the basis of whether or not the respondent lived with a partner or spouse. Mean incomes for each occupation, separately for men and women, were obtained from Statistics Finland. Age was used as a continuous variable.

Statistical analysis

The chi-square test and *t*-test were used in describing the participants. Logistic regressions were used in analyses of the associations of employment type and social support with subsequent health, and the results were presented as odds ratios and their 95% confidence intervals. Three sequential regression models were used. In the first step, the associations with health were

studied by adjusting age. In the second step, the models were additionally adjusted for marital status, occupational status, income and baseline level of the health outcome in question. Adjustment for health at baseline provides interpretation for the associations between social capital and subsequent change in health (cf. Stansfeld et al., 1998). To study the independent effects of various types of social capital, the third step entered all predictors into the same model. The first and second steps were also used in the analysis of the associations of combined 'social job capital' with health. All the analyses were carried out separately for men and women, and interaction terms were applied to test whether the associations between measures of social

capital and health depended on gender. SPSS for Windows version 10.1 statistical software was used in the analyses.

Results

Description

Table 1 presents descriptive statistics for the participants. The gender distribution (80% women) corresponds closely to that found in Finnish municipalities (Statistics Finland, 2000). Permanent employment was associated with high mean age and a high probability of

Table 1
Descriptive statistics of the participants ($N = 6028$)

	All	Employment type			<i>p</i> -value
		Permanent	Fixed-term	Subsidised	
<i>Women</i>	$N = 4800$	$N = 3123$	$N = 1306$	$N = 371$	
Age (mean (SD))	42 (9.4)	45 (7.3)	36 (9.9)	38 (11.6)	<0.001
Married (%)	88	92	82	78	<0.001
Occupational status (%)					<0.001
Professionals	35	36	40	11	
Associate professionals	24	25	24	15	
Clerks	13	12	10	29	
Manual workers	28	27	26	45	
Social support (%)					
Spouse	75	77	75	62	<0.001
Relative	68	67	73	67	<0.001
Friend	67	64	76	69	<0.001
Co-worker	34	38	28	13	<0.001
Someone else	11	12	7	10	<0.001
Network heterogeneity					<0.001
High	18	20	16	7	
Intermediate	65	63	71	69	
Low	17	17	13	24	
<i>Men</i>	$N = 1228$	$N = 875$	$N = 257$	$N = 96$	
Age (mean (SD))	43 (9.3)	46 (7.6)	36 (9.8)	41 (11.2)	<0.001
Married (%)	86	92	76	62	<0.001
Occupational status (%)					<0.001
Professionals	40	41	50	4	
Associate professionals	17	17	16	15	
Clerks	5	3	10	21	
Manual workers	38	39	24	60	
Social support (%)					
Spouse	80	85	72	53	<0.001
Other relative	47	43	56	57	<0.001
Friend	48	44	60	55	<0.001
Co-worker	22	23	22	11	0.022
Someone else	12	12	13	13	0.845
Network heterogeneity					0.121
High	13	13	11	11	
Intermediate	50	49	58	49	
Low	37	38	31	40	

being married. No overall differences in occupational statuses were found between permanent and fixed-term employees. The proportion of manual jobs was higher in subsidised employees than in other employment types.

Social support according to employment type

The downward steps in co-worker support from permanent to subsidised employees were clear with the exception of permanently employed men, who did not differ from men in fixed-term employment (Table 1). There were also significant differences in getting support from spouse, relative, friend and—in women—someone else. Worth noting is the low level of co-worker support and network heterogeneity among subsidised employees. Six per cent of male subsidised employees reported that they did not have a single source of social support.

Employment and health

After adjustment for age, fixed-term women had better self-rated health and less psychological distress than permanent female employees (Tables 2 and 3). In fixed-term men, the odds ratios were also indicative of better health and lower distress, but the associations were not statistically significant. Adjustments for all background variables and baseline health as well as for social support caused only minor changes in the odds ratios. The non-significant result in men was probably due to the smaller number of men in the sample, as the association between type of employment contract and health did not depend on gender (p -value for interaction for self-rated health 0.903 and for psychological distress 0.153 in model 3). In subsidised employees the point estimates (in model 3) were similar to those we found for

Table 2

Odds ratios and 95% confidence intervals for poor self-rated health and psychological distress in follow-up survey in women according to employment type and social support

Type of social capital	Poor self-rated health			Psychological distress		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
<i>Employment contract</i>						
Permanent	1	1	1	1	1	1
Fixed-term	0.75 (0.63–0.89)	0.77 (0.63–0.93)	0.74 (0.61–0.90)	0.86 (0.73–1.01)	0.78 (0.65–0.92)	0.78 (0.65–0.93)
Subsidised	1.20 (0.94–1.54)	0.88 (0.65–1.18)	0.82 (0.61–1.11)	0.93 (0.72–1.19)	0.78 (0.59–1.03)	0.76 (0.58–1.01)
<i>Support from co-worker</i>						
Yes	1	1	1	1	1	1
No	1.24 (1.08–1.42)	1.13 (0.96–1.32)	1.12 (0.88–1.41)	1.00 (0.87–1.14)	0.93 (0.81–1.08)	0.87 (0.70–1.07)
<i>Support from spouse</i>						
Yes	1	1	1	1	1	1
No	1.34 (1.16–1.55)	1.14 (0.95–1.38)	1.09 (0.86–1.39)	1.25 (1.08–1.44)	1.15 (0.97–1.37)	1.06 (0.85–1.33)
<i>Support from relative</i>						
Yes	1	1	1	1	1	1
No	1.02 (0.89–1.16)	0.98 (0.83–1.15)	0.94 (0.74–1.18)	1.12 (0.98–1.29)	1.10 (0.95–1.27)	1.01 (0.82–1.25)
<i>Support from friend</i>						
Yes	1	1	1	1	1	1
No	1.07 (0.94–1.23)	0.99 (0.84–1.16)	0.93 (0.75–1.17)	1.01 (0.88–1.16)	1.00 (0.86–1.16)	0.90 (0.73–1.11)
<i>Support from someone else</i>						
Yes	1	1	1	1	1	1
No	0.95 (0.78–1.16)	0.97 (0.77–1.22)	0.94 (0.71–1.24)	0.83 (0.68–1.01)	0.82 (0.68–1.01)	0.78 (0.60–1.00)
<i>Network heterogeneity</i>						
High	1	1	1	1	1	1
Intermediate	1.40 (1.13–1.74)	1.15 (0.90–1.48)	1.19 (0.66–2.17)	1.21 (0.98–1.51)	1.10 (0.87–1.38)	1.48 (0.86–2.56)
Low	1.22 (1.03–1.46)	1.13 (0.92–1.38)	1.12 (0.79–1.58)	1.08 (0.91–1.29)	0.97 (0.81–1.16)	1.17 (0.86–1.61)

Model 1: adjusted for age; Model 2: adjusted for age, marital status, occupational status, income and baseline level of the health outcome in question; Model 3: adjusted for variables in model 2 and according to employment type for social support variables and according to social support for employment type and the other social support variables.

Table 3

Odds ratios and 95% confidence intervals for poor self-rated health and psychological distress in follow-up survey in men according to employment type and social support

