Factors contributing to sense of coherence among men and women

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Background: The purpose of this study was to examine the associations of four key areas of resistance resources (GRR), i.e. childhood living conditions, work and family life, and social relationships, with sense of coherence (SOC) among Finnish men and women. A particular interest was devoted to interactions between sex and GRR. **Methods:** The data derived from a representative personal interview survey collected by Statistics Finland in 1994 (N=8650, response rate 73%). This study included ages 25–64 (N=6506, 49% women). The associations of age, educational attainment, childhood living conditions, work and family, and social relationships with SOC were analysed using ordinary regression analysis. **Results:** Among both men and women, psycho-emotional resources rather than socio-economic circumstances were associated with SOC. These resources included the quality of the relationship with partner, social support, quality of work, and childhood living conditions. Although sex differences were small, the association of living without a partner with low SOC was stronger among men than women. **Conclusion:** SOC is strongly associated with the psycho-emotional resistance resources. In the Finnish context, the SOC scale was largely sex neutral.

Public health research has shown that social and personality factors are among the key determinants of health and well-being. Most previous studies have, however, focused on harmful factors, i.e. adverse living conditions, risk factors and psychosocial stressors. By introducing the concept of sense of coherence (SOC) Aaron Antonovsky[1] intended to launch an alternative approach: Which factors are likely to protect people from falling ill? According to Antonovsky, people with strong SOC are less likely to assess a given situation as dangerous or uncontrollable, more likely to consider it as challenging, and thus maintain good health even under strenuous life events.

According to Antonovsky,[2] sense of coherence 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 one's 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'. Thus, SOC consists of three interrelated components: a) comprehensibility, b) manageability, and c) meaningfulness.[2]

Previous research has rendered support to the association between health and SOC. A relationship has been found between SOC and self-rated health,[3–8] health behaviours,[9,10] psychological distress,[11,12] sickness absence,[13,14] mental and physical symptoms, various illnesses,[14–25] subjective well-being and happiness,[25] and self-esteem.[27] Longitudinal studies have shown that strong SOC predicts good health, measured in various ways, suggesting that the association between SOC and health is not due to an inverse causal association.[14,28–32]

While there are many studies on the associations between health and SOC, the background factors of SOC have been much less examined. According to Antonovsky[1] the full development of SOC can be reached only when generalised resistance resources

(GRR) for SOC are present. These resources include characteristics of a person, a group or an environment that facilitate effective tension management. The resistance resources contribute to life experiences, characterized by consistency, participation in the shaping of outcomes, and to an underload–overload balance. These experiences are closely linked to the three key areas in which SOC is borne, i.e. comprehensibility, manageability, and meaningfulness, and thus give rise to or reinforce a strong SOC. The most important external general resistance resources or, general resistance deficits, include childhood living conditions, education, wealth, work-related factors, and social support. Furthermore, the more resistance resources an individual possesses, the better are the chances for strong SOC.[2]

To fully understand SOC and its development, knowledge about resistance resources, i.e. factors contributing to the development of SOC, is needed. Antonovsky was not particularly accurate in specifying the developmental conditions for strong SOC, and only a few earlier studies have focused on the factors promoting it. Lundberg[23] showed that social class as well as age were related to SOC: middle-aged white-collar employees and entrepreneurs scored highest on SOC. In another study, Lundberg[24] found that only dissension in the childhood family had a direct negative effect on adult SOC. Experience of economic hardship in childhood had a weak indirect adverse effect on adult SOC, mediated through adult class position. In a 10-year follow-up, Lundberg and Nyström Peck[20] found that old age and social class were clearly related to poor SOC whereas sex was not. Blue-collar workers and farmers had a higher than average risk for poor SOC, whereas for white-collar employees and the self-employed the opposite was true. In a study by Larsson and Kallenberg,[22] young age, occupation, income, number of friends and household size were all related to strong SOC. However, educational level was unrelated to SOC. In a Finnish study, Suominen[3] reported that life control (SOC and life satisfaction) was related to strong social integration, a high socio-economic position, low level of perceived strain at work, and active leisure time. Another Finnish study[33] found that good relationships with parents during childhood, household size, a high socio-economic position, level of education, status of occupation, and high income in adulthood were related to strong SOC. A Canadian study[34] showed that strenuous life experiences in childhood rather than in later life were associated with adult

