

Salla-Maarit Volanen

SENSE OF COHERENCE
Determinants and Consequences

ACADEMIC DISSERTATION

To be presented, with the permission of the Faculty of Medicine of the University of Helsinki, for public examination in Small Hall, University Main Building, on 21st January 2011, at 12 noon.

Hjelt Institute
Department of Public Health
Faculty of Medicine
University of Helsinki

Helsinki, Finland
2011

Supervisors

Docent Sakari Suominen

Department of Public Health
University of Turku

Professor Eero Lahelma

Hjelt Institute
Department of Public Health
University of Helsinki

Docent Karri Silventoinen

Population Research Unit
Department of Social Research
University of Helsinki

Reviewers

Professor Taru Feldt

Department of Psychology
University of Jyväskylä

Research Professor Marko Elovainio

National Institute for Health and Welfare

Official opponent

Professor Ari Haukkala

Department of Social Psychology
University of Helsinki

Cover photo: Salla-Maarit Volanen

Unigrafia, Helsinki 2011

ISSN 0355-7979

ISBN 978-952-10-6587-3 (print)

ISBN 978-952-10-6588-0 (pdf), <http://ethesis.helsinki.fi/>

CONTENTS

ABSTRACT	5
TIIVISTELMÄ	7
LIST OF ORIGINAL PUBLICATIONS	9
ABBREVIATIONS	10
LIST OF TABLES AND FIGURES	11
1 INTRODUCTION	13
2 THEORY OF SENSE OF COHERENCE	16
2.1 The definition of sense of coherence	16
2.2 The development of sense of coherence	18
2.3 Generalized resistance resources	19
2.3.1 Language related resistance resources	21
2.3.2 The role of gender	23
2.4. The salutary principles of sense of coherence theory	24
2.4.1 Sense of coherence as a tool for successful coping	24
2.4.2 Retirement process in the context of health and sense of coherence	26
2.5 The stability of sense of coherence	26
2.6 For and against the theory of sense of coherence	28
3 REVIEW OF PREVIOUS EMPIRICAL RESEARCH	30
3.1 Empirical evidence of the association between sense of coherence and health	30
3.1.1 Sense of coherence and health	30
3.1.2 Sense of coherence and retirement process	32
3.2 Previous studies on generalized resistance resources	32
3.2.1 Childhood as generalized resistance resource	32
3.2.2 Socio-economic and psychosocial resistance resources	34
3.3 The stability of sense of coherence in previous studies	35
3.4 Summary of previous studies	38

4 THEORETICAL FRAMEWORK AND PURPOSE OF THE STUDY	40
5 MATERIAL AND METHODS	43
5.1 Material	43
5.2 Measures	44
5.3 Statistical methods	51
6 RESULTS	52
6.1 Generalized resistance resources among Finnish women and men	52
6.2 Generalized resistance resources and sense of coherence among Finnish- and Swedish-speaking Finns	56
6.3 The effect of adverse life events on sense of coherence	60
6.4 Association between sense of coherence and intentions to retire early	62
7 DISCUSSION	64
7.1 Main findings	64
7.2 Interpretation of main findings	65
7.2.1 Psycho-emotional resistance resources	65
7.2.2 Work related resistance resources	68
7.2.3 Gender differences and similarities in resistance resources	69
7.2.4 Differences and similarities between language groups	71
7.2.5 Sense of coherence and intentions to retire early	73
7.2.6 The stability of sense of coherence	75
7.2.7 Sense of coherence in the light of personality theory	77
7.2.8 Determinants and consequences of sense of coherence: overall assessment	81
7.3 Methodological evaluation	83
7.4 Implications for further research	86
7.5 Implications for health and welfare policies	88
8 CONCLUSIONS	89
9 ACKNOWLEDGEMENTS	90
10 REFERENCES	92

ABSTRACT

Sense of coherence (SOC) is a core concept within Antonovsky's salutogenic theory and is argued to be a psychological determinant of health. The present social-epidemiological study explores the associations between a wide range of generalized resistance resources of SOC among Finnish- and Swedish-speaking women and men with a view to gaining deeper insight into its developmental circumstances and determinants. Secondly, a five-year follow-up study was conducted in order to assess the stability of SOC in difficult life events. Finally the role and effect of SOC in the intentions to retire early was investigated in a prospective study.

The above studies were based on two data sets: the Finnish 'Survey on Living Conditions' (ELO-94) conducted in 1994 by means of personal face-to-face interviews (N=6506), and a prospective postal survey of the 15-year Health and Social Support (HeSSup) study for which the baseline data was collected in 1998 (N=25 898) and the follow-up in 2003.

The present study reveals that the level of SOC in adulthood is strongly dependent on close and successful social relationships during both childhood and adulthood, and that there is a strong association with qualitative work features. Not having a partner as well as being unable to use one's skills at work proved to threaten men's SOC in particular, whereas a lack of social support did the same for women. Otherwise, the association with generalized resistance resources turned out to be quite similar in both genders. Swedish-speaking Finns appear to have a slightly stronger SOC due to the better psycho-emotional circumstances in the childhood home and work circumstances in adulthood, in other words higher levels of generalized resistance resources compared to Finnish speakers. These language group differences did not concern any social-life factors included in the present study.

The results of the five-year follow-up study suggest that SOC is not stable, and that the level clearly decreases after a negative life event. Even a strong SOC decreased during the follow-up period and, furthermore, was no more stable than a mediocre or weak SOC. There seems to be a clear and independent association with the intentions to retire early among both men and women following full adjustment. Swedish speakers appear to be less inclined to retire early than Finnish speakers.

In the light of the present study, it seems that SOC is determined not only by socio-economic factors but also by close and successful social relationships during both childhood and

adulthood. This applied to both genders and language groups. Interventions aimed at promoting the health of the disadvantaged should therefore focus on families with children, and extend later also to other than socio-economic spheres of life. SOC theory could also be applied in efforts to inhibit early retirement: management practices aimed at providing employees with a work environment and tasks that are comprehensible, manageable and meaningful could potentially decrease the intentions to retire early.

TIIVISTELMÄ

Sosiologi Aaron Antonovskyn salutogeeninen teoria koherenssin tunteesta kuvaa ihmisen kykyä ymmärtää ja hallita elämän haasteita ja löytää niistä mielekkäisyys - eli kykyä selviytyä. Tämän selviytymiskyvyn katsotaan ehkäisevän terveyttä kuormittavan pitkäkestoisen stressitilan syntyä ja koherenssin tunnetta pidetään psykologisena terveyden determinanttina. Tämän tutkimuksen tarkoituksena on aiempia tutkimuksia systemaattisemmin selvittää koherenssin tunteen taustatekijöitä ja seurauksia suomalaisessa suomen- ja ruotsinkielisessä väestössä.

Koherenssin tunteen mahdollisia taustatekijöitä kartoitettiin tässä tutkimuksessa useiden lapsuuden kodin olosuhteita sekä sosioekonomisten ja psykososiaalisten työ- ja yksityiselämää kuvaavien tekijöiden avulla molempien sukupuolten ja kieliryhmien keskuudessa. Viiden vuoden seurantatutkimuksessa kartoitettiin koherenssin tunteen pysyvyyttä negatiivisten elämäntapahtumien yhteydessä. Lopuksi tutkittiin koherenssin tunteen seurauksia eli yhteyttä varhaisiin eläkeaikomuksiin niin ikään viiden vuoden seurannassa. Tutkimuksessa on käytetty kahta aineistoa: Tilastokeskuksen vuonna 1994 keräämää Elinolotutkimusta (ELO-94, N=6506) sekä 15 vuoden Health and Social Support-seurantatutkimusaineistoa (HeSSup, N=25 898), jossa perusaineisto kerättiin vuonna 1998 ja ensimmäinen seuranta vuonna 2003.

Tutkimuksessa korostui lapsuuden olosuhteiden, parisuhteen hyvän laadun ja sosiaalisten suhteiden merkittävä rooli koherenssin tunteen tason selittäjinä. Myös työn laadulliset piirteet, kuten työn kokeminen antoisaksi, olivat vahvasti yhteydessä koherenssin tunteen tasoon. Sukupuolieroja havaittiin vain muutama: yksin eläminen sekä kyvyttömyys käyttää tietojaan/taitojaan työssään uhkasivat erityisesti miesten koherenssin tunteen tasoa, kun taas sosiaalisen tuen puute teki saman naisille. Siitä huolimatta voimavarojen yhteys koherenssin tunteeseen oli sukupuolten välillä pääsääntöisesti samankaltaista. Ruotsinkielisten vahvempaa koherenssin tunteen tasoa suomenkielisiin verrattuna selittivät ruotsinkielisten paremmat lapsuuden olosuhteet sekä työolosuhteet aikuisuudessa. Sen sijaan kaikki sosiaalista elämää kuvaavat tekijät, esim. ihmissuhteiden laatu ja sosiaalinen tuki, jakaantuivat lähes identtisesti kieliryhmien kesken.

Koherenssin tunteen taso ei tässä tutkimuksessa osoittautunut pysyväksi, vaan laski negatiivisten elämäntapahtumien kohdalla. Myöskään vahva koherenssin tunteen taso ei osoittautunut pysyvämmäksi kuin keskitasoinen tai heikko koherenssin tunteen taso. Koherenssin tunteella oli selkeä ja itsenäinen yhteys varhaisiin eläkeaikomuksiin sekä miesten että naisten keskuudessa.

Tämä tutkimus korosti läheisten ja hyvien ihmissuhteiden laatua sekä lapsuudessa että aikuisuudessa koherenssin tunteen tason selittäjinä. Tulos koski miehiä ja naisia sekä molempia tutkittuja kieliryhmiä. Interventiot heikommassa asemassa olevien terveyden edistämiseksi tulisi kohdistaa lapsiperheisiin. Lisäksi sosioekonomisten tekijöiden ohella sosiaalisten suhteiden ja tuen merkitys tulisi huomioida. Koherenssin tunteen itsenäinen ja selkeä yhteys varhaisiin eläkeaikomuksiin viittaa mahdollisuuden käyttää kyseistä teoriaa hyväksi työurien pidentämistavoitteissa. Merkityksellinen sekä ymmärrettävissä ja hallittavissa oleva työ saattaisi ehkäistä varhaista eläkkeelle siirtymistä ja tulisi turvata jokaiselle työntekijälle työnantajien taholta.

LIST OF ORIGINAL PUBLICATIONS

- I Volanen S-M, Lahelma E, Silventoinen, K, Suominen S. Factors contributing to sense of coherence among men and women. *European Journal of Public Health* 2004; 14:322-330
- II Volanen S-M, Suominen S, Lahelma E, Koskenvuo M, Silventoinen K. Sense of coherence and its determinants: A comparative study of the Finnish-speaking majority and the Swedish-speaking minority in Finland. *Scandinavian Journal of Public Health* 2006; 34:515-525.
- III Volanen S-M, Suominen S, Lahelma E, Koskenvuo M, Silventoinen K. Negative life events and stability of sense of coherence: A five year follow-up study of Finnish women and men. *Scandinavian Journal of Psychology* 2007; 48:433-441.
- IV Volanen S-M, Suominen S, Lahelma E, Koskenvuo K, Koskenvuo M, Silventoinen K. Sense of coherence and intentions to retire early among Finnish women and men. *BMC Public Health* 2010; 10:22.

The original articles have been reproduced with the permission of their copyright holders.

ABBREVIATIONS

SOC	sense of coherence
HeSSup	Health and Social Support Study
ELO-94	'Survey on Living conditions' in Finland (collected in 1994)
OLQ	Orientation to Life Questionnaire
95% CI	95% confidence interval
OR	odds ratio
BDI	Beck Depression Inventory

LIST OF TABLES AND FIGURES

TABLES

Table 1.	Orientation to Life Questionnaire (SOC-13).	45
Table 2.	Mean SOC scores (range 13-91) at 95% confidence intervals among Finnish- and Swedish-speaking Finns by education, childhood problems and qualitative features of working life in adulthood.	57
Table 3.	Mean SOC scores (range 13-91) at 95% confidence intervals among Finnish- and Swedish-speaking Finns by relationship with parents during childhood, having a spouse/partner, quality of and support from relationships, and social relationships and support.	58
Table 4.	Logistic regression models of intentions to retire early (weak and strong intention combined): full models including age, SOC, language, childhood living conditions, education, working conditions, having a partner, social support, alcohol intoxication and smoking among somatically and mentally unhealthy respondents. Odd ratios (OR) and their 95% confidence intervals compared with the “no intentions” class (OR=1.00) in women and men.	63

FIGURES

Figure 1.	Schematic representation of the role of generalized resistance resources in the production of good health.	20
Figure 2.	Framework of the study.	41
Figure 3.	Regression analysis of SOC scores adjusted for age, childhood conditions and education among men and women (*statistically significant).	52
Figure 4.	Regression analysis of SOC scores adjusted for age, childhood conditions, education, employment status, socio-economic status, significance of work and ability to use skills at work among men and women (*statistically significant).	53
Figure 5.	Regression analysis of SOC scores adjusted for age, childhood conditions, education, marital status, family type, quality of relationship and support from partner among men and women (*statistically significant).	54

- Figure 6. Regression analysis of SOC scores adjusted for age, childhood conditions, education, number of friends, social support and satisfied with support among men and women (*statistically significant). 55
- Figure 7. Regression analysis of the association between negative life events and SOC in 2003 at 95% confidence intervals among men and women, adjusted for age, education, marital status*, language, childhood living conditions and SOC in 1998, i.e., the figure shows the change in SOC scores during the follow-up in 1998-2003 according to each negative life event. (*Models on divorce/separation and relational problems are not adjusted for marital status). 61

1 INTRODUCTION

Good health is attributable not only to favourable biological factors but also to a supportive material, social and psychological environment. Given that good health is an outcome of various favourable life circumstances, there is a need for systematic research in order to gain a deeper and comprehensive understanding of good health and its multifaceted determinants. Only then will it be possible to ensure that societal interventions aimed at promoting the health of individuals are correctly, efficiently and duly directed.

Awareness of the potential effect of psychological factors on somatic health developed in the early 20th century. Along with the emergence of stress theory in the 1970s, research on the role of personality and psychosocial factors in health became more common. Thus far, health research has identified personality features and emotions that are assumed to affect health both negatively (type A personality, hostility, depression, anxiety, neuroticism) and positively (self-efficacy, hardiness, locus of control, optimism).

Sense of coherence (SOC) theory, developed in the late 1970s by the American-Israeli medical sociologist Aaron Antonovsky, represents the latter research tradition focusing on psychological health resources (Antonovsky 1979, Antonovsky 1987). However, unlike various other related theories (e.g., Bandura's self-efficacy and Rotter's locus of control theories), SOC does not represent a fixed way of behaving in a certain way in a given situation: it rather reflects a flexible orientation to life that promotes successful coping. Moreover, Antonovsky emphasizes more strongly than others his focus on good health and on seeking answers to the question: "How do people manage stress and stay well"? His theory is therefore often described as salutogenic (vs. pathogenic). As far as the development and level of SOC is concerned, its determinants, known as generalized resistance resources, play a crucial role. Many of these are in some way societal, such as childhood living conditions, education, wealth, occupation, working circumstances, and social ties and support (Antonovsky 1979, Antonovsky 1987). Accordingly, in individualizing these determinants Antonovsky made his theory sociologically/social epidemiologically approachable. He was determined to increase justice and equity among individuals, and he emphasized the role of society in creating conditions that foster coping strengths and allow people to maintain and develop good health (Eriksson 2007).

A systematic review of SOC studies was published almost thirty years after the first formulations of the theory (Eriksson & Lindström 2005). SOC is thus described as a resource promoting the development of a positive state of health. Further, unhealthy people with a strong SOC cope better with their sickness (Eriksson & Lindström 2005). However, there are still open theoretical questions that need to be explored. Most studies so far treat SOC as an independent explanatory factor. There is thus a need for more detailed knowledge of the factors determining SOC, and eventually good health, in order to promote health and equity in health status among individuals. The present study explores the determinants of SOC, in other words a wide range of generalized resistance resources from different spheres of life, in more detail than hitherto, and also covers aspects related to gender and language group.

Another open question concerns the stability of SOC. If it really is to serve as coping mechanism, it could be argued that it should be a stable personality disposition, just as Antonovsky claimed it was. However, its stability has been questioned, and therefore needs clarification and further exploration. One empirical approach is to examine the impact of negative life events on SOC.

Finland is an appropriate context in which to conduct comparative research on the determinants of good health in two groups, Finnish and Swedish speakers. Previous studies have shown that Swedish speakers work and live longer, and report better perceived health compared to Finnish speakers (Suominen et al. 2000, Finnäs 2002). It has been argued that one explanation for the health disparity between the two language groups is the higher social capital of Swedish speakers (Hyypä 1999, Hyypä & Mäki 2001b). However, previous studies have not provided a comprehensive account of the factors explaining the better well-being of Swedish speakers compared to Finnish speakers. Given the need to further clarify this issue the aim in the present study is to find out whether the levels of generalized resistance resources and SOC differ between the two language groups, in other words whether the answer to the health disparity lies partly in the different orientations and attitudes towards the world and oneself, the level of SOC.

Another current societal discussion in Finland relates to early retirement, which could be considered a suitable health related outcome from the perspective of SOC theory. A poor health status is the greatest single factor pushing people to retire early. In 2007, around 50 per cent of people aged 60-64 were retired, and about half of them were on a disability pension due to either mental or somatic illness (Statistical Yearbook of... 2008). It is worth noting,

however, that given the same conditions, some people continue working whereas others consider early retirement. It thus seems that people's attitudes and psychological processes and resources also have an influence on whether or not a health problem is associated with a deterioration in work ability (Suominen et al. 2005). Yet, studies on individual differences in terms of personality are sparse in the literature on retirement. The present study explores the association between SOC and intentions to retire in order to find out whether a strong SOC has a protective effect.

In sum, the aim of the study is to obtain more detailed knowledge about levels of SOC and the quality and quantity of the most crucial resistance resources among Finnish- and Swedish-speaking women and men. Further, given the argument that SOC is crucial for successful coping, the exploration also covers the debated issue of whether a strong SOC is a stable coping mechanism in the presence of negative life events. Finally, in order to enhance knowledge about the subjective and psychological factors behind the retirement process, research attention is given to the association between SOC and the intentions to retire early. The aim in each sub-study (I-IV) was, in addition to exploring the association between SOC and the different factors, to explore Antonovsky's arguments on an empirical level, in other words to develop the theory of SOC in a more pragmatic direction.

Given the above-mentioned aim to empirically explore some of Antonovsky's theoretical arguments, such as resistance resources and SOC stability, a brief presentation of the salutary theory of SOC is given in Chapter 2. Chapter 3 reviews previous empirical research on the focal issues addressed in the present study. Chapter 4 describes the theoretical frames and purpose of the study, and Chapter 5 covers the material and methods used. The main results are presented in Chapter 6, illustrated in tables and bar charts. Finally, Chapters 7 and 8 discuss the main findings, give an overall assessment of the determinants and consequences of SOC, suggest implications for further research, and present the conclusions.

2 THEORY OF SENSE OF COHERENCE

2.1 The definition of sense of coherence

Why do some people stay healthy regardless of severe hardship, and others do not? In the late seventies Antonovsky (1979) proposed a salutogenic approach to the origins of health (versus the origins of diseases), based on the assumption that the human environment causes strain. The stressors responsible for this may be genetic, microbiological, personal, economic, social, cultural or geo-political. The normal state of the human organism is one of disorder and conflict rather than stability and homeostasis. Antonovsky focused on making order out of chaos, and emphasized the importance of coping resources in dealing with stress. He sought a construct that would characterize the shared components of a wide variety of generalized resistance resources, such as childhood living circumstances, social support, cultural stability, education and income, and that might explain how they facilitate coping with stressors and promoting health. Consequently, he found that what these various generalized resistance resources have in common is a life orientation, which he called sense of coherence (SOC) (Antonovsky 1979, Sagy & Antonovsky 2000).

According to Antonovsky's definition (Antonovsky 1987) SOC is:

“a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that 1) the stimuli, deriving from ones internal and external environment in the course of living are structured, predictable and explicable; 2) the resources are available for one to meet the demands posed by these stimuli; 3) these demands are challenges, worthy of investment and engagement”.

SOC thus has three main components: comprehensibility, manageability and meaningfulness (Antonovsky 1979, Antonovsky 1987).

Antonovsky discusses similarities with some convergent concepts explaining health, such as hardiness (Kobasa), a sense of permanence (Boyce), domains of the social climate (Moos), resilience (Werner and Smith), and a family construction of reality (Reiss), self-efficacy (Bandura), learned resourcefulness/helplessness (Seligman) and locus of control (Rotter), all of which include some salutogenic elements. Smith and Meyers (1997) found in their empirical study, consistently with Antonovsky's contention, that SOC was positively

associated with hardiness, locus of control and self-efficacy, and negatively with learned helplessness. However, it is argued that SOC differs from the above concepts in that it is not a fixed trait in people to cope in certain manner in different situations, but a flexible life orientation to problem solving and coping through the mobilization of appropriate resistance resources.

SOC has also been studied in the context of personality traits. Only few decades ago the prevalent opinion among personality experts was that personality traits did not exist, and that situational factors swamped personality variables in accounting for what people actually did. However, the current discussion ascribes personality traits a privileged status. There is widespread acceptance of the five-factor model of personality, often called the Big Five, according to which individual differences in social and emotional life fall into five broad categories derived from factor analysis, and most commonly labelled extraversion (vs. introversion), neuroticism (negative affective), conscientiousness, agreeableness, and openness to experience (McAdams & Pals 2006, Sutin et al. 2010b). Feldt et al. (2007) analysed the conceptual relationship between SOC and the five-factor model of personality. They reported a strong negative association between a high SOC and neuroticism (-0.85), and a modest positive association between SOC and extraversion, openness, conscientiousness and agreeableness, thus concluding that SOC and reversed neuroticism, i.e., emotional stability, are closely related constructs.

In addition to psychological element, SOC has a strong sociological element, given that coping is not exclusive to the person concerned, but also involves interaction between people and the society around them, in other words the human resources and circumstances of the living context. Antonovsky contended that salutogenesis was an interdisciplinary approach bringing coherence between different disciplines and realization of what connects them (Eriksson 2007). SOC theory lies in the middle ground between sociology and psychology. In highlighting and concentrating on the socially determined resources and aspects of the theory the present study therefore represents the social-epidemiological approach.

2.2 The development of sense of coherence

According to the theory, particular psychological, social, cultural and historical situations and circumstances are likely to provide the developmental and reinforcing experiences that result in a strong SOC. These circumstances serve as sources of generalized resistance resources (Antonovsky 1979). Parental values and child-rearing patterns are seen as a psychological source of such resources. The SOC developmental process begins at the same time as the child begins to interact with his/her environment.

The development of SOC during infancy and childhood

According to Antonovsky, a child will experience a feeling of security in surroundings characterised by consistent and familiar experiences as well as constant and permanent close relationships. Consequently, he or she will be able to perceive stimuli deriving from his/her internal or external environment as familiar and routine, and will begin to respond in a similar way. Thus the world begins to appear consistent and a sense of comprehensibility develops (Antonovsky 1987).

In addition to being consistent, the response should also be delightful. The infant is a proactive being, who unequivocally seeks ways of shaping his/her environment and the behaviour of others. If the outcome is coherent regarding the child's actions, it could be said that, early on, there is participation in shaping outcomes and socially valued decision-making (crying, hungry child gets cuddled and fed), which provides the basis for the meaningfulness component (Antonovsky 1987).

According to Antonovsky, experiences of load balance develop a sense of manageability. Load balance refers to the extent to which people suffer over/under-load in terms of the appropriateness of the demands made upon them and their resources. Parents, who are oriented towards complexity, flexibility, alternatives and self-direction, in the sense that problems are manageable and solvable, are likely to respond to the child so as to avoid under-load and over-load. The stronger the SOC of the parents, the more likely they are to be able to offer the child life experiences leading in the same direction (Antonovsky 1987).

Antonovsky refers to many psychologists of the time in his analyses of the role of childhood living conditions with regard to the development of SOC. However, there are few empirical studies focusing on the association between childhood living circumstances and the level of SOC in adulthood.

The development of SOC during adolescence and adulthood

Antonovsky argues that the basic level of SOC develops during infancy and childhood. The next layer is built during adolescence. This often restless and uneasy period of life may either strengthen or threaten the basic SOC level. This basic level is best strengthened in a complex and open society that provides a wide variety of legitimate and realistic options. SOC development is more complicated in surroundings of uncertainty, unpredictability and poverty. However, Antonovsky emphasises the fact that adolescence also opens up several different paths to the reinforcement of the basic level of SOC (Antonovsky 1987).

The so-called tentative level develops during adolescence, on the threshold of adulthood. The upcoming development trends are influenced by engagement in long-lasting relationships, social roles and working life, and the quality and quantity of these resources determine the final level of SOC during the last phase of the developmental process, in other words between the ages of 20 and 30. SOC development thus begins in early childhood and ends at around the age of 30 (Antonovsky 1987). It is assumed to be stable thereafter, although this supposition has attracted much criticism (see Chapter 2.5).

2.3 Generalized resistance resources

Another question that challenged Antonovsky in addition to the question of the origin of health was why well-off, highly educated people are healthier than people in the opposite situation. How does education, for example, turn into health?

