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Sense of Coherence and Health: survey for young ICT-employees in Southern Finland

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Abstract

The purpose of this study was to describe the sense of coherence and perceived health, and factors related to them, of young employees working in information and communication technology (ICT) