

RESEARCH REPORT

Sense of coherence and disability pensions. A nationwide, register based prospective population study of 2196 adult Finns

Sakari Suominen, Raija Gould, Jari Ahvenainen, Jussi Vahtera, Antti Uutela, Markku Koskenvuo

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Background: Strong sense of coherence (SOC) has been shown to be associated with good, perceived health both in cross sectional and longitudinal studies.

Study objective: To find out if level of SOC was associated to incidence of disability pension.

Study design: A prospective cohort study based on survey data on sense of coherence in 1989 or 1993 and data on disability pensions in 1990–1996 from national registers.

Participants: 2196 identifiable subjects derived from a representative sample (n = 5000) in 1989 of male and female Finns between 15 and 64 years of age. Initial health was categorised on the basis of number of long term illnesses reported on entry into the study (no illnesses; one illness or several illnesses resulting in only mild or moderate functional limitation; one illness or several illnesses resulting in severe or very severe functional limitation).

Main results: In an interindividual comparison a decrease in initial SOC score by one point was significantly (hazard ratio 1.56, 95% confidence intervals 1.15 to 2.12) associated with receipt of a disability pension by subjects who had been 50 years of age or less on entry into the study. Sex was not associated with outcome once initial level of health, level of occupational training, level of engagement in physical exercise, and alcohol consumption were taken into consideration. No similar significant association was seen in relation to people who had been more than 50 years of age on entry into the study.

Conclusions: It seems probable that a weak SOC in people of 50 years or younger increases the likelihood of grant of a disability pension.

See end of article for authors' affiliations

Correspondence to:
Dr S Suominen, State
Provincial Office of
Western Finland and
University of Turku,
Department of Public
Health, Lemminkäisenkatu
1, FIN 20520 Turku,
Finland; sakari.suominen@
utu.fi

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In the event of long term work inability every Finnish citizen of 16–64 years of age is entitled to disability pension from a publicly funded social insurance system. A disease that limits physical or mental functioning usually constitutes an obvious reason for inability to work. Nevertheless, other factors related to work, for example, labour market policy and social protection, also affect the relation between impairment of health and grant of a disability pension.^{1–5} Disability pension can provide a route towards early exit from the labour market and may to a certain extent substitute for other such routes.⁶ Personal traits, qualifications, and aspects of behaviour also have an influence on whether a health problem is associated with decreased ability to work.^{4 5 7} Risk of loss of ability to work is greater, for example, in relation to old workers with low levels of education than for young workers with high levels of education.^{6 8} Possession of skills or a high level of education can aid coping with functional limitations resulting from impaired health. Coping mechanisms generally play important parts in connection with disablement.

Under Finnish pension legislation, the definition of disability for work presupposes a clear causative relation between health impairment and inability to work, although socioeconomic factors are also taken into consideration in determining disability status.⁹ Besides normal disability pension, there exists also a special form of disability pension with more lenient medical eligibility criteria called individual early retirement pension. It is designed for aging persons who have experienced a permanent reduction in work ability but who are not sick enough to qualify for the ordinary disability pension. The individual early retirement pension can be granted from age 60 onwards. However, during the 1990s

when the study was performed, the age limit was lower: initially 55 and later 58.

The salutogenic theory, introduced by Antonovsky in 1979, deals with the capacity of people to deal with environmental strain. According to the theory,^{10 11} a strong sense of coherence (SOC) is regarded as a fairly stable characteristic that helps a person to make efficient and effective use of available resources and thus makes life less arduous. It is assumed that this improves prospects for staying healthy or at least to be able to cope with health problems should they arise. It can also be assumed that a strong SOC reduces needs to draw on other resources.¹² The salutogenic theory,^{10 11} deals fundamentally with causes of health rather than causes of illness. According to the theory^{10 11} SOC develops during adolescence, and gradually reaches stability in early adulthood, at least in people in whom a strong SOC has been achieved by the end of adolescence. Conclusive supporting data are, however, still lacking.