Type of social capital	Poor self-rated health			Psychological distress		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
<i>Employment contract</i>						
Permanent	1	1	1	1	1	1
Fixed-term	0.76 (0.53–1.09)	0.69 (0.44–1.08)	0.69 (0.43–1.09)	0.73 (0.50–1.05)	0.66 (0.43–1.02)	0.67 (0.43–1.04)
Subsidised	1.24 (0.78–1.96)	0.79 (0.43–1.46)	0.75 (0.40–1.40)	1.19 (0.74–1.90)	1.26 (0.71–2.24)	1.30 (0.72–2.35)
<i>Support from co-worker</i>						
Yes	1	1	1	1	1	1
No	0.97 (0.72–1.31)	1.00 (0.69–1.43)	1.14 (0.66–1.97)	0.96 (0.70–1.32)	1.00 (0.71–1.41)	1.26 (0.76–2.08)
<i>Support from spouse</i>						
Yes	1	1	1	1	1	1
No	1.44 (1.06–1.96)	1.30 (0.83–2.05)	1.48 (0.81–2.67)	1.45 (1.06–1.99)	1.20 (0.78–1.83)	1.80 (1.03–3.14)
<i>Support from relative</i>						
Yes	1	1	1	1	1	1
No	1.11 (0.86–1.43)	1.07 (0.78–1.45)	1.10 (0.65–1.89)	1.19 (0.91–1.55)	1.17 (0.87–1.58)	1.80 (1.08–2.99)
<i>Support from friend</i>						
Yes	1	1	1	1	1	1
No	1.13 (0.87–1.45)	0.99 (0.73–1.35)	0.98 (0.59–1.64)	1.09 (0.84–1.42)	1.11 (0.83–1.49)	1.63 (0.99–2.66)
<i>Support from someone else</i>						
Yes	1	1	1	1	1	1
No	1.06 (0.72–1.57)	1.08 (0.67–1.73)	1.19 (0.65–2.19)	0.66 (0.45–0.96)	0.82 (0.53–1.26)	1.15 (0.65–2.04)
<i>Network heterogeneity</i>						
High	1	1	1	1	1	1
Intermediate	1.17 (0.78–1.76)	0.97 (0.60–1.56)	0.73 (0.18–2.90)	1.13 (0.71–1.73)	1.00 (0.62–1.61)	0.29 (0.08–1.06)
Low	0.92 (0.62–1.36)	0.73 (0.46–1.16)	0.60 (0.25–1.42)	1.20 (0.79–1.83)	1.01 (0.64–1.59)	0.54 (0.24–1.24)

Model 1: adjusted for age; Model 2: adjusted for age, marital status, occupational status, income and baseline level of the health outcome in question; Model 3: adjusted for variables in model 2 and according to employment type for social support variables and according to social support for employment type and the other social support variables.

fixed-term female employees (for self-rated health and psychological distress) and for fixed-term male employees (for health), but these did not reach statistical significance.

Social support and health

In women (Table 2), spousal support and co-worker support were associated with better self-rated health, but no associations were seen between support from relative, friend or someone else and self-rated health in the age-adjusted model. After adjustment for age there was also an association between high network heterogeneity and good self-rated health. In the respective model spousal support was associated with a low risk of psychological distress. When adjustments were made for all background variables and baseline health

as well as for employment type and social support variables, the associations became insignificant in women. In men (Table 3), the spouse was the only source of support that was positively associated with self-rated health but only in the age-adjusted model. Spousal support was also negatively associated with psychological distress. Moreover, there were two significant findings in men: support from relative was associated with a low risk of psychological distress (model 3) and support from someone else was associated with a high risk of psychological distress (model 1). The association between co-worker support and health did not depend on employment type (with respect to self-rated health, the *p*-value for interaction was for women 0.803 and for men 0.357 in model 3, and with respect to psychological distress 0.654 and 0.320, respectively).

Social job capital and health

Finally, we analysed the effect of combined social job capital on health using the variable which combines the type of employment contract and co-worker support into a three level measure as presented in the methods. As indicated by the odds ratios in Table 4, the associations were insignificant except in one case: compared with a high level, a low level of social job capital was associated with poor self-rated health in the age-adjusted model in women.

Discussion

The aim of this study was to articulate the work-related sources of social capital and their relationship to health of employees in a longitudinal setting. We used two measurements, i.e. employment type and co-worker support, and combined them into a variable indicating the amount of 'social job capital'. The results supported our hypothesis that a low level of 'social job capital' is associated with poor health only in the age-adjusted model in women. When baseline health differences and other background variables were taken into account, the associations were insignificant both in women and in men. Health behaviours were not controlled for in this study; on the basis of another Finnish study (Virtanen, Liukkonen, Vahtera, Kivimäki, & Koskenvuo, 2003) in the same years, we know that there are only minor differences in these behaviours according to labour market status.

As expected, the descriptive data on the constituents of perceived social support showed that subsidised employees received co-worker support least often. This

finding is obviously explained by the preceding and to a great extent by the future prospect of unemployment (Aho, Halme, & Nätti, 1999), as well as by the short duration of the subsidy contract. On the other hand, subsidy programmes may for several participants give an opportunity to extend their support network as a desired 'side effect', i.e. they may also be part of 'active social policy' which not only aims to maintain the employability of the marginalising work force, but also to keep the long-term unemployed integrated into society in general (Hvinden, Heikkilä, & Kankare, 2001).

Our results are in line with earlier evidence (Gore & Colten, 1991) that women compared to men have a more heterogeneous social network and benefit from the existing network more often. This was reflected in the high scores recorded for support from friends and relatives, as well as the fact that heterogeneous networks and high support from co-workers were preventive of health problems in women only (age-adjusted model). Support from the spouse was, however, equally important for health in men and women (*p*-value for interaction for self-rated health 0.975 and for psychological distress 0.459 in model 3), although in the fully adjusted model spousal support was significantly associated with a low risk of psychological distress only in men.

Fixed-term employment, a prerequisite for moderate contractual security, predicted better self-rated health and less psychological distress when compared with permanent, i.e. contractually secure employment. Our longitudinal results are in line with a cross-sectional analysis of the initial survey (Virtanen et al., 2002) which found that fixed-term employees had better self-rated health than permanent employees. Psychological

Table 4

Odds ratios and 95% confidence intervals for poor self-rated health and psychological distress in follow-up survey in women and men according to social job capital^a

Social job capital	Poor self-rated health		Psychological distress	
	Model 1	Model 2	Model 1	Model 2
<i>Women</i>				
High	1	1	1	1
Intermediate	1.11 (0.96–1.29)	1.04 (0.87–1.23)	0.99 (0.85–1.15)	0.91 (0.78–1.07)
Low	1.44 (1.09–1.90)	0.96 (0.69–1.35)	0.93 (0.70–1.24)	0.75 (0.55–1.02)
<i>Men</i>				
High	1	1	1	1
Intermediate	0.90 (0.65–1.26)	0.86 (0.58–1.28)	0.99 (0.69–1.41)	0.97 (0.66–1.42)
Low	1.15 (0.66–2.00)	0.92 (0.45–1.88)	1.32 (0.75–2.34)	1.58 (0.80–3.11)

Model 1: adjusted for age; Model 2: adjusted for age, marital status, occupational status, income and baseline level of the health outcome in question.

^aSocial job capital was defined as 'high' for permanent employees getting co-worker support, as 'low' for subsidised employees not getting such support, and as 'intermediate' for the rest of the respondents.

distress showed a different pattern: the results were reversed from the initial survey, which indicated higher distress in fixed-term employees. Among subsidised employees, corresponding changes from the initial to the follow-up survey were seen in women, but not in men.

Sample attrition and health-related selection are common causes for biased results in epidemiological studies. One may suspect then that psychological distress might be differently associated with non-response in permanent and fixed-term women. However, this is an unlikely source of bias in the present study, as the percentages of distressed respondents and non-respondents in fixed-term women were 28% and 32%, and in permanent women 23% and 25%, respectively. An alternative explanation for the better self-rated health observed for fixed-term employees relates to response style. Non-permanent employees may be more reluctant to report health problems, in spite of assurances of confidentiality. We also checked the possible health-related loss-to-follow-up: the figures for permanent employees (prevalence of poor health 32.8% initially and 31.0% at follow-up, and distress 25.1% and 23.6%, respectively) and non-permanent employees (prevalence of poor health 20.5% initially and 20.4% at follow-up, and distress 28.8% and 28.3%, respectively) show that there is no major bias due to the different loss rates in the cohorts. Neither was the loss-to-follow-up related to co-worker support (percentages for permanent employees 33.7 and 34.4, and for non-permanent 23.7 and 23.4).