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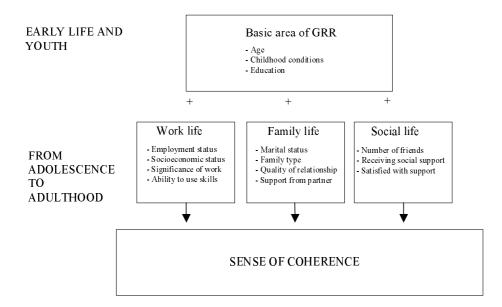
Figure 1 Framework of four principal areas of GRR (generalized resistance resources), i.e. the basic (age, childhood living conditions, educational attainment), work life, family life, and other social relationships assumed to contribute to SOC

SOC. This study also found that social support had a positive effect on SOC.

In summary, the previous studies suggest that both socio-economic and psychosocial factors contribute to SOC. Yet, partly contrasting findings regarding, for example, the effect of age, education, and childhood living conditions on SOC have been reached. Furthermore, most previous studies have examined simultaneously only a limited number of factors related to childhood conditions and adult social position. Therefore, we lack a comprehensive picture and deeper understanding of the reciprocal role of the socio-economic and psychosocial factors behind SOC. Another gap in the SOC literature concerns sex differences. Some previous studies have found stronger SOC among men than women,[6,7,15,22] but we lack studies on whether the same factors contribute to high SOC among men and women.

This study aims to examine the socio-economic and psychosocial factors of generalized resistance resources lying behind sense of coherence. We first asked whether SOC is associated with four principal areas of GRR: a) childhood living conditions and educational attainment, b) work life, c) family life, and d) other social relationships (*figure 1*). Secondly, we asked whether the factors within the four areas of GRR show different associations with SOC among men and women.

DATA AND METHODS

The data derive from the 1994 Finnish Survey on Living Conditions by Statistics Finland. The data were collected by personal interviews (response rate 73%). The sample satisfactorily represents the non-institutional Finnish population aged 15 years or older.[35] This study focused on ages 25–64 (*N*=6506). Information on SOC was missing for 2.9% of men and 1.6% of women, and they were omitted from the data.

SOC was assessed by Antonovsky's short 13-item scale (see *Appendix*). The items were randomly ordered in the questionnaire according to Antonovsky.[2] Scores for each item ranged from 1 (poor SOC) to 7 (strong SOC). A sum score of the scale was calculated by summing up the raw scores. The Cronbach alpha coefficient was 0.81, suggesting high internal consistency of the SOC scale.

Childhood living conditions were assessed by a sum variable drawing on four separate items which read: 'When you think about your childhood years, i.e. the years before the age of 16, a) Did your family have long-lasting economic difficulties?, b) Did a member of your family have problems due to alcohol?, c) Were you often afraid of some family member? and d) Were there conflicts in your childhood family? Three categories were used: no difficulty, one difficulty, and two or more difficulties in the childhood family.

Educational attainment (ISCED-classification) derived from the Finnish national register of educational degrees, and was categorized into three levels: a) higher education equals a university degree or an examination in another higher educational institution (≥13 years of education); b) secondary education equals secondary school plus vocational training, or the matriculation examination (10–12 years of education); and c) basic education equals compulsory education or less (maximum of 9 years of education).

Work life was assessed using four variables. Employment status consisted of four categories: employed, unemployed, homemaker, and disability pensioner. Socio-economic status was based on the current occupation or the previous occupation among the non-employed: upper non-manual, lower non-manual, manual worker, entrepreneur, and farmer. Those who were employed were asked two further questions on the quality and the significance of their work. The first question included two alternatives: 'Do you find your work meaningful, i.e. besides the income, does your work give you personal pleasure?', or 'Is income the only meaning and reason for you to work?' The second question asked: 'Is it possible for you to use your knowledge and skills at work?' (yes or no).

Family life was measured by four variables. Marital status included four categories: married/couples, single, divorced/separated, and widow/er. Family type also included 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: 'Would you describe your present relationship as very good or good, satisfactory, or poor or very poor?' and 'When needed, i.e., in difficult life situations, does your partner support you?' (yes or no).

Other *social relationships* were measured by three variables. The number of friends consisted of four categories: none, one, from 2 to 5, and more than five friends. 'In a difficult life situation, is it possible for you to receive social support?' (yes, I don't need support, no). The third variable applied only to those who had social support and included three categories: 'Are you satisfied with the support you receive?' (very satisfied, quite satisfied, not satisfied).