It has been shown, in various cross sectional settings, that a strong SOC is associated with better health, defined in various ways, than a weak SOC.^{13–15} In longitudinal population studies, weak SOC has been shown to be associated with an increased incidence of sick leaves for women, an increased risk of myocardial infarction for men in white collar occupations, increased all cause mortality, and a poorer subjective state of health for both sexes^{16–19} compared with strong SOC. In cross sectional studies, a strong SOC has also been shown to be associated with high socioeconomic status and a high level of occupational training.^{12 15 20} In another cross sectional setting a weak SOC has been shown to be associated with mental distress, psychosocial problems at work, and poor self perception of ability to work.⁵

Table 1 Mean sense of coherence (SOC) score and hazard ratios (HR) in relation to grant of disability pensions between 1990 and 1996 and in relation to possible confounding variables at the start of study

	Number of participants	SOC Mean (95% CI)	p Value	Number of disability pensions granted	HR (95% CI)
Sex			0.4875		
Male	926	9.53 (9.46 to 9.61)		46	1.0
Female	996	9.50 (9.43 to 9.57)		58	1.29 (0.88 to 1.90)
Initial age in 1989 (y)			0.0109		
15–50	1496	9.55 (9.50 to 9.61)		30	1.0
>50	482	9.40 (9.30 to 9.50)		92	10.30 (6.82 to 15.55)
Initial level of occupational training			<0.0001		
University level	166	9.89 (9.72 to 10.06)		1	1.0
Below university level	1170	9.54 (9.48 to 9.60)		73	10.35 (1.44 to 74.44)
None	591	9.40 (9.31 to 9.49)		31	7.97 (1.09 to 58.36)
Initial health			<0.0001		
No illness	1398	9.61 (9.55 to 9.67)		53	1.0
One illness or several illnesses with mild or moderate functional limitation	468	9.53 (9.43 to 9.62)		45	3.60 (2.39 to 5.31)
One illness or several illnesses with severe or very severe functional limitation	112	8.66 (8.45 to 8.86)		24	7.99 (4.93 to 12.96)
Initial level of engagement in physical exercise during previous month			<0.0001		
4 times or more	1005	9.67 (9.60 to 9.74)		39	1.0
2–3 times	443	9.46 (9.36 to 9.56)		23	1.29 (0.77 to 2.17)
Once	142	9.42 (9.24 to 9.60)		11	1.93 (0.98 to 3.74)
None	358	9.21 (9.15 to 9.33)		34	2.24 (1.41 to 3.55)
Initial consumption of alcohol until onset of drunkenness			<0.0001		
Never	714	9.61 (9.53 to 9.69)		55	1.0
Less than a couple of times a month	923	9.52 (9.45 to 9.60)		35	0.47 (0.31 to 0.72)
A couple of times a month	248	9.41 (9.27 to 9.55)		10	0.45 (0.23 to 0.89)
Once a week	68	9.03 (8.77 to 9.30)		5	0.77 (0.31 to 1.92)
A couple of times a week	21	8.71 (8.23 to 9.19)		2	0.84 (0.21 to 3.47)

Factors found to be associated with a weak SOC have also been found to be correlated with disability pension.^{2 21–25} Other factors found in longitudinal studies to be associated with disability pensions include advanced age, unemployment, and various work related factors.^{2 3 21–24 26 27} Health related lifestyle factors such as high alcohol consumption, smoking, and lack of physical exercise have also been found to be associated with disability pensions.^{23 24} Most empirical studies on the association of SOC and health have focused on various measures of perceived health. To our knowledge there are only three longitudinal studies^{16 17 19} showing an association between strong SOC and good health determined by register data.

The aim of the study reported here was to find out if level of SOC was associated with incidence of disability pension among the general Finnish working age population.

METHODS

Sample

Five thousand people (of whom 49.2% were women and 50.8% men) were selected at random in 1989 from a register of the entire Finnish population, grouped according to the contemporary 12 subdivisions of the country. The sample was representative of the population of Finland between 15 and 64 years of age except that the city of Turku, in the south west of the country, with some 175 000 inhabitants was deliberately fourfold overrepresented. Persons recorded as being in long term institutional care were excluded in forming the sample. Distributions of the sample by age, sex, and country subdivision corresponded well with distributions relating to the corresponding total populations.²⁸

Initial survey

Data were collected by means of a questionnaire. Distribution of numbered questionnaires began in September 1989 and

ended in December 1989. Those who failed to respond earlier were reminded twice, once in October and once in November. The second reminder permitted anonymous response. Altogether 3421 of the original recipients (68.4%) returned a completed questionnaire. A total of 3068 of these recipients were identifiable according to a unique identification number of the returned questionnaire.