According to Antonovsky (1979), the attainment of a full strength SOC is dependent on the presence of generalized resistance resources, at least during the developmental process. These generalized resources are defined as any characteristic of a person, primary group, subculture or society that is able to facilitate effective tension management. By definition, they contribute to life experiences that are characterized by consistency, participation in shaping of outcomes, and an under-load-overload balance. Repeated life experiences of this kind are SOC enhancing in that they are closely linked to the three areas in which SOC resides, namely comprehensibility, manageability and meaningfulness (Antonovsky 1987). Resistance resources help people to cope successfully. Each new experience of success further reinforces their trust and confidence, which is reflected in their

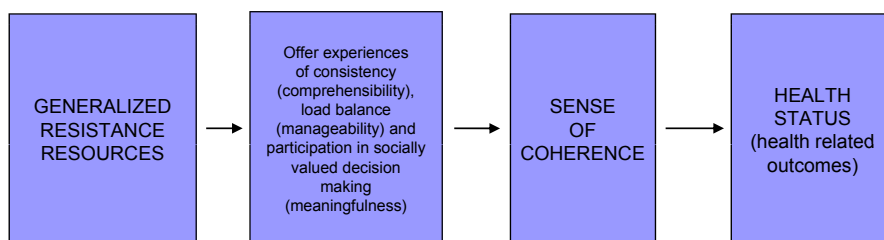


Figure 1. Schematic representation of the role of generalized resistance resources in the production of good health.

SOC and hence, eventually, in their health and wellbeing. SOC mediates the effects of generalized resistance resources into health (see Figure 1).

According to Antonovsky, generalized resistance resources include any physical (genetic strength, immunologic features), cognitive and emotional (ego identity, knowledge-intelligence, self-esteem, cultural capital, traditions) and valuative-attitudinal (coping strategies) features that maintain good health. However, investigation of these intrapersonal resources is beyond the scope of this social epidemiological research, which focuses on the various ‘external’ resistance resources Antonovsky considered crucial to the level of SOC. The most important of these resources include childhood living conditions, education, wealth, work-related factors, and social life and support (Antonovsky 1987). For example, access to money is a crucial generalized resistance resource in most societies: money buys a better doctor, for example, but is also linked to the acquisition of other such resources. More important than the amount of generalized resistance resources is the ability to mobilize them correctly. On the other hand, generalized resistance deficits introduce entropy into the system and can develop into stressors. Antonovsky (1987) distinguishes three different kinds of stressors: chronic stressors, major life events, and acute daily hassles. Chronic stressors (e.g., a lack of education, poverty, unemployment, a lack of social relationships) represent the greatest risk as far as the level of SOC is concerned (Antonovsky 1987).

Full understanding of the concept of SOC requires knowledge of the factors promoting its development. However, Antonovsky was not all that particular in specifying the conditions leading to a strong SOC, and did not empirically study the role of generalized resistance resources. SOC theory is subject to debate not least because of the obscurity of the developmental processes involved (Geyer 1997). More detailed knowledge of the factors that promote SOC is needed in order to enhance understanding of the concept and its development, in other words the pathways that lead to a strong SOC. Only then will it be possible to direct societal interventions where they are needed in order to support such development and, eventually, good health.

2.3.1 Language related resistance resources

SOC does not develop in a vacuum, and is strongly dependent on the external social circumstances. In other words, the social environment and reality shape the life orientation of people. SOC develops more favourably among those who grow up in a mentally and socio-economically stable environment, with clearly established norms and values (Lundberg & Nyström Peck 1994). Furthermore, the more resistance resources an individual has, the better chances he or she has to develop a strong SOC (Antonovsky 1987). In other words, SOC is strongly related to how people integrate into their social environments. As Antonovsky puts it, it is a global orientation to life that transcends cultural lines and is therefore disposable in different cultural settings and countries. There are very few empirical comparisons of countries or different ethnic and language groups within one country or limited region focusing on SOC and generalized resistance resources. Some studies on SOC and ethnicity suggest that SOC is weakest among disadvantaged minorities (Bayard-Burfield, Sundquist & Johansson 2001, Gibson 2003).

Finland offers an excellent opportunity to study two different language groups, Finnish- and Swedish-speaking Finns, with regard to their levels of SOC and generalized resistance resources. Although in the minority, Swedish-speaking Finns do not comprise a disadvantaged language group. It has been argued that, because of its size and regional distribution, the Swedish-speaking population lives in tighter social networks than the Finnish speakers, and that this has clear effects on different aspects of life. For example, Swedish speakers have been found to experience stronger marital stability (Finnäs 1997), to have lower unemployment rates (Saarela & Finnäs 2002a, Saarela & Finnäs 2003c), a higher

socio-economic position (Saarela & Finnäs 2004, Saarela 2004) and higher levels of education (Saarela & Finnäs 2003b).

Moreover, earlier studies have shown that the health status of Swedish speakers is better than that of Finnish speakers: the rate of early retirement due to disability is lower among Swedish speakers (Hyypä & Mäki 2001b, Saarela & Finnäs 2002b), the perceived health of Swedish speakers is better than that of Finnish speakers (Suominen et al. 2000, Hyypä & Mäki 2001b, Saarela & Finnäs 2003a, Nyqvist 2009), and Swedish-speaking Finns live longer than the Finnish-speaking majority (Finnäs 2002, Valkonen 1982, Valkonen & Martelin 1988, Koskinen 1994, Näyhä 1989, Sipilä & Martikainen 2009). These language group differences in health and wellbeing cannot be attributed to socio-demographic and regional factors (Valkonen 1982, Koskinen 1994, Martelin 1994), nor do they vanish when factors such as age, sex, education, family situation and socio-economic position are controlled for.

It has been argued that one explanation for the health disparity between language groups lies in their social relationships. Several terms are used to describe social relationships: social support, social networks, social integration and social capital. The connection with health is in the assumption that other people can influence cognitions, emotions, behaviour and biological responses in ways that are beneficial to health and wellbeing (Eriksson 2007). According to Hyypä and Mäki (2001b), compared to Finnish-speaking communities in the same region, Swedish-speaking communities are characterized by higher levels of social capital, in which they include civic trust and mistrust, auxiliary friends, religious attendance, and community and associational participation. Furthermore, the social integrity typical of a community is associated with the better health of Swedish speakers (Hyypä & Mäki 2001a, Hyypä 2002). According to Nyqvist (2009), Swedish-speaking Finns have consistently higher levels of social capital than Finnish speakers even when the major socio-demographic variables are controlled for. However, social capital is often, but not always, associated with health: the relationship is complex and multidimensional.

In order to improve the health of the more disadvantaged group (here, Finnish speakers), there is a need to enhance understanding of the factors that explain the better health status of Swedish speakers. According to the results of the above studies, Swedish speakers, compared to Finnish speakers, seem to possess higher levels of generalized resistance resources (in the form of socio-demographic factors and social capital), which in theory could result in a differentiated orientation to the self, life and its challenges and, eventually, the level of SOC

in these two language groups. Antonovsky argues (1987) that all factors that facilitate effective coping are generalized resistance resources, i.e., also social capital. In this sense these two separate but related theories of SOC and social capital could be connected. The present research does not explore this association, however. The differences between Finnish- and Swedish-speaking Finns are considered from the perspective of SOC theory through comparison of the levels of generalized resistance resources and SOC. This research approach was motivated by the need to gain a more comprehensive understanding of the factors (and not only those associated with social life) that could conceivably lie behind the differentiated status of well-being between the two language groups.

2.3.2 The role of gender

People's lives are determined by their gender in many respects, with regard to occupation, salary (Laaksonen et al. 2010), health status and life expectancy (Lahelma et al. 1999), reproductive responsibilities and social ties (Väänänen et al. 2008), for example. Basing his arguments on Condry (1984), Antonovsky suggests that gender roles are adopted because they allow us to act competently in the world. Thus we can control the social world and anticipate and manipulate its causal structures (Antonovsky 1987). The implication is that life can be managed and controlled, and therefore comprehended and experienced as meaningful, by people as women or men.

Antonovsky analyses the housewife's role as follows: "From early childhood, a woman has known that her destined role is that of a wife and a mother. Through attachment and identification, she has had the chance to acquire the great variety of skills needed to perform this role well. Moreover, she has learned early on that not only does her culture value this role highly, but it is regarded as the cornerstone of the society..." (Antonovsky 1979). Despite the fact that this analysis reflects the reality of housewives in America and Israel in the 1970s, and that now, in the 21st century, the housewife's role may not necessarily be greatly valued, it nevertheless pinpoints the significance of the socialisation process, social values and gender roles, as well as expectations attached to them, regarding the level of SOC.

Antonovsky does not specifically discuss the role of gender in his theory. He does claim, however, that poor and working-class women run the greatest risk of a low SOC, and that class differences are as significant as gender differences (Antonovsky 1987). In other words,

he saw women in a subordinate position regarding the level of SOC compared to men. Most studies focusing on gender differences report higher scores on the SOC scale among men than among women (Larsson & Kallenberg 1996, Antonovsky & Sagy 1985, Anson et al. 1993). However, Antonovsky does not specifically discuss the role of gender in his theory in terms of the association between generalized resistance resources and SOC, in other words whether gender differences exist in the generalised resistance resources promoting SOC due to the somewhat different respective social realities and expectations.

Further, there is no previous empirical research on the association between generalized resistance resources and gender. If we are to understand more thoroughly the theory of SOC and the determinants that promote health among women and men, we should address the questions of whether generalized resistance resources are equally distributed between the genders, and whether the same resources are equally important for both regarding the level of SOC.

2.4 The salutary principles of sense of coherence theory

2.4.1 Sense of coherence as a tool for successful coping

Having a strong SOC is believed to be a major coping resource for maintaining good health. Coping includes both the ability to mobilise resources in order to manage the situation (instrumental), and the ability to regulate emotions in the situation (emotional) (Lazarus & Folkman 1984). According to Antonovsky, people are constantly, non-stop, bombarded by different stimuli and demands. However, the definition of stressors should not be extended to all stimuli that are taxing because that underlies the widespread failure to distinguish between tension and stress that derives from a pathogenic orientation. Only if the individual appraises the stimuli as exceeding his or her resources and hence endangering his or her well-being is the stimulus a stressor (Antonovsky 1987).

According to Antonovsky (1987), a person with a strong SOC is more likely to define stimuli as non-stressors and to assume that he or she will adapt automatically to the demand. Then again, if the stimuli are appraised as stressors, someone with a strong SOC is more likely to define them as comprehensible, manageable and meaningful, in other words, benign or irrelevant, and to feel confident that the tension will quickly dissipate. The ability to comprehend the problem also enables the management and identification/regulation of

emotions, thus motivating action. The appraisal of a stimulus as a non-stressor on the one hand, and the ability to define a stressor as irrelevant on the other, are attributable to the generalized resistance resources that inspire confidence in strong SOC persons that, as in the past, by and large things will work out well, and that what seems to be a problem will turn out to be less serious and is reasonably resolvable. The tension evaporates, and instead of damaging health, leads to a neutral or even a health-promoting outcome (Antonovsky 1987). The healthy effect of a strong SOC is that it lowers the probability that tension will be transformed into health damaging stress.

A strong SOC is also associated with health behaviours, and eventually with health status. According to Antonovsky, people with a strong SOC will engage in adaptive health behaviours more often than those with a weak SOC, all other things being equal (Antonovsky 1987). The third route between SOC and health goes through the central nervous system. In addition to mobilising emotional and cognitive intra- and interpersonal and material resources in order to cope with problems, a person with a strong SOC also mobilizes neuroimmunological and neuroendocrinological resources to prevent damage to the organism.

For the purposes of empirical exploration, Antonovsky put his theory into practice in the form of the Orientation to Life Questionnaire (OLQ), comprising 29 questions (SOC-29), after conducting a pilot study among 51 respondents. According to the first empirical studies carried out in England and Israel during 1983-1987, the consistently high Cronbach's alpha levels (ranging between 0.84 and 0.93) confirmed the internal consistency and the reliability of the instrument (Antonovsky 1987). A shorter version comprising 13 questions came into use later (SOC-13).

Since then, the association between SOC and health as predicted in the theory has been examined at least in 32 countries all over the world. According to a systematic review conducted during 1992-2003 and including 458 scientific publications and 13 doctoral theses (Eriksson & Lindström 2005), SOC has a major, moderating or mediating role in the explanation of health. Furthermore, it appears to be able to predict health (Eriksson 2007).

2.4.2 Retirement process in the context of health and sense of coherence

The Finnish population is ageing more rapidly than populations in other OECD countries. At the same time, the employment-population ratio among people aged 55-64 is below the EU average, and is lower than in Finland's Nordic neighbours. The main reason for early exit from the labour market in Finland is early retirement on the grounds of disability: in 2007 around 24 per cent of people aged 60-64 were receiving a disability pension (Statistical Yearbook of... 2008).

In the Finnish pension system, a disability pension is granted to people with a medically confirmed illness, disease or injury that essentially restricts or prevents their working. In other words, medical reasons are evident predictors of early retirement. In terms of the retirement process, it is noteworthy that, given the same conditions some people continue working whereas others begin to consider early retirement. Thus people's attitudes and psychological processes and resources also have an influence on whether or not a health problem is associated with a decreased ability to work (Suominen et al. 2005). Yet, studies on individual differences in personality are sparse in the literature on retirement.

According to Beehr (1986), early retirement is a process that occurs over a period of time preceding both the intention and the decision to retire before the official retirement age. Both personal (e.g., personality attributes, health, skills obsolescence, personal financial status) and environmental (e.g., the attainment of occupational goals, job characteristics, the marital and family situation and leisure pursuits) factors affect intentions to retire early (Beehr 1986).

It has been shown that the intentions to retire early predict actual early retirement (Harkonmäki et al. 2009). The focus in the present study is on the role of SOC in the early phases of the process. The intentions to retire early is an interesting health-related outcome given the multifaceted causalities of different factors as well as the lack of clarity regarding the role of individuals' subjective and psychological features in the retirement process.

2.5 The stability of sense of coherence

An essential feature of SOC is that it is, in theory, a fairly stable dispositional orientation. It is claimed to develop from early childhood to approximately the age of 30. After this age it is assumed to be relatively stable in that most people have made their major life commitments

with regard to marriage, occupation and work, and lifestyle, and have established their social roles. All this provides a stable set of life experiences that foster SOC (Antonovsky 1979, Antonovsky 1987).

The current psychological knowledge partly confirms this view, according to which the adoption of social roles plays a part in trait changes and consistency. However, Antonovsky's argument in favour of the stable nature of SOC may not be in accordance with current psychological knowledge regarding trait consistency (see 3.3 and 7.2.7).

However, Antonovsky also points out that SOC is not immutable. He emphasises its dynamic nature, acknowledging that some modifications, "fluctuations around a mean level" as he calls it, may occur throughout the life course as a result of major changes in an individual's generalized resistance resources. The death of a spouse, for example, or unemployment can undermine a mediocre or weak SOC, whereas a strong SOC remains either stable or, when undermined, is only temporarily weakened. Further, very persistent or serious illnesses may jeopardize the level of SOC by causing work disability (Antonovsky 1987). However, the change in SOC would be no greater than 10 per cent, and the level would return to normal once the reason for the change was no longer present (Smith, Breslin & Beaton 2003).

According to Lindström and Eriksson's systematic review (2005) of SOC research conducted during 1992-2003, SOC is comparatively stable over time, but not as stable as Antonovsky assumed. The moderate correlation with life events revealed an association with changes in living conditions (Eriksson & Lindström 2005). One empirical approach to the question of the stability in SOC, or coping ability, would be to examine the impact of negative life events on a strong SOC in a prospective study setting. Until recently there has been little scientific interest in the stability of SOC, and especially of a strong SOC, under strenuous life circumstances. Given Antonovsky's argument that SOC is a flexible and adaptive dispositional orientation enabling successful coping with adverse life events and experiences, it would be worthwhile investigating its stability in such circumstances.

2.6 For and against the theory of sense of coherence

Criticism of the theory

Antonovsky's theory has attracted a great deal of scientific interest since he devised it in the late 1970s. It has also met a lot of criticism. As Eriksson (2007) shows, the criticism is wide-ranging: the concept is argued to be psychometrically unclear, confounded with emotions, full of contradictions, lacking in evidence of stability over time, and deficient in predicting physical health status. The claims regarding the validity of the SOC measurement are perhaps the most serious. In terms of reliability, however, most studies report the SOC scale to be internally consistent.

Does the SOC scale measure a phenomenon called sense of coherence, in other words, does SOC exist? It has been suggested that a high negative correlation between SOC and measures of mental health indicates that the instruments may assess the same phenomenon (Geyer 1997). Further, previous studies report a strong association between SOC and psychological complaints including pathogenic factors of depression and anxiety (Kivimäki et al. 2000, Kontinen, Haukkala & Uutela 2008, Frenz, Carey & Jorgensen 1993), and with neuroticism (Feldt et al. 2007).

The close association between SOC and depression, for example, raises the question of the meaningfulness of exploring SOC (or any other psychologically oriented determinant of health) as a separate determinant of mental health on the one hand, and of including it in the definition of mental health, on the other. It has been suggested that SOC, anxiety and depression should be brought into the same scientific discussion on the assumption that research of this kind could have a positive impact on the application of these constructs to the development of theory-based health programmes (Kontinen, Haukkala & Uutela 2008).

Antonovsky also claimed that even though each item of his questionnaire (SOC-29/SOC-13) represented one of the three dimensions of SOC, the scale measured the SOC construct unidimensionally. Few studies using exploratory factor analyses support the one-factor solution for both SOC-13 and SOC-29 (Frenz, Carey & Jorgensen 1993, Antonovsky 1993, Flannery & Flannery 1990), whereas Sandel et al. (1998) report somewhat different results. Further, several confirmatory factor analyses support the theoretically based correlated three-factor solution (Feldt et al. 2000, Feldt et al. 2003, Feldt, Leskinen & Kinnunen 2005,

Hakanen, Feldt & Leskinen 2007, Feldt et al. 2007). Hence the SOC scale is multidimensional rather than unidimensional (Eriksson 2007), as Antonovsky argues.

The strengths of the theory

Whatever the theory, there is a need for empirical research associated with it and critical investigation, both of which contribute to its development and practicability. This naturally also applies to the SOC theory. Even though there are several studies reporting its validity (Eriksson 2007), in other words that contradict the criticism, further clarification and development are required. This is one of the aims in the present study, although the focus is not on validity. Nevertheless, more research on the validity of SOC is needed (see 7.4).

Antonovsky's salutogenic notion of comprehensibility, manageability and meaningfulness comprising a generalised life orientation to perceive and control the environment in a health-promoting way is logical and grounded, which may partly explain its popularity in health research. Additionally, given its strong association, SOC may be regarded as a determinant of mental health. This adds to the significance of the theory in the field of public health (research) in that mental health is often considered secondary to physical health. SOC theory offers researchers a new approach to mental health, its determinants, and developmental circumstances, and a means of successful intervention.

Additionally, in individualising the generalized resistance resources that are society bound, SOC theory highlights the sociological or social-epidemiological nature of somatic and mental health. The most rewarding element in the theory is its focus on factors that *promote good health*. According to Antonovsky, poor health and good health are not merely two sides of the same coin. Different phrasing of the question could produce valuable new information concerning the good health of individuals. Finally, in taking account of childhood living circumstances Antonovsky combines the life-span approach with its sociological perspective on resources with the discourse on health promotion.

3 REVIEW OF PREVIOUS EMPIRICAL RESEARCH

3.1 Empirical evidence of the association between sense of coherence and health

3.1.1 Sense of coherence and health

Empirical studies report that individuals with a strong SOC avoid stressors more easily and experience fewer negative life events, whereas those with a weak SOC are more likely to interpret stressors as threatening and anxiety-provoking (Anson et al. 1993, Antonovsky & Sagy 1986). Moreover, individuals with a weak SOC tend to experience more distress and anger when confronted with stressors, and are more likely to report minor stressors as a chronic source of stress (Antonovsky & Sagy 1986, McSherry & Holm 1994).

According to Wainwright et al. (2008), the SOC concept embraces multiple sets of chronic-disease risk factors that include lifestyle choice and factors associated with socio-economic status, and is potentially helpful in understanding differences in health outcomes among similar individuals.

Numerous cross-sectional studies have produced evidence that SOC is positively associated with health behaviours (Kuuppelomäki & Utriainen 2003, Midanik et al. 1992, Bernabe et al. 2009, Savolainen et al. 2009, Lindmark et al. 2005), physical and psychological health (Lundberg & Nyström Peck 1994, Larsson & Kallenberg 1996, Flannery & Flannery 1990, Lundberg 1997, Suominen et al. 1999, Dahlin et al. 1990, Nyamathi 1991, Dangoor & Florian 1994, Söderberg, Lundman & Nordberg 1997) and self-rated health (Anson et al. 1993, Suominen et al. 1994).

Moreover, longitudinal studies suggest that SOC predicts good health, and that it affects health rather than the other way round (Kivimäki et al. 2000, Suominen, Helenius & Blomberg 1996, Kouvonen et al. 2008, Kouvonen et al. 2010, Carmel & Bernstein 1989, Bernstein & Carmel 1991, Sagy & Antonovsky 1990, Poppius et al. 1999, Suominen et al. 2001). There is also evidence of an association between SOC and all-cause mortality (Surtees et al. 2003, Poppius et al. 2003), and mortality among the oldest age groups (Lundman et al. 2010).

SOC seems to have an impact on and predictive value in terms of the quality of life: the stronger the SOC, the better the quality of life (Eriksson 2007). Furthermore, both cross-

sectional (Nahlen & Saboonchi 2009) and prospective (Kennedy et al. 2009) empirical studies report that people with a strong SOC cope better with both chronic health problems and mental health problems.

SOC has also been associated positively with self-esteem (Petrie & Brook 1992), optimism and quality of life (Eriksson 2007), and negatively with neuroticism (Feldt et al. 2007) and hostility (Eriksson & Lindström 2005), all of which are associated with health and well-being. Further, according to a Finnish seven-year follow-up study (Kivimäki et al. 2002), SOC is a mediator between hostility and health among women.

Eriksson and Lindström found in their systematic review (2005) that SOC appears to have different effects on the various dimensions of health: it seems to be strongly associated with perceived good health, especially along the mental dimension and at least among people with a strong SOC. The relationship between SOC and physical health is more complex, and seems to be weaker than with mental health. According to Eriksson (2007) SOC is not the same as health: according to their analysis of variance it is strongly related, especially to mental health, and partly explains health, but the rest of the variance is attributable to or accounted for by other factors, such as age, social support and education.

There is only one study focusing on SOC in a Swedish-speaking context in Finland, namely in the Åland Islands. Eriksson et al. (2007) explored the reasons for the lower pharmaceutical consumption and lower levels of most chronic diseases, including depression, in the Swedish-speaking Åland Islands compared to the rest of Finland. On the international level, the mean SOC of the Åland Islanders is high (70.7): two-thirds of the respondent population rated their own health as good, which corresponds well to earlier findings among Finns and Swedes (Eriksson, Lindström & Lilja 2007). Of the Åland Islands population, eight per cent had a moderate level of depression (BDI), which corresponded quite well with the level found earlier in Finland (6-8% depending on the study). However, the low mean score (2.8) among the Åland Islanders differed from the 8.7-per-cent mean identified earlier among Finns. The high level of a strong SOC was a significant explanatory factor for the low mean score for depression.

3.1.2 Sense of coherence and retirement process

To our best knowledge only one study has explored the association between SOC and disability retirement. A prospective cohort study (Suominen et al. 2005) showed that, independently of initial health, a weak SOC among people aged 50 years or less was associated with an increased incidence of disability retirement.

Only a few studies address the association between SOC and the retirement process, or early retirement. A Finnish study (Huhtaniemi 1995), using a construct quite close to SOC, i.e. a sense of life control, showed that the impact of health concerns and aspects of job stress on intentions to retire early varied depending upon the occupation and sense of life control of the subject: the higher the belief in one's ability to influence one's own life and to be responsible for oneself, and the more favourable the self-image, the less likely one is to think about early retirement.

According to HUUHTANEN and TUOMI (2006), high levels of the comprehensibility and manageability components of SOC weaken the intentions to retire early. RASKU (1993) and RASKU and KINNUNEN (1995) also showed that a weak SOC was associated with intentions to retire early, and highlighted the concomitant push factors. Moreover, JANATUINEN (2001) found that a strong SOC was associated with the wish to continue working until the official retirement age. However, these studies concerned only a few occupational groups and were based on relatively small (N= 1012-1823) cross-sectional surveys.

3.2 Previous studies on generalized resistance resources

3.2.1 Childhood as generalized resistance resource

There are few studies on the development of SOC during childhood and adolescence, although there are some on the role of childhood living conditions on adult SOC. SAGY and ANTONOVSKY (2000), for example, explored whether family structural characteristics (parental economic status and educational level) and early life experiences (consistency, load balance, participation in shaping outcomes and emotional closeness) during childhood were related to the development of SOC. According to their findings, the most relevant childhood experiences related to adult SOC were participation in shaping outcomes (meaningfulness) and load balance (manageability). They found no relationships between SOC and consistency

(comprehensibility) or emotional closeness, although there was an association with parental economic status and educational level. Later research investigated the role of the structural characteristics of the family and life experiences within the family context during adolescence in adult SOC. The experiences during adolescence that correlated most highly with adult SOC were load balance (manageability), participation in shaping outcomes (meaningfulness) and emotional closeness. No relationship between SOC and consistency was established. There were high correlations between family educational level during the respondent's adolescence and adult SOC: in particular, parental economic status and educational level were highly correlated with load balance (manageability). Another study examining the factors associated with SOC during adolescence (Marsh et al. 2007) reported a positive relationship with social support and neighbourhood cohesion among both males and females.