Since the SOC score is approximately normally distributed ordinary regression analysis was used. The modelling was carried out by the GLM procedure in the SAS statistical package.[36] Variables were entered into the analysis in accordance with the conceptual model of the study (*figure 1*). First, age in 10-year groups was added. Second, the childhood living condition variable was added. Third, educational attainment was added. These three variables, i.e. the basic area of GRR, were adjusted for in the analyses of the three further principal areas of GRR, i.e. work life, family life, and other social relationships. The three areas were analysed separately adding variables one at a time to the analysis, while adjusting for the basic areas variables. All analyses were made separately for men and women, and in the final phase interactions between sex and the background variables were controlled for.

RESULTS

Table 1 shows that the unadjusted mean SOC scores for men and women were very similar (66.8 in men and 66.3 in women). SOC increased slightly with age among men and women. Poor childhood living conditions were related to lower SOC score for both men and women. Furthermore, those with the highest education had the highest SOC score.

Being unemployed or early retired was clearly related to low SOC score for both men and women. Socio-economic differences in SOC showed that both male and female manual workers had the lowest scores. Variables measuring the quality of work had the strongest associations with SOC for both men and women, i.e. those in poor jobs scored even lower than the unemployed.

According to marital status, being single was more strongly related to men's than women's SOC. Family type showed that couples with or without children had the highest SOC score for both sexes. Male single parents scored lowest on the SOC scale. For the quality of people's relationships it was found that living in an unsatisfactory relationship or not receiving support from the partner was strongly related to low SOC for both men and women.

The three variables of other social relationships, i.e. having friends, receiving social support, and being satisfied with it, were all associated with high SOC score for both men and women.

In the regression analysis, the variables of the basic area of the GRR, age, childhood living conditions, and education, were statistically significantly associated with SOC for both men and women (*table 2*). Among men SOC was lowest in the age group 35–44 years, but among women in the next age group, i.e. 45–54 years old. SOC was strongest for men and women in the oldest age group, i.e. 55–64 years old. Adjusting for the other basic area variables had negligible effect on the age pattern of SOC. Childhood living conditions had a clear association with SOC for both sexes. The difference between the reference group (no difficulty), and the group having two or more difficulties in the childhood family was 3.7 for men and 4.2 for women. Here also, adjusting for the other basic area variables did not affect the associations found. Educational attainment showed a gradient for both sexes:

the higher the education, the higher the SOC score. The difference between higher and basic education was 1.7 among men and 2.2 among women.

The work life variables, adjusted for basic GRR, were all statistically significantly associated with SOC, except possibilities of using one's skills at work for women (*table 3*). Among different employment statuses being unemployed or early retired were most strongly associated with poor SOC. The difference between the employed and unemployed was 3.7 among men, and 3.8 among women. Being early retired contributed particularly strongly to poor SOC among men (–4.3). Adjusting for the other variables of work life did not affect the association of employment status with SOC. According to socio-economic status, being a female manual worker was detrimental to SOC; the difference to upper non-manuals was 2.6. Adjusting for the significance of work and possibilities of using skills at work flattened the socio-economic pattern of SOC. Significance of work had a strong association with SOC for men as well as women. The difference between those who received personal pleasure from work and those who worked only for money was 4.9 among men and 4.2 among women, i.e. those in poor jobs scored even lower than the unemployed. For men, but not for women, lacking possibilities of using skills at work was also strongly associated with poor SOC, the difference being 4.6 points.

Of the family life variables, marital status and the quality of relationship were both clearly associated with men's and women's SOC (*table 4*). Being single was more strongly associated with men's than women's SOC. The difference between couples and singles among men was 3.9, and among women 1.2. According to family type, single males and single male parents had the lowest SOC score. For women, this variable was not statistically significant. Of all variables, the quality of relationship showed the strongest association with SOC for both sexes. The difference between good and poor relationship was 11.8 points among men, and 10.2 among women. Not receiving support from partner was slightly more strongly associated with men's (–1.9) than women's (–0.9) SOC. Thus for both sexes having an unsatisfactory relationship was a greater risk of poor SOC than loneliness.

Table 5 shows that the variables of the other social relationships were clearly associated with men's and women's SOC. Both men and women having more than five friends scored highest on the SOC scale. Men with only one friend (–2.3) or no friends (–3.7) scored slightly lower than women (–1.3 and –2.5, respectively). However, lack of social support showed somewhat stronger association with women's (–7.4) than men's SOC (–5.2). Satisfaction with social support was important to both men's and women's SOC. The difference was 8.4 among men and 7.2 among women.

In order to control for sex differences in SOC, interaction terms between sex and the background factors of SOC were controlled for. The associations of age, socio-economic status, ability to use skills and knowledge at work, marital status, and family type with SOC differed statistically significantly between men and women. First, women and men scored lowest by different age groups (p=0.03). Second, socio-economic status (p=0.001) differed somewhat between sexes: male farmers scored lower than the reference group, whereas female farmers did the opposite. Also female manual workers showed somewhat lower than scores their male counterparts. Third, being able to use skills and knowledge at work (p=0.01) was associated with SOC only among men. Fourth, marital status differed between the sexes (p=0.007). Widows scored higher than the reference group (couples), whereas widowers did the opposite. Also the difference between single men and women was clear. Fifth, family type (p=0.0238) differed between men and women as single men and single male parents scored lower than the reference group while for women

Table 1 Mean SOC score (range 13–91) among men and women aged 25–64 by basic, work life, family life and other social relationships areas of the GRR (generalised resistance resources)

	Men			Women		
	Mean	SD	N	Mean	SD	N
Age (years)						
25–34	67.1	9.5	810	66.5	9.3	826
35–44	65.7	9.9	946	66.2	9.4	945
45–54	67.2	8.7	854	65.6	9.7	810
55–64	67.7	10.0	606	67.3	11.2	559
Childhood living conditions						
No difficulties	68.0	9.1	1814	68.3	9.1	1944
1 difficulty	64.5	9.9	695	65.6	9.5	776
≥2 difficulties	63.8	9.9	524	64.5	10.0	426
Educational attainment						
Higher	68.1	8.5	785	67.9	7.9	652
Secondary	66.7	9.7	1363	66.4	9.4	1507
Basic	66.2	10.1	1068	65.4	11.3	1003
Employment status						
Employed	67.6	8.6	2330	67.0	8.9	2090
Unemployed	63.6	11.0	440	63.1	10.7	366
Homemaker	69.9	9.8	6	67.1	10.0	231
Disabil. pension	64.0	12.4	202	64.6	14.9	155
Socio-economic status						
Upper non-manual	68.8	8.2	674	67.9	8.1	467
Lower non-manual	66.6	10.5	456	66.8	9.9	1189
Worker	65.6	11.2	1066	64.1	11.8	613
Entrepreneur	67.8	7.2	524	66.8	7.1	274
Farmer	68.0	7.1	399	67.4	8.7	252
Significance of work						
Personal pleasure	68.7	8.4	1911	67.6	8.5	1865
Money	63.6	8.7	354	62.3	10.2	208
Ability to use skills						
Much	68.3	8.4	1962	67.6	8.5	1704
Some	66.5	7.9	226	65.3	9.9	253
Little	62.9	10.7	97	63.6	10.1	131
Marital status						
Married/Couple	67.8	9.1	2458	66.9	9.4	2394
Single	63.8	10.7	513	65.6	10.4	332
Divorced/separated	63.8	10.2	224	63.6	10.4	290
Widow/er	68.8	8.3	21	65.8	12.7	124
Family type						
Couple + children	67.9	9.0	1701	66.9	8.8	1603
Couple no children	67.6	9.2	826	66.6	10.4	788
Single	63.8	10.8	537	65.2	11.2	448
Single parent	63.1	9.7	152	64.5	10.3	301
Quality of relationship						
Good	68.3	8.9	2243	67.6	9.0	2128
Satisfactory	62.6	9.3	184	61.1	9.9	222
Poor	57.2	11.2	15	53.5	14.3	19
Support from partner						
Yes	68.0	9.0	2276	67.2	9.0	2138
No	63.9	10.3	837	64.6	11.0	979
Number of friends						
More than 5	68.1	9.2	1522	67.9	9.3	938
2–5	65.8	9.6	1263	65.8	9.6	1795
1	65.4	9.8	144	65.9	10.4	252
0	63.9	10.1	211	63.7	12.7	121
Receiving social support						
Yes	67.1	9.5	3023	66.4	9.7	3086
Not needed	68.7	9.3	64	71.2	13.8	15
No	60.5	10.3	90	58.5	12.5	31
Satisfied with support						
Satisfied	68.8	9.3	1166	68.4	9.0	1529
Quite satisfied	66.1	9.2	1700	64.6	9.8	1472
Not satisfied	58.3	14.4	64	58.3	10.7	91

Table 2 Regression analysis of the association between SOC and variables within the basic area of the GRR (generalised resistance resources); men and women

	Men			Women		
	Model 1 Age	Model 2 1+childhood conditions	Model 3 2+ education	Model 1 Age	Model 2 1+childhood conditions	Model 3 2+ education
R-square	0.5	3.1	3.4	0.3	3.7	4.3
P-value of added variable	0.0007	0.0001	0.0038	0.0181	0.0001	0.0002
Standard mean	67.1	68.4	69.2	66.6	68.0	69.0
Basic area						
Age						
25–34	0	0	0	0	0	0
35–44	–1.37	–1.16	–1.16	–0.37	–0.16	–0.04
45–54	0.13	0.28	0.39	–0.94	–0.33	0.04
55–64	0.59	1.09	1.43	0.78	1.22	1.86
Childhood conditions						
No difficulty		0	0		0	0
1 difficulty		–2.82	–2.66		–3.63	–3.56
≥2 difficulties		–3.74	–3.61		–4.15	–4.00
Education						
Higher			0			0
Secondary			–0.98			–1.21
Basic			–1.66			–2.21

Table 3 Regression analysis of the association between SOC and variables within the work life area of the GRR (generalised resistance resources), adjusted for the basic area variables; men and women

	Men				Women			
	Model 1 Basic+ employ. status	Model 2 1+ socioeco. status	Model 3[a] 2+ signif. of work	Model 4[a] 3+ ability use skills	Model 1 Basic+ employ. status	Model 2 1+ socioeco. status	Model 3[a] 2+ signif. of work	Model 4[a] 3+ ability use skills
R-square	5.8	6.3	6.7	7.8	5.8	6.7	6.7	6.7
P-value of added variable	0.0001	0.0263	0.0001	0.0001	0.0001	0.0003	0.0001	0.3509
Standard mean	69.7	70.3	70.6	70.7	69.4	69.7	69.7	69.7
Work area								
Employment status								
Employed	0	0	–	–	0	0	–	–
Unemployed	–3.72	–3.50	–	–	–3.78	–3.60	–	–
Homemaker	–	–	–	–	–0.01	–	–	–
Disability pens.	–4.27	–3.99	–	–	–2.02	–1.68	–	–
Socioeconomic status								
Upper non-manual		0	0	0		0	0	0
Lower non-manual		–1.62	–0.95	–0.74		–0.51	–0.04	–0.01
Worker		–1.45	–0.57	–0.05		–2.56	–1.12	–0.92
Entrepreneur		–0.74	–0.27	–0.11		–0.64	–0.03	–0.02
Farmer		–1.06	–0.76	–0.42		0.05	1.11	1.17
Significance of work								
Personal pleasure			0	0			0	0
Money			–4.88	–4.56			–4.18	–3.86
Ability to use skills at work								
Much				0				0
Some				–0.98				–0.92
Little				–4.55				–0.41

a: Models 3 and 4 include only people who are employed.

Table 4 Regression analysis of the association between SOC and variables within the family life area of the GRR (generalised resistance resources), adjusted for the basic area variables of the GRR; men and women

	Men				Women			
	Model 1 Basic+ marital status	Model 2 1+ family type	Model 3[a] 2+ quality of relationship	Model 4[a] 3+support from partner	Model 1 Basic+ marital status	Model 2 1+ family type	Model 3[a] 2+ quality of relationship	Model 4[a] 3+support from partner
R-square	5.8	6.1	6.1	6.7	5.0	5.1	7.5	7.5
P-value of added variable	0.0001	0.0146	0.0001	0.0072	0.0001	0.3816	0.0001	0.1590
Standard mean	70.4	70.7	70.3	70.3	69.1	69.3	69.9	69.9
Family area								
Marital status								
Married/Couples	0	0	–	–	0	0	–	–
Single	–3.93	–2.53	–	–	–1.17	–2.90	–	–
Divorced/separated	–3.26	–1.68	–	–	–2.81	–4.57	–	–
Widow	0.42	1.63	–	–	–1.25	–3.19	–	–
Family type								
Couple+ children		0	–	–		0	–	–
Couple no children		–1.28	–	–		–0.67	–	–
Single		–2.10	–	–		1.62	–	–
Single parent		–1.95	–	–		1.44	–	–
Quality of relationship								
Good			0	0			0	0
Satisfactory			–5.10	–5.31			–6.30	–6.05
Poor			–11.81	–10.96			–10.23	–9.52
Support from partner								
Yes				0				0
No				–1.88				–0.88

a: Models 3 and 4 include only people who live in partnership.

Table 5 Regression analysis of the association between SOC and variables within the other social relationships, adjusted for the basic area variables; men and women

	Men			Women		
	Model 1 basic+number of friends	Model 2 1+social support	Model 3[a] 2+satisfied with support	Model 1 basic+number of friends	Model 2 1+social support	Model 3[a] 2+satisfied with support
R-square	4.9	5.9	7.8	4.9	5.5	8.7
P-value of added variable	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Standard mean	70.4	70.4	71.2	70.0	70.2	70.2
Social relationships						
Number of friends						
More than 5	0	0	0	0	0	0
2–5	–2.18	–2.10	–1.35	–1.90	–1.84	–1.41
1	–2.25	–1.98	–0.71	–1.34	–1.36	–0.87
0	–3.70	–3.00	–2.72	–2.45	–2.38	–1.89
Receiving social support						
Yes		0	0		0	0
Does not need		1.71	–2.61		4.36	6.40
No		–5.23	–2.33		–7.36	–8.19
Satisfied with support						
Satisfied			0			0
Quite satisfied			–2.30			–3.25
Not satisfied			–8.39			–7.16

a: Model 3 includes only people who receive social support.

the opposite was true. However, none of these interactions were very strong.

DISCUSSION

With regard to the first research question, we found that all four key areas of the resistance resources were associated with sense of coherence. With regard to the second research question concerning interactions between sex and the GRR variables, we found only few and relatively small differences between men and women. That means that the SOC scale used was broadly sex neutral among Finnish respondents. Nevertheless loneliness seemed to threaten, in particular, Finnish men's SOC.

The main findings can be summarized under four points:

First, the quality of the relationship with partner showed the strongest association with SOC for both sexes. The bearing of the quality of family relationships and family life on SOC has been neglected in the SOC literature. In this study, a poor relationship with a partner was a major threat to SOC. It makes sense to think that living in a difficult relationship and not being able to improve it weakens one's feelings of control, and thus the level of SOC. Another possibility is that people with poor SOC have difficulties in having close relationships.

Second, both ability to receive social support and satisfaction with it showed also strong associations with SOC for both sexes. This result confirms the importance of social relationships and social support to SOC as has been suggested by Antonovsky[2] and as found in other studies.[3,22] However, here the direction of influence may be reciprocal: good social relationships may contribute to SOC and a strong SOC may help gain social relationships. In previous studies social support has been associated with men's poorer health, since some men may show difficulties in being dependent on other people.[37,38] However, according to our results accepting the need for social support was unlikely to challenge Finnish men's SOC.

Third, the significance of paid work had a slightly stronger association than employment status with SOC among both sexes. Nevertheless, employment status was important to SOC for both sexes. This is also in line with previous studies.[22,23] There were no sex differences in the association of unemployment with SOC. This is probably due to an equal psychological significance of employment among men and women, which can be understood as a reflection of the almost equal full-time labour force participation among Finnish men and women.[39] Also homemakers and employed women had equal levels of SOC. This is probably associated with the housewife role in Finland, which is relatively uncommon and usually only temporary.[40]

The association of the quality of paid work with SOC has also been a neglected area of research. The quality of work was even more important than being employed. Unemployed people had a higher SOC than people with unsatisfactory working conditions. This confirms Antonovsky's suggestion of the importance of qualitative factors of paid work. A meaningful job provides opportunities for skill and knowledge use and thus experience of success, further supporting one's SOC. In contrast, having poor working conditions and a passive job might enhance negative feelings towards employment and thus weaken one's SOC. However, unexpectedly among women the ability to use skills and knowledge in one's job was unassociated with SOC, whereas receiving personal satisfaction from work was associated with SOC. Among men, both of these factors were strongly associated with their SOC.