Addition of health register data to initial survey data

Social security numbers, which are unique personal identification numbers, of identifiable respondents were requested from the authorities concerned in 1990, after resources allowing the study to be made prospective had been provided. The social security numbers allowed data from health registers (relating to mortality from Statistics Finland; relating to entitlement to disability pensions from the Social Insurance Institution of Finland) covering the period 1987 to 1998 to be added to the initial data obtained via the questionnaire. After linkage the data were rendered anonymous. From 1997 onwards the register of the Social Insurance Institution no longer covered all disability pensions, as a result of changes in Finnish pension laws and hence, the follow up had to be stopped at the end of 1996.

Distributions of the total number of respondents ($n = 3421$) did not differ significantly from corresponding distributions relating to the Finnish population as a whole in 1989 (sex, age²⁸) and 1990 (socioeconomic status²⁹). Women, those engaged in professions and students were slightly overrepresented among identifiable respondents. Pensioners were slightly underrepresented.²⁹

Measures

SOC values were determined on the basis of replies to 16 multiple choice questions derived from the original 29 questions.¹³ The number of questions was reduced because

Table 2 Hazard ratios (HR) relating to increased incidence of disability pension from 1989 to 1996 for people $\leq 50 > 50$ years of age on entry into the study according to a decrease by one of initial SOC (continuous variable, range 3–12) score when sex (model 1), sex and initial health as number of reported long term illnesses (model 2) and sex, initial health as number of long term illnesses, and initial level of occupational training were included as explanatory variables (model 3). The final model (model 4) includes the previously mentioned explanatory variables but was also adjusted for initial level of engagement in physical exercise and consumption of alcohol until onset of drunkenness

Explanatory variable	Model 1		Model 2		Model 3		Model 4 (final model)	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Initial age ≤ 50 years								
Initial SOC								
Score decrease by one point	1.81	1.39 to 2.36	1.59	1.21 to 2.09	1.59	1.19 to 2.10	1.56	1.15 to 2.12
Sex								
Female	1.0		1.0		1.0		1.0	
Male	2.07	0.90 to 4.78	2.19	0.95 to 5.05	2.53	1.04 to 6.10	2.38	0.93 to 6.10
Initial health								
Number of reported long term illnesses								
None	NI		1.0		1.0		1.0	
Mild or moderate functional limitation/			4.30	1.82 to 10.14	4.02	1.67 to 9.68	4.67	1.89 to 11.54
Severe or very severe functional limitation			5.95	1.84 to 19.30	5.90	1.83 to 19.05	5.91	1.88 to 18.53
Initial level of occupational training								
University/institute level	NI		NI		1.0		1.0	
Intermediate/none					1.07	0.39 to 2.91	0.97	0.34 to 2.73
Initial age > 50 years								
Initial SOC								
Score decrease by one point	1.21	1.02 to 1.44	1.10	0.91 to 1.32	1.14	0.93 to 1.40	1.11	0.90 to 1.37
Sex								
Female	1.0		1.0		1.0		1.0	
Male	0.73	0.70 to 0.98	0.74	0.46 to 1.19	0.76	0.47 to 1.24	0.65	0.36 to 1.16
Initial health								
Number of reported long term illnesses								
none	NI		1.0		1.0		1.0	
mild or moderate functional limitation/			1.81	1.09 to 3.03	1.97	1.17 to 3.34	1.91	1.12 to 3.26
severe or very severe functional limitation			2.41	1.24 to 4.71	2.62	1.33 to 5.15	2.55	1.29 to 5.04
Initial level of occupational training								
University/institute level	NI		NI		1.0		1.0	
Intermediate/none					1.15	0.63 to 2.07	1.09	0.59 to 2.01

NI, variable not included in model.

the original number of questions was evaluated being too high. The questions were chosen by the research group to make them readily understandable to Finnish people.

Pearson's correlation coefficient between scores for the 16 item scale and corresponding scores for the original 29 item scale was found to be 0.87.¹²

Disability pension

The response variable was entry into disability pension (including individual early retirement pension) during the follow up period from the beginning of 1990 until the end of 1996. Entitlement to a disability pension arises on diagnosis of long term illness clearly resulting in inability to work. Participants in the study were followed up until a disability pension was granted, until they reached 64 years of age, or until they died. People already retired at the time of the first survey in 1989 were excluded from the study. Because for unemployed and those who take care of their own households disability pensions are not as important exit routes from the active labour force as some other forms of social protection, subjects who initially and during the follow up indicated that they fell in one or other of these categories (n = 99), were excluded from the study^{16,9} leaving 2196 participants.

Because of the possibility of individual early retirement pension in the 1990s: initially from the age of 55 and later 58 onwards, age on entry into the study was categorised as

15–50 years or 51–64 years on the basis of date of birth as shown by the social security number. During the follow up period the younger age group was entitled only to the normal disability pension, while the older group was entitled to the individual early retirement pension as well. Moreover, those over 50 years of age had also many other options for early exit from work.

Possible confounding variables

Initial health was assessed on the basis of number of long term illnesses reported (no illnesses; one illness or several illnesses resulting in only mild or moderate functional limitation; one illness or several illnesses resulting in severe or very severe functional limitation).

Initial socioeconomic status was assessed on the basis of level of occupational training (university level/institute level, vocational school level/participation in an occupational training course/none).

Level of engagement in physical exercise was assessed initially on the basis of replies to one question (not at all during the previous month; once during the previous month; two to three times during the previous month; more than three times during previous month). Consumption of alcohol until drunkenness ensued was also assessed on the basis of replies to one question (a couple of times a week/once a week; a couple of times a month; less than a couple of times a month; never).

Statistical methods

Initial average scores were calculated for each SOC component, namely comprehensibility, manageability, and meaningfulness. Total SOC scores (SOCS) were calculated by adding the scores for the three components (range 3–12, mean 9.55, SD 1.11). SOCS were calculated only if at least half of the questions in relation to each component had been answered. A second survey (2291 responses) relating to the initial sample was undertaken in October 1993. SOCS data from this survey were used when available. In cases, in which disability pension was granted before the arrival of the response to the second survey ($n = 58$) or the date of that response or the second value of SOCS itself was missing, the SOCS from the first survey was used (altogether $n = 327$). SOC was measured identically at both occasions.

Cox regression analyses were computed, with entitlement to disability pension from the time of the response to the second survey until the end of 1996 as the response variable. If disability pension was granted before the arrival of the response to the second survey or the date of this response was missing survival time was computed from the date of the response to the first survey. Significance of differences in distribution of SOCS in relation to each of the potential confounding variables was determined by means of analysis of variance. Statistical calculations were performed using the SAS program version 8.2 (SAS Institute, Cary, TX).

In the statistical models the initial number of long term illnesses reported, initial level of occupational training, initial SOC (as a continuous variable), and sex were included as explanatory variables. All analyses were carried out separately for both age groups.

RESULTS

Table 1 shows the SOC scores and crude hazard ratios (HR) in relation to grant of a disability pension during the follow up period in connection with each possible confounding variable (sex, initial age, initial level of occupational training, initial level of engagement in physical exercise, and initial consumption of alcohol until onset of drunkenness).

For those who had been 50 years of age or less on entry into the study, a weak SOC was significantly (HR for a decrease in SOC by one point 1.81, 95% confidence intervals (CI) 1.39 to 2.36, table 2) associated with an increased incidence of disability pension, in a multivariate model adjusted for sex. The corresponding HR for those who had been more than 50 years of age on entry into the study was 1.21 (CI 1.02 to 1.44, table 2). When the model was adjusted for initial health, the HR for those who had been 50 years of age or less on entry into the study was 1.59 (CI 1.21 to 2.09). For those who had been more than 50 years of age on entry into the study the association was no longer significant (table 2). When the model was adjusted for initial occupational training, initial level of engagement in physical exercise, and consumption of alcohol until drunkenness ensued, the HR in relation to increased incidence of disability pension on the basis of a weak initial SOC was 1.56 (CI 1.15 to 2.12) for those who had been 50 years of age or less on entry into the study. However, for those who had been more than 50 years of age on entry into the study there was no significant association (table 2).

DISCUSSION

The results of this study show that a weak SOC, independently of initial health, was associated with a higher incidence of disability pension than a strong SOC, in those who had been 50 years of age or less on entry into the study. As far as we know, no other follow up study of this kind has been conducted.

Incidence of disability pension is of critical importance to society. Payment of disability pensions constitutes a great economic burden to national economies. At the end of 2002 there were 253 500 people in Finland entitled to a disability pension, 7.4% of the population between 16 and 64 years of age.³⁰ In 2002, disability pension payments amounted to 2854 million euros³¹—that is, 8% of all social expenditure that year. It has been predicted that numbers of people fit for work will become a matter of concern in Western Europe, including Finland.³²

Two possible explanations for the principal finding in the study reported here can be suggested. SOC can be understood as reflecting the general ability of a person to cope with any kind of strain, including strain arising from illness. A person with a strong initial SOC could have been less likely to become entitled to a disability pension than a person with a weak initial SOC, if the health status of both were comparatively similar. Alternatively, a weak initial SOC could result in a comparatively high risk of subsequent deterioration in health.^{16–19} As the study design meant that data relating to health and SOC were not available throughout the follow up period, there is no way of telling which explanation was the most probable. However, both mechanisms might apply. At a more general level the principal finding could be interpreted as supporting the scientific relevance of the theory of SOC because initial weak SOC was associated with poor health within next years as could be hypothesised.

However, it could also be speculated that strong SOC might increase entry into disability pension if this is the precise goal of a particular person. Obvious diseases as, for example, severe rheumatoid arthritis can with certainty be evaluated as conditions filling the medical criteria for entitlement to disability pension. However, the outcome—that is, whether the person becomes pensioned or not—is concomitantly strongly depending on their perception of the handicap caused by the disease. If the person is firmly determined to continue in gainful employment this might influence the probability for pensioning. This determination again could be hypothesised to be associated with SOC as SOC could be regarded as a fairly stable characteristic that helps a person to make efficient and effective use of available resources. Moreover, it could be anticipated that a person with strong SOC might be more motivated to stay in gainful employment because of, for example, positive economic consequences or the satisfaction work can give. Our results seem to support the protective role of SOC, regardless of initial health in relation to disability pension at least among people 50 years of age or younger.

In those who were over 50 years of age at the beginning of the follow up period, health related factors probably diminished the independent predictive power of SOCS in relation to entry into a disability pension as health problems themselves might be reflected as a decrease of SOCS.

The different results in the two age groups may also partly be explained by the differences in the disability pension procedures. The younger group was entitled only to ordinary disability pension, while the older group also was entitled to

Key points and policy implications

A weak SOC of people ≤ 50 years on entry into the study was associated with an increased incidence of disability pension. Efforts should be made to develop methods for strengthening SOC. The SOC scale could be used for identification of comparatively young people at risk of disability pensioning.

individual early retirement pension—a disability pension with less stringent medical criteria.

It was assumed when conducting the study that there would be a linear association between SOC and incidence of disability pension. The validity of the assumption is supported by the fact that SOC could be used as a continuous variable in the statistical models used.

Initial level of occupational training, initial level of engagement in physical exercise, and initial situation with regard to consumption of alcohol until onset of drunkenness had no significant effects on the association between a weak initial SOC and grant of a disability pension.

Level of occupational training was included as a variable reflecting the socioeconomic status of the subjects. This could have been of importance in relation to grant of a pension because of inability to work. The variable was chosen because it was applicable to all subjects and has been shown to correlate fairly well with individual economic situations.^{33 34} Level of engagement in physical exercise and information relating to alcohol consumption were included merely to control for a possible effect of health-behaviour on the association studied. The justification for the inclusion of these variables in the statistical analysis is seen in table 1.

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Authors' affiliations

S Suominen, State Provincial Office of Western Finland and University of Turku, Department of Public Health, Lemminkäisenkatu, Turku, Finland

R Gould, Finnish Centre for Pensions

J Ahvenainen, Department of Biostatistics, University of Turku

J Vahtera, Turku Regional Institute of Occupational Health, Finland

A Uutela, National Public Health Institute, Helsinki, Finland

M Koskenvuo, Department of Public Health, University of Turku

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