This longitudinal study allows us to look into the potential causal associations. It seems that high co-worker support and moderate employment security contribute to better health, particularly in women. Our results also suggest that during the study period permanent employment was a marker of some factors that are associated with deterioration of health. On the other hand, at least four longitudinal studies have reported temporary employment as a marker of an increased health risk, as indicated by poor self-rated health, incidence of work-related musculoskeletal disorders and mortality due to external causes, smoking-related cancer and alcohol-related causes (Rodriguez, 2002; Silverstein, Welp, Nelson, & Kalat, 1998; Silverstein, Viikari-Juntura, & Kalat, 2002; Kivimäki et al., 2003). However, none of these studies have taken into account the cumulative exposure of individuals to different types of employment during their work careers. In the present study, we know that the proportion of fixed-term personnel increased rather than decreased during the follow-up years (Kivimäki, Vahtera, Virtanen, et al., 2003), but also that the follow-up period was preceded by a sharp reduction in the number of fixed-term employees (Vahtera, Kivimäki, & Pentti, 1997). Health-related

selection in temporary employees and the wearing off of such selection in permanent employees are probable explanations for the relatively positive development of their health. Health selection, a process in which healthy people are more likely to move up the hierarchy is recognised as an explanation for the re-entry into work of the unemployed (Bartley & Owen, 1996; Claussen, Björndal, & Hjort, 1993). Also the fact that fixed-term employees were quite well placed to get a new contract, may partly explain the relatively positive development of their health. Moreover, the growing number of fixed-term personnel probably means an increased workload and responsibilities for permanent employees, who may also have suffered more from the general intensification of work in the public sector than their non-permanent fellow workers. All in all, there is reason to suspect that growing staff heterogeneity, in our case permanent, fixed-term and subsidised municipal employees, presents a risk for the optimal development of social job capital. The situation in the private sector may well be different, where cyclical fluctuations are more immediately reflected in the staff composition and working conditions.

Spousal support emerged very clearly and prominently in both genders as a strong predictor of both low psychological distress and good self-rated health. In women, a significant association was also seen between co-worker support and good self-rated health, indicating that support from co-workers can indeed be important to well being. However when all background variables and baseline health were added to the statistical models, these associations became insignificant. One possible explanation is the relatively short follow-up time. We were unable in this study to look separately at supervisor support and co-worker support because no such distinction is made in the Social Support Questionnaire. An earlier study has shown that fixed-term and subsidised employees report higher supervisor support than permanent employees (Saloniemi, Virtanen, & Koivisto, 2002). It is possible that this support partly compensates for the lack of social support from co-workers as a source of social capital. Friend or relative support, which were more common than co-worker support, did not predict good health outcomes even in the baseline regression model.

The above results go to show that employment type and support from co-workers are relevant correlates of health, but does the analysis also justify their use as indicators of social capital? Discussions and definitions of social capital frequently refer to social networks and support, reciprocity and trust, which are available in the community concerned. However, the characteristics studied are predominantly quantitative (such as network size and frequency of contacts) rather than reflecting subjective meanings of the relationships. Qualitative aspects seem to appear mainly in health-related

studies, which also have separate questions about civic trust, helpfulness of others, or auxiliary friends. The Social Support Questionnaire that we applied in this study measures the quality of different relationships in a methodologically standardised, valid and reliable way. As we have argued above, it assesses the trust of individuals in one another. From this point of view trust, as measured in this study, may be seen as an indicator which provides a relevant reflection of social capital in the case of co-worker relations. Employment type, on the other hand, may be considered an element of trust in one's status as labour market citizen.

When one reviews the theoretical and empirical research on social capital from the perspective of work life research, the workplace appears mainly as a source of potential friends or a field for acquiring useful connections, not as a community that is able to contribute as such to employees' social capital. For example, the Integrated Questionnaire for the Measurement of Social Capital (The World Bank Group) refers to "business or work associates" only as possible sources of information. However, the importance of work is clearly indicated among others by Veenstra (2000), who shows that the frequency of socialisation with workmates is associated with better self-rated health, whereas no respective association is seen for socialisation with family members or friends. Veenstra's study, as indeed almost all research on social capital and health, is based on a cross-sectional design.

There is a lack of longitudinal research on social job capital and health in general and in the field of working life in particular. The limitation of this study was that the cohorts comprised predominantly women working in the public sector. It is possible that a corresponding study would produce different results in the private sector, where the contractual and economic conditions of non-permanent employment are different. At the international level, generalisability is limited by differences in employment regulation and labour market situation. It would be important to replicate this study in different labour markets. Future research will also show whether such factors as job strain and other psychosocial working conditions and features of organisational development and culture mediate the effect of social job capital on health. Much more research is still needed to unravel the significance of the workplace as a constituent of social capital and consequent health.

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Appendix

The 6-Item Short Form of the Social Support Questionnaire (Sarason, Sarason, Shearin & Pierce, 1987).

- (1) Whom can you really count on to distract you from your worries when you feel under stress?
- (2) Whom can you really count on to help you feel more relaxed when you are under pressure or tension?
- (3) Who accepts you totally including both your worst and best points?
- (4) Whom can you really count on to care about you regardless of what is happening to you?
- (5) Whom can you really count on to help you feel better when you are feeling generally down-in-the-dumps?
- (6) Whom can you count on to console you when you are very upset?

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Labor Market Trajectories and Health: A Four-Year Follow-up Study of Initially Fixed-Term Employees

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With the growth of atypical employment, there is increasing concern about the potential health-damaging effects of unstable employment. This prospective study of Finnish public-sector employees in 1998–2002 examined labor market trajectories and changes in health. At entry, all participants had a fixed-term job contract. Trajectories were measured by exposure to unstable employment during follow-up, destination employment status at the end of follow-up, and the way in which these elements were combined. Nonoptimal self-rated health at baseline was associated with high exposure to unstable employment and unemployment as the destination. After adjustment for health and psychological distress at baseline, a trajectory with stable employment as the destination was associated with a decreased risk of psychological distress at follow-up (odds ratio = 0.68, 95% confidence interval: 0.46, 0.98), whereas a trajectory toward the labor market periphery was related to increased risk of nonoptimal health (odds ratio = 2.54, 95% confidence interval: 1.47, 4.39) when compared with remaining in fixed-term employment. A significant dose-response relation was seen between the measure combining exposure to instability with destination employment status and nonoptimal health. This longitudinal study provides evidence of health-related selection into employment trajectories and suggests that the trajectories themselves carry different health risks.

career mobility; employment; health; prospective studies; unemployment

A move toward flexible production is common to all Western economies. Organizations prepare to adapt to international and national changes in economic conditions by reducing the core staff and developing a temporary buffer workforce or by outsourcing parts of production to subcontractors. The instability of labor market structures has led to an increase in various nonpermanent job contracts (1). Employment in the peripheral labor market tends to be associated with socioeconomic adversities, such as income insecurity, low or no accumulation of pensions, and poor opportunities for promotion. The different formal job contracts also mean different psychological contracts regarding mutual rights and responsibilities in terms of employment

relations. Moreover, within the spectrum of nonpermanent employment arrangements, many other aspects of psychosocial working conditions and properties of the physical workplace environment vary.

The set of risks that endanger health and well-being differs between nonpermanent and permanent employees. The assumption that the risks associated with nonpermanent jobs may exceed the benefits has given rise to recent research concerning their potential adverse health effects. However, a body of cross-sectional research provides a rather inconsistent picture of this association (2–9). The few longitudinal studies mainly concern work-related illness: compared with those in permanent employees, occupational injuries are more

common (10, 11) or equal (12, 13) in nonpermanent employees, whereas their sickness absence rates are the same (4, 14) or lower (9, 15). A longitudinal study (16) has demonstrated poorer self-rated health in fixed-term employees in Germany but not in the United Kingdom. The latter finding has been replicated in a recent British study (17). A register-based prospective study from Finland has shown higher overall mortality in initially fixed-term employees (18).

In traditional labor markets, dominated by permanently employed men and their clear-cut periods of unemployment, atypical forms of employment were not a major research issue. In the new labor market, however, several sectors are occupied mainly by women, and it is in these areas that workers are expected to be the most flexible (19). This development, taking place in particular in the service industries of both the public and private sectors, means that women are the predominant gender in studies of atypical employment and its associations with well-being and health.

A previous cross-sectional study of Finnish public sector employees found that female fixed-term employees tend to rate their health as better than that of their co-workers with permanent jobs but to perceive higher levels of psychological distress (8). This subsample of women with initially fixed-term contracts formed the cohort that was followed up in the present study. Our aim was to examine whether their career trajectories, as characterized by variations in exposure to unstable employment and in labor market position at the end of the follow-up, were associated with health.

MATERIALS AND METHODS

Participants

This study was part of the ongoing Temporary Employees in Municipal Jobs Study of the employees of eight Finnish local government administrations. In a 1998 postal questionnaire survey of nonpermanent municipal employees (response rate, 61 percent), 1,791 full-time employed female participants reported having a fixed-term contract. "Fixed-term" in this context refers to jobs that contain a termination date as part of the contract. In 2002, the addresses of fixed-term employees were traced by using the Finnish population register, and a follow-up survey was mailed. Seven percent of the employees ($n = 121$) could not be located. Thus, the cohort of this study consisted of 1,670 female employees who initially had a fixed-term contract. Their response rate for the follow-up survey was 78 percent ($n = 1,306$). Compared with nonrespondents ($n = 364$), respondents were older (mean age 35.4 years vs. 33.7 years, $p = 0.002$) and more often had nonmanual occupations (74.0 percent vs. 70.6 percent, $p < 0.001$), but no difference was seen with respect to baseline self-rated health ($p = 0.330$) or psychological distress ($p = 0.157$).

Labor market trajectories

In the follow-up survey, respondents were asked to report their labor market situation at four points in time—January 1999, January 2000, January 2001, and the present (i.e., spring 2002). The preset response options for those working

or seeking a job were permanent employment (including entrepreneurship), fixed-term employment, and unemployment (including short-term employment on government-subsidized contracts). Situations outside the labor force were classified in the following four categories: family reasons (including maternity and child-care leave), studies, retirement, and "other." Retired participants ($n = 7$) were excluded. Otherwise, these situations were considered "temporary economic inactivity" and were recoded according to most recent employment status. In all, 1,246 respondents completed the question about labor market situation, and each of them was placed in the category of having a permanent job, having a fixed-term job, or being unemployed at each point of the follow-up time.

We described labor market trajectories according to "exposure" to unstable employment during follow-up, "destination" employment status at the end of follow-up, and a variable that combined exposure and destination. The *exposure* variable was constructed by giving permanent employment, fixed-term employment, and unemployment values of 0, 1, and 2, respectively, for each year from 1998 to 2002 inclusive and by adding the values to obtain a score (range, 1–9). Respondents receiving scores of 1–3 (lowest tertile) were classified as having "low" exposure, those with scores of 4 or 5 (middle tertile) "moderate" exposure, and those with scores of 6–9 (highest tertile) "high" exposure to unstable employment. *Destination* was classified on the basis of employment status at the end of follow-up in 2002: "permanent," "fixed-term," or "unemployed." *Combined mobility* comprised six categories formed as follows: the group of respondents with a permanent destination was split at the median of the exposure score (2/3) into those with low and high exposure. Corresponding dichotomization was made for respondents with a fixed-term destination (split value 5/6 exposure points) and for those who were unemployed (6/7 exposure points).

Health outcomes

Self-rated health was measured with a single question offering five options and was dichotomized into optimal (excellent or fairly good) and nonoptimal (average, fairly poor, or poor) in the standard manner (20). Psychological distress was assessed with the 12-item version of the General Health Questionnaire (21), and those respondents scoring more than three points were classified as suffering psychological distress.

Covariates

We measured gender, age, marital status, and occupation as baseline covariates. Marital status was dichotomized on the basis of whether the respondent was living with a partner at baseline. Occupations were classified according to the International Standard Classification of Occupations (ISCO) (22) into nonmanual (major groups 1–4) and manual (groups 5–9).

Statistical analysis

The effect of health at baseline on subsequent career development was assessed with multinomial logistic

regression analysis. To explore the association between labor market trajectories and self-rated health or psychological distress at follow-up, we used binary logistic regression. The reference categories were moderate exposure to unstable employment, fixed-term destination, and the combination of low exposure and fixed-term destination. Analyses were adjusted for age, marital status, and occupational status, and, additionally, to assess changes during follow-up in self-rated health and psychological distress, for the baseline value of the outcome of interest.

To study whether there were significant trends toward poorer health and higher distress in the more peripheral trajectories, we gave the destination variable values of 1 (permanent), 2 (fixed-term), and 3 (unemployment). Correspondingly, the exposure variable was given values of 1–3 and the combined trajectory values of from 1 (permanent with low exposure) to 6 (unemployment with high exposure). These values were treated as continuous variables in the regression analysis (23).

RESULTS

The percentage of permanently employed participants rose steadily during follow-up from 13 percent in 1999 to 45 percent in 2002. Respective proportions of those having fixed-term contracts fell from 78 percent to 33 percent. Unemployment was relatively rare (6 percent annually). The percentage of participants giving reasons for being outside the workforce rose from 4 percent to 17 percent, the most common reasons relating to family or study. Changes in marital status were small (the percentage of participants who were married rose from 72 percent to 76 percent during follow-up). Analysis by trajectory (table 1) showed that women with more peripheral trajectories were older and more often in manual occupations.

Health and labor market trajectory

The crude figures (table 1) showed that the associations between baseline psychological distress and subsequent labor market trajectory were small and inconsistent, whereas non-optimal self-rated health predicted a trajectory toward unstable employment. Multinomial logistic regression models, adjusted for age, occupational status, and marital status, showed that, compared with participants whose health was optimal, those whose health was nonoptimal at baseline had a higher risk of unemployment as a destination (odds ratio = 2.00, 95 percent confidence interval: 1.16, 3.43). Corresponding odds ratios were 1.82 (95 percent confidence interval: 1.14, 2.92) for high exposure to unstable employment and 2.66 (95 percent confidence interval: 1.34, 5.28) for the combination of high exposure and unemployment.

Labor market trajectory and changes in self-rated health

As shown in table 2, both ending up unemployed and having high exposure to unstable employment were associated with higher risk of nonoptimal health at follow-up than remaining in a fixed-term job and having moderate exposure

to instability. Those who achieved a permanent position and experienced high employment stability did not have a significantly decreased risk. However, an inverse association between greater employment instability and poorer health was found across all of the labor market trajectories. Adjustments for initial health confirmed that the observed health differences were not due to preexisting differences in ill health but to changes during follow-up.

Labor market trajectory and changes in psychological distress

With regard to psychological distress, only one finding was statistically significant: low exposure plus permanent employment at the end of follow-up was associated with low psychological distress (table 3). A significant trend was seen in the analysis of trajectories according to destination. The trend was close to statistical significance with respect to exposure trajectory but was nonsignificant in the cohorts defined by combined trajectory. Among the latter, however, a three-level structure was observed. The odds ratio for the combination of permanent employment and low exposure was significantly lower compared with that for the reference group, the odds ratios for the combinations of permanent employment and high exposure and of fixed-term employment and high exposure were quite close to those for the reference cohort, and the odds ratios for psychological distress experienced by the unemployed were relatively high irrespective of the amount of exposure.

DISCUSSION

This prospective cohort study explored mobility in the labor market and its association with self-rated health and psychological distress in employees who initially had fixed-term job contracts. We found that trajectories directed toward the periphery of the labor markets were associated with poorer health, whereas trajectories directed toward permanent employment were associated with better health. An earlier Finnish study of health inequalities in the labor market core-periphery structure has shown significant gradients in self-rated and mental health within the employed and within the unemployed groups (24). This study reveals some features of the mechanisms that lie behind these inequalities.

For practical and ethical reasons, genuine experiment is impossible in studies aiming to examine the health risks of potentially adverse social circumstances. Of observational designs, the prospective cohort study is the best for questions on the etiology of ill health. However, such a design cannot escape the issue of health-related selection. In our study, the methodology used to analyze the career trajectories drew on ideas from life-course models (25), although, as identified by Hallqvist et al. (26), disentangling accumulation of exposure- and outcome-related social mobility is problematic in such studies. Adjustment of the regression models for initial health diminishes the possibility of reverse causation (27), and controlling for both health and labor market status at baseline may be considered an essential strength of our design.

TABLE 1. Characteristics of participants at baseline according to trajectory in the labor market* during a 4-year follow-up, Temporary Employees in Municipal Jobs Study, Finland, 1998-2002†

	Trajectory by destination						Trajectory by exposure					
	Permanent contract (n = 607)		Fixed-term contract (n = 547)		Unemployment (n = 92)		Low exposure (n = 610)		Moderate exposure (n = 495)		High exposure (n = 141)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mean age (years)	35.3 (8.9)‡		34.5 (9.9)		37.6 (11.7)		35.2 (8.9)		34.4 (9.7)		37.6 (11.3)	
Marital status												
Married	499	82	435	80	75	82	499	82	397	81	113	80
Nonmarried	107	18	108	20	17	19	110	18	94	19	28	20
Occupational status												
Nonmanual	472	82	378	71	45	51	476	82	349	72	70	52
Manual	102	18	154	29	44	49	103	18	133	28	64	48
Self-rated health												
Optimal	516	87	446	82	68	74	518	86	406	83	106	75
Nonoptimal	87	14	96	18	24	26	88	15	84	17	35	25
GHQ§ caseness												
Noncase	438	72	382	70	67	73	436	72	355	72	96	68
Case	168	28	163	30	25	27	173	28	138	28	45	32
Combined trajectory												
	Permanent contract and low exposure (n = 285)		Permanent contract and high exposure (n = 322)		Fixed-term contract and low exposure (n = 502)		Fixed-term contract and high exposure (n = 45)		Unemployed and low exposure (n = 38)		Unemployed and high exposure (n = 54)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mean age (years)	36.1 (9.3)		34.6 (8.4)		34.2 (9.7)		37.3 (10.8)		36.2 (11.1)		38.5 (12.1)	
Marital status												
Married	239	84	260	81	400	80	35	78	30	79	45	83
Nonmarried	46	16	61	19	98	20	10	22	8	21	9	17
Occupational status												
Nonmanual	220	82	252	83	356	73	22	52	17	46	28	54
Manual	50	19	52	17	134	27	20	48	20	54	24	46
Self-rated health												
Optimal	242	86	274	85	412	83	34	76	31	82	37	69
Nonoptimal	40	14	47	15	85	17	11	24	7	18	17	32
GHQ caseness												
Noncase	210	74	228	71	355	71	27	60	28	74	39	72
Case	75	26	93	29	145	29	18	40	10	26	15	28

* Destination employment status, exposure to nonpermanent employment, and their combination.

† Some percentages do not total 100 because of rounding.

‡ Numbers in parentheses, standard deviation.

§ GHQ, General Health Questionnaire.

TABLE 2. Odds ratios and 95% confidence intervals for nonoptimal health by destination employment status and exposure to unstable employment, Temporary Employees in Municipal Jobs Study, Finland, 1998–2002

Labor market trajectory	No. of cases/no. of participants	Adjusted for demographics*		Adjusted for demographics + health at baseline	
		OR†	95% CI†	OR	95% CI
By destination					
Permanent contract	109/601	1.01	0.73, 1.39	1.09	0.77, 1.53
Fixed-term contract	95/544	1		1	
Unemployment	32/90	2.57	1.54, 4.28	2.54	1.47, 4.39
Test for trend <i>p</i> value		0.015		0.062	
By exposure					
Low exposure	109/604	1.07	0.77, 1.49	1.13	0.80, 1.61
Moderate exposure	82/492	1		1	
High exposure	45/139	2.41	1.53, 3.79	2.38	1.46, 3.87
Test for trend <i>p</i> value		0.008		0.032	
Destination and exposure combined					
Permanent contract and low exposure	40/282	0.87	0.58, 1.32	0.92	0.59, 1.43
Permanent contract and high exposure	47/321	1.28	0.87, 1.87	1.38	0.92, 2.07
Fixed-term contract and low exposure	85/497	1.00		1.00	
Fixed-term contract and high exposure	11/45	1.84	0.88, 3.83	1.75	0.92, 2.07
Unemployed and low exposure	7/38	3.50	1.69, 7.27	4.00	1.84, 8.66
Unemployed and high exposure	17/54	2.28	1.18, 4.40	2.00	0.99, 4.07
Test for trend <i>p</i> value		<0.001		<0.001	

* Age, marital status, and occupational status.

† OR, odds ratio; CI, confidence interval.

Earlier findings on unemployment suggest that poor physical health is a cause (28) and poor mental health a consequence (29) of unemployment. In accordance with these studies, we found that nonoptimal self-rated health at baseline increased the probability of becoming unemployed but that psychological distress was not associated with unemployment. In subsequent analyses of associations between trajectories and changes in health, this selection was controlled by adjustments. Of course, poor health postbaseline will have continued to exert selective effects on labor market trajectories during follow-up. However, we believe that our results cannot be attributed merely to health-related selection.

The follow-up period of our study was relatively short, and the results to date should be classified as short-term associations. However, they indicate that we are likely to see more pronounced associations over a longer period. Moreover, in some of the cells of the tables, the small numbers of participants suggest that the large odds ratios observed would probably reach statistical significance if we had greater numbers.

Some of our findings lead us to conclude that the association between labor market trajectory and health is not always so straightforward. For example, when examining combined trajectories, we found no difference between fixed-term low exposure to instability and fixed-term high exposure. Furthermore, the health risk was smaller for the unemployed with high exposure than for those with low exposure, especially when we looked at the values for self-rated health. The reason for this finding may be that, in the

former cohort, nonoptimal health at baseline was already considerably more common than in the other cohorts (table 1). Because a person's self-rated health seldom improves, only a relatively small proportion of the cohort could be expected to change their health status category. Another paradoxical finding was the relatively high odds ratio for nonoptimal self-rated health in stabilizing careers. The finding suggests a healthy-worker effect; that is, if health problems occur, the career trajectory takes a turn toward the periphery less easily for employees in permanent jobs than for those whose labor market status is more contingent.

Much of the previous work in this field has been limited by designs that compare permanent employees of unknown tenure with temporary employees for whom health selection into the workforce is likely to be a recent event. With the design applied in this study, we were able to more easily evaluate the health effects of atypical employment. We restricted the study to those in fixed-term employment at baseline and chose the "immobile" employees, that is, those with fixed-term contracts throughout the 4-year follow-up, as the reference cohorts. This procedure enabled us to discern core- and periphery-directed trajectories and their associations with health.

The baseline population was gathered with the help of employers who ensured that employees with a nonpermanent contract received the baseline postal questionnaire. Of the respondents, we selected all those who reported having a fixed-term contract. There is no reason to suspect reporting

TABLE 3. Odds ratios and 95% confidence intervals for psychological distress* by destination employment status and exposure to unstable employment, Temporary Employees in Municipal Jobs Study, Finland, 1998–2002

Labor market trajectory	No. of cases/no. of participants	Adjusted for demographics†		Adjusted for demographics + distress at baseline	
		OR‡	95% CI‡	OR	95% CI
By destination					
Permanent contract	133/605	0.80	0.60, 1.06	0.82	0.61, 1.09
Fixed-term contract	141/546	1		1	
Unemployment	32/91	1.53	0.94, 2.48	1.60	0.98, 2.64
Test for trend <i>p</i> value		0.009		0.011	
By exposure					
Low exposure	139/608	0.89	0.67, 1.18	0.88	0.66, 1.19
Moderate exposure	121/494	1		1	
High exposure	46/140	1.41	0.92, 2.16	1.38	0.89, 2.13
Test for trend <i>p</i> value		0.046		0.059	
Destination and exposure combined					
Permanent contract and low exposure	56/284	0.67	0.46, 0.96	0.68	0.46, 0.98
Permanent contract and high exposure	77/321	0.94	0.67, 1.31	0.96	0.68, 1.34
Fixed-term contract and low exposure	127/501	1.00		1.00	
Fixed-term contract and high exposure	14/45	1.13	0.56, 2.28	1.02	0.50, 2.11
Unemployed and low exposure	14/38	1.56	0.77, 3.18	1.67	0.81, 3.46
Unemployed and high exposure	18/53	1.53	0.83, 2.83	1.56	0.83, 2.92
Test for trend <i>p</i> value		0.144		0.135	

* General Health Questionnaire caseness.

† Age, marital status, and occupational status.

‡ OR, odds ratio; CI, confidence interval.

bias regarding the type of employment contract. The response rate was satisfactory enough to argue that the respondents represent the personnel who have fixed-term contracts. Retrospective inquiry regarding the yearly employment situations may have reduced the validity of the information obtained in the follow-up survey, but this issue applies similarly to all respondents and does not bias the classification of labor market trajectory. The decision to attribute previous employment status to respondents who, at the follow-ups, were economically inactive was based on the concept that, as a “labor market citizen” (30), a person is carrying the stigma of his or her last (un)employment situation until a new one is assumed.

We cannot rule out the possibility that health-related non-response affected the results. Moreover, part of the exit from the population register, as deaths, was related to health, and persons in the exit group probably had the most unusual employment trajectories. Consequently, the cohorts studied were “normalized.” Thus, it is likely that sample attrition led to an underestimation rather than an overestimation of the observed associations between labor market trajectories and health.

