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

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.


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.
Table 1

<table>
<thead>
<tr>
<th>Number of disability pensions granted</th>
<th>HR (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>1.0</td>
<td>0.4875</td>
</tr>
<tr>
<td>58</td>
<td>1.29 (0.88 to 1.90)</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>1.0</td>
<td>0.0109</td>
</tr>
<tr>
<td>92</td>
<td>10.30 (6.82 to 15.55)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>1</td>
<td>10.35 (1.44 to 74.44)</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>7.97 (1.09 to 38.36)</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>1.0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>45</td>
<td>3.60 (2.39 to 5.31)</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>7.99 (4.93 to 12.96)</td>
<td></td>
</tr>
</tbody>
</table>

Factors found to be associated with a weak SOC have also been found to be correlated with disability pension. Other factors found in longitudinal studies to be associated with disability pensions include advanced age, unemployment, and various work related factors. 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. 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 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 southwest 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.

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.

Measures
SOC values were determined on the basis of replies to 16 multiple choice questions derived from the original 29 questions. The number of questions was reduced because...
Participants in the study were followed up until a disability pension was granted or a disability pension was granted despite insufficient work capacity. The response variable was entry into disability 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. Individuals who initially and during the follow up period had a diagnosis of long term illness clearly resulting in inability to work 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.

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.

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).

### Table 2

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4 (final model)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR 95% CI</td>
<td>HR 95% CI</td>
<td>HR 95% CI</td>
<td>HR 95% CI</td>
</tr>
<tr>
<td>Initial age &lt; 50 years</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Initial SOC</td>
<td>1.81 1.39 to 2.36</td>
<td>1.59 1.21 to 2.09</td>
<td>1.59 1.19 to 2.10</td>
<td>1.56 1.15 to 2.12</td>
</tr>
<tr>
<td>Score decrease by one point</td>
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<td></td>
<td></td>
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<tr>
<td>Sex</td>
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<td></td>
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<tr>
<td>Female</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Male</td>
<td>2.07</td>
<td>0.90 to 4.78</td>
<td>2.19 0.95 to 5.05</td>
<td>2.53 1.04 to 6.10</td>
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<tr>
<td>Initial health</td>
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<tr>
<td>Number of reported long term illnesses</td>
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<tr>
<td>None</td>
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<tr>
<td>Mild or moderate functional limitation/</td>
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<tr>
<td>Severe or very severe functional limitation</td>
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<tr>
<td>Initial level of occupational training</td>
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<tr>
<td>University/institute level</td>
<td>NI</td>
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<td>1.0</td>
<td>1.0</td>
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<tr>
<td>Intermediate/none</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
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<td></td>
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<tr>
<td>Initial age &gt; 50 years</td>
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<td></td>
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<tr>
<td>Initial SOC</td>
<td>1.21 1.02 to 1.44</td>
<td>1.10 0.91 to 1.32</td>
<td>1.14 0.93 to 1.40</td>
<td>1.11 0.90 to 1.37</td>
</tr>
<tr>
<td>Score decrease by one point</td>
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<td></td>
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<tr>
<td>Sex</td>
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<tr>
<td>Female</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Male</td>
<td>0.73</td>
<td>0.70 to 0.98</td>
<td>0.74 0.46 to 1.19</td>
<td>0.76 0.47 to 1.24</td>
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<tr>
<td>Initial health</td>
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<tr>
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<td>NI</td>
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<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Intermediate/none</td>
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</tbody>
</table>

NI, variable not included in model.
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 exceeded 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 initial occupa-
tional training, initial level of engagement in physical exercise, and consumption of alcohol until drunkenness. 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 disability pensioning.

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.
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.\(^{13,14}\)

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.

ACKNOWLEDGEMENTS

We would like to thank MSc Hans Helenius for help in the data analyses.

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Funding: the linkage with register data was financed by the Academy of Finland.

Competing interests: none declared.

Ethics approval: the study has been approved by the Joint Ethical Committee of the University of Turku and Turku University Central Hospital.

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J Epidemiol Community Health 2005 59: 455-459
doi: 10.1136/jech.2003.019414

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