According to Kalimo and Vuori (1991), a good quality of home care during youth is associated with a strong adult SOC among males and females, and among the highly educated. Feldt et al. (2005), in turn, found that child-centred parenting in adolescence and a stable career line in adulthood were directly associated with a strong SOC at 42 years of age. Furthermore, child-centred parenting, a high parental socio-economic status and school success at 14 years of age were indirectly associated with adult SOC via education and career stability. Lundberg (1997) examined the association between childhood conditions and adult SOC, and found that only dissension in the childhood family had a direct effect. Experiences of economic hardship in childhood had a weak indirect effect, mediated through adult class position. Moreover, SOC did not mediate the effect of childhood conditions on adult health: childhood conditions and adult SOC rather appeared to be complementary, and were additive risk factors for adult illness.

Wolf and Ratner (1999) found that exposure to traumatic life events in childhood was a stronger predictor of SOC than exposure during adulthood. They concluded that pre-adulthood stressors are the most influential in terms of the development of SOC. Respondents who encountered childhood stressors such as parental divorce, family stress, physical abuse and parental alcohol or drug use were most likely to have a weak SOC as adults. Kranz and Östergren (2000) reported contradictory results showing that early-childhood events, such as living with one parent, lacking siblings in the family and being subjected to violence did not appear as statistically significant risk factors for a weak SOC in adulthood, whereas recent

life experiences such as job strain, low social support and low social anchorage in adulthood were independent predictors of a weak adulthood SOC.

Honkinen (2009) found that childhood behavioural problems from the age of three years predicted a poor SOC at the age of 18. She concluded that identification of behavioural problems in early childhood would help to identify children at risk of ill-being and poor SOC in adolescence.

3.2.2 Socio-economic and psychosocial resistance resources

A number of studies examining the resistance resources of SOC have been carried out in Sweden. Lundberg (1997) found that social class as well as age were related to SOC: white-collar employees and entrepreneurs, together with middle-aged people, achieved the highest scores on the SOC scale. Gender was unrelated to the SOC level. Lundberg and Nyström Peck (1994) further showed in a 10 year follow-up that age and social class were clearly related to a poor SOC, whereas gender was not. Blue-collar workers as well as farmers had a higher-than-average risk of reporting a poor SOC, whereas the opposite was true for white-collar employees and the self-employed. Older people were also more likely to score low on the SOC scale.

A study conducted by Larsson and Kallenberg (1996) showed that gender, age, occupation, income, number of friends, and the number of persons in the household were all related to SOC, although educational level was not. In other words, young men with a high occupational status and income level, who were not living alone, and who had friends, reported the highest levels of SOC. Suominen (1993) reported in a Finnish study that life control (SOC and life satisfaction) was related to strong social integration, a high socio-economic position, a low level of perceived strain at work, and active leisure time. According to another Finnish study (Hakanen, Feldt & Leskinen 2007), only the level of home care in adolescence was associated with adult SOC, whereas there were no associations with the other four resistance resources (i.e., parental educational level, parental income, individual cognitive ability, and general health status).

It was found in a study conducted in Italy among elderly people, in turn, that favourable living arrangements (living with a spouse or partner), a high education and a higher level of responsibility in the former job were associated with a strong SOC (Ciairano et al. 2008).

Further, favourable living arrangements moderated the negative effect of a lower level of education, especially in terms of the motivational component, in other words the meaningfulness of SOC. It is noteworthy that age significantly reduced only the meaningfulness component, and not the cognitive (comprehensibility) or the instrumental (manageability) components. The researchers concluded that age is less relevant to older people than social integration. No gender differences were found.

3.3 The stability of sense of coherence in previous studies

Antonovsky's argument that SOC is a stable personality disposition has been heavily criticised. However, ever since his theory saw the light of day psychologists have been revealing novel information about personality and its stability. It is argued that personality essentially relies on enduring patterns of emotional, cognitive and behavioural tendencies, known as personality traits (Roberts, Walton & Viechtbauer 2006). Although these traits are enduring, they do not necessarily maintain the same strength throughout the lifespan. Consequently, the contemporary psychological debate concerns the extent to which personality changes over time. The theory of trait consistency concerns personality changes along the following four general dimensions: rank-order consistency, mean-level change, individual-level change and ipsative stability (Roberts & DeVecchio 2000). Rank-order consistency and mean-level change are population-level phenomena. Specifically, rank-order consistency refers to an individual's relative placement within a population assessing whether people show uniform changes in personality levels, and is usually indexed by way of test-retest correlations on specific trait dimensions. Mean-level change, in turn, is commonly associated with normative changes in personality and refers to increases and decreases in average trait levels. It is typically indexed by way of longitudinal research (Roberts, Walton & Viechtbauer 2006).

Most previous studies examining the stability of SOC have focused on personality-level changes (rank-order consistency), with somewhat inconsistent results. Kivimäki et al. (2000) reported the level of SOC to be relatively stable over time: a 0.64 test-retest correlation was observed over a three-year research period. The mean SOC scores between baseline and follow-up also remained unchanged, indicating stability in an individual's position on the scale. Another Finnish study based on longitudinal factor analysis (Feldt et al. 2000) showed that SOC represented a moderately stable personality over a one-year follow-up period, and

no mean changes in the latent structures were detected. According to a Finnish 13-year follow-up study exploring both rank-order and mean-level changes in individual SOC (Hakanen, Feldt & Leskinen 2007), stability after the age of 30 depends strongly on the level. Two latent groups were identified, high-SOC and low-SOC individuals, the former showing greater stability over the 13 years. Furthermore, although the mean level increased in both groups, the positive change was more evident in the high-SOC group.

Stability of SOC was further investigated in a five-year follow-up study based on longitudinal factor analysis (Feldt et al. 2003) comparing two age groups (25-29 and 35-40 years of age at baseline in 1992). Contrary to theoretical expectations, the stability coefficients were exactly the same (0.67) in both groups, implying that age has no role in the stability or level of SOC, neither in the mean changes. However, in both age groups the mean was higher in 1997 than in 1992, indicating that, along with the moderate stability coefficients, environmental effects may also modify the level of SOC in adulthood.

Smith et al. (2003) studied the stability of SOC in a large population-based sample (N=6,790) over a four-year period. According to the findings, SOC may not be as stable as Antonovsky originally suggested, in that there was a change in the level of SOC between 1994 and 1998 among 35 per cent of the participants (25 per cent reported an increase, and 10 per cent a decrease). Furthermore, an unskilled occupational position and a low household income were associated with reduced SOC levels in both genders.

Studies examining the impact of adverse life events, expressed as severe health problems, suggest that SOC is quite unstable. A longitudinal study exploring SOC levels after multiple trauma (Snekkevik et al. 2003) reported that, although the median SOC scores were fairly stable, the individual scores were not, and there was wide variation among some subjects. Furthermore, SOC seemed to have no long-term prognostic value for general life satisfaction or for psychological well-being, at least not in the first years after severe multiple trauma.

It was further shown in a one-year follow up study focusing on the mean level of change in SOC (Caap-Ahlgren & Dehlin 2004) that people with Parkinson's disease experienced a striking decline during the study period. According to the authors, this indicated that the subjects' ability to handle stressors that were secondary to the progress of the disease might have decreased. Another longitudinal study (Nilsson et al. 2003) on mean-level changes reported that the loss of perceived good health and social support lowered the level of SOC

among people with an initially low SOC, whereas stability was maintained only among those with an initially strong SOC.

A Japanese one-year follow-up study (Takayama et al. 1999) reported no intra-individual SOC stability in stressful life events: the mean score in 1998 was significantly lower than in the previous year. Furthermore, strenuous life events had a negative effect on SOC scores one year later only among those with a low SOC score at baseline, an effect that was stronger among men than women. SOC was positively related to psychological health, but had a buffering effect in terms of dealing with strenuous life events only among men.

Adverse life events may cause psychological problems, leading to other negative health outcomes. Kivimäki's longitudinal study (Kivimäki et al. 2002) examined whether psychological problems, such as a decreased SOC, were linked with adverse life events (the death or illness of a family member, violence, interpersonal conflict, or financial difficulties) and later sickness absence. Such life events were associated with psychological problems, including a lowered level of SOC, in both genders, although there was an increased risk of sickness absence only among men. This could have been attributable to the fact that men who had experienced an adverse life event had smaller social support networks compared to women. Richardson and Ratner (2005) also conducted a longitudinal study on SOC as a moderator of the effects of adverse life events on health. They found that a recent adverse experience (e.g., family breakdown, financial crisis, physical abuse) had no significant impact on self-reported health status among individuals with higher-than-average SOC: in other words, a strong SOC buffered the impact of recent adverse life events on self-reported health. However, there was an average decline in self-reported health of 0.24 of a response category among subjects with lower levels of SOC (Richardson & Ratner 2005).

Given the health promoting role of SOC, the most salient issue in terms of its stability concerns the potential enhancement of the level of SOC after the formative years. In other words, could SOC be improved through active interventions? An American research group (Weissbecker et al. 2002) found that women suffering from fibromyalgia who had attended mindfulness-based stress-reduction classes reported a significant increase in their SOC compared to wait-list controls. Another study conducted in Norway (Lillefjell & Jakobsen 2007) reported significant improvements in the level of SOC following a 57-week rehabilitation period among individuals with chronic musculoskeletal pain. Vastamäki et al. (Vastamäki, Moser & Paul 2009), meanwhile, showed that both intentional modification

through an intervention programme, and change due to a positive life event, in other words re-employment, were effective in increasing the level of SOC. Finally, Langeland (2007) found that using salutogenic therapy principles in an intervention programme promoted SOC and coping ability.

3.4 Summary of previous studies

It seems that both socio-economic and psychosocial circumstances during childhood and adolescence directly affect adult SOC: family economic status and education, social support and neighbourhood cohesion, and a good quality of home care and child-centred parenting (the latter having both direct and indirect effects via education and career stability) all have an effect on adult SOC. Contradictory results are also reported: economic hardship in childhood has only a weak indirect effect on adult SOC, whereas a direct association has been found only with dissension in the childhood family. Similarly, the level of home care has been associated with adult SOC, whereas parental educational level and income have not.

Findings regarding the role of negative events experienced during childhood vs. adulthood on adult SOC are also contradictory. The present study explores the effects of several aspects of childhood living conditions, such as socio-economic and psychosocial adversities and the quality of the child-parent relationship, on SOC in more detail among men and women, and among Finnish- and Swedish-speaking Finns.

Similarly, the few previous studies exploring resources of SOC in adulthood suggest that both socio-economic and psychosocial resources make a contribution. However, contradictory results regarding age, education and gender have been reported. Given the lack of a systematic picture of the resistance resources of SOC, there is a need for more detailed knowledge and a deeper understanding of the reciprocal role of the underlying socio-economic and psychosocial factors of SOC, for example. Moreover, the role of gender has been ignored in previous studies. Both of these issues are explored in detail in the present study.

Previous studies also suggest that SOC reacts to negative life events. However, only few previous studies have explored whether such life events affect a strong SOC even though this was one of the central arguments in Antonovsky's theory. Thus far, a strong SOC has proved to be stable, and buffering effects of strong SOC on health during negative life events have

also been reported. The present study explores in detail the effect of various adverse life events in different spheres of life on the (strong) mean level of SOC on the population level.

Finally, previous studies, based on small samples, examining the association between SOC and the intentions to retire early indicate a potential link. This question is also explored in more detail.

4 THEORETICAL FRAMEWORK AND PURPOSE OF THE STUDY

The research framework of this study is based on Antonovsky's theory of SOC (Figure 2), which has been widely studied as a determinant of health since the late 1980s. In fact, SOC is treated as a dependent variable in three of the four sub-studies (I, II and III). Antonovsky emphasized the role of "external" generalized resistance resources in the development and level of SOC, although empirical evidence on the association is scarce. Sub-study I explores these resistance resources of SOC in more detail among both genders focusing on several underlying socio-economic and psychosocial resistance resources, an area that is largely ignored in most previous studies. Four areas of life were identified as relevant to SOC: (a) childhood living conditions, (b) working life, (c) family life and (d) social relationships. Although Antonovsky did not include family life and partnership as a separate area, they were considered important here and were distinguished from other social relationships. A further aim was to investigate potential gender differences in the association between SOC and the resistance resources within the four life areas.

Previous studies have revealed a health disparity in Finland between the two major language groups, Finnish- and Swedish-speaking Finns, in favour of the latter. However, there is a theoretical gap in terms of comparing wellbeing and health and their determinants among the two language groups. A novel way of reducing this gap would be to compare the levels of generalized resistance resources and SOC. Therefore, sub-study II explored the generalized resistance resources and the levels of SOC among Finnish- and Swedish-speaking Finns in order to find out whether there were any group differences in the determinants or levels of SOC.

Claims that SOC is a stable life orientation have been heavily criticised. However, there are only a few studies exploring the effect of adverse life events on a strong SOC. According to Antonovsky's main arguments, people with a strong SOC cope more easily with adverse events, and the tension evaporates instead of turning into health damaging stress. Sub-study III tested Antonovsky's stability argument in the context of nine negative life events.

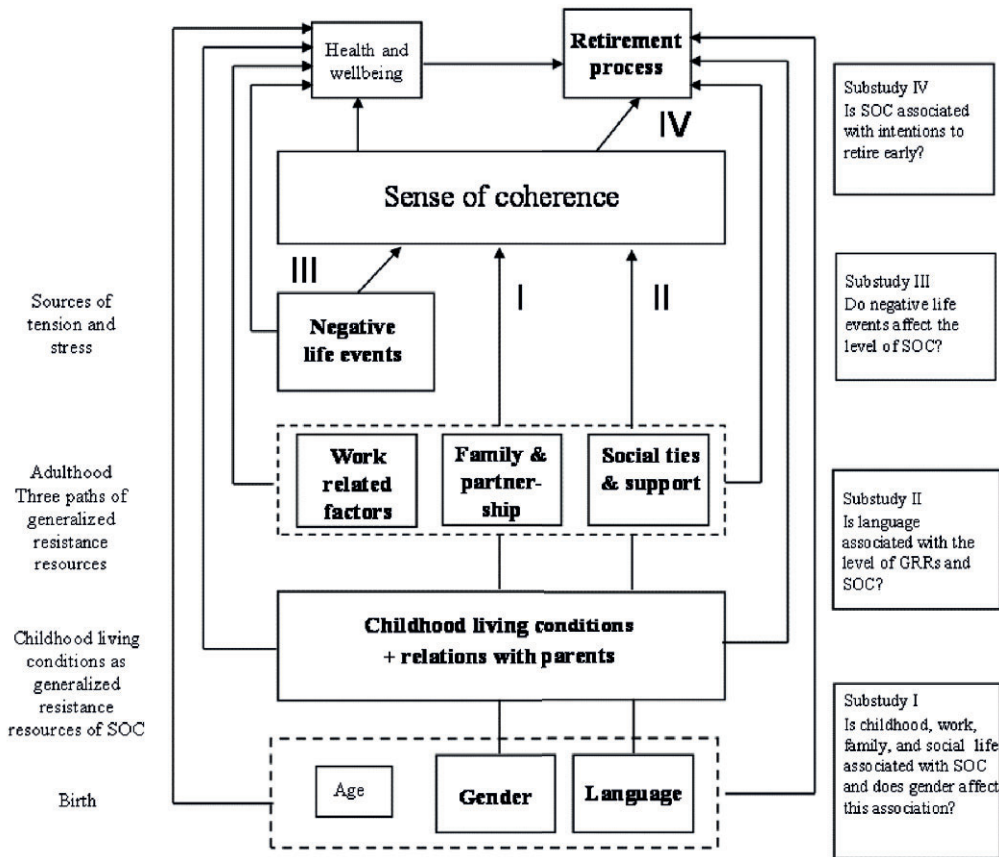


Figure 2. Framework of the study.

Early retirement has proved to be a multifaceted and complicated phenomenon, and there is a need for further research that will enhance understanding of potential preventive factors. Substudy IV treated SOC as an independent factor in exploring its association with intentions to retire early.

The general objective of the study was to empirically explore the developmental prerequisites, in other words the generalized resistance resources, of SOC among men and women and Finnish- and Swedish-speaking Finns, and to compare the level of SOC in the two language groups. This is a new approach to investigating the life circumstances and health disparities between these two groups, and hence the present study offers novel insights. The areas of investigation also included the stability of SOC in the presence of

adverse life events, and the association between SOC and intentions to retire early in the Finnish- and Swedish-speaking population of Finland.

The main goals were as follows:

1) To examine whether SOC is associated with four principal areas of generalized resistance resources: a) childhood living conditions, b) working life, c) family life and d) other social relationships, and furthermore whether these generalized resources are differently associated with SOC among men and women (sub-study I).

2) To examine potential differences in the level of generalized resistance resources, i.e. childhood living conditions, education, working life, family life, and social relationships and support, as well as in the levels of SOC, in the two main language groups: Finnish- and Swedish-speaking Finns. The research focus was on a) the level of SOC, b) the structure of the generalized resistance resources and c) the associations between generalized resistance resources and SOC in Finnish- and Swedish-speaking Finns (sub-study II).

3) To examine the effect of negative life events on subsequent levels of SOC. The main focus was on the stability of SOC, in other words whether SOC reacts to negative life events. A further aim was to test whether an initially strong SOC is more stable than an initially mediocre or weak SOC, as Antonovsky claims (sub-study III).

4) To examine the association between SOC and subsequent intentions to retire early among Finnish- and Swedish-speaking Finns, and whether this association is affected by age, education, language, childhood living conditions, work-related psychosocial factors, marital status, social support, and health-related behaviours and health status (sub-study IV).

5 MATERIAL AND METHODS

5.1 Material

The data for sub-study I was obtained in connection with the Finnish 'Survey on Living Conditions' conducted in 1994 (ELO-94) (Sauli et al. 1989) by the government statistical body, Statistics Finland. The data were collected by means of personal face-to-face interviews ($n=8,650$, with a response rate of 73%). The sample satisfactorily represents the non-institutional Finnish population aged 15 years or older (Heiskanen & Laaksonen 1996). The study focused on people aged between 25 and 64, thus the final number of subjects was 6,506, of which 49 per cent were women (Ahola et al. 1995).

The data for sub-studies II, III and IV were obtained from the on-going survey within the 15-year Health and Social Support (HeSSup) study. The study sample was stratified by gender and age (20-24, 30-34, 40-44 and 50-54), and comprised three sub-samples: Finnish-speaking Finns living in the Turku area ($N=10,000$), other Finnish-speaking Finns living in Finland ($N=46,797$) and Swedish-speaking Finns living in Finland ($N=8,000$). The baseline measurement initiated in 1998 yielded 25,898 valid responses. After one reminder, the response rate was 40 per cent. According to a thorough non-response analysis (Korkeila et al. 2001) concerning health-related differences between the respondents and the general population, the late respondents smoked and used more psychopharmaceutical drugs than the early ones, suggesting similar features in the non-respondents. The mail survey was repeated five years later in 2003, with a few alterations. It was sent to the 24,385 subjects who had responded in 1998. The follow-up response rate was 80 per cent.

The subsample of Finnish speakers living in the Turku area ($N=10,000$) was excluded in sub-study II, which therefore comprised nationally-representative samples of Finnish ($N=19,970$) and Swedish ($N=2,967$) speakers (of which 59 and 58 per cent, respectively, were women).

Sub-study III was a prospective study including the follow-up data on both Finnish- and Swedish-speaking Finns (again people living in the Turku area were excluded), the total number of respondents being 17,271. In other words, the study included only the respondents who answered the SOC questionnaire both at the baseline in 1998 and at the follow-up in 2003 (61% women).

Sub-study IV excluded respondents from the youngest age group (20-24 years at baseline), those who had retired at baseline in 1998, those who had strong intentions to retire early at baseline in 1998, and those who had already applied for early retirement either at baseline in 1998 or during the follow-up in 2003. Thus, the final sample comprised 12,275 respondents (60% women). People living in the Turku area were included in this study.

5.2 Measures

Outcome variables

Measurement of SOC (studies I-IV)

Sense of coherence was assessed on Antonovsky's short 13-item scale derived from the original 29-item Orientation to Life Questionnaire (OLQ) covering the three main subcomponents of SOC, i.e. comprehensibility (cognitive), manageability (instrumental/behavioural) and meaningfulness (motivational) (Antonovsky 1987). The items were randomly ordered in the questionnaire. The scores on each item ranged from one (weak) to seven (strong), and four items had a reverse scale. All the items were converted to parallel scores and the sum score was calculated by summing up the raw scores. The SOC variable is a sum variable consisting of three factors based on individual questions. If missing values exist, they are replaced based on the values of other items if at least two-thirds of the questions were answered. This procedure was selected because it tolerates some missing values, but still gives the correct factor weights. The Cronbach's alpha coefficient in the Survey on Living Conditions data was 0.81, and 0.85 in the Health and Social Support Study (both in 1998 and 2003) data, suggesting acceptable internal consistency among the SOC scales (Table 1).

Intentions to retire early (study IV)

Intentions to retire early in 2003 were asked as follows: 'Have you considered applying for a disability pension, an early-retirement pension or some other pension? The four response options were: 1) No, I have not considered applying for a pension; 2) Applying for a pension has occurred to me; 3) I have seriously considered applying for a pension; 4) I have already applied for a pension. Given the focus on the intentions to retire early, those in the fourth category (I have already applied for a pension) were excluded, and the dependent variable was divided into three categories: no intentions, weak intentions and strong intentions.

Table 1. Orientation to Life Questionnaire (SOC-13).

1	Until now your life has had (ME) ¹	no clear goals or purpose at all	1 2 3 4 5 6 7	very clear goals and purpose
2	Do you have the feeling that you don't really care about what goes on around you? (ME)	very seldom or never	1 2 3 4 5 6 7	very often
3	Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well? (C)	never happened	1 2 3 4 5 6 7	always happened
4	Has it happened that people whom you counted on disappointed you? (MA)	never happened	1 2 3 4 5 6 7	always happened
5	Do you have the feeling that you are being treated unfairly? (MA)	very often	1 2 3 4 5 6 7	very seldom or never
6	Do you have the feeling that you are in an unfamiliar situation and don't know what to do? (C)	very often	1 2 3 4 5 6 7	very seldom or never
7	Doing the things you do every day is: (ME)	a source of deep pleasure and satisfaction	1 2 3 4 5 6 7	a source of pain and boredom
8	Do you have very mixed-up feelings and ideas? (C)	very often	1 2 3 4 5 6 7	very seldom or never
9	Does it happen that you have feelings inside you would rather not feel (C)	very often	1 2 3 4 5 6 7	very seldom or never
10	Many people – even those with a strong character – sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past? (MA)	very seldom or never	1 2 3 4 5 6 7	very often
11	When something happened, have you generally found that: (C)	you over-estimated or under-estimated its importance	1 2 3 4 5 6 7	you saw things in the right proportion
12	How often do you have the feeling that there's little meaning in the things you do in your daily life? (ME)	very often	1 2 3 4 5 6 7	very seldom or never
13	How often do you have feelings that you're not sure you can keep under control? (MA)	very often	1 2 3 4 5 6 7	very seldom or never

¹C= comprehensibility, MA= manageability, ME = meaningfulness

Background variables in sub-study I (Survey on Living Conditions)

Age groups

The study population was classified into four 10-year age groups: 25-34, 35-44, 45-54, and 55-64.

Childhood living conditions

Childhood living conditions were assessed on one variable comprising the following four separate items: “When you think about your childhood years, before the age of 16, (a) Did your family have long-lasting economic difficulties? (b) Did any member of your family have alcohol-related problems? (c) Were you often in fear of any family member? (d) Were there conflicts in your childhood family?”

Education

Information on educational attainment was obtained from a national register of educational qualifications, linked to the interview survey. Educational attainment (ISCED classification) was categorized on three levels: (a) Higher, meaning a university degree or a qualification from another higher educational institution, requiring at least 13 years of education in total; (b) Secondary, meaning secondary school plus vocational training, or the matriculation examination, requiring an average 10-12 years of education in total; (c) Basic, meaning compulsory education or less, i.e., a maximum of nine years in total.

Work related factors

Working life was assessed on four variables. (a) Employment status consisted of four categories: Employed, Unemployed, Housewives, On disability pension. (b) Socio-economic status was based on current occupation, and for the non-employed on their previous occupation, according to the following five categories: Upper non-manual, Lower non-manual, Manual worker, Entrepreneur and Farmer. Those who were employed were asked two further questions referring to the quality and significance of their work. (c) The first question included two alternatives: “Do you find your work meaningful, i.e., apart from the income, does your work give you satisfaction? Is the income the only reason for you to work?” (d) The second question covered the quality of work: “Are you able to use your knowledge and skills at work?” (Yes or No)

Factors assessing family life

Family life was measured on four variables: (a) Marital status included four categories: Married/in a partnership, Single, Divorced/separated and Widowed. (b) Family type also comprised four categories: Family (couple with children), Couple without children, Single and Single parent. Couples were asked two further questions about the quality of their relationship: (c) “Would you describe your present relationship as very good or good, satisfactory, very bad or bad?” and (d) “When necessary, i.e., at difficult times, does your partner support you?” (Yes or No)

Social life factors

Aspects of social life other than the family were measured on three variables: (a) The number of friends (in four categories: none, one, between two and five and more than five); (b) “In a difficult life situation, is it possible for you to get social support?” (Yes, I don't need support, No). (c) The third variable applied only to those who had social support and comprised three categories: “Are you satisfied with the support you get?” (Very satisfied, Quite satisfied, Not satisfied).