Longitudinal studies of the association between unemployment and health have so far failed to specify the type of employment contract lost. In demonstrating that loss of a fixed-term job may also be a health risk, our study sheds new and significant light on questions of well-being in the new labor market. However, any single study concerning the

effects of nonpermanent employment has to consider the context specificity of the results. In addition to national and cultural distinctions, the association with well-being and health may depend on the stage of macroeconomic affairs and the segmentation of the labor market. This study concentrated on full-time, fixed-term, paid employment, the most common type of nonpermanent job in Western labor markets, and on women who, more often than men, had a fixed-term contract. The annual figures on employment status indicate that many participants were “on a bridge” to permanent employment and only a few were “in a trap” between unemployment and fixed-term jobs. The results may also be seen as indicators of the macroeconomic context. At the time of the present study, the Finnish national economy was recovering from a deep recession and gathering momentum once more, and employers were taking on new personnel. Thus, our findings describe the health of employees during a period of improving employment prospects and rapid economic growth.

As far as we know, this is the first longitudinal study that has simultaneously examined exposure to unstable employment and destination labor market position at the end of follow-up. The results offer novel evidence about health differences between employees on a trajectory toward a permanent job and those on a trajectory of fixed-term contracts or toward the periphery of the labor market. However, we should be cautious about generalizing the evidence. Although the findings accord

with previous research that has examined the effects of exposure to adverse socioeconomic positions and downward socioeconomic mobility over the life course (31–35), much more work is required on the health effects of work careers in general and work careers in the new labor market in particular.

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Employment trajectories and changes in sense of coherence

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Background: Knowledge of the associations between labour market position and sense of coherence (SOC) comes mainly from cross-sectional studies. We investigated whether change in employment status is associated with change in SOC and whether such an association varies when young (<30 years) and older employees are compared. **Methods:** Data were derived from two studies: a cohort of initially non-permanent employees ($n = 1898$) was followed up for four years, and a cohort representing the national workforce ($n = 9623$) was followed up for five years. Labour market position at baseline and at follow-up (permanent/fixed-term job/unemployed) was used to locate the participants into six or nine different employment trajectories depending on the cohort. SOC was measured with a 13-item questionnaire. Associations of the employment trajectories with changes in SOC were analysed with general linear models. **Results:** In both cohorts the change of SOC was significantly associated with type of employment trajectory. The results supported the hypothesis of more favourable development of SOC among those whose trajectories were directed upward: the associations of poor SOC with unemployment are indisputable, whereas the effects of fixed-term employment seem to be neutral or even positive. The analysis by age revealed that the effects of employment trajectory on SOC are particularly strong among individuals aged below 30 years. **Conclusion:** This longitudinal study provided evidence for the interpretation that stabilisation of SOC associates with stabilisation of the labour market position. Moreover, the fluctuations of SOC seem to depend on the type of trajectory throughout adult life.

Keywords: employment status, temporary employment, career, sense of coherence, follow-up study.

Introduction

Stability of the position in the labour market and consistency of career development are essential for the well-being of individuals in gainful employment. These elements are also salient in Aaron Antonovsky's salutogenic, i.e. health-oriented theory about sense of coherence (SOC).^{1–3} On the other hand, the labour markets of Western societies tend to move towards flexibility: atypical and temporary job contracts are common and employees have to be prepared for unexpected changes; such as mergers, outsourcings and downsizings. Associations of today's precarious employment with SOC are still poorly understood and explored.⁴

The SOC concept should be understood as an orientation to life: individuals with strong SOC perceive life as comprehensible, manageable and meaningful, which helps them to stay healthy despite encounters with stressors.^{1,2} There is a growing body of empirical research showing that SOC is associated with various aspects of health, especially with perceived and mental health.^{5–8}

According to Antonovsky's theory SOC develops during childhood, adolescence and the first decade of adult life.^{1,2} Around the age of 30, SOC becomes a dispositional orientation which is assumed to remain relatively stable once having grown strong. Antonovsky states that major crises, such as unemployment, can undermine a mediocre or weak SOC while a strong SOC remains either stable or it is only temporarily

weakened.^{1–3} The assumption that an initially strong SOC is more stable has gained support from empirical studies,^{9,10} although SOC seems not to be as stable as Antonovsky assumed.¹¹ SOC tends to strengthen throughout life but adverse life events weaken SOC irrespective of its initial level.¹² Moreover, SOC seems to be more stable among individuals over 30 years than among younger adults.¹³

In work life, employment-related experiences and characteristics of the actual working environment may modify SOC.^{2,3} Work offers an opportunity to participate in socially valued decision-making, and given that it does not include excessive overload or underload and that the employment is perceived as secure, work according to Antonovsky does represent a positive resource. Unemployment, by contrast, can be harmful to SOC,³ research has even shown population level decrease of SOC during period of increasing unemployment.¹⁰

Research conducted on work life has shown that a strong SOC protects against the adverse effects of certain work characteristics and is associated with fewer psychosomatic symptoms and emotional exhaustion.^{14–16} Follow-up studies have shown that good organizational climate and low job insecurity are related to strong SOC.^{15,17} Furthermore, strong SOC predicts low sickness absence in women,⁶ and weak SOC increases the likelihood of disability retirement.¹⁸

There are only a few studies focusing on the associations between employment status and SOC. In a cross-sectional setting, the re-employed had a significantly stronger SOC than the unemployed,¹⁹ and being unemployed or early retired was related to low SOC score.²⁰ In the two follow-up studies, stable employment was associated with strong SOC.^{21,22} In all, the scarce research on the associations between employment status and SOC has major limitations: the samples have been small and occupationally limited,^{21,22} and the classification of labour market status as employed and unemployed is too crude,^{19,20} as employees of the modern

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labour market may occupy several statuses between permanent jobs and overt unemployment. Finally, there is a lack of research on the hypothesized effects of labour market careers on the stability of SOC.

This study focused on associations of different careers in the labour market, or employment trajectories, with changes in the SOC. The study was carried out in Finland where the labour market during the follow-up period was characterized by high unemployment (between 9 and 11%), rapid economic growth, and high non-permanent employment (16–18%) compared with other European countries.²³ Our hypothesis was that the changes vary so that the development of SOC is most favourable among those whose trajectories are directed upward or from less stable to more stable employment status. Moreover, based on Antonovsky's assumption of the instability of the SOC in early adulthood, we proposed the hypothesis that the association of SOC with employment trajectory is stronger among those below 30 years of age than among those older than 30 years.

Methods

The data were derived from two follow-up studies, the Temporary Employees in Municipal Jobs Study (TMJ Study) and the Health and Social Support Study (HeSSup Study).

The TMJ Study was carried out among employees who had a non-permanent job contract in the service of eight Finnish municipalities in November 1997 (Time 1). A postal survey with a participation rate of 57%, yielded 2194 respondents who reported having a fixed-term contract (i.e. a termination date as part of their contract) and 682 subsidised employees (i.e. individuals whose unemployment had been interrupted with a six-month work contract funded through a governmental re-employment programme). In this study the latter group was considered as unemployed. In 2002 (Time 2), a follow-up survey was posted to the respondents of the initial survey whose addresses (94%) were found in the population register. Response rates were 76% ($N=1563$) among fixed-term employees and 73% ($N=467$) among the unemployed. In the follow-up survey, respondents were asked to report their actual labour market situation, and they were classified as having a permanent job, as having a fixed-term job or as being unemployed (receiving unemployment benefit or participating in a re-employment programme). The TMJ cohort ($N=1898$) consisted of the respondents who answered the question about labour market situation at Time 2 and the SOC questionnaire both at Time 1 and Time 2. There were 1479 fixed-term employees and 419 unemployed at Time 1, and 829 permanent employees, 785 fixed-term employees and 284 unemployed at Time 2.

The initial survey of the HeSSup Study was conducted in 1998 (Time 1) among a sample representative of the age groups 20–24, 30–34, 40–44 and 50–54 years of the Finnish population. The postal survey yielded 25 901 participants (response rate 40%). The follow-up questionnaire was sent in 2003 (Time 2) to all participants still living in Finland, the number of respondents was 19 269 (response rate 80%). A set of questions concerning labour market status was used for the classification of employment status.²⁴ This study includes only those respondents ($N=9623$) who were at work or were seeking a job and who answered the SOC question both at Time 1 and Time 2. The participants were placed in the category of having a permanent job ($N=7572$), having a fixed-term job ($N=1038$) or being unemployed ($N=1013$) at Time 1. At Time 2, the corresponding figures were 8018, 678 and 927.