Finally, childhood living conditions showed a strong association with men's and women's SOC. In the theory of SOC, childhood living conditions are among the most important factors contributing to SOC even in later life.[2] Also, earlier studies reported similar results.[24,33] We found that childhood living conditions were strongly associated with both men's and women's SOC. Poor childhood living conditions may affect adult SOC in

various ways. First, difficulties in childhood may have a negative impact on self-esteem and positive life attitudes, and these weaken SOC. Secondly, the effect of accumulation may explain the findings. According to Lundberg,[24] childhood conditions were related to adult social class, i.e. childhood conditions are likely to contribute to not only intra-personal but also social and material resources. In our study, sex was neither a risk factor nor a protective factor for the association between adverse childhood living conditions and poor adult SOC.

There are some limitations in this study. First, while resistance resources contribute to a strong SOC, a strong SOC can also contribute resistance resources. Due to the cross-sectional design, the direction of influence cannot be judged. Further longitudinal studies are needed to confirm the directions of the found associations. Secondly, accumulation of the resistance resources may complicate the interpretation of these results. The resistance resources as well as resistance deficiencies may accumulate to the same individuals. In order to minimize this problem, the analyses were adjusted for age, paid work and family life, other social relationships, childhood living conditions, and educational attainment.

However, the measurement of the GRR as well as SOC itself has limitations. For example, the questions on childhood conditions were retrospective, and the measurement of social relations may also lack precision. Although the SOC questionnaire was originally developed by Antonovsky himself, it may still need further development in order to capture the key ideas in the theory of SOC. These limitations may weaken the associations found between the GRR and SOC.

Despite the limitations we think that the findings of this study contribute to a better understanding of SOC. First, the data come from a large representative sample of the Finnish population and are based on personal face-to-face interviews. Secondly, besides the data, the study examined a broad range of resistance resources, including not only socio-economic ones, but also psycho-emotional resources.

Overall the findings suggest that the essence of SOC is covered rather by people's psycho-emotional life sphere related to close social relationships than their socio-economic status. However, earlier studies suggest that socio-economic factors are also associated with SOC. According to Geyer,[41] SOC is an attitude of people who are well-educated and occupy higher socio-economic positions. As far as psycho-emotional factors are also related to socio-economic ones, this is feasible. But it is seems likely that SOC needs to be considered also in a wider and deeper perspective including other life spheres than just people's socio-economic position. Factors such as quality of family life and social relationships, significance of work and childhood living conditions reflect mostly people's own interpretations of their life. In that sense, the strengths and weaknesses of SOC are based very much on people's perceived experiences. However, the psycho-emotional factors behind SOC, i.e. good close relationships, meaningful employment and good childhood living conditions, need to be deepened in further studies. Equally the fact that SOC showed relative sex neutrality in the Finnish context needs to be examined in other countries as well.

Largely similar general resistance resources that influence SOC are also likely to influence people's health. Previous studies have found SOC to be associated with health,[6-8] and SOC is also a potential reason or mediating process for psychosocial and socio-economic inequalities in health. However, future research needs to examine whether the influences on health and health inequalities of the general resistance resources are direct or whether they go through SOC.

In conclusion, our study shows that the factors contributing to SOC are the same for men and women and produce similar levels of SOC among both sexes. Furthermore, this sex equality suggests that women and men are likely to share broadly similar

levels of general resistance resources in Finland. Sense of coherence seems to portray, in particular, men's and women's psycho-emotional well-being and ill-being, and associate with close relationships with partner and friends, as well as social support, working conditions, employment status and childhood living conditions.

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Appendix Antonovsky's[2] short 13-item sense of coherence questionnaire including three main subareas

A The comprehensibility subscale included the following items:

  1 Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well?

  2 Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

  3 Do you have very mixed-up feelings and ideas?

  4 Does it happen that you have feelings inside that you would rather not feel?

  5 When something happens, have you generally found that you have overestimated or underestimated its importance or that you have seen things in their right proportion?

B The manageability subscale included the following items:

  1 Has it happened that people whom you counted on have disappointed you?

  2 Do you have the feeling that you are being treated unfairly?

  3 Many people even those with a strong character sometimes feel sad sacks (losers) in certain situations. How often have you felt this way in the past?

  4 How often do you have feelings that you are not sure you control yourself?

C The meaningfulness subscale included the following items:

  1 Do you have the feeling that you do not really care about what goes on around you?

  2 Has your life until now had no clear goals or no purpose at all, or very clear goals and purpose?

  3 Is doing the things you do every day a source of deep pleasure and satisfaction or a source of pain and boredom?

  4 How often do you have the feeling that there's little meaning in the things you do in your daily life?