Background variables in sub-studies II-IV (Health and Social Support Study)

Age groups

The populations in sub-studies II and III were grouped according to age as follows: 20-24, 30-34, 40-44 and 50-54, and the same categorisation but excluding the youngest group was used in sub-study IV.

Language

Sub-studies II-IV included the two main language groups living in Finland: Finnish- and Swedish-speaking Finns (from the Population Register Centre).

Childhood living conditions

Adverse childhood living conditions were assessed on a scale of five questions in sub-studies II, III and IV. The respondents were asked whether they had experienced any of the following in their childhood: parental divorce/separation, long-term financial difficulties in the family,

serious conflicts in the family, being frequently in fear of a family member, or having a family member with an alcohol problem.

Quality of the relationship with parents

Sub-studies II and IV also assessed the quality of the relationship with both mother and father in childhood and adolescence. Four categories were used in sub-study II: a) Warm and close with both parents; b) Warm and close with the mother and neutral, bad or very bad with the father; c) Warm and close with the father and neutral, bad or very bad with the mother; d) Neutral, bad, or very bad with both parents. Three categories were used in sub-study IV: a) Very close and warm or good with both parents; b) Very close and warm or good with one parent and neutral, bad or very bad with the other; and c) Neutral, bad or very bad with both.

Educational attainment

Self-reported educational achievement was categorized on three levels in sub-studies II-IV: a) Higher education, meaning a university degree, a qualification from another higher-educational institution or secondary school (a minimum of 13 years of education); b) Secondary education, meaning the matriculation examination, vocational training or apprenticeship (10-12 years of education) and; c) Basic education, meaning compulsory education or less (a maximum of nine years).

Employment

In sub-study II, self-reported employment status comprised three categories: Employed (full-time or part-time), Unemployed and Non-employed (retired, housewife or student).

Work related psychosocial factors

Karasek's Job Demand-Control Model (Karasek 1979) was used in sub-studies II and IV. Job demands were assessed on a sum variable drawing on five separate questions: 1) "My job requires me to work very quickly"; 2) "My job requires me to work very hard"; 3) "I am asked to do an excessive amount of work"; 4) "I have enough time to get the job done"; 5) "Other people impose conflicting demands on me". There were three response categories: low, average and high demands. Skill utilization was assessed on a sum variable drawing on six separate questions: 1) "My job requires me to learn new things"; 2) "My job involves a lot of repetitive work"; 3) "My job requires me to be creative"; 4) "My job requires a high level of skill"; 5) "I get to do a variety of different things in my job"; 6) "I have the opportunity to

develop my own special abilities”. Again there were three response categories: high, average, and low skill utilization. In addition, decision-making authority was assessed in Study II on a sum variable drawing on three separate questions: 1) “My job allows me to make a lot of decisions on my own”; 2) “I have very little freedom to decide how I do my work”; 3) “I have a lot of say in what happens in my job”. The same three response categories were used: high, average and low decision-making authority.

Family relations and social life and support

Self-reported marital status as assessed in sub-study III included five categories: Married/remarried, Cohabiting, Unmarried, Divorced/separated and Widowed. In sub-studies II and IV the respondents were asked whether they had a spouse/partner (married/remarried, cohabiting) or whether they lived alone (unmarried, divorced/separated and widowed).

Sub-study II included two further questions for those who had a spouse/partner concerning the quality of the relationship: “Are you satisfied with your marriage/relationship at the moment” (very satisfied, satisfied and dissatisfied); and an item from the Brief Social Support Questionnaire compiled by Sarason et al. (1987) concerning support from the partner, rated numerically in three categories: 5-6, 3-4, or 0-2 forms of support.

Three variables were used in sub-study II to assess social relationships and support. In terms of size the close social network fell into one of four categories: more than 20, 11-20, 6-10, or between one and five people. There were three categories of reciprocity: receiving more, reciprocally sharing and giving more. Six items from the Brief Social Support Questionnaire (Sarason et al. 1987) were used in sub-studies II and IV in order to assess perceived social support from the following six sources: Spouse/partner, Other close relative, Close friend, Close colleague, Close neighbour, Someone else who is close and No one, in six different types of situation. The maximum score was 36 and the minimum was zero, and four categories were formed: more than 18, 12-17, 6-11, or 0-5 help givers. Reciprocity comprised three categories: receiving more, reciprocally sharing and giving more.

Negative life events

The 21-item life-event inventory from the HeSSup study was used to assess negative life events in 2003. The inventory includes information on a wide range of (mainly negative) life experiences, of which 12 items are comparable to those on the widely known 43-item Holmes and Rahe (1967) questionnaire. The respondents were asked to indicate which life events they

had encountered, and to specify the timing (response alternatives: “In the last six months”, “In the last five years”, “Longer ago than five years” and “Never”). The following nine items were selected into this study as representing different aspects of negative life events in working, personal and social life: Death (of a spouse, a child, a parent or other close relative), Being a victim of physical, psychological or sexual violence, Having significant trouble with a boss at work, Having significant trouble with colleagues, Losing one’s job, Financial hardship, Divorce/separation, Relational problems with one’s spouse/partner and The breakdown of a long-lasting friendship. Death and being a victim of violence represented person-independent life events, whereas the rest represent person-dependent life events. The death of five different types of close relative was combined to comprise one variable, placed in one of three categories according to when the event occurred: in the last six months/in the last five years/earlier.

Health behaviours and somatic and mental health

Health-related risk behaviours was measured in terms of alcohol intoxication (drunk once a week or more) and smoking (non-smoker, former smoker, smoking fewer than five cigarettes a day, and smoking more than five cigarettes a day).

Health status was measured in terms of somatic disease diagnosed by a physician as follows: Has your physician ever told you that you have or have had: Bronchitis, Chronic obstructive pulmonary disease, Allergic rhinitis, Hypertension, Diabetes, Myocardial infarction, Angina pectoris, Atricular flimmer/flutter, Stroke, Other cerebrovascular disorder, Peptic/duodenal ulcer, Liver disease, Renal disease, Rheumatoid arthritis, Arthrosis, Sciatica, Glaucoma, Epilepsy, Cerebral injury, Neurological disorder, Cancer, Some other long-lasting/difficult disease? There were two response categories: No and Yes (yes=has or has had at least one of the diseases diagnosed by a physician).

Beck’s Depression Inventory comprises four classes: No depression (BDI 0-9), minor depression (BDI 10-18), moderate depression (BDI 19-36) and major depression (BDI >36).

5.3 Statistical methods

The SAS (SAS/STAT Users Guide, 4th ed. 1990) and the Stata (STATA User's Guide Release 7, 2001) statistical packages were used for the analyses in the present study. Given that the SOC score is approximately normally distributed, ordinary regression analysis was applied in sub-studies I, II and III. A 5% significance level was applied in the statistical tests, and the results are reported at 95% confidence intervals (CI). All the analyses in sub-studies I, III and IV were conducted separately for women and men, and in sub-study II separately for Finnish- and Swedish-speaking Finns.

The variables were entered into the analysis in assumed temporal order in sub-studies I and II, and age, childhood living conditions and education were adjusted for in the further analyses of working life, family life, and other social relationships. Interactions with gender (sub-study I) and language (sub-study II) were controlled for in the final phase of the analysis.

Sub-study III, which was prospective, focused on negative life events and SOC stability. The association between negative life events (reported in 2003) and SOC (reported in both 1998 and 2003) was subjected to ordinary regression analysis. In order to study the effect of each separate event on the SOC level they were entered into the analysis one at a time (adjusted for the background factors). The analysis also covered the change in SOC between 1998 and 2003. The interaction terms between the SOC level in 1998 and life events reported in 2003 were fitted into the model in order to find out whether the 1998 level of SOC modified the association between negative life events and the subsequent level of SOC in 2003.

Sub-study IV examined the association between SOC and the subsequent risk of intentions to retire early. The associations of SOC (measured in 1998) and other background variables (measured in 1998) with the intentions to retire early (measured in 2003) were subjected to logistic regression analysis. Weak and strong intentions to retire early were combined. The analyses were made separately among somatically or mentally unhealthy respondents, and somatically and mentally healthy respondents. Those with no intentions to retire early were selected as the reference category for SOC and each background variable. The results are presented as odds ratios (OR) and their 95% CIs. Age-adjusted prevalence percentages were also calculated.

6 RESULTS

6.1 Generalized resistance resources among Finnish women and men

Study I examined generalized resistance resources of SOC separately among women and men. The mean SOC score was 66.8 for men and 66.3 for women. Contrary to most previous studies, the gender difference was not statistically significant, but in accordance with most studies, SOC increased slightly with age in both genders.

The regression analyses revealed that adverse childhood living conditions decreased the mean level of SOC in both genders: the difference between the groups with no adverse experiences in their childhood family and the group reporting two or more was 3.7 SOC points among men and 4.2 among women. Adjusting for the education did not affect this association (see Figure 3). Separate analyses revealed that having feared a family member decreased the level of SOC the most. Educational attainment showed a linear association with SOC in both genders: the higher the level of education the stronger was the SOC (Figure 3).

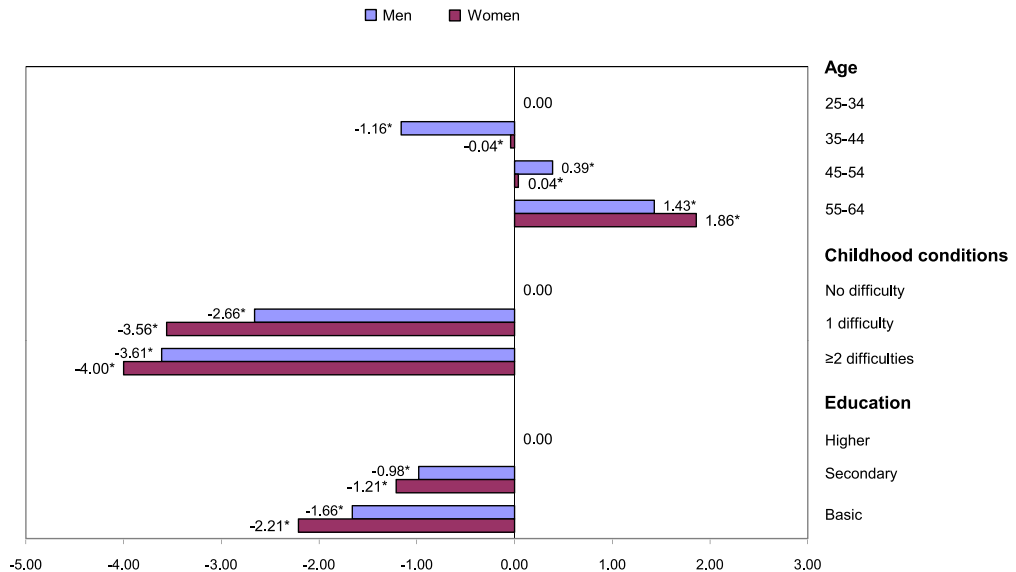


Figure 3. Regression analysis of SOC scores adjusted for age, childhood conditions and education among men and women (*statistically significant).

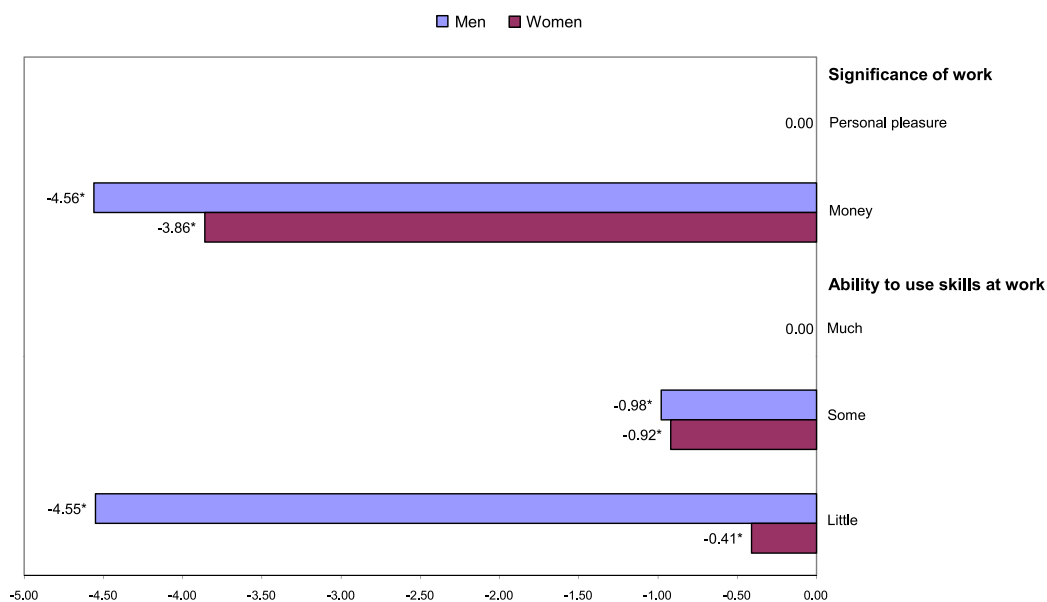


Figure 4. Regression analysis of SOC scores adjusted for age, childhood conditions, education, employment status, socio-economic status, significance of work and ability to use skills at work among men and women (*statistically significant).

Being unemployed or early retired were strongly associated with a poor SOC. The difference between the employed and the unemployed was 3.7 and 3.8 SOC points among men and women, respectively. Being early retired contributed particularly strongly to a poor SOC among men (-4.3). Adjusting for the other work variables did not affect the association of employment status with SOC. Being a female manual worker was associated with a poor SOC, the difference in the upper-non-manual class being 2.6 SOC points: adjusting for the significance of work and being able to use one's skills at work flattened the socio-economic pattern, however. Significance of work was strongly associated with SOC among both men and women. The difference between those who enjoyed their work and those who worked only for money was 4.9 and 4.2 SOC points among men and women, respectively: in other words, those in poor jobs scored even lower than unemployed. Adjusting for the ability to use skills at work hardly affected this association (see Figure 4). Among men, not being able to use their skills at work was also strongly associated with a poor SOC, the difference being 4.6 SOC points (Figure 4).

Marital status and the quality of relationship were both clearly associated with SOC among both women and men. It is notable that the association with being single was stronger among men than among women. The quality of the relationship was the most strongly associated with SOC in both genders: the differences between a good and a poor relationship were 11.8 and 10.2 SOC points among men and women, respectively. Adjusting for the support from partner flattened this association only little (see Figure 5).

Both men and women who reported having more than five friends achieved the highest scores on the SOC scale. Satisfaction with social support was very important to men and women, the difference being 8.4 and 7.2 SOC points, respectively. In other words, lack of social support and/or not being satisfied with it was more strongly associated with SOC than not having many friends or having no friends at all (Figure 6).

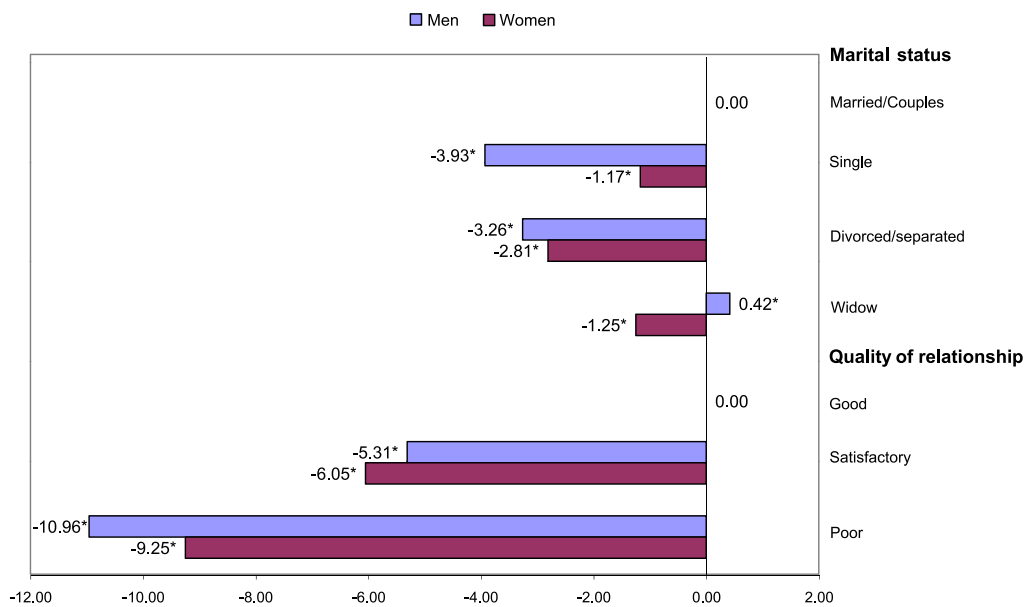


Figure 5. Regression analysis of SOC scores adjusted for age, childhood conditions, education, marital status, family type, quality of relationship and support from partner among men and women (*statistically significant).

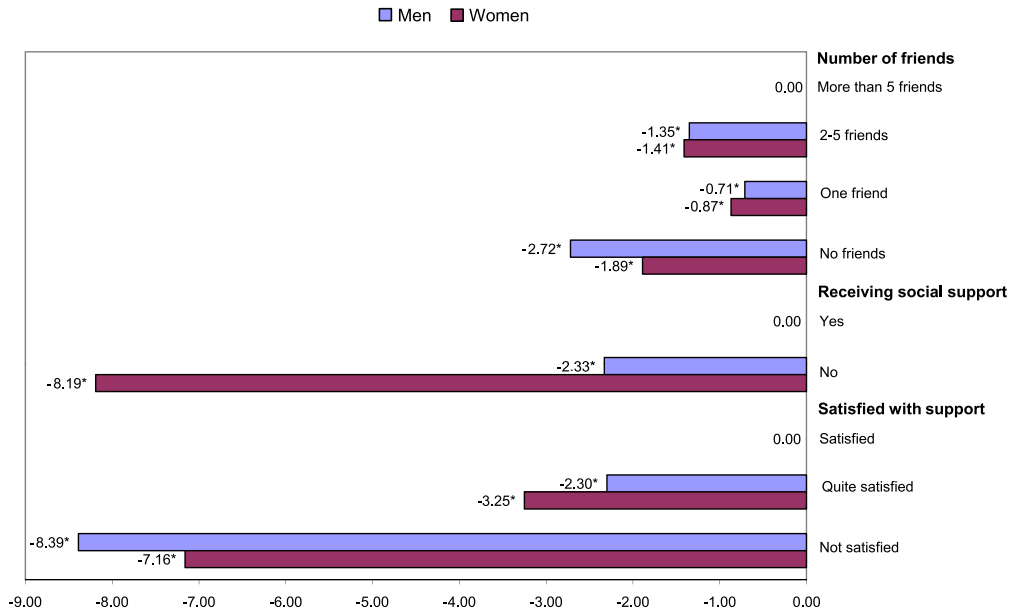


Figure 6. Regression analysis of SOC scores adjusted for age, childhood conditions, education, number of friends, social support and satisfied with support among men and women (*statistically significant).

Gender differences

The interaction terms between gender and the background variables were controlled for in order to assess gender differences in SOC. There were statistically significant differences in the associations between SOC and age, socio-economic status, being able to use skills and knowledge at work and marital status. First, the lowest scores appeared in different age groups ($P=0.029$). Secondly, there were some gender differences in socio-economic status, in other words occupation ($P=0.001$): male farmers achieved lower scores than the reference group, whereas the opposite was the case among female farmers, and working-class women had somewhat lower scores than working-class men. Thirdly, being able to use skills and knowledge at work ($P=0.009$) had a substantial effect only on men's SOC. Fourthly, in terms of marital status ($P=0.006$), widows achieved higher scores than the reference group (couples), whereas widowers did the opposite. There was also a clear difference between single men and single women. However, none of these interactions were very strong.

In sum, with regard to the second research focus of the first sub-study, i.e., whether there are gender differences in the association between resistance resources and SOC, most of the resources in question had quite similar effects in both genders: in other words, men and women required resistance resources of similar quality and quantity. However, three clear differences emerged: not being able to use skills at work and being single noticeably threatened SOC only among men. At the same time, not receiving social support was particularly threatening to women.

6.2. Generalized resistance resources and sense of coherence among Finnish- and Swedish-speaking Finns

Sub-study II examined the levels of generalized resistance resources and SOC in Finnish- and Swedish-speaking Finns. The mean SOC scores were 63.9 (95% CI 63.8-64.1) and 64.7 (95% CI 64.3-65.1), respectively, the difference being statistically significant ($P < 0.001$). The SOC score for the Swedish-speaking women was 0.9 points higher than that for the Finnish-speaking women, whereas among men the difference was 0.6 points.

Childhood living conditions, education, the relationship with and perceived support from spouses/partners and friends, and working life, were each associated with SOC in both language groups. However, financial difficulties and psychosocial problems during childhood, as well as unemployment and not being able to use skills at work in adulthood were noticeably more prevalent among the Finnish speakers (Table 2). All in all, the clearest differences between the language groups concerned the prevalence of resistance resources, and not their association with SOC.

At the same time, there were no prevalent language-group differences in resistance resources reflecting social life factors (Table 3).

The regression analysis revealed an association between SOC and both age ($P < 0.001$) and gender ($P < 0.001$) in both language groups. In both language groups the respondents who had a good relationship with both parents achieved the highest SOC scores, whereas those with neutral or bad relationships achieved very low scores; -7.0 and -7.5, respectively. Similarly,

Table 2. Mean SOC scores (range 13-91) at 95% confidence intervals among Finnish- and Swedish-speaking Finns by education, childhood problems and qualitative features of working life in adulthood.

	Finnish-speaking Finns			Swedish-speaking Finns		
	Mean	%	95% CI	Mean	%	95% CI
Education						
Higher	65.7	44.0	(65.5-65.9)	66.0	52.4	(65.4-66.5)
Secondary	63.1	36.6	(62.8-63.4)	64.1	27.9	(63.4-64.9)
Basic	61.5	19.4	(61.2-61.9)	62.4	19.6	(61.4-63.4)
Childhood parents divorced in childhood						
No	64.5	82.9	(64.3-64.7)	65.0	87.5	(64.5-65.5)
Yes	61.7	17.1	(61.3-62.1)	63.9	12.5	(62.7-65.1)
Financial difficulties at childhood home						
No	65.2	55.3	(65.1-65.4)	66.1	68.4	(65.6-66.6)
Yes	61.8	28.8	(61.5-62.1)	61.4	18.8	(60.3-62.5)
Psychosocial problems at childhood home						
No	66.1	62.6	(65.9-66.3)	66.6	77.4	(66.1-67.1)
Yes	61.7	37.4	(61.4-62.0)	61.1	22.6	(60.1-62.1)
Adulthood/Working life						
Decision authority						
High	65.5	61.9	(66.3-66.8)	66.9	69.1	(66.4-67.5)
Average	62.8	21.5	(62.5-63.2)	62.4	20.0	(61.3-63.5)
Low	60.8	16.6	(60.4-61.3)	61	10.9	(60.0-62.5)
Skill utilization						
High	67.1	44.7	(66.9-67.4)	67.2	56.2	(66.7-67.8)
Average	63.8	32.0	(63.6-64.2)	63.9	27.5	(63.1-64.9)
Low	61.6	23.3	(61.2-62.0)	61.3	16.3	(60.1-62.5)
TOTAL		100%	N=19 970	100 %		N=2 967

adverse childhood living conditions clearly affected the SOC level in both language groups. Additional analyses (data not shown) showed that the quality of the relationship with parents was clearly a stronger predictor of the SOC level than difficulties as such: in other words, a good relationship with at least one parent protected SOC from adverse living conditions in the family.

Table 3. Mean SOC scores (range 13-91) at 95% confidence intervals among Finnish- and Swedish-speaking Finns by relationship with parents during childhood, having a spouse/partner, quality of and support from relationships, and social relationships and support.