SOC

The original short-form (13-item) Orientation to Life Questionnaire was used to assess SOC.^{2,25} Each item is answered on a scale from 1 to 7. The sum of all items provides a score ranging from 13 to 91, higher scores indicating a stronger SOC.

Covariates

In the TMJ cohort we measured gender, age, socio-economic status, self-rated health and mental health as baseline covariates. Age was categorized into four age groups: 18–29, 30–39, 40–49, 50–62. Socio-economic status was based on occupations, which were classified according to the international standard classification of occupations (ISCO) into professionals, associate professionals, clerks and manual workers.²⁶ Self-rated health was classified as good (good or fairly good) and poor (average, fairly poor or poor). Mental health was assessed with the 12-item version of General Health Questionnaire,²⁷ and those respondents scoring more than three points were classified as psychologically distressed.

The baseline covariates of the HeSSup Study were gender, age group (20–24, 30–34, 40–44 and 50–54 years), socio-economic status measured by education (none, vocational school, college, university), self-rated health classified as good and poor, and mental health (assessed with the 21-item version of Beck's Depression Inventory²⁸ and dichotomized at score 9).

Statistical methods

Paired sample *t*-tests were used to test the mean SOC values. The change in SOC from Time 1 to Time 2 by trajectory was studied with general linear models (GLM) with gender, age group, socio-economic status, self-rated health, and mental health as covariates. If statistically significant, the covariate and the interaction between the covariate and the trajectory were included in the final model. This procedure was carried out for the whole cohorts and for the cohorts split at age 30. Interaction terms were applied to test whether the associations between change of SOC and employment trajectory depended on age. In pairwise comparisons, the Tukey HSD adjustment was used to control for Type 1 error. Statistical analyses were conducted with SPSS 15.0 for Windows (SPSS Inc., 2006).

Results

Descriptive statistics of the TMJ cohort are presented in Table 1. Typically for fixed-term employment in the public sector there were 83.8% women and 43.0% professionals among fixed-term employees in this cohort. Among the unemployed there were a relatively high proportion of manual workers and participants with poor self-rated health at baseline. The corresponding statistics of the HeSSup cohort are presented in Table 2. In this population based cohort women were somewhat overrepresented. The proportion of those with highest level of education was relatively high among permanent and fixed-term employees because they responded more actively than other education groups.²⁹ The youngest age group remained smaller than the other three age groups because relatively many young respondents were still students at Time 1 and became excluded from this study. Among the unemployed there were also a relatively high proportion of participants with poor self-rated health and with depression.

The TMJ cohort was classified into six and the HeSSup cohort into nine employment trajectories basing on employment status at Time 1 and Time 2. SOC scores at

baseline are presented in Tables 3 and 4. Those who were unemployed at both measurement times had the lowest baseline SOC in both cohorts, whereas initially the highest SOC scores were seen in the TMJ cohort among participants in the trajectory from fixed-term to permanent employment and in the HeSSup cohort among those who were permanently employed at both times.

At Time 1, the mean level of SOC was in the TMJ cohort 65.02 [standard deviation (SD)=11.00] and in the HeSSup cohort 65.33 (SD=11.12). During the follow-up the average SOC score increased 2.83 points in the TMJ cohort ($P<0.001$) and 1.44 points in the HeSSup cohort ($P<0.001$). Increasing scores were seen in all employment trajectories except in the trajectory from fixed-term employment to unemployment in the HeSSup cohort. The increase was statistically significant in all other trajectories except in the trajectories from fixed-term employment to unemployment (both cohorts) and in the trajectories from unemployment to fixed term employment and from unemployment to unemployment (HeSSup cohort). The changes of SOC score by trajectory differed significantly (P -value for the TMJ cohort 0.015 and for the HeSSup cohort <0.001).

Table 3 shows the estimated marginal means of the changes in SOC by trajectory in the TMJ cohort. The greatest improvement was in the trajectory from unemployment to permanent

employment and the smallest improvement in the trajectory from fixed-term employment to unemployment. The increase of SOC was statistically significant in trajectories from fixed-term employment and from unemployment to permanent employment compared with the trajectory from fixed-term employment to unemployment (P -values for pairwise comparisons 0.044 and 0.007, respectively).

In corresponding analysis of the HeSSup cohort (Table 4), the estimated marginal means show that change in SOC was most favourable in the trajectory from unemployment to permanent employment and least favourable in the trajectory from fixed-term employment to unemployment. The improvement was significantly greater, according to pairwise comparisons, among participants with a trajectory from unemployment to permanent employment than among participants who were permanently employed ($P<0.001$) or unemployed ($P<0.001$) at both times.

In the youngest age group of the TMJ cohort [$N=638$, baseline SOC 64.98 (SD=10.59)] SOC developed most favourably on the trajectory from unemployment to fixed-term employment and least favourably among participants who were unemployed at both times. The improvement was significantly greater, according to the pairwise comparisons, on the trajectory from unemployment to fixed-term employment than on the trajectory from fixed-term to

Table 1 Descriptive statistics of the TMJ Study Cohort at baseline by employment status

	Fixed-term N (%)	Unemployed N (%)
Sex		
Women	1239 (83.8)	333 (79.5)
Men	240 (16.2)	86 (20.5)
Age at Time 1 (years)		
18–29	509 (34.4)	129 (30.8)
30–39	496 (33.5)	92 (22.0)
40–49	316 (21.4)	96 (22.9)
50–62	158 (10.7)	102 (24.3)
Occupational status		
Professionals	609 (43.0)	42 (10.4)
Associate professionals	321 (22.7)	61 (15.4)
Clerks	140 (9.9)	110 (27.8)
Manual workers	346 (24.4)	184 (46.5)
Self-rated health		
Good	1229 (83.5)	294 (70.5)
Poor	243 (16.5)	123 (29.5)
Psychological distress		
No	1069 (72.3)	307 (73.3)
Yes	409 (27.7)	112 (26.7)

Table 2 Descriptive statistics of the HeSSup Study Cohort at baseline by employment status

	Permanent N (%)	Fixed-term N (%)	Unemployed N (%)
Sex			
Women	4107 (54.2)	687 (66.2)	635 (62.7)
Men	3465 (45.8)	351 (33.8)	378 (37.3)
Age at Time 1 (years)			
20–24	493 (6.5)	310 (29.9)	228 (22.5)
30–34	1872 (24.7)	366 (35.3)	232 (22.9)
40–44	2744 (36.2)	217 (20.9)	282 (27.8)
50–54	2463 (32.5)	145 (14.0)	271 (26.8)
Education			
University	1205 (16.1)	227 (22.1)	51 (5.2)
College	2781 (37.2)	413 (40.2)	278 (28.1)
Vocational school	1887 (25.3)	228 (22.2)	309 (31.3)
None	1598 (21.4)	159 (15.5)	350 (35.4)
Self-rated health			
Good	6291 (83.2)	932 (90.0)	779 (77.0)
Poor	1268 (16.8)	104 (10.0)	233 (23.0)
Depression			
No	6282 (83.4)	884 (85.2)	694 (69.3)
Yes	1250 (16.6)	153 (14.8)	307 (30.7)

Table 3 SOC at baseline (means and SDs) and changes in SOC during the follow-up (estimated marginal means and 95% confidence intervals) by employment trajectory of the TMJ Study Cohort

Employment trajectory	All		All ^a	Age under 30 year ^b	Age over 30 year ^c
	N (%)	SOC at time 1			
Fixed-term to permanent	724 (38.1)	66.78 (10.15)	3.92 (3.20–4.64)	5.74 (3.69–7.79)	4.03 (3.17–4.90)
Fixed-term to fixed-term	645 (34.0)	65.35 (10.89)	3.43 (2.68–4.18)	2.05 (0.27–3.84)	3.55 (2.60–4.50)
Fixed-term to unemployment	110 (5.8)	62.60 (11.92)	1.08 (–0.68–2.84)	–0.29 (–4.69–4.12)	1.00 (–1.15–3.16)
Unemployment to permanent	105 (5.5)	63.27 (10.45)	5.64 (3.83–7.44)	5.33 (1.71–8.95)	5.64 (3.38–7.90)
Unemployment to fixed-term	140 (7.4)	62.93 (10.60)	4.21 (2.64–5.77)	7.49 (3.83–11.15)	2.80 (0.73–4.88)
Unemployment to Unemployment	174 (9.2)	60.75 (13.00)	2.95 (1.54–4.36)	–0.63 (–7.24–5.98)	2.97 (1.40–4.53)
F-value, P for difference		12.04, <0.001	3.09, 0.009	3.60, 0.003	2.22, 0.050

a: Adjusted for psychological distress

b: Adjusted for gender, occupational status, psychological distress and the interaction between trajectory and gender

c: Adjusted for psychological distress

Table 4 SOC at baseline (means and SD) and changes in SOC during the follow-up (estimated marginal means and 95% confidence intervals) by employment trajectory of the HeSSup Study Cohort

Employment trajectory	All		All ^a	Age under 30 year ^b	Age over 30 year ^c
	N (%)	SOC at time 1	Changes during follow-up in SOC	Changes during follow-up in SOC	Changes during follow-up in SOC
Permanent to permanent	6981 (72.5)	66.20 (10.69)	2.60 (2.26–2.94)	3.79 (2.58–5.01)	2.24 (1.95–2.53)
Permanent to fixed-term	237 (2.5)	63.69 (11.11)	3.73 (2.10–5.37)	6.32 (3.49–9.16)	3.57 (1.72–5.41)
Permanent to unemployment	354 (3.7)	63.82 (11.34)	0.56 (–0.93–2.05)	–3.37 (–7.95–1.22)	2.86 (1.74–3.99)
Fixed-term to permanent	671 (7.0)	64.62 (10.30)	2.66 (1.63–3.68)	4.81 (3.23–6.38)	2.09 (0.94–3.24)
Fixed-term to fixed-term	271 (2.8)	65.43 (12.10)	3.38 (1.75–5.02)	5.92 (3.52–8.31)	2.28 (0.47–4.09)
Fixed-term to unemployment	96 (1.0)	62.02 (11.04)	–0.28 (–2.56–2.00)	1.19 (–3.89–6.27)	–0.22 (–2.56–2.11)
Unemployment to permanent	366 (3.8)	61.88 (12.79)	4.95 (3.81–6.09)	5.58 (3.49–7.68)	4.62 (3.37–5.88)
Unemployment to fixed-term	170 (1.8)	63.15 (11.12)	2.61 (0.85–4.36)	2.02 (–0.56–4.59)	2.03 (–0.11–4.17)
Unemployment to unemployment	477 (5.0)	59.60 (13.43)	0.94 (0.02–1.87)	1.57 (–1.24–4.38)	0.78 (–0.10–1.65)
F-value, P for difference		29.98, <0.001	5.58, <0.001	3.09, 0.001	2.83, <0.001

a: Adjusted for age, depression and the interaction between trajectory and age and trajectory and depression

b: Adjusted for depression

c: Adjusted for depression and the interaction between trajectory and depression

unemployment ($P=0.038$). Among older members of the TMJ cohort [$N=1260$, baseline SOC 65.04 (SD=11.20)] SOC improved in particular on the trajectory from unemployment to permanent employment whereas the trajectory from fixed-term employment to unemployment proved least advantageous. This difference was statistically significant ($P=0.036$).

The analysis of the HeSSup cohort by age is shown in Table 4. In the young age group [$N=1031$, baseline SOC 61.32 (SD=11.48)] SOC developed most favourably on the trajectory from permanent to fixed-term employment and least favourably on the trajectory from permanent employment to unemployment. According to the pairwise comparisons, the improvement in SOC was significantly greater on the trajectories from permanent to fixed-term ($P=0.009$), from fixed-term to permanent ($P=0.023$), from unemployment to permanent ($P=0.009$) and from fixed-term to fixed-term employment ($P=0.012$) than on the trajectory from permanent employment to unemployment. Among older participants [$N=8592$, baseline SOC 65.82 (SD=10.98)] SOC improved in particular on the trajectory from unemployment to permanent employment, whereas the trajectory from fixed-term employment to unemployment turned out to be the least advantageous. Significantly greater the increase was among participants with a trajectory from unemployment to permanent employment than among participants who were permanently employed or unemployed at both times (respective P -values 0.029 and 0.008).

Discussion

This study investigated the associations between employment trajectories and changes in SOC. The results mainly supported our hypothesis that development of SOC is most favourable among those whose trajectories are directed upward. As expected, particularly strong effects of employment trajectory on SOC were seen in employees aged <30 years. The change by trajectory depended on age in the HeSSup cohort (P -value for interaction 0.002) but not in the TMJ cohort ($P=0.404$); this may be due to different age structures of the cohorts.

A trajectory from unemployment to permanent employment was associated with the greatest improvement in SOC. This finding was in line with earlier studies. Unexpectedly, in particular among younger participants, a prominent improvement in SOC was observed in the trajectory from permanent to fixed-term employment. One explanation for this finding may be that the results describe the situation during a period of improving employment prospects and rapid economic

growth. During the follow-up years the Finnish national economy was recovering from a deep recession and employers were taking on new personnel. People had a lot of opportunities to build careers by changing workplaces, and also voluntarily chose fixed-term contracts. In such cases, the trajectory cannot in fact be characterized as 'downward'. In accordance with this, the trajectory from fixed-term employment to unemployment was associated with unfavourable change in SOC as strongly as the trajectory from permanent employment to unemployment, and among young individuals the most favourable change in SOC was seen in the trajectory from unemployment to fixed-term employment in the TMJ Study.

Our study also supports Antonovsky's theory in general and in particular his emphasis on unemployment as a life situation that can be unfavourable to SOC.^{2,3} He was especially concerned about unemployment among the young and thought that attention should be given to their working conditions. It is possible that SOC remains permanently at a low level if the early career is less favourable. This study gives more reasons for this concern, although we cannot know what will happen in the future with those whose SOC decreased due to downward trajectory during the first decade of adult life.

Despite the fact that job loss and unemployment may be a major change in life, among older participants a trajectory from permanent employment to unemployment was associated with fairly favourable development of SOC. Maybe in these individuals unemployment does not mean immediate financial difficulties, as in Finland the period of earnings-related daily allowance paid by unemployment funds lasts for 500 working days, i.e. ~2 years. It is also possible that changes in SOC were less obvious due to long-term stabilisation of SOC among older participants in permanent jobs.

SOC is strongly correlated to mental health it can even be supposed that it in fact is just one way to measure mental health.⁵ In our analyses, control of pre-existing differences in psychological distress and depression did not eliminate the changes observed in SOC by trajectory. Replication of this finding with two established surveys of mental health supports the view of SOC as an independent psychological construct.

This longitudinal study allows us to conclude that events in the career associate with subsequent changes in the SOC. In the light of earlier research, it has remained somewhat unclear whether the level of SOC is influenced by employment experiences or vice versa. Moreover, our study

differs from earlier research in that we measured participants' employment positions in more detail and therefore were able to differentiate a spectrum of trajectories relevant to today's labour market. The data of the HeSSup Study come from a large population sample that offered statistical power for separate analyses of different employment trajectories. The TMJ cohort offered an opportunity to focus the analysis on the public sector where fixed-term employment relationships are particularly common in Finland.³⁰

The focus of the TMJ Study on the public sector may, on the other hand, be considered a limitation. The cohort consisted predominantly of women with relatively high socio-economic status, and the numbers of respondents per trajectory were relatively small. In the HeSSup Study, the response rate at baseline was low;²⁹ however, only minor differences were found in socio-demographic and health-related issues in the non-response analysis. In the follow-up survey of the HeSSup Study, the response rate was as high as 80%.

This study focused on the SOC of the employees in a labour market where increasing requirements for flexibility have divided the workforce into different employment trajectories. This longitudinal study suggests that employment trajectory plays a significant role in the development of an individual's SOC. The results mainly supported the hypothesis of more favourable development of SOC among those whose trajectories are directed upward. We were not able to show that fixed-term employment had negative effects on SOC. Replication studies are needed to test whether the results are valid at different times and different labour markets. The results of this study cannot be converted into direct policy recommendations, but they give reason to recommend intervention studies in particular among young people with difficulties in entering work life.

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Key points

- This longitudinal study suggests that employment trajectory plays a significant role in the development of an individual's SOC.
- The fluctuations of SOC seem to depend on the type of trajectory throughout adult life.
- Particularly strong effects of employment trajectory on SOC are seen in employees aged <30 years. There is need of policy measures and associated intervention studies among young people with difficulties in entering work life.

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