	Finnish-speaking Finns			Swedish-speaking Finns		
	Mean	%	95% CI	Mean	%	95% CI
Relationship with parents						
Good with both	65.6	63.4	(65.4-65.8)	66.1	65.9	(65.6-66.6)
Good with mother/ neutral or bad with father	61.9	20.6	(61.6-62.3)	63.8	17.5	
Good with mother/ neutral or bad with father	61.9	20.6	(61.6-62.3)	63.8	17.5	(62.7-64.8)
Good with father/ neutral or bad with mother	61.8	6.1	(61.1-62.4)	62.8	6.3	(61.2-64.4)
Neutral or bad with both	59.0	9.9	(58.4-59.6)	58.8	10.4	(57.4-60.2)
Having a spouse/partner						
Yes	65.3	67.1	(65.2-65.5)	66.3	68.9	(65.9-66.8)
No	61.1	32.9	(60.8-61.4)	61.2	31.1	(60.4-61.9)
Satisfied with relationship						
Very satisfied	66.9	74.5	(66.7-67.1)	68.0	75.0	(67.5-68.5)
Satisfied	61.3	18.1	(60.9-61.7)	61.5	18.2	(60.4-62.6)
Dissatisfied/ very dissatisfied	57.5	7.4	(56.8-58.3)	58.3	6.9	(56.2-60.3)
Support from partner						
5-6 forms of support	66.7	53.0	(66.5-66.9)	67.9	51.7	(67.4-68.4)
3-4 forms of support	62.7	12.6	(62.3-63.1)	63.1	10.7	(61.9-64.3)
0-2 forms of support	60.2	34.4	(59.9-60.5)	60.9	37.6	(60.1-61.6)
Network size						
21-	66.9	23.0	(66.5-67.2)	67.0	21.1	(66.1-67.9)
11-20	64.1	45.4	(63.9-64.3)	65.6	42.9	(65.0-66.3)
6-10	62.3	23.7	(62.0-62.7)	63.3	25.0	(62.4-64.2)
1-5	60.3	7.8	(59.6-60.9)	60.8	11.1	(59.3-62.3)
Social support						
18-	69.3	8.3	(68.8-69.7)	69.5	10.9	(68.3-70.6)
12-17	66.0	27.2	(65.7-66.3)	67.1	28.5	(66.3-67.8)
6-11	63.4	56.4	(63.2-63.6)	63.7	53.3	(63.2-64.3)
0-5	55.9	8.1	(55.2-56.5)	56.2	7.3	(54.3-58.1)
Direction of social support						
Receiving more	62.7	41.2	(62.4-62.9)	63.7	41.4	(63.0-64.4)
Reciprocally shared	65.0	34.0	(64.7-65.3)	66.1	34.8	(65.4-66.8)
Giving more	64.7	24.8	(64.4-65.1)	65.0	23.8	(64.1-65.8)
TOTAL		100%	N=19 970	100		N=2 967

The interaction terms between the language groups and the background factors of SOC revealed one interaction ($P=0.028$): parental divorce in the respondent's childhood lowered the SOC score only among the Finnish speakers. However, when the relationship with parents was adjusted for there were no differences between the language groups.

The difference between having and not having a spouse/partner was -3.0 among the Finnish speakers and -3.8 for the Swedish speakers, and the respective differences between being very satisfied and being dissatisfied with their relationship were -8.5 and -9.1. Adjusting for partner support weakened this association. There were no interactions between language group and these family related background factors.

There was a clear association between SOC and the social network as well as the amount of social support in both language groups, and a very strong association with reciprocal support. Furthermore, those receiving more support than they gave achieved the lowest scores on the SOC scale among both Finnish and Swedish speakers. There were no interactions between language group and social-life factors.

The effect of working life on SOC was fairly similar among Finnish and Swedish speakers. Being unemployed resulted in a clearly lower score on the SOC scale than being employed, the difference in SOC points being 3.7 among the Finnish speakers and 3.1 among the Swedish speakers. With regard to decision-making authority, among those on the lowest level the Finnish speakers scored -3.9 SOC and the Swedish speakers -4.0 SOC points compared to the reference group. There was also a clear association between SOC and skill utilization in both language groups, but there were no interactions between language group and employment status or other working-life factors.

Finally, we looked at whether the generalized resistance resources explained the difference in SOC between the Finnish and Swedish speakers (data not shown). Analysis of the independent effects of generalized resistance resources on SOC revealed that the statistically significant difference in SOC level between the language groups disappeared when psychosocial problems in childhood, decision-making authority at work and skill utilization in adulthood were added separately to the model.

6.3 The effect of adverse life events on sense of coherence

The focus in sub-study III was on stability of SOC after negative life events, examined empirically in a five-year follow-up study. According to the regression analysis, the level of SOC in 1998 predicted the level of SOC in 2003 in both men and women ($P < 0.001$). All life events, with the exception of the death of a close relative, decreased the SOC level statistically significantly among both men and women irrespective of the timing of the life event. This was the same in the unadjusted model 1 and in model 2, which was adjusted for the SOC level in 1998. The more recent the life event, the lower was the SOC level in 2003. However, even if the life event had occurred more than five years previously, the SOC level was still lower than in the reference group reporting no life events, and this applied to both genders.

The association between SOC and negative life events decreased in model 2 compared with model 1. The data was further analysed in order to find out why, and it was discovered that those who had a weak SOC in 1998 had been subjected to more negative life events during the follow up (data not shown). However, the SOC levels in model 2 were all statistically significant among men and women, in other words the 1998 level alone did not explain the decrease of SOC level in 2003 initiated by negative life events (Figure 7).

A few interactions between gender and life events were identified: death of a close relative, having been the victim of violence and having problems with colleagues were common to both models 1 and 2. Of those who had experienced violence the SOC level was statistically significantly lower among men than among women. Interactions between gender and financial hardship, divorce/separation and relational problems were only evident in model 1. Divorce in the previous six months lowered the SOC level especially among men.

In order to find out whether the 1998 SOC level was related to the association between SOC level in 2003 and negative life events in 2003, interaction terms between SOC in 1998 and life events in 2003 were fitted (data not shown). There were only a few interactions: job loss and divorce/separation among women, and problems with colleagues and divorce/separation among men. Further, the divergence made the content of the interaction difficult to interpret, in other words, depending on the timing of the event, the SOC level in 1998 seemed to either protect or weaken SOC level in 2003. Overall, the results suggest that the level of SOC in 1998 was not related to the association between the 2003 level and negative life events: in other words, a strong SOC in 1998 did not prevent a decline in 2003 as people faced negative life events. In sum, strong SOC did not remain stable.

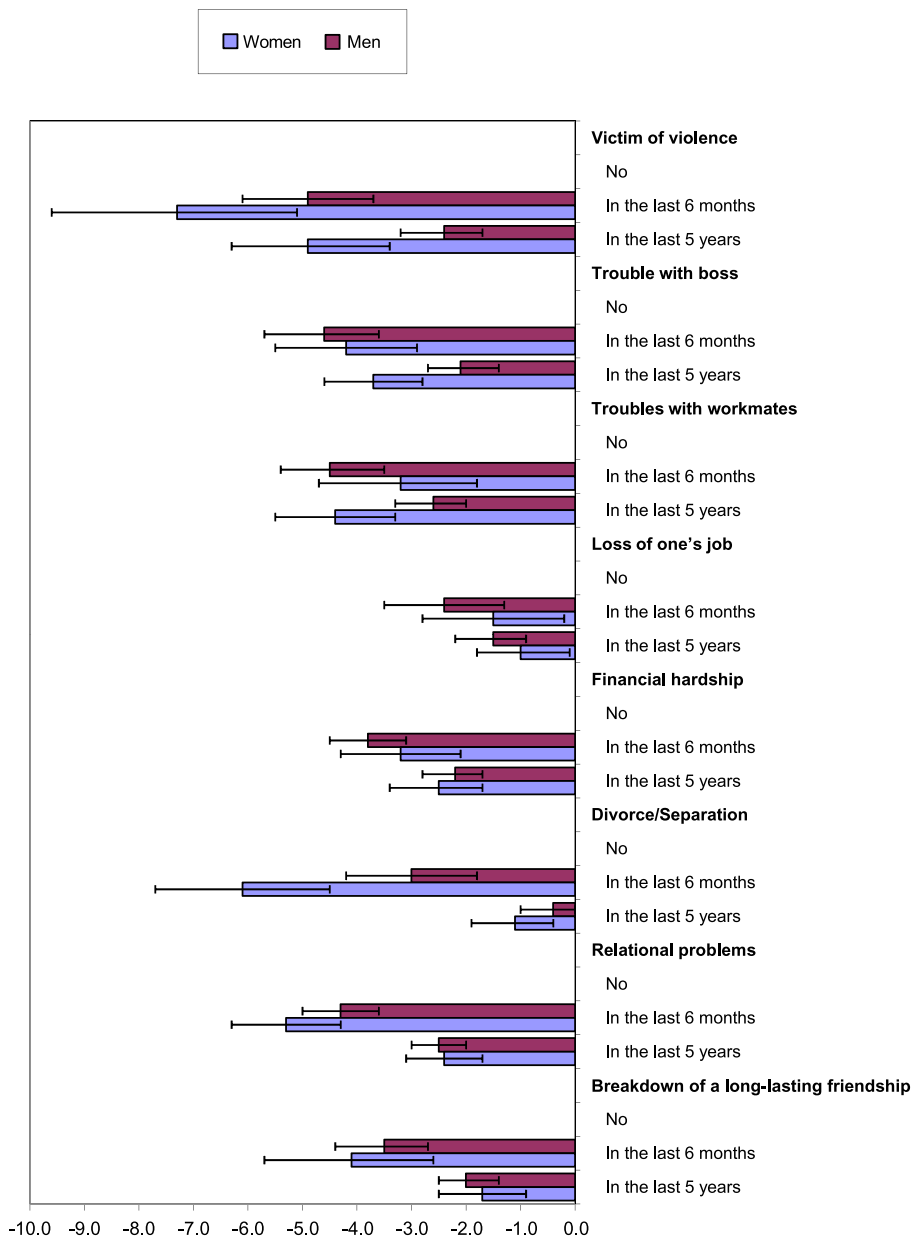


Figure 7. Regression analysis of the association between negative life events and SOC in 2003 at 95% confidence intervals among men and women, adjusted for age, education, marital status*, language, childhood living conditions and SOC in 1998, i.e., the figure shows the change in SOC scores during the follow-up in 1998-2003 according to each negative life event. (*Models on divorce/separation and relational problems are not adjusted for marital status).

6.4 Association between sense of coherence and intentions to retire early

Sub-study IV explored the association between SOC and the intentions to retire early among Finnish and Swedish speakers. The mean SOC was strongest among respondents with no such intentions, being 65.4 among women and 66.9 among men. Of those aged 50-54 years, 42 per cent of women and 53 per cent of men reported some degree of intentions to retire early.

Logistic regression analyses of intentions to retire early (weak and strong intentions combined) were conducted separately for somatically or mentally unhealthy and somatically and mentally healthy women. According to the results, there was a statistically significant association between SOC and the intentions to retire early among the unhealthy women in both Model 1, which was age-adjusted, and Model 2 with all the background factors adjusted for. The OR of SOC in Model 2 (with all the background factors adjusted for) was 0.97, in other words, each increase in the SOC score reduced the risk of intentions to retire early by three per cent among somatically and/or mentally unhealthy women. Further, neither socio-economic circumstances nor psychosocial or work- and health-behaviour-related factors influenced the association: adding the background factors in Model 2 had no influence on the odds ratios of SOC in the intentions to retire early (Table 4).

The result was almost identical for men: SOC was associated with intentions to retire early among somatically or mentally unhealthy men in both Model 1 (age-adjusted) and Model 2 (with all the background factors adjusted for); each increase in the SOC score reduced the intention risk by three per cent; and socio-economic circumstances, psychosocial and work- and health-behaviour-related factors had almost no influence on the association (the OR of SOC increased from 0.96 to 0.97). What is notable, however, is that with regard to the somatically and mentally healthy, the association between SOC and the intentions to retire early remained among men in both models: in other words, the role of SOC in intentions to retire early was stronger among men than among women.

There was no interaction between either language or gender and SOC in the prediction of early retirement intentions.

Table 4. Logistic regression models of intentions to retire early (weak and strong intention combined): full models including age, SOC, language, childhood living conditions, education, working conditions, having a partner, social support, alcohol intoxication and smoking among somatically and mentally unhealthy respondents. Odd ratios (OR) and their 95% confidence intervals compared with the “no intentions” class (OR=1.00) in women and men.

	Women		Men	
	OR	95% CI	OR	95% CI
SOC	0.97	(0.96-0.98)	0.97	(0.96-0.98)
Language				
Finnish	1.00		1.00	
Swedish	0.76	(0.55-1.04)	0.67	(0.48-0.94)
Relations with parents				
Good with both	1.00		1.00	
Good with one, neutral or bad with the other	1.01	(0.81-1.26)	1.16	(0.90-1.49)
Bad with both	1.17	(0.87-1.58)	0.84	(0.56-1.24)
Difficulties during childhood				
No	1.00		1.00	
Yes (1-6)	1.19	(0.97-1.47)	1.26	(1.01-1.57)
Education				
Higher	1.00		1.00	
Higher secondary	1.42	(1.07-1.87)	1.56	(1.14-2.13)
Lower secondary	1.41	(1.02-1.95)	1.82	(1.31-2.54)
Primary	1.46	(1.08-1.99)	1.80	(1.29-2.51)
Job demands				
Low	1.00		1.00	
Average	1.21	(0.94-1.57)	1.07	(0.80-1.42)
High	1.27	(0.95-1.70)	1.46	(1.05-2.04)
Skill utilization				
High	1.00		1.00	
Average	0.96	(0.76-1.21)	1.11	(0.86-1.44)
Low	0.91	(0.69-1.20)	1.00	(0.72-1.40)
Having a partner				
Yes	1.00		1.00	
No	0.95	(0.76-1.18)	1.02	(0.77-1.35)
Social support				
18->	1.00		1.00	
12-17	0.95	(0.68-1.33)	1.10	(0.66-1.85)
6-11	0.95	(0.69-1.31)	1.36	(0.85-2.17)
0-5	0.88	(0.56-1.39)	1.15	(0.66-2.00)
Alcohol intoxication once a week or more				
No	1.00		1.00	
Yes	1.26	(0.70-2.26)	0.96	(0.68-1.36)
Smoking				
No	1.00		1.00	
Earlier	0.82	(0.65-1.02)	1.23	(0.96-1.57)
< 5/day	0.87	(0.48-1.57)	1.32	(0.63-2.77)
> 5/day	0.98	(0.76-1.26)	1.33	(1.00-1.76)

P<0.05

7 DISCUSSION

The purpose of this study was to examine the determinants of SOC, its stability in negative life events, and its consequences in terms of its association with intentions to retire early among the Finnish population: women and men, and Finnish and Swedish speakers. The main findings are presented and discussed in the following sections.

7.1 Main findings

The crucial psycho-emotional resistance resources of SOC

The *first* main finding was that SOC is a psycho-emotional rather than a socio-economic scale (sub-studies I and II). According to Antonovsky, the most crucial resistance resources concern childhood living circumstances, education, wealth (socio-economic status), social relationships and employment, including good working conditions. For the most part, the present study confirmed Antonovsky's argument: all the factors included, selected on the basis of his theory, were clearly associated with SOC. However, the most significant resistance resources in both genders were related to close human relationships, in other words the quality of partner relationships, and social support and satisfaction with it. Further, the significance of and being satisfied with work had a slightly stronger association with SOC among the employed compared to the association of unemployment with SOC in both genders. Finally, childhood living conditions (in particular being in fear of a family member), and especially having had neutral or bad relationships with both parents, strongly threatened the level of SOC. The effect of both education and socio-economic status was weaker, although still significant, than that of close social relationships during childhood or adulthood.

Gender neutral SOC

The *second* main finding was that the SOC scale was relatively gender-neutral among the Finnish respondents (sub-study I). It was nevertheless found that loneliness, i.e., being single, and not being able to use one's skills at work threatened men's SOC in particular, whereas not receiving social support was especially threatening to women.

A higher level of resistance resources and SOC among Swedish speakers

The *third* main finding was that the level of SOC was stronger among the Swedish than among the Finnish speakers in both genders, although the difference was only slight. *Fourthly*, the determinants of SOC, in other words the generalized resistance resources, were unevenly distributed between the language groups: the difference in levels in favour of Swedish speakers was attributable to the greater propensity among Finnish speakers to psychosocial problems during childhood and their worse psychosocial working conditions during adulthood.

Negative life events affect strong SOC

The *fifth* main finding was that a strong SOC at baseline did not prevent a decline during the follow-up. In other words, initially strong SOC was no more stable than initially mediocre or weak SOC, as Antonovsky argued. In general, SOC responds to negative life events: those who reported such events had a weaker SOC than those who did not. SOC level was not very stable but negative life events affected the level of SOC in the present study.

The independent effect of SOC on the retirement process

The *sixth* main finding was that SOC appears to have an independent effect on intentions to retire early. In other words, it was clearly associated with the intentions to retire early among the somatically or mentally unhealthy in both genders, and this association remained even after adjustment for a range of socio-economic, psychosocial and work- and health-behaviour-related background factors. Further, the association remained among the somatically and mentally healthy male respondents.

7.2 Interpretation of main findings

7.2.1 Psycho-emotional resistance resources

Relationship with spouse/partner

Antonovsky did not analyse the role of close family relationships as a generalized resistance resource of SOC. There are several possible explanations for the result obtained in the present study. People in close relationships not only spend most of their private time with their spouse/partner, but are also often the most “exposed”, revealing the different sides and

deepest layers of their personality, body and soul to their life companion. Living in a difficult and unsatisfactory relationship and not being able to improve it may weaken one's view of the world as an accessible, meaningful and controllable place, in other words one's SOC. It seems probable that a problematic relationship will weaken a person's ability to cope well with other problems and challenges in life, hence affecting his or her general coping capability, SOC and, eventually, health. Given that previous studies have shown that SOC serves as a determinant of mental health (Eriksson 2007), it could be argued that a poor relationship quality poses a risk for mental health.

Cross-sectional data raise the question of the direction of influence. People with a poor SOC may have difficulties in forming good and close relationships or in choosing "a suitable" spouse/partner: in other words the low level of SOC may explain the lack of a good relationship. Further, previous results have shown (Höge & Büssing 2004) a strong correlation between SOC and negative affectivity, the predisposition to experience cross-situational distress and discomfort even in the absence of environmental stressors. Moreover, an accumulation effect cannot be discounted: the fewer other resistance resources a person has, the more difficult it may be to maintain a good relationship.

In sum, according to the results of the present study, a poor relationship is a clear risk for SOC. It is also worth noting that stress and challenges in private relationships may be funnelled and extended to other spheres of life: the source of what could be interpreted as work-related stress could at least partly lie in one's home and relationship. This aspect and the role of the quality of the relationship with one's life companion may not have received enough attention in the discourse on well-being and (mental) health.

Social support

Antonovsky emphasized the role of social relationships in SOC, especially the level of commitment to social groups and social support (Antonovsky 1979). Previous studies have also reported an association between social support and SOC (Larsson & Kallenberg 1996, Suominen 1993), thus its crucial role identified in the present study was quite expected. Knowledge (comprehensibility) and confidence (manageability) in terms of receiving social support if needed add to the self-evaluation (meaningfulness) aspect, and hence social support has the potential to affect all three components of SOC. Further, there is empirical evidence that SOC mediates the effect of social support on health, as Antonovsky argued. According to Wiesmann et al. (2009), optimism, self-esteem and social support influence

psychological health and symptom reporting indirectly via SOC, in other words SOC explains why resistance resources have a positive affect on the psychological aspect of health.

According to the results of the present study, it is not the lack of friends as such (even though not having friends also decreased the SOC level), but the lack of or dissatisfaction with social support that greatly compromises SOC. It could thus be argued that the role of local organizations, communities and societies in encouraging and building functional networks and support systems of different kinds, and not only financial, is crucially important and health-promoting.

Childhood

Antonovsky's description of how consistent, load-balanced and participative experiences build up the components of SOC, i.e., comprehensibility, manageability and meaningfulness, step by step during childhood is easy to follow and seems sensible. Childhood living conditions are among the most influential factors contributing to SOC in later life (Antonovsky 1979, Antonovsky 1987). Earlier studies report similar results (Sagy & Antonovsky 2000, Lundberg 1997). It should be noted, however, that according to the present research, the quality of the parental relationship matters: having a poor relationship with one or both parents was clearly a stronger risk factor for SOC than problems during childhood as such. Furthermore, the respondents who had had both a good relationship with their parents and problems in their childhood home had stronger SOC than those who had a bad relationship with their parents but none of the other specified childhood problems. This could imply that a good relationship with parents buffers the harmful effects of childhood problems at home. It is a comforting thought that dedicated and good parenting could, at least to some degree, compensate for e.g. economic problems or parental divorce.

At the same time, these findings give quite a depressing picture of children whose parents are too stressed, tired or sick to be able to bond with them. A bad relationship with parents and/or problems during childhood would appear to affect adult SOC in different ways. Firstly, there may be an impact on intra-personal resistance resources, such as self-esteem, optimism and a positive life attitude, which may eventually reduce the level of SOC, and secondly, there may be an accumulation effect. According to Lundberg (1997), childhood conditions are related to adult social class, in other words they may have an impact on social and material, as well as on intra-personal resistance resources, and therefore also on the level of SOC.

Several previous studies suggest that childhood living conditions are associated with adult physical and mental health (Schilling, Aseltine & Gore 2007, Sacco et al. 2007, Korkeila et al. 2010, Sumanen et al. 2009). According to the results of the present study, SOC, i.e. coping ability, stems from childhood, and furthermore, adverse circumstances during childhood may risk the development of SOC and, subsequently, of good health. Interventions promoting SOC and health in individuals should therefore be executed early enough, i.e. in childhood. Financial and mental investment in (families with) children by society will pay off in the form of health and well-being in later life. The societal discussion on children's rights and well-being should go hand in hand with the discussion on health and well-being in adulthood.

7.2.2 Work related resistance resources

Antonovsky claimed that working life had a strong effect on the SOC level. He further postulated that people identify with their work to the extent that things and ideas learned and valued at work will spill over to non-professional life regions (Antonovsky 1987) – a factor further explaining the impact of work on people and their SOC and, eventually, their health. Previous research has reported close interactions between work and private life in predicting health. According to Bauer and Jenny (2007), work experiences may affect situational Work-SOC, whereas private-life experiences may affect situational Life-SOC. Work-SOC and Life-SOC interact with each other and with global SOC as defined by Antonovsky. It would therefore be difficult to separate the role of working-life factors from private-life factors in global life orientation, known as SOC.

Previous research has confirmed the substantial influence of working life on the SOC level. According to Feldt, for example, a good organizational climate and low job insecurity is related to a strong SOC, which again is associated with high levels of general and occupational well-being, and there is some support for the moderating role of SOC in the relationship between perceived work characteristics and well-being. Furthermore, positive changes in the organizational climate and leadership relations have been found to be related to changes in SOC and, via that, to changes in well-being, whereas occupational stress did not decrease the SOC level (Feldt 2000).

The present study confirms the above-mentioned findings: qualitative working circumstances had a strong effect on the level of SOC, especially compared with the (somewhat minor)

association with unemployment, which again according to Antonovsky is a great threat to SOC and has been identified as a clear weakening factor in previous studies (Vastamäki, Moser & Paul 2009). A good quality of work implies participation in decision-making, an overload-underload balance and consistency, thereby promoting a strong SOC, which in turn promotes employee health and well-being. In contrast, having poor working conditions and a passive job functions the other way round in failing to offer positive experiences related to self-fulfilment (meaningfulness) and skill utilization (manageability), for example, it may thus weaken the SOC level.

However, the cross-sectional nature of the data makes it impossible to ascertain the direction of the influence between SOC and poor working conditions. There is also theoretical confusion regarding the predictive associations between SOC and work characteristics. It was shown in a longitudinal study (Feldt et al. 2004) that SOC at Time 1 predicted work characteristics at Time 2, but the characteristics at Time 1 did not predict SOC at Time 2. According to the results of another longitudinal study (Smith, Breslin & Beaton 2003), unskilled work is associated with a decline in the level of SOC in both genders, whereas decision latitude and insecurity are not. Hence it is not the working conditions that are deleterious to SOC in lower occupational positions, but rather factors outside the workplace that directly lead to SOC changes in these groups.

7.2.3 Gender differences and similarities in resistance resources

Social support

Most previous studies report stronger SOC among men than women (Eriksson 2007), although in some the association between SOC and health-related factors is stronger among women (Larsson & Kallenberg 1996, Kivimäki et al. 2000). There has also been speculation that in terms of health, SOC has more relevance to women than to men. Less attention has been given to possible gender differences in the associations between resistance resources and SOC. Antonovsky did not explicitly analyse the meaning of resistance resources in terms of gender, but he did analyse the role of housewives, highlighting the significance of social values and gender roles, as well as the expectations attached to them, regarding the level of SOC. Hence, it is theoretically possible that the generalized resistance resources (implicitly) included in women's "life sphere" (e.g., a family life with children, social relationships and

support) have a greater effect on women's SOC, whereas the opposite is the case for men (with regard to employment status and the meaning of work in general). The results of the present study only partially support this notion.

Basing their arguments on studies reporting an association between social support and men's poorer health, some researchers suggest that men have difficulties in being dependent on other people (Flaherty & Richman 1989, Edwards, Nazroo & Brown 1998). In the present study, not receiving social support was a much greater risk to SOC among women than among men, whereas dissatisfaction with social support threatened both men's and women's SOC. Could this imply that, in general, (receiving) social support is gender-bound to some extent at least, in other words it is more acceptable to women than to men, whereas unsatisfactory support threatens SOC (and health) in both genders?

On the level of intimate relationships, however, previous research gives contradictory accounts of women's and men's needs. A Finnish study (Väänänen et al. 2005) exploring the role of support reciprocity in intimate relationships regarding sickness absence showed that women benefit from giving support whereas men benefit from receiving it. Similarly, according to the results of another Finnish study (Väänänen et al. 2008) on depressive symptoms, a change in the balance towards receiving support elevated the future risk of depressive symptoms among women, whereas for men a change towards giving support had a parallel impact. The present study does not clearly support these arguments with regard to SOC: despite the fact that not getting support from one's partner proved to be a slightly bigger risk to SOC for men than for women in the same situation, not getting support from their partners also had a negative effect on women.

In the present study, men were found to be more vulnerable to loneliness, i.e., not having a spouse/partner. In terms of SOC theory, one explanation for the low SOC scores of lonely men could be the lower ability among men to control their private life, i.e., their household and social relationships. This argument is rather speculative, but worth further examination. Furthermore, loneliness among men is often associated with unemployment, poverty, and poor health and health behaviours, i.e., generalized resistance deficits, which are also likely to affect SOC.

Working life

Being able to use one's skills and knowledge at work was not associated with women's SOC in the present study, whereas obtaining personal satisfaction from work was, and there was a clear and strong association among men with both of these factors. There were no gender differences in employment status: in other words, being employed was no more important to men than to women. This may well be attributable to the broadly equal psychological significance of employment among men and women, which in turn could be understood as a reflection of gender equality in full-time employment in Finland (Lahelma et al. 2002, Arber & Lahelma 1993). In other words, having a job as such seemed to be equally important for both genders, whereas the meaningfulness component seemed more relevant to men. This result may reflect gender differences in expectations attached to paid work on the population level: women may appreciate using their abilities in other/more spheres of life. On the subject of working-class women, Antonovsky (1987) may have been right: it seems that, in Finland, they have lower SOC levels than women in other social classes.

All in all, SOC appears to be quite gender-neutral in the Finnish context, which is probably attributable to the reasonably similar societal circumstances and working abilities, as well as the relative gender equality. However, a lack of social support among women, and not having a partnership or being able to use skills and knowledge at work among men seem to be gender-bound risks regarding the level of SOC. Lonely men in poor jobs are overrepresented among the unhealthy, thus presenting the greatest challenge to the public health service, and should therefore receive more attention from occupational health professionals and society in general. It would be interesting to study gender differences in the association between SOC resources and levels in other than Western countries.

7.2.4 Differences and similarities between language groups

The minor difference in SOC between the two language groups was in favour of Swedish speakers and related to disparities in childhood living conditions and working life in adulthood. These results are in accordance with Antonovsky's theory emphasizing the role of childhood living conditions and work characteristics in SOC (Antonovsky 1987), and with the results of some other studies (Feldt 2000, Lundberg 1997).

To the best of our knowledge there have been no previous studies on the childhood living circumstances of Finnish- and Swedish-speaking Finns. However, it has been shown that not only health status, but also the level of education, employment status, wealth and marital stability favour Swedish speakers (Finnäs 1997, Saarela & Finnäs 2002a, Saarela & Finnäs 2003c). There is also evidence of significantly more harmful drinking patterns among the Finnish-speaking majority (Paljärvi et al. 2009). It thus seems that social problems accumulate in the Finnish-speaking population, and this may also be associated with the greater proportion of psychosocial problems during childhood and worse working conditions during adulthood, i.e., lower levels of resistance resources, among Finnish speakers compared to Swedish speakers. Moreover, with regard to the differences in childhood living circumstances, it may be that upbringing practices, parental attitudes and conceptions of the family (nuclear vs. extended), differ at least to some extent in the two language groups. This is a speculative statement, but worth further study. However, the proportions of respondents with a good, neutral or bad relationship with their parents during childhood were similar in both language groups.

Of the conceivable reasons behind the differences between the language groups, the effect of area should be considered. Sipilä and Martikainen (2010) examined the effect of living area, in other words the local language composition (Finnish-speaking, mainly Finnish-speaking, mixed, Swedish-speaking), and found no strong or consistent effect on external and alcohol-related male mortality among the Finnish or Swedish speakers. The effects of living area were sharper among women: the mortality of Swedish-speaking women in the Swedish-speaking areas was less than half of that of the Finnish-speaking women in both age groups after full adjustment. It should be noted, however, that Swedish-speaking women living in Finnish-speaking areas had a higher mortality rate than their Finnish-speaking neighbours in both age groups, although the difference was not statistically significant. There again, Finnish-speaking women did not gain any advantage from living in a Swedish-speaking area. It seems that the area with its cultural differences in lifestyle and social practices is a major factor related to wellbeing in women. Future research on childhood living conditions among language groups should therefore consider the effect of living area in order to give a more detailed picture of the processes and explanatory factors behind the better childhood living conditions of people who speak Swedish as their mother tongue.

There were no language-group differences in social-life factors: it seems from our results that social capital (alleged to explain health disparity between language groups) does not include

the quality of or support in intimate relationships, the size of social networks, auxiliary friends or the direction of social support, given that there were no proportional differences in these factors among the language groups. Yet, it has been argued that Swedish-speaking communities have more social capital than Finnish-speaking communities (Hyypä 2002). The significance of auxiliary friends (Hyypä & Mäki 2001a), and also of religious attendance, civic trust, and community and associational participation has been emphasized. These factors were not included in the present study, but instead the resistance resources of SOC were. According to our results, the language-group differences included childhood psychosocial living conditions and working conditions in adulthood and not social-life factors as such.

The results of sub-study II and sub-study I were in accord regarding SOC resistance resources, suggesting a particularly strong association with psycho-emotional factors such as good and close social ties with friends and family, and childhood living conditions, as opposed to socio-economic factors.

7.2.5 Sense of coherence and intentions to retire early

The result of the present study was in line with previous studies based on small cross-sectional samples reporting an association between SOC and the intentions to retire early (Huuhtanen & Tuomi 2006, Rasku 1993, Rasku & Kinnunen 1995, Janatuinen 2001). To our knowledge, only one study has explored the association between SOC and disability retirement, in other words actual early retirement (Suominen et al. 2005). According to the results, independently of initial health, a weak SOC in people aged 50 years or less is associated with an increased incidence of retirement on the grounds of disability.

In the context of the present study, there are unquestionably numerous routes through which SOC and intentions to retire early are linked. According to Antonovsky, and other researchers, people with a strong SOC are more capable of adapting to social stress (Surtees, Wainwright & Khaw 2006) and work stress (Feldt 2000). It is therefore feasible that people with a strong SOC who find themselves considering the length of their working career and the possibility of retiring early, trust that they will have the necessary resources to cope with future work-related risk factors and challenges. Further, such people perceive life and its different dimensions, including working life, as meaningful and worthy of investment, and

hence do not think of retiring early. To someone with a poor SOC, on the other hand, work and life in general may appear to be chaotic, unmanageable and meaningless, and he or she may be reluctant to continue working (until the official retirement age). In other words, the level of SOC may determine the decision to carry on working or not, thereby having a “direct” effect on the process.

Research has also shown that chronically ill people with a strong SOC deal better with their illness (Eriksson 2007). SOC may therefore be an inhibiting factor with regard to early retirement among people with health complaints. Furthermore, an association has been found linking early rehabilitation with a higher-than-average retirement age (Väänänen-Tomppo, Janatuinen & Törnqvist 2001, Kaiser et al. 2006). According to Kaiser et al. (2006), SOC is related to coping style and is thus a prerequisite for engaging in rehabilitation.

A good atmosphere and situation at work are important factors to those still of working age, and hence affect the retirement process. It was found in a Finnish study (Sutinen et al. 2005) that a low level of job control, poor teamwork and unjust supervisory practices were associated with retirement thoughts and preferences among hospital physicians, and the association remained when indicators of health and social circumstances were controlled for. According to another Finnish study (Elovainio et al. 2005), the association between low level of job control and intentions to retire early is stronger if job demands are high. Moreover, there is some evidence of a main effect of SOC on well-being at work, and of a moderating role of SOC in the relationship between perceived work characteristics and well-being (Feldt 2000). The findings of the present study confirm the role of psychosocial working conditions in the retirement process in some circumstances: high job demands remained associated with intentions to retire early among men, after full adjustment for other confounding factors.

It has been found in earlier studies that Swedish-speaking Finns retire later than their Finnish-speaking counterparts (Saarela & Finnäs 2002a, Saarela & Finnäs 2002b). In terms of intentions to retire early in men, this study confirmed these results: the intentions to retire early were more prevalent among the Finnish speakers even after full adjustment for the background variables. Moreover, the two groups differed somewhat in attitude during the first phase of the retirement process.

In sum, SOC may influence the retirement process in several ways, directly in determining whether or not to continue working, and indirectly through fostering adaptability to ill health

or working circumstances, and engagement in rehabilitation. The Swedish-speaking men expressed fewer intentions to retire early than their Finnish-speaking counterparts.

7.2.6 The stability of sense of coherence

The results of the present study suggest that negative environmental effects modify the level of even a strong SOC and also after the formative years of adulthood. Karlsson et al., (2000) reported similar findings in that there was no relationship between change or stability of SOC and the preoperative SOC level in individual patients, indicating that each patient is able to alternate between positive and negative levels. On the other hand, there is evidence of an initially strong SOC remaining stable (Hakanen, Feldt & Leskinen 2007, Nilsson et al. 2003, Takayama et al. 1999, Buddeberg-Fischer, Klaghofer & Schnyder 2001, Schnyder et al. 2000). However, these studies were based either on SOC stability over time or on dichotomized SOC values, not on the interaction between SOC at baseline and negative life events.

Having been victim of violence contributed strongly to the level of SOC. Høgh and Mikkelsen (2005) suggest that victimization - especially human-induced - may risk people's basic assumptions of the world as meaningful, controllable and benevolent. Further, it may also shatter people's expectations of themselves as worthy and capable of controlling future events. In such a case the exposure (to violence) leads to a negative perception of the world and oneself. Alternatively, a weak SOC may promote stress reactions and/or lead to maladaptive coping. Høgh and Mikkelsen (2005) found that SOC did act as a mediator rather than a moderator of the relationship between violence and psychosomatic as well as cognitive stress reactions. Further, there is evidence (Kranz & Östergren 2000) of a synergistic relationship between a weak SOC and both childhood and adult experience of violence or abuse: the association between victimization and common symptoms were attenuated in the presence of a high or medium level of SOC. Moreover, according to Kivimäki et al. (2002), being a victim of violence correlates with a lowered level of SOC. It could thus be concluded from the above and from the results of the present study that being exposed to violence is a great risk to the ability to cope well and hence extra (mental) support should be offered to the victims.

The present results give no unambiguous evidence of gender differences in the effects of negative life events on SOC. However, men seemed to be more vulnerable to violence and divorce/separation. An earlier study (Takayama et al. 1999) reported that the effect of strenuous life events on changes in SOC was stronger among men compared to women. It was also found in a Finnish study (Kivimäki et al. 2002) that men were more likely to be affected by life events: since men had smaller social support networks than women, thus partially explaining their higher vulnerability, it was concluded that social support might help them to cope with life events. However, contradictory results have also been reported. For example, changes in health status and the psychosocial environment have been found to have a stronger effect on women's than on men's SOC (Nilsson et al. 2003). Moreover, Vahtera et al. (2006) showed that exposure to strenuous events was associated with a bigger increase in sickness absence and a longer recovery period among women than among men. Furthermore, according to Suominen et al. (2007), only among women do negative life events predict later sickness absence. Thus, more research is needed in order to clarify the possible gender differences in the effects of different negative life events on SOC. In sum, in terms of the gender aspect in the present study, there was a noticeably similar SOC reaction to negative life events among women and men.

The unstable nature of SOC does not necessarily have to be negative. Namely, there are findings suggesting that a (weak and mediocre) level of SOC may be influenced and increased even after the age of thirty. For example, a Swedish study (Karlsson, Berglin & Larsson 2000) showed that an initially weak SOC strengthened after coronary artery bypass surgery among many patients: in other words, an operation or action that may improve peoples' lives is a potential source of an increase in the SOC level. It should therefore also be possible to influence weak and mediocre SOC in a positive direction given the appropriate measures. A Norwegian study (Langeland 2007) investigated and compared talk-therapy groups based on principles of either salutogenic treatment, i.e., increasing participants' consciousness of their potential and their internal and external resistance resources, or standard care. According to the results, salutogenic treatment improved coping ability (the level of SOC) among people with various mental health problems.

All in all, the results of the present study challenge Antonovsky's argument according to which a person with a strong SOC is less vulnerable and sensitive to change brought about by strenuous and negative life events than a person with a weak or mediocre SOC. It must be noted, however, that Antonovsky also suggests that if there is a weakening in a strong SOC,

the strength will be restored as soon as the living circumstances normalize. Interpretation of the present results is therefore complicated in that the SOC parameters were smaller, in other words, SOC was stronger if the event happened in the last five years or earlier than if it happened in the last six months. Does this mean that a (strong) SOC will be restored as life circumstances improve, as Antonovsky argues?

Furthermore, in terms of health status, what does it mean that a strong SOC (= the ability to cope well) is not stable? Does it mean that when SOC is perhaps most needed (=in sudden and difficult life situations) it fails you and the tension arising from the situation turns into health-damaging stress, nonetheless? According to previous findings, people with a strong SOC cope better in strenuous situations than people with a mediocre or weak SOC (Eriksson 2007, Takayama et al. 1999, Richardson & Ratner 2005). Furthermore, according to the results of a previous Finnish 13-year follow-up study, a strong SOC is more stable than a weak SOC (Hakanen, Feldt & Leskinen 2007). Although the study did not include negative life events, it seems reasonable to assume that most of the participants would have faced some kind of negative event during the 13 years. There is probably no reason to doubt the beneficial effect of a baseline strong SOC in such circumstances: although it may have weakened, a strong SOC will presumably facilitate successful coping more effectively than an initially mediocre or weak SOC. This question should be explored further in well-designed study settings. There are several open questions. What happens after the decline, in other words how soon does SOC start to recover after the negative life event? What circumstances promote the recovery? In which population group does the restoration process begin (those with a strong SOC before the event)? How long does the recovery process last, on average? The most useful approach would be to explore the association between SOC and health in different phases of that process. More knowledge is needed in order to enhance understanding of the prerequisites and circumstances of successful coping mechanisms in relation to health.

7.2.7 Sense of coherence in the light of personality theory

The issue of the stability of SOC relates to the debate about personality traits and their consistency and change. Personality traits are defined as the relatively stable patterns of thoughts, feelings and behaviours that distinguish individuals from one another. Whether personality traits continue to develop in adulthood depends in part on how ‘relatively stable’ is defined (Roberts & Mroczek 2008). It had been assumed that personality traits stabilise in

adulthood, but cross-sectional and longitudinal studies of personality-trait change in adulthood conducted in the mid 1990s have changed the views of researchers. Roberts et al. carried out two large meta-analyses of the Big Five personality traits, including both rank-order consistency (Roberts & DelVecchio 2000) and the mean level of change (Roberts, Walton & Viechtbauer 2006) and concluded that personality traits are developmental process, even in adulthood. More specifically, their first analysis of rank-order consistency (the relative placement of individuals within a group) showed that trait consistency increased in a linear, step-like pattern from early childhood until the ages from 50 to 59, when it peaked. It appears that the traits are mostly consistent in adulthood, although there is some indication that they retain a dynamic quality (Roberts & DelVecchio 2000).

The second analysis (Roberts, Walton & Viechtbauer 2006) of mean level changes of the Big Five personality traits across the life course produced somewhat different results in that change was found to persist at almost all ages. The changes occur predominantly in young adulthood (age 20-40), but there is mean-level change in middle and old age, showing that personality traits can fluctuate at any age. Thus, populations can demonstrate high rank-order consistency, in other words become increasingly consistent with age at least in comparison with one another. At the same time, mean-level changes appear to occur primarily in young adulthood, but may continue throughout the remainder of the life course. The direction of change appears to be positive, people becoming more confident, warm, responsible and calm, i.e., socially mature, with age. Those who develop cardinal traits of psychological maturity earliest are more effective in their relationships and work, and lead healthier and longer lives (Roberts et al. 2007). In terms of SOC, several studies, including the present one, report an increase in SOC along the life course (Eriksson 2007, Nilsson et al. 2003). Similarly, the results of the present study suggest that a strong SOC is associated with better work and relationship circumstances, whereas previous studies report associations between SOC and both health and longevity (Eriksson 2007).

Why, then, do mean-level changes occur, in other words why does the personality change in adulthood? Change is a multifaceted phenomenon. Roberts et al. (Roberts, Walton & Viechtbauer 2006, Roberts & Mroczek 2008) suggest that there is quasi-universal trend in young adulthood to invest in social roles that are tied to one's career, family and community. This process is described as social investment, and it serves as a catalyst for change in personality traits, such as finding a marital partner, starting a family and establishing a career. These appear to be candidate experiences through which people experience increases in traits

such as conscientiousness and emotional stability. In other words, these changes take place, in part, through social role experiences. If people do change in response to life experiences, which can vary quite significantly, then the normative patterns of trait development that result from such experiences may also vary. Many developmental psychologists therefore refer to “psychological age”, instead of chronological age, as a more appropriate depiction of the development.

In the context of the present study, Antonovsky also attached the development, in other words strengthening, of SOC to the adoption of social roles in work and family life, which in the vast majority of cases had happened by the age of 30. The situation today may be different, however, as people study longer and embark upon a career and family life later. In the light of the current knowledge of trait consistency among developmental psychologists, Antonovsky’s argument concerning the stable nature of a strong SOC after the age of 30 is open to question.

A unique feature in the study of individual differences in change is that personality traits are considered outcomes, not predictors (as they are typically viewed). For example, personality traits have been seen as the consequence of work experiences (Roberts & Mroczek 2008). This claim is in accordance with Antonovsky’s argument, and with the results of the present study suggesting that generalized resistance resources, such as work experiences, determine the level of SOC.

However, SOC should not be considered a separate personality trait in the same way as those presented in the Big Five (Feldt et al. 2007). SOC develops through maturation and life experiences, whereas personality traits are considered to represent an individual’s basic tendencies. In interaction with the environment these traits produce so-called characteristic adaptations such as skills, beliefs, values, strategies and self-images. Characteristic adaptations, on the other hand, are activated in response to and are ultimately shaped by the everyday demands of social life. According to McAdams and Pals (2006), they are situated in particular contexts and may change markedly over time. This does not mean, however, that they carry less significance for the personality than dispositional traits (McAdams & Pals 2006). It is no simple matter to determine whether SOC is closer to personality traits (which are fairly stable albeit dynamic) or characteristic adaptations (which may change markedly) given the lack of a clear distinction between dispositional traits and characteristic adaptations. However, it could be assumed from previous research that SOC is closer in definition to

personality traits given its reasonable stability, the tendency to strengthen along the life course, and its apparent dependency on the adoption of social roles with regard to its development, even though, like characteristic adaptations, it interacts with the environment and is context-dependent.

In the context of the present study, the stability of SOC in difficult life events is somewhat different than its stability over the life course. According to a 10 year prospective study conducted by Sutin et al. (2010b) exploring stressful life events and personality trait development in middle adulthood, individuals high in neuroticism perceive such an event as a negative turning point, whereas extraverts reported having learned a lesson from it. Longitudinally, the former perception was associated with an increase in neuroticism, whereas learning a lesson was associated with increases in extraversion and conscientiousness. The characteristics of the events themselves were primarily unrelated to trait change. The researchers concluded that trait change in middle adulthood could be more strongly related to how individuals understand the stressful events rather than to the occurrence of such events. Sutin et al. (2010a) also found that a lower self-rating of health and higher ratings of psychological distress were associated with the perception of the stressful event as a negative turning point. In this case they concluded that the way individuals construe the most stressful events in their lives is associated with changes in self-rated health and distress.

Theoretically, in accordance with Antonovsky's argument, one could speculate that SOC should, at least to some extent, serve the disposition that orients people to understand a stressful event in a positive and character-developing way, in other words to learn a lesson from it, instead of perceiving it as a negative turning point. Given the previous research evidence of a clear negative association between a strong SOC and neuroticism (and a modest association with the other Big Five factors), it may be that, in addition to serving as a coping mechanism in negative life events, SOC may also react to them, as found in the present study. The decrease in SOC strength as a result of negative life events may be connected to the above-mentioned discussion on trait changes due to changes in social roles, including divorce, unemployment and severe relationship problems. These changes may force people suddenly to adopt a new social status such as single (parent), unemployed, poor or lonely, hence (temporarily) affecting SOC strength. This is a speculative argument but is worth further research.

What picture of SOC is conveyed by the current knowledge of psychology together with the findings of the present study? The current knowledge of the nature and changeability of personality traits reflects SOC in many respects. A tentative conclusion is that the unstable nature of SOC identified in the present study is not in contradiction with the current knowledge of personality consistency. SOC is rather “a trait-like” orientation in people to cope with life, which like traits may increase over the life course, develop partly through social-role experiences (here, generalized resistance resources), react to negative life events (due to sudden changes in role composition and expectations), and eventually be associated with better living circumstances (e.g., pleasant work and good relationships). However, there is a need for a deeper understanding of the role and place of SOC in psychological theories. It would also be valuable to further investigate its role in negative life events. How and through which mechanisms does it facilitate coping? Why does it react to the event? Another issue that deserves further examination concerns the association between SOC and health during such life events.

7.2.8 Determinants and consequences of sense of coherence: overall assessment

The present study explored the determinants of SOC in detail, thereby enhancing knowledge of the supportive mechanisms of good health. The determinants appear to be strongly associated with childhood living conditions, and especially with a good relationship with parents during that time, close and good relationships with one’s partner and friends, social support, and favourable working conditions. This applied to both genders and language groups under study. According to Geyer (1997) SOC is an attitude and is prevalent among people who are well-educated and occupy fairly privileged social positions. In as far as psycho-emotional and socio-economic elements are related, this is feasible. However, SOC should be considered from a wider and deeper perspective that takes into account spheres of life other than socio-economic position. It is logical to assume that when the “qualitative” aspects of life (such as having a good partnership, a circle of friends and rewarding work) are in order, one’s general life orientation will be trustful, and therefore coping with the constant demands and challenges will be easier. It could be argued that what one possesses (in objective terms) is of minor importance compared with how one sees, evaluates and experiences what one has. The results of this study indicate that SOC is a determinant of both mental health and quality of life.

It seems that SOC is relatively gender-neutral in Finland in the sense that the resistance resources are similar among men and women, and produce similar SOC levels. The only exceptions concern partnership and being able to use one's skills at work, which threatened men's SOC if they were lacking, whereas a lack of social support was a risk only among women. It could thus be argued, given the results of the present study, that the determinants of SOC, and eventually of good health, are much the same among women and men.

The fact that the level of adult SOC has its roots in childhood living conditions and relationships with parents during that time suggests that SOC is a deeply "conditioned" and internalized orientation to appraising oneself, the world and its demands. The results of this study therefore appear to confirm the view that SOC is a psychological determinant of health. It could also be argued that a permanent change in the level of SOC – in either a positive or a negative direction - would imply relatively substantial changes (and interventions) in the life circumstances of the people concerned.

Swedish-speaking Finns turned out to have only a slightly stronger SOC than Finnish speakers. This difference could be attributed to the better childhood living conditions and adult working circumstances among the Swedish speakers. There were no social-life differences between the two language groups. The implication is that the health disparity between Finnish- and Swedish-speaking Finns may be related to the different childhood circumstances and adult work situations, and not to social-life factors and support.

Furthermore, the present study also explored stability of SOC in the presence of several different negative life events reflecting different spheres of life. Contrary to Antonovsky's theoretical assumptions and the results of previous studies, a strong SOC did not prove to be more stable than a mediocre or weak SOC in the presence of negative life events. It thus seems that difficult life events may, at least if protracted or accumulated, risk the health status and the maintenance of good health. Their effects on SOC were largely similar in both genders. However, because health was not included as an outcome in terms of the stability of SOC, the question of an association between (initially strong) SOC and health following a negative life event remains open.

Finally, the consequences of SOC in terms of its association with intentions to retire early were explored. A clear and independent association was identified in both genders. The implication is that SOC could serve as a theory in helping to prevent early retirement. It could be argued that appraising one's own intentions to retire early, in other words the self-assessed

willingness or ability to continue in work until of pensionable age, is more multi-faceted as an outcome than appraising one's own health status. It could also be argued that such an appraisal, at least to some degree, reflects respondent expectations regarding future working circumstances, health status, family life and financial situation. In other words, the negative association between SOC and the intentions to retire early may be somewhat "direct" in the sense that a strong SOC leads people to interpret their life prospects in a positive way. This being the case, SOC theory may have an application potential in health research, specifically with regard to the prevention of early retirement.

7.3 Methodological evaluation

Two different representative and random data sets were used in the present study. The data for sub-study I derived from the Finnish 'Survey on Living Conditions' conducted in 1994 by means of face-to-face interviewing, whereas that used in sub-studies II, III and IV derived from a postal survey connected with the 15-year Health and Social Support (HeSSup) study. Face-to-face interviews are often considered more efficient and reliable than postal surveys in terms of gathering data on account of the assistant role of the interviewer, for example, although there is a risk that the interviewer will (unintentionally) prompt the respondent and therefore mediate the answers. Postal surveys are usually considered reliable, although there are several potential sources of bias, including inadequate sampling, incomplete responses and inaccurate reporting. Furthermore, epidemiological studies in general are prone to bias and error due to various selection effects, an inappropriate study design, reversed causality, measurement or follow-up bias, inappropriate statistical methods and flawed conclusion. The limitations of the present work are discussed below.

The baseline response rate of the Health and Social Support study conducted in 1998 was 40 per cent, and the follow-up response rate in 2003 was 80 per cent. The non-response analysis of the baseline was carried out in 2001, although the over-represented proportions of the Swedish-speaking and Turku-area population were excluded (Korkeila et al. 2001). The analysis indicated that the major demographic and physical-health-related differences between the respondents and non-respondents were small. Furthermore, there is no reason to believe that the two language groups, i.e., Finnish- and Swedish-speaking Finns, were not similarly representative.

According to the non-response analysis at follow-up (in 2003), loss to follow-up was higher among men, in the younger age groups and in the lower socio-economic groups, and among those with at least moderate depression, a current smoking habit and heavy alcohol consumption. The differences between the respondents and non-respondents were relatively small, hence major follow-up bias was considered unlikely (Harkonmäki et al. 2007).

However, the risk of reporting bias, accumulation, negative affectivity and the question of the direction of influence should be taken into account in drawing conclusions from the results of the present study. Given the focus of the two first sub-studies on the developmental factors of SOC (i.e., resistance resources), the cross-sectional design does not allow identification of the direction of the influence: resistance resources may produce a strong SOC, and a strong SOC may increase the chances of acquiring these resources. This assumed bidirectional movement, however, does not mean that the resource does not serve as a (further) promoter of SOC. In practice it would be very difficult to design a study that would fully resolve the question of the direction of influence. Nevertheless, a follow-up study starting from early childhood and including the subject's entire family and its resources and changing life situations throughout the data-gathering process would enhance understanding of the developmental (or under-developmental) processes and resources of SOC during certain life phases, situations and challenging periods, and hence add to our knowledge about the prerequisites and risks of coping and good health.

The main results of cross-sectional sub-studies I and II (the collapse of SOC in respondents with an unsatisfactory social life, and the crucial role of the psycho-emotional resistance resources of SOC) may be prone to reporting bias and the accumulation effect. People with a weak SOC may interpret their lives negatively, and give similar responses. Moreover, the accumulation of resistance resources may complicate the interpretation of the results in that they (as well as the resistance deficits) typically accumulate in the same people. Adjustments regarding some basic resistance resources were made in the further analyses in order to minimize this problem.

The risk of reporting bias also applies the results of the third sub-study (low SOC scores among those with [remote] negative life events), in that people may report (remote) events as negative or traumatic if they have a low SOC level. Further, some of the change in SOC may be due to overlap between SOC and negative affectivity, for example. Despite these

theoretical shortcomings, however, the conclusion that SOC reacts to negative life events seems to be justifiable.

Childhood living conditions and the relationship with parents were assumed to play a major role in the development and level of SOC, and were therefore included in each sub-study, either as an independent variable explaining the level (sub-studies I and II) or as adjustment factors (sub-studies III and IV). The retrospective nature of the questions concerning childhood and its adversities could be considered a source of reporting bias. In terms of childhood adversities, tests of response reliability (HeSSup: baseline and follow-up) (Sumanen et al. 2005) showed that the kappa coefficient varied between 0.56 and 0.90, indicating reliability in the retrospective data.

The most serious methodological question concerns the reliability and validity of the Orientation to Life Questionnaire (SOC-13). The validity of SOC has been a matter for debate since the theory came to light in the late 1970s. Eriksson (2007) analysed almost 500 studies in terms of the face validity, consensual validity, construct validity, criterion validity, discriminant validity, predictive validity, responsiveness, internal consistency and test-retest reliability of SOC. With regard to construct validity, and in conflict with Antonovsky's theory, SOC seems to be multidimensional rather than unidimensional in factorial structure, and not to be as stable as Antonovsky assumed but to respond to environmental change over time. All in all, Eriksson (2007) concluded, the SOC scale seems to be a reliable, valid and cross-culturally applicable instrument for measuring how people manage stressful situations and stay well.

The strengths of the present study should also be acknowledged. The findings contribute to the theoretical understanding of SOC given the inclusion of a broad range of determinants both of a socio-economic nature and related to social, family and working life. Furthermore, new light is shed on the aspect of gender in SOC theory. As far as we are aware, the HeSSup database is one of the largest, if not the largest, on the global level where SOC-13 is charted. In terms of stability of SOC, the large sample size gave statistical power to the separate gender-based analyses of different negative life events. Furthermore, the data in sub-study II, in which the focus was on language differences, was unique due to the overrepresentation of Swedish speakers. This made it possible to carry out a representative population study that yielded novel information concerning resistance resources and SOC among the two language groups.

7.4 Implications for further research

Further prospective studies would shed more light on the stability of SOC during strenuous life events, and especially the association between SOC and health at such times. Given the association between a strong SOC and a good health status, the main focus should be on stability in this respect. It seems from the present study that a five-year follow-up may not give enough time to produce a reliable understanding of the stability and potential recovery capability of a strong SOC. A longer-term follow-up study incorporating minor and major life events and regular measurements of SOC and (mental) health would perhaps clarify the picture.

There is also a need for experimental intervention studies on the intentional strengthening of SOC. A few intervention studies have produced encouraging results, but we lack a comprehensive understanding of whether the improvement in SOC level is “final”. Detailed and well-designed research exploring the circumstances and means that are required in order to strengthen the level of SOC on a permanent basis would help to fill this gap.

According to the results of the present study, psycho-emotional resistance resources are strongly associated with SOC in both genders and both language groups. A prospective study on the predictive role of psycho-emotional (vs. socio-economic) resistance resources could confirm these results and offer deeper insight into the direction of the influence. The explanatory factors behind the better childhood conditions of Swedish speakers compared to Finnish speakers should also be explored in greater detail in future studies. If it were feasible, it would be useful to include the influence of the over-generational accumulation of socio-economic status and of the current residential area in a study charting the determinants of the different childhood living conditions (and health disparity) between the language groups.

Even though early retirement is a multifaceted health-related outcome, only a few existing studies have explored the role of SOC in the process. More research on the association between SOC and actual early retirement, preferably based on register data, is needed in order to investigate in more detail the assumed preventive role of SOC. One might speculate from the results of the present study that the ability to comprehend, manage and find meaning in (working) life may decrease the risk of early retirement. A large intervention study is currently underway in Germany, the aim being to strengthen the levels of work-related and global SOC through the development of organizations and working conditions in line with

salutary principles (Bauer & Jenny 2007). This kind of experimental intervention study aimed at increasing SOC levels among employees in Finland would be extremely useful.

The present study did not focus on the validity of SOC, which is a debated issue and crucial in terms of using the concept in health research and in practice. There is therefore an obvious need for further validation studies. Previous studies also call for more research on divergent and discriminant validity in the context of SOC, incorporating neuroticism and depression, for example (Feldt et al. 2007, Konttinen, Haukkala & Uutela 2008). However, it is worth pointing out that there does not seem to be any “golden standard” with regard to the validity research on SOC. Constructs such as depression, anxiety, neuroticism and SOC seem, at least to a certain degree, to have counterparts in our personality that leave their marks. However, despite the lack of a clear understanding of the processes and mechanisms behind depression, for example, it is possible to identify who is “depressed” based on responses to Beck’s questionnaire, for instance. Similarly, we do not know what role the ability to comprehend, manage and find meaning in life plays in the process of maintaining good mental health, or vice versa, in the process of depression: how are SOC and depression related – in other words how internalized (concomitant) or separate (cause/effect) are the three elements of SOC in mental health process? It could be argued that SOC serves as a “mental tool” that interacts with our “internal and deeper psychological layers” which eventually determines the status of our mental health. A “launching factor”, such as the loss of a family member or divorce (i.e. a negative life event), is often identified as cause of depression. It seems likely that a person with a strong SOC has more tools for dealing with these life events, and hence is better able to prevent the emergence of depression than someone with a weak SOC. The role of SOC is therefore significant in terms of mental health, and its close link with depression, for example, seems self-evident. There is still a need for more knowledge about the reciprocal relationship between SOC and the other constructs mentioned. Further validation studies, together with (qualitative) measurement development (e.g., SOC, depression, anxiety, neuroticism) may be needed. It seems that existing measurements are not sufficiently accurate. No measurement should be taken for granted or used as standard when there is a need for research of varying depth.

7.5 Implications for health and welfare policies

Given the social gradient of health status, the major objective of public health policy should be to reduce the social inequalities and concomitantly to improve the overall health of the population. Regarding the results of the present study, in order to foster health equity among individuals, society should focus more on the equal distribution of both socio-economic and social-life-related factors (such as social relationships and support). Furthermore, socio-economic and psychosocial factors go hand in hand, and attention to both is essential in promoting SOC and, eventually, health.

The present study confirms the view that adult health status has its roots in childhood living circumstances. With regard to interventions by policymakers, support for families with children should be highly prioritized: threats to future SOC levels, and therefore the risk of health problems, start (to accumulate) from childhood. Again, there is a need for both socio-economic and social support of families with children. Childhood living circumstances and the well-being and rights of children should feature much more strongly in the public discussion, particularly in relation to later health and well-being. Guaranteeing safe and good living conditions for every child would be health promotion at its best.

Furthermore, occupational-health-care professionals, doctors and social workers should give more attention to people who have recently experienced a strenuous life event. Such events and phases carry a potential health risk, and professional interventions may help to avoid their accumulation and the consequent risk.

8 CONCLUSIONS

The objective of the present study was to enhance knowledge and understanding of the determinants of successful coping, in other words SOC, as well as of the consequences. According to the findings, close and successful social relationships create favourable circumstances for health promotion - in the form of a strong SOC. It also seems that SOC is determined, possibly even primarily, by people's psycho-emotional life sphere, and not only by their social position and socio-economic status. The level of adult SOC has its roots in the living conditions and relationships with parents during childhood. These results concerned both genders and the two language groups studied. In order to increase equity among individuals and groups with regard to health status, society should pay attention not only to socio-economic but also to social-life-related factors, such as social relationships and support. Furthermore, societal interventions aimed at improving the health of disadvantaged people should be initiated during childhood.

Swedish-speaking Finns had only a slightly stronger SOC than the Finnish speakers, the difference being attributable to the better childhood living conditions and working circumstances during adulthood among the Swedish speakers. There were no apparent social-life differences between the language groups. A strong SOC did not prove to be more stable than a mediocre or weak SOC in the presence of negative life events, the implication being that difficult life events, at least if protracted or accumulated, could present a risk to health status. People who have faced negative life events should be eligible for extra help from medical doctors and social workers. Finally, the clear and independent association between SOC and the intentions to retire early in both genders points to the potential use of SOC theory in the prevention of early retirement.

9 ACKNOWLEDGEMENTS

This study is the result of co-operation between three research units, the Department of Public Health, the Hjelt Institute, the University of Helsinki, the Folkhälsan Research Centre and the Department of Social Science, Åbo Akademi University in Vaasa. I wish to express my sincere gratitude to the Head of the Department of Public Health, Professor Jaakko Kaprio, and the Director of the Hjelt Institute, Docent Ritva Halila, for allowing me to use the excellent facilities and to be part of such a great and encouraging work environment.

I have been very fortunate in having three highly professional supervisors: Docent Karri Silventoinen, Professor Eero Lahelma and Docent Sakari Suominen. I am deeply grateful to Karri for his pedagogic skills in explaining statistical matters in a detailed and clear way, and for his valuable comments regarding my work in general; to Eero for his patience and always being ready to voice his sharp-sighted and profound thoughts and to give advice; and to Sakari for sharing with me his extensive expertise in the theory of sense of coherence, for all the inspiring discussions, and for his practical support and advice regarding my research work. All three have always found time to read my texts in depth and at short notice. I humbly thank you all.

I would like to express my sincere thanks to the official reviewers of this study, Professor Taru Feldt and Research Professor Marko Elovainio, for their insightful and constructive comments. As they represent different disciplines from mine and emphasized the psychological dimension of the theory I was exploring, I could not have had better reviewers.

I acknowledge the contributions of my two co-authors, Professor Markku Koskenvuo and Karoliina Koskenvuo, PhD. Markku is the primary investigator in the Health and Social Support Study (HeSSup), and I thank him for allowing me to use this high-quality data. I would also like to thank all the researchers in the HeSSup study group, especially Lauri Sillanmäki, our biostatistician, for his help regarding the use of the data.

My warmest thanks go to the Helsinki Health Study (HHS) research group. I was working on another research project of which I was the only member in our department and I am very grateful to you for always welcoming me to join your coffee breaks and involving me in various activities. This work place support was invaluable and I would not have managed without it. I am profoundly grateful to Tea Lallukka and Peppiina Saastamoinen for their support, advice and friendship during these years of thesis preparation. I would also like to mention my more recent colleagues Peijja Haaramo and Sanna-Mari Kääriä: it has been a pleasure to make friends with you. You all made such a difference!

I owe a debt of gratitude to many others for their advice, discussions, encouragement and friendship. My sincere thanks go to the wonderful women at the Department of Public Health,

including Eila Voipio, Ulla Broms, Leena Lundell and Nina Simonsen, for their inspiring and supportive friendship over the years, and to Netta Mäki from the Department of Sociology. Thank you all for the laughter and the tears. I must not forget the men: my warm thanks go to Kauko Heikkilä for his help with the statistics, Akseli Aittomäki for many interesting discussions on science and art and Mikko Laaksonen for his help and advice.

When I started my thesis my study was part of the larger research project: ‘In search of social capital: the case of the Swedish-speaking Finns’, headed by Professor Gunborg Jakobsson at Åbo Akademi University in Vaasa. I am grateful to Professor Jakobsson and to the whole research group for the interesting seminars and the opportunities to present my research on Finnish- and Swedish-speaking Finns. I would also like to thank Fredrica Nyqvist, my colleague in the project, for the pleasure of sharing thoughts and feelings about recent motherhood and doctoral work, and how to combine the two.

I am deeply grateful to Joan Nordlund for her help in revising the language of the dissertation. Thank you.

I gratefully acknowledge the financial support provided by the Academy of Finland, the Doctoral Programs in Public Health, the Yrjö Jahnsson Foundation, and the Juho Vainio Foundation.

I have been involved in two doctoral programmes, the Doctoral Programs in Public Health (DPPH) and the Population, Health and Living Conditions programme. I am grateful to my fellow students and to the postdoctoral researchers and directors in the latter for all their valuable comments on my work in progress. I acknowledge the contribution of Emeritus Professor Tapani Valkonen in particular.

I give my warm thanks to all my friends in Helsinki, elsewhere in Finland and abroad for the substance you bring into my life. I am so fortunate to have you!

I am grateful beyond words to my mother Eila, who is always willing to help and to babysit, even if it means cancelling her own plans, and to my father Paavo, whose love and faith have been the basis and mainstay of my life.

My deepest gratitude is owed to my partner Ilmo Keskimäki and our two wonderful children, our daughter Karelia and her little brother, our son Valtari. I am eternally indebted to Ilmo for his constant support, encouragement and faith. No matter how loaded with work you might have been, I have always been able to count on your support and advice. What a privilege! Thank you. And finally, Karelia and Valtari, äidin pienet pupukat: you are the meaning of my life. May my love follow you and guide you throughout your lives.

Helsinki, January 2011

Salla-Maarit Volanen

10 REFERENCES

- Ahola, A., Djerf, K., Heiskanen, M. & Vikki, K. (eds) 1995, *Elinolotutkimus 1994. Aineiston keruu (Survey on Living Conditions 1994. Collecting the data)*, Statistics Finland, Helsinki.
- Anson, O., Paran, E., Neuman, L. & Chernichovsky, D. 1993, "Gender differences in health perceptions and their predictors", *Social Science & Medicine*, vol. 36, pp. 419-427.
- Antonovsky, A. 1993, "The structure and properties of the sense of coherence scale", *Social Science & Medicine*, vol. 36, pp. 725-733.
- Antonovsky, A. 1987, *Unraveling the Mystery of Health. How People Manage Stress and Stay Well*. Jossey-Bass, San Francisco.
- Antonovsky, A. 1979, *Health, Stress and Coping*. Jossey-Bass, San Francisco.
- Antonovsky, H. & Sagy, S. 1985, "The development of a sense of coherence and its impact on responses to stress situations", *Journal of Social Psychology*, vol. 126, pp. 213-225.
- Antonovsky, H. & Sagy, S. 1986, "The development of a sense of coherence and its impact on responses to stress situations", *Journal of Social Psychology*, vol. 126, no. 2, pp. 213-225.
- Arber, S. & Lahelma, E. 1993, "Inequalities in women's and men's ill-health: Britain and Finland compared", *Social Science & Medicine*, vol. 37, no. 8, pp. 1055-1068.
- Bauer, G. & Jenny, G. 2007, "Development, Implementation and Dissemination of Occupational Health Management (OHM): Putting Salutogenesis into Practice." in *Occupational Health Psychology. European Perspectives on Research, Education and Practice.*, eds. S. McIntyre & J. Houdmond, European Academy of Occupational Health Psychology, Castelo de Maia: ISMAI, pp. 219-250.
- Bayard-Burfield, L., Sundquist, J. & Johansson, S. 2001, "Ethnicity, self reported psychiatric illness, and intake of psychotropic drugs in five ethnic groups in Sweden.", *Journal of Epidemiology and Community Health*, vol. 55, pp. 657-664.
- Beehr, T. 1986, "The process of retirement: A review and recommendations for future investigation", *Personal Psychology*, vol. 39, pp. 31-55.
- Bernabe, E., Kivimäki, M., Tsakos, G., Suominen-Taipale, A.L., Nordblad, A., Savolainen, J., Uutela, A., Sheiham, A. & Watt, R.G. 2009, "The relationship among sense of coherence, socio-economic status, and oral health-related behaviours among Finnish dentate adults", *European Journal of Oral Sciences*, vol. 117, no. 4, pp. 413-418.
- Bernstein, J. & Carmel, S. 1991, "Gender differences over time in medical school stressors, anxiety and the sense of coherence", *Sex-Roles*, vol. 24, pp. 335-344.
- Buddeberg-Fischer, B., Klaghofer, R. & Schnyder, U. 2001, "Sense of coherence in adolescents (abstract)", *Sozial- und Präventivmedizin*, vol. 46, no. 6, pp. 404-410.
- Caap-Ahlgren, M. & Dehlin, O. 2004, "Sense of coherence is a sensitive measure for changes in subjects with Parkinson's disease during 1 year.", *Scandinavian Journal of Caring Sciences*, vol. 18, pp. 154-159.
- Carmel, S. & Bernstein, J. 1989, "Trait-anxiety and sense of coherence: A longitudinal study", *Psychological Reports*, vol. 65, pp. 221-232.
- Ciairano, S., Rabaglietti, E., De Martini, R. & Giletta, M. 2008, "Older people's sense of coherence: relationship with education, former occupation and living arrangements", *Ageing & Society*, vol. 28, pp. 1075-1091.
- Condry, J.C. 1984, "Gender Identity and Social Competence", *Sex Roles*, vol. 11, pp. 485-511.
- Dahlin, L., Cederblad, M., Antonovsky, A. & Hagnell, O. 1990, "Childhood vulnerability and adult invincibility", *Acta Psychiatrica Scandinavica*, vol. 82, pp. 228-232.
- Dangoor, N. & Florian, V. 1994, "Women with chronic physical disabilities: Correlates of their long-term psychosocial adaptation", *International Journal of Rehabilitation Research*, vol. 17, pp. 159-168.
- Edwards, A., Nazroo, J. & Brown, G.W. 1998, "Gender differences in marital support following a shared life event", *Social Science & Medicine*, no. 46, pp. 1077-1085.

- Elovainio, M., Forma, P., Kivimäki, M., Sinervo, T., Sutinen, R. & Laine, M. 2005, "Job demands and job control as correlates of early retirement thoughts in Finnish social and health care employees", *Work and Stress*, vol. 19, no. 1, pp. 84-92.
- Eriksson, M. 2007, *Unravelling the mystery of salutogenesis. The evidence base of the salutogenic research as measured by Antonovsky's Sense of Coherence Scale*. Folkhälsan Research Centre, Health promotion research programme, Turku.
- Eriksson, M. & Lindström, B. 2005, "Validity of Antonovsky's sense of coherence scale: a systematic review", *Journal of Epidemiology and Community Health*, vol. 59, no. 6, pp. 460-466.
- Eriksson, M., Lindström, B. & Lilja, J. 2007, "A sense of coherence and health. Salutogenesis in a societal context: Åland, a special case?", *Journal of Epidemiology and Community health*, vol. 61, no. 8, pp. 684-688.
- Feldt, T. 2000, *Sense of Coherence. Structure, Stability and Health Promoting Role in Working Life*.
- Feldt, T., Kivimäki, M., Rantala, A. & Tolvanen, A. 2004, "Sense of coherence and work characteristics: A cross-lagged structural equation model among managers.", *Journal of Occupational and Organizational Psychology*, vol. 77, pp. 323-342.
- Feldt, T., Kokko, K., Kinnunen, U. & Pulkkinen, L. 2005, "The Role of Family Background, School Success, and Career Orientation in the Development of Sense of Coherence", *European Psychologist*, vol. 10, no. 4, pp. 298-308.
- Feldt, T., Leskinen, E., Kinnunen, U. & Mauno, S. 2000, "Longitudinal factor analysis models in the assessment of the stability of sense of coherence", *Personality and Individual Differences*, vol. 28, pp. 239-257.
- Feldt, T., Leskinen, E., Kinnunen, U. & Ruoppila, I. 2003, "The stability of sense of coherence: comparing two age groups in a 5-year follow-up study", *Personality and Individual Differences*, vol. 35, pp. 1151-1165.
- Feldt, T., Metsäpelto, R., Kinnunen, U. & Pulkkinen, L. 2007, "Sense of Coherence and Five-Factor Approach to Personality. Conceptual Relationships", *European Psychologist*, vol. 12, no. 3, pp. 165-172.
- Feldt, T., Leskinen, E. & Kinnunen, U. 2005, "Structural invariance and stability of sense of coherence: A longitudinal analysis of two groups with different employment experiences", *Work & Stress*, vol. 19, no. 1, pp. 68-83.
- Feldt, T., Lintula, H., Suominen, S., Koskenvuo, M., Vahtera, J. & Kivimäki, M. 2007, "Structural validity and temporal stability of the 13-item sense of coherence scale: prospective evidence from the population-based HeSSup study", *Quality of Life Research* vol. 16, no. 3, pp. 483-493.
- Finnäs, F. 2002, "How long do Swedish-speaking Finns live? A comment on the paper by Hyyppä and Mäki.", *Health Promotion International*, vol. 17, no. 3, pp. 287-290.
- Finnäs, F. 1997, "Social Intergration, Heterogeneity, and Divorce: The Case of the Swedish-speaking Population in Finland.", *Acta Sociologica*, vol. 40, pp. 263-277.
- Flaherty, J. & Richman, J. 1989, "Gender differences in the perception and utilization of social support: theoretical perspectives and empirical test", *Social Science and Medicine*, vol. 28, pp. 1221-1228.
- Flannery, R. & Flannery, G. 1990, "Sense of coherence, life stress and psychological distress: A prospective methodological inquiry", *Journal of Clinical Psychology*, vol. 46, pp. 415-421.
- Frenz, A., Carey, M. & Jorgensen, R. 1993, "Psychometric Evaluation of Antonovsky's Sense of Coherence Scale", *Psychological Assessment*, vol. 5, no. 2, pp. 145-153.
- Geyer, S. 1997, "Some conceptual considerations on the sense of coherence", *Social Science & Medicine (1982)*, vol. 44, no. 12, pp. 1771-1779.
- Gibson, L. 2003, "Inter-relationship among sense of coherence, hope and spiritual perspective (inner resources) of african-american and european-american breast cancer survivors", *Applied Nursing Research*, vol. 16, no. 4, pp. 236-244.
- Hakanen, J., Feldt, T. & Leskinen, E. 2007, "Change and stability of sense of coherence in adulthood: Longitudinal evidence from the Healthy Child study", *Journal of Research in Personality*, vol. 41, pp. 602-617.
- Harkonmäki, K. 2007, *Predictors of disability retirement: From early intentions to retirement*. Helsinki University Print: Helsinki.

- Harkonmäki, K., Korkeila, K., Vahtera, J., Kivimäki, M., Suominen, S., Sillanmäki, L. & Koskenvuo, M. 2007, "Childhood adversities as a predictor of disability retirement", *Journal of Epidemiology and Community Health*, vol. 61, pp. 479-484.
- Harkonmäki, K., Martikainen, P., Lahelma, E., Pitkaniemi, J., Halmeenmäki, T., Silventoinen, K. & Rahkonen, O. 2009, "Intentions to retire, life dissatisfaction and the subsequent risk of disability retirement", *Scandinavian Journal of Public Health*, vol. OnlineFirst, published on January 29, 2009.
- Heiskanen, M. & Laaksonen, S. 1996, "Non-response and ill-being in the survey of living conditions. Laaksonen, S. 219, 81-100" in *Statistics Finland*, Helsinki.
- Höge, T. & Büssing, A. 2004, "The impact of sense of coherence and negative affectivity on the work stressor--strain relationship", *Journal of Occupational Health psychology*, vol. 9, no. 3, pp. 195-205.
- Hogh, A. & Mikkelsen, E. 2005, "Is sense of coherence a mediator or moderator of relationships between violence at work and stress reactions?", *Scandinavian Journal of Psychology*, vol. 46, pp. 429-437.
- Holmes, T. & Rahe, R. 1967, "The social readjustment rating scale", *Journal of Psychosomatic Research*, vol. 2, pp. 213-218.
- Honkinen, P. 2009, *Nuorten koherenssin tunne: mittaaminen, ennustavat tekijät, seuraukset [Sense of coherence in adolescence: measuring, predictive factors, consequences]. Annales Universitatis Turkuensis. Turku: University of Turku.*
- Huhtaniemi, P. 1995, *The sense of life control and thoughts of early retirement. Annales Universitatis Turkuensis. Turku: University of Turku.*
- Huhtanen, P. & Tuomi, K. 2006, "Työ ja työkyky vakavien eläkeajatusten ennustajina: seuranta tutkimus kunta-alalla 1981-92 sekä eläkeajatusten toteutuminen 1997.", *Työ ja ihminen*, , no. 1, pp. 22-42. [Work and working capacity as predictors of serious thoughts of retirement: a follow-up study in municipal sector during the years 1981-92 and the realization of retirement thoughts in 1997].
- Hyypä, M. 2002, *Elinvoimaa yhteisöstä. Sosiaalinen pääoma ja terveys (Vitality from community. Social capital and health)*, PS-kustannus, Keuruu.
- Hyypä, M.T. 1999, "Swedes living in costal regions are healthier and live longer. The Roseto effect in Finland?", *Lakartidningen*, vol. 96, no. 20, pp. 2453.
- Hyypä, M.T. & Mäki, J. 2001a, "Individual-level relationships between social capital and self-rated health in a bilingual community", *Preventive Medicine*, vol. 32, no. 2, pp. 148-155.
- Hyypä, M.T. & Mäki, J. 2001b, "Why do Swedish-speaking Finns have longer active life? An area for social capital research", *Health Promotion International*, vol. 16, no. 1, pp. 55-64.
- Janatuinen, E. 2001, "Miksi ennenaikaiselle eläkkeelle? Tutkimus valtion työntekijöiden työkyvyttömyyseläkkeelle, yksilölliselle varhaiseläkkeelle tai työttömyyseläkkeelle siirtymisen taustoista. Helsinki: Valtiokonttori, 2001", vol. [Why retire early? A study of the reasons why State employees' retire on disability pension, individual early retirement pension or unemployment pension].
- Kaiser, P., Mattsson, B., Marklund, S. & Wimo, A. 2006, "Sense of coherence and vocational rehabilitation of persons with chronic musculoskeletal disorders-gender aspects", *Journal of Men's Health & Gender*, vol. 3, no. 4, pp. 373-378.
- Kalimo, R. & Vuori, J. 1991, "Work factors and health: The predictive role of pre-employment experiences", *Journal of Occupational Psychology*, vol. 64, pp. 97-115.
- Karasek, R. 1979, "Job demands, job decision latitude, and mental strain: Implications for job redesign.", *Administrative Science Quarterly*, vol. 24, pp. 285-307.
- Karlsson, I., Berglin, E. & Larsson, P. 2000, "Sense of coherence: quality of life before and after coronary artery bypass surgery- a longitudinal study", *Journal of Advanced Nursing*, vol. 31, no. 6, pp. 1383-1392.
- Kennedy, P., Lude, P., Elfstrom, M.L. & Smithson, E. 2009, "Sense of coherence and psychological outcomes in people with spinal cord injury: Appraisals and behavioural responses", *British Journal of Health Psychology*.

- Kivimäki, M., Elovainio, M., Vahtera, J., Nurmi, J., Feldt, T., Keltikangas-Järvinen, L. & Pentti, J. 2002, "Sense of coherence as a mediator between hostility and health. Seven-year prospective study on female employees", *Journal of Psychosomatic Research*, vol. 52, pp. 239-247.
- Kivimäki, M., Feldt, T., Vahtera, J. & Nurmi, J. 2000, "Sense of coherence and health: Evidence from two crosslagged longitudinal samples", *Social Science & Medicine*, vol. 50, pp. 583-597.
- Kivimäki, M., Vahtera, J., Elovainio, M., Lillrank, B. & Kevin, M. 2002, "Death or illness of a family member, violence, interpersonal conflict, and financial difficulties as predictors of sickness absence: Longitudinal cohort study on psychological and behavioral links", *Psychosomatic Medicine*, vol. 64, pp. 817-825.
- Kontinen, H., Haukkala, A. & Uutela, A. 2008, "Comparing sense of coherence, depressive symptoms and anxiety, and their relationships with health in a population-based study", *Social Science & Medicine (1982)*, vol. 66, no. 12, pp. 2401-2412.
- Korkeila, K., Suominen, S., Ahvenainen, J., Ojanlatva, A., Rautava, P., Helenius, H. & Koskenvuo, M. 2001, "Non-response and related factors in nation-wide health survey", *European Journal of Epidemiology*, vol. 17, pp. 991-999.
- Korkeila, J., Vahtera, J., Korkeila, K., Kivimäki, M., Sumanen, M., Koskenvuo, K. & Koskenvuo, M. 2010, "Childhood adversities as predictors of incident coronary heart disease and cerebrovascular disease", *Heart (British Cardiac Society)*, vol. 96, no. 4, pp. 298-303.
- Koskinen, S. 1994, *Origins of regional differences in mortality from ischaemic heart disease in Finland*, Research Reports, nr. 41, NAWH, Helsinki.
- Kouvonen, A.M., Väänänen, A., Vahtera, J., Heponiemi, T., Koskinen, A., Cox, S.J. & Kivimäki, M. 2010, "Sense of coherence and psychiatric morbidity: A 19-year register-based prospective study", *Journal of Epidemiology and Community Health*, vol. 64, pp. 255-261.
- Kouvonen, A.M., Väänänen, A., Woods, S.A., Heponiemi, T., Koskinen, A. & Toppinen-Tanner, S. 2008, "Sense of coherence and diabetes: a prospective occupational cohort study", *BMC Public Health*, vol. 8, pp. 46.
- Kranz, G. & östergren, P. 2000, "The association between violence victimisation and common symptoms in Swedish women", *Journal of Epidemiology and Community Health*, vol. 54, pp. 815-821.
- Kuuppelomäki, M. & Utriainen, P. 2003, "A 3 year follow-up study of health care students' sense of coherence and related smoking, drinking and physical exercise factors", *International Journal of Nursing Studies*, vol. 40, no. 4, pp. 383-388.
- Laaksonen, M., Mastekaasa, A., Martikainen, P., Rahkonen, O., Piha, K. & Lahelma, E. 2010, "Gender differences in sickness absence - the contribution of occupation and workplace", *Scandinavian Journal of Work, Environment & Health*.
- Lahelma, E., Arber, S., Kivelä, K. & Roos, E. 2002, "Multiple roles and health among British and Finnish women: the influence of socio-economic circumstances", *Social Science & Medicine*, vol. 54, no. 5, pp. 727-740.
- Lahelma, E., Martikainen, P., Rahkonen, O. & Silventoinen, K. 1999, "Gender differences in illhealth in Finland: patterns, magnitude and change", *Social Science & Medicine*, vol. 48, no. 1, pp. 7-19.
- Langeland, E. 2007, *Sense of coherence and life satisfaction in people suffering from mental health problems. An intervention study in talk-therapy groups with focus on salutogenesis [thesis]*, University of Bergen, Bergen.
- Larsson, G. & Kallenberg, K. 1996, "Sense of coherence, socio-economic conditions and health. Interrelationship in a nation-wide swedish sample", *European Journal of Public Health*, vol. 6, pp. 175-180.
- Lazarus, R. & Folkman, S. 1984, *Stress, Appraisal, and Coping*. Springer, New York.
- Lillefjell, M. & Jakobsen, K. 2007, "Sense of Coherence as a Predictor of Work Reentry Following Multidisciplinary Rehabilitation for Individuals With Chronic Musculoskeletal Pain", *Journal of Occupational Health Psychology*, vol. 12, no. 3, pp. 222-231.
- Lindmark, U., Stegmayr, B., Nilsson, B., Lindahl, B. & Johansson, I. 2005, "Food selection associated with sense of coherence in adults", *Nutrition Journal*, vol. 4, pp. 9.
- Lindström, B. & Eriksson, M. 2005, "Salutogenesis", *Journal of Epidemiology and Community Health*, vol. 59, no. 6, pp. 440-442.

- Lundberg, O. 1997, "Childhood conditions, sense of coherence, social class and adult illhealth: Exploring their theoretical and empirical relations", *Social Science & Medicine*, vol. 44, pp. 821-831.
- Lundberg, O. & Nyström Peck, M. 1994, "Sense of coherence, social structure and health. Evidence from population survey in Sweden", *European Journal of Public Health*, vol. 4, pp. 252-257.
- Lundman, B., Forsberg, K.A., Jonsen, E., Gustafson, Y., Olofsson, K., Strandberg, G. & Lovheim, H. 2010, "Sense of coherence (SOC) related to health and mortality among the very old: The Umea 85+ study", *Archives of Gerontology and Geriatrics*, vol. 51, pp. 329-332.
- Marsh, S., Clinkinbeard, S., Thomas, R. & Evans, W. 2007, "Risk and Protective Factors Predictive of Sense of Coherence during Adolescence", *Journal of Health Psychology*, vol. 12, no. 2, pp. 281-284.
- Martelin, T. 1994, *Differential mortality at older age. Sociodemographic mortality differences among the Finnish elderly*, Publications of the Finnish Demographic society, Helsinki.
- McAdams, D. & Pals, J. 2006, "A New Big Five. Fundamental Principles for an Integrative Science of Personality", *American Psychologist*, vol. 61, no. 3, pp. 204-217.
- McSherry, V. & Holm, J. 1994, "Sense of coherence: Its effects on psychological and physiological processes prior to, during, and after a stressful situation.", *Journal of Clinical Psychology*, vol. 50, no. 4, pp. 476-487.
- Midanik, L.T., Soghikian, K., Ransom, L.J. & Polen, M. 1992, "Alcohol problems and sense of coherence among older adults", *Social Science & Medicine*, vol. 34, pp. 43-48.
- Nahlen, C. & Saboonchi, F. 2009, "Coping, sense of coherence and the dimensions of affect in patients with chronic heart failure", *European Journal of Cardiovascular Nursing*.
- Näyhä, S. 1989, "Geographical variations in cardiovascular mortality in Finland 1961-1985", *Scandinavian Journal of Social Medicine*, vol. 40.
- Nilsson, B., Holmgren, L., Stegmayr, B. & Westman, G. 2003, "Sense of coherence- stability over time and relation to health, disease, and psychosocial changes in a general population: a longitudinal study", *Scandinavian Journal of Public Health*, vol. 31, no. 4, pp. 297-304.
- Nyamathi, A. 1991, "Relationship of resources to emotional distress, somatic complaints and high-risk behaviors in drug recovery and homeless minority women", *Research in Nursing & Health*, vol. 14, pp. 269-277.
- Nyqvist, F. 2009, *Social Capital and Health: Variations, Associations and Challenges*. Painosalama Oy, Turku.
- Paljärvi, T., Suominen, S., Koskenvuo, M., Winter, T. & Kauhanen, J. 2009, "The differences in drinking patterns between Finnish-speaking majority and Swedish-speaking minority in Finland", *European Journal of Public Health*, vol. 19, no. 3, pp. 278-284.
- Petrie, K. & Brook, R. 1992, "Sense of coherence, self-esteem, depression and hopelessness as correlates of reattempting suicide", *British Journal of Clinical Psychology*, vol. 31, pp. 293-300.
- Poppius, E., Tenkanen, L., Hakama, M., Kalimo, R. & Pitkänen, T. 2003, "The sense of coherence, occupation and all-cause mortality in the Helsinki Heart Study", *European Journal of Epidemiology*, vol. 18, pp. 389-393.
- Poppius, E., Tenkanen, L., Kalimo, R. & Heinsalmi, R. 1999, "The sense of coherence, occupation and the risk of coronary heart disease in the Helsinki Heart Study", *Social Science & Medicine*, vol. 49, no. 1, pp. 109-120.
- Rasku, A. 1993, "Ikääntyvä opettaja - voimavarat ja eläkehakuisuus. Ikääntyvä arvoonsa - työterveyden, työkyvyn ja hyvinvoinnin edistämishojelman julkaisuja 9. Helsinki:Työterveyslaitos ja Työsuojelurahasto, 1993".
- Rasku, A. & Kinnunen, U. 1995, "Ikääntyvien opettajien eläkehakuisuuden yleisyys ja syyt [The frequency and reasons of intentions to retire among ageing teachers]", *Gerontologia*, vol. 9, no. 2, pp. 125-133.
- Richardson, C. & Ratner, P. 2005, "Sense of coherence as a moderator of the effects of stressful live events on health", *Journal of Epidemiology and Community Health*, vol. 59, pp. 979-984.
- Roberts, B., Kuncel, N., Shiner, R., Caspi, A. & Goldberg, L. 2007, "The power of personality: A comparative analysis of the predictive validity of personality traits, SES, and IQ.", *Perspectives on Psychological Science*, vol. 2, pp. 313-345.

- Roberts, B.W. & DelVecchio, W.F. 2000, "The rank-order consistency of personality traits from childhood to old age: a quantitative review of longitudinal studies", *Psychological Bulletin*, vol. 126, no. 1, pp. 3-25.
- Roberts, B.W. & Mroczek, D. 2008, "Personality Trait Change in Adulthood", *Current Directions in Psychological Science*, vol. 17, no. 1, pp. 31-35.
- Roberts, B.W., Walton, K.E. & Viechtbauer, W. 2006, "Patterns of mean-level change in personality traits across the life course: a meta-analysis of longitudinal studies", *Psychological Bulletin*, vol. 132, no. 1, pp. 1-25.
- Saarela, J. 2004, "De förmögnä finlandsvenskarna? (The wealthy Finnish speaking population in Finland?)", *Janus*, vol. 12, no. 1, pp. 80-96.
- Saarela, J. & Finnäs, F. 2004, "Interethnic Wage variation in the Helsinki Area", *Finnish Economics Papers*, vol. 17, no. 1, pp. 35-48.
- Saarela, J. & Finnäs, F. 2003a, "The health of Swedish-speaking and Finnish speaking schoolchildren in Finland", *Child: Care, Health and Development*, vol. 30, pp. 51-58.
- Saarela, J. & Finnäs, F. 2003b, "Social background and education of Swedish and Finnish speakers in Finland", *European Journal of Education*, vol. 38, no. 4, pp. 445-456.
- Saarela, J. & Finnäs, F. 2003c, "Unemployment and native language: the Finnish case", *Journal of Socio-Economics*, vol. 32, no. 1, pp. 59-80.
- Saarela, J. & Finnäs, F. 2002a, "Ethnicity and unemployment in Finland", *Ethnic Studies Review*, vol. 25, pp. 26-37.
- Saarela, J. & Finnäs, F. 2002b, "Language-group differences in very early retirement in Finland", *Demographic Research*, vol. 7, no. 3, pp. 49-66.
- Sacco, K.A., Head, C.A., Vessicchio, J.C., Easton, C.J., Prigerson, H.G. & George, T.P. 2007, "Adverse childhood experiences, smoking and mental illness in adulthood: a preliminary study", *Annals of Clinical Psychiatry*, vol. 19, no. 2, pp. 89-97.
- Sagy, S. & Antonovsky, A. 1990, "Coping with retirement: Does the sense of coherence matter less in the Kibbutz?", *International Journal of Health Sciences*, vol. 1, pp. 233-242.
- Sagy, S. & Antonovsky, H. 2000, "The development of the sense of coherence: a retrospective study of early life experiences in the family", *International Journal of Aging & Human Development*, vol. 51, no. 2, pp. 155-166.
- Sandell, R., Blomberg, J. & Lazar, A. 1998, "The factorial structure of Antonovsky's sense of coherence scale in Swedish clinical and nonclinical samples", *Personality and Individual Differences*, vol. 24, no. 5, pp. 701-711.
- Sarason, I., Sarason, B., Shearin, E. & Plerce, G. 1987, "A brief measure of social support: practical and theoretical implications", *Journal of Social and Personal Relationships*, vol. 4, pp. 497-510.
- SAS/STAT Users Guide. 4th ed. 1990, SAS Institute, Inc.
- Sauli, H., Ahola, A., Lahelma, E. & Savolainen, J. 1989, *Living Conditions in Figures. The 1986 Survey on Living Conditions in Finland*, Cental Statistical Office in Finland, Living Conditions 1989:1 B.
- Savolainen, J., Suominen-Taipale, A., Uutela, A., Aromaa, A., Härkänen, T. & Knuutila, M. 2009, "Sense of coherence associates with oral and general health behaviours", *Community Dental Health*, vol. 26, no. 4, pp. 197-203.
- Schilling, E.A., Aseltine, R.H., Jr & Gore, S. 2007, "Adverse childhood experiences and mental health in young adults: a longitudinal survey", *BMC Public Health*, vol. 7, pp. 30.
- Schnyder, U., Buchi, S., Sensky, T. & Klaghofer, R. 2000, "Antonovsky's sense of coherence: trait or state?", *Psychotherapy and Psychosomatics*, vol. 69, no. 6, pp. 296-302.
- Sipilä, P. & Martikainen, P. 2010, "Language-group mortality differentials in Finland: the effects of local language composition", *Health & Place*, vol. 16, no. 3, pp. 446-451.
- Sipilä, P. & Martikainen, P. 2009, "Language-group mortality differentials in Finland in 1988-2004: assessment of the contribution of cause of death, sex and age", *European Journal of Public Health*, vol. 19, no. 5, pp. 492-498.
- Smith, P., Breslin, F. & Beaton, D. 2003, "Questioning the stability of sense of coherence. The impact of socio-economic status and working conditions in the Canadian population", *Social Psychiatry and Psychiatric Epidemiology*, vol. 38, pp. 475-484.

- Smith, T. & Meyers, L. 1997, "The Sense of Coherence: Its Relationship to Personality, Stress and Health Measures", *Journal of Social Behavior and Personality*, vol. 12, no. 2, pp. 513-526.
- Snekkevik, H., Anke GH., Stanghelle JK. & Fugl-Meyer AR. 2003, "Is sense of coherence stable after multiple trauma?", *Clinical Rehabilitation*, vol. 17, no. 4, pp. 443-453.
- Söderberg, S., Lundman, B. & Nordberg, A. 1997, "Living with fibromyalgia: sense of coherence, perception of well-being and stress in daily life", *Research of Nursing and Health*, vol. 20, pp. 495-503.
- STATA User's Guide Release 7. 2001, College Station, Texas:Stata press.
- Statistical Yearbook of Pensioners in Finland 2007. 2008, Official Statistics of Finland, Social Protection, Finnish Centre for Pensions and Social Insurance Institution of Finland, Helsinki, Finland.
- Sumanen, M., Koskenvuo, M., Sillanmäki, L. & Mattila, K. 2005, "Childhood adversities experienced by working-aged coronary heart disease patients", *Journal of Psychosomatic Research*, vol. 59, no. 5, pp. 331-335.
- Sumanen, M.P., Koskenvuo, M.J., Sillanmäki, L.H. & Mattila, K.J. 2009, "Peptic ulcer and childhood adversities experienced by working-aged people", *World Journal of Gastroenterology*, vol. 15, no. 27, pp. 3405-3410.
- Suominen, S. 1993, *Perceived Health and Life Control. A theoretical review and empirical study about the connections between health and life control determined according to the strength of sense of coherence [Thesis]*, National Research and Development Centre for Welfare and Health.
- Suominen, S., Blomberg, H., Bäckman, G., Helenius, H. & Koskenvuo, M. 1994, "Koettu terveys ja elämänhallinta (Perceived health and life control, in Finnish)", *Sosiaalilääketieteellinen Aikakauslehti*, vol. 31, pp. 54-63.
- Suominen, S., Blomberg, H., Helenius, H. & Koskenvuo, M. 1999, "Sense of coherence and health - does the association depend on resistance resources? A study of 3115 adults in Finland", *Psychology & Health*, vol. 14, no. 5, pp. 937-948.
- Suominen, S., Gould, R., Ahvenainen, J., Vahtera, J., Uutela, A. & Koskenvuo, M. 2005, "Sense of coherence and disability pensions. A nationwide, register based prospective population study of 2196 adult Finns", *Journal of Epidemiology and Community Health*, , no. 59, pp. 455-459.
- Suominen, S., Helenius, H. & Blomberg, H. 1996, "Koherenssin tunne koetun terveydentilan ennustajana [sense of coherence as a predictor of perceived health status]", *Sosiaalilääketieteellinen Aikakauslehti*, vol. 33, pp. 7-15.
- Suominen, S., Helenius, H., Blomberg, H., Uutela, A. & Koskenvuo, M. 2001, "Sense of coherence as predictor of subjective state of health. Results of 4 years of follow-up of adults", *Journal of Psychosomatic Research*, vol. 50, pp. 77-86.
- Suominen, S., Välimaa, R., Tynjälä, J. & Kannas, L. 2000, "Minority status and perceived health: a comparative study of Finnish- and Swedish-speaking schoolchildren in Finland", *Scandinavian Journal of Public Health*, vol. 28, pp. 179-187.
- Suominen, S., Vahtera, J., Korkeila, K., Helenius, H., Kivimäki, M. & Koskenvuo, M. 2007, "Job strain, life events, and sickness absence: a longitudinal cohort study in a random population sample", *Journal of Occupational and Environmental Medicine*, vol. 49, no. 9, pp. 990-996.
- Surtees, P., Wainwright, N., Luben, R., Khaw, K. & Day, N. 2003, "Sense of coherence and mortality in men and women in the EPIC-Norfolk United Kingdom prospective cohort study", *American Journal of Epidemiology*, vol. 158, no. 12, pp. 1202-1209.
- Surtees, P.G., Wainwright, N.W.J. & Khaw, K. 2006, "Resilience, misfortune, and mortality: evidence that sense of coherence is a marker of social stress adaptive capacity", *Journal of Psychosomatic Research*, vol. 61, no. 2, pp. 221-227.
- Sutin, A.R., Costa, P.T., Jr, Wethington, E. & Eaton, W. 2010a, "Perceptions of stressful life events as turning points are associated with self-rated health and psychological distress", *Anxiety, Stress, and Coping*, vol. 23, no. 5, pp. 479-492.
- Sutin, A.R., Costa, P.T., Jr, Wethington, E. & Eaton, W. 2010b, "Turning points and lessons learned: stressful life events and personality trait development across middle adulthood", *Psychology and Aging*, vol. 25, no. 3, pp. 524-533.
- Sutinen, R., Kivimäki, M., Elovainio, M. & Forma, P. 2005, "Associations between stress at work and attitudes towards retirement in hospital physicians", *Work and Stress*, vol. 19, no. 2, pp. 177-185.

- Takayama, T., Asano, Y., Yamazaki, Y., Yoshii, K., Nagasaka, Y., Fukada, J., Furusawa, Y., Takahashi, S. & Seki, Y. 1999, "Sense of coherence, stressful life events and psychological health (abstract, article in Japanese)", *Nippon Koshu Eisei Zasshi*, vol. 46, no. 11, pp. 965-976.
- Väänänen, A., Buunk, A.P., Kivimäki, M., Vahtera, J. & Koskenvuo, M. 2008, "Change in reciprocity as a predictor of depressive symptoms: A prospective cohort study of Finnish women and men", *Social Science & Medicine*, vol. 67, no. 11, pp. 1907-1916.
- Väänänen, A., Buunk, B.P., Kivimäki, M., Pentti, J. & Vahtera, J. 2005, "When it is better to give than to receive: long-term health effects of perceived reciprocity in support exchange", *Journal of Personality and Social Psychology*, vol. 89, no. 2, pp. 176-193.
- Väänänen-Tomppo, I., Janatuinen, E. & Törnqvist, R. 2001, "All well at work? Evaluation of workplace-based early rehabilitation in the Finnish State administration", *International Journal of Rehabilitation Research*, vol. 24, no. 3, pp. 171-180.
- Vahtera, J., Kivimäki, M., Väänänen, A., Linna, A., Pentti, J., Helenius, H. & Elovainio, M. 2006, "Sex differences in health effects of family death or illness: Are women more vulnerable than men?", *Psychosomatic Medicine*, vol. 68, pp. 283-291.
- Valkonen, T. 1982, "Psychosocial stress and sociodemographic differentials in mortality from ischaemic heart disease in Finland", *Acta Medica Scandinavica*, vol. 660, pp. 152-164.
- Valkonen, T. & Martelin, T. 1988, *Occupational class and suicide: an example of the elaboration of a relationship. Research reports*, Department of Sociology, University of Helsinki.
- Vastamäki, J., Moser, K. & Paul, K.I. 2009, "How stable is sense of coherence? Changes following an intervention for unemployed individuals", *Scandinavian Journal of Psychology*, vol. 50, no. 2, pp. 161-171.
- Wainwright, N., Surtees, P., Welch, A., Luben, R., Khaw, K. & Bingham, S. 2008, "Sense of coherence, lifestyle choices and mortality", *Journal of Epidemiology and Community Health*, vol. 62, no. 9, pp. 829-831.
- Weissbecker, I., Salmon, P., Studts, J., Floyd, A., Dedert, E. & Sephton, S. 2002, "Mindfulness-Based Stress Reduction and Sense of Coherence Among Women With Fibromyalgia", *Journal of Clinical Psychology in Medical Settings*, vol. 9, no. 4, pp. 297-307.
- Wiesmann, U., Niehörster, G. & Hannich, H.J. 2009, "Subjective health in old age from a salutogenic perspective", *British Journal of Health Psychology*, vol. 14, no. Pt 4, pp. 767-787.
- Wolff, A. & Ratner, P. 1999, "Stress, social support, and sense of coherence", *Western Journal of Nursing Research*, vol. 21, no. 2, pp. 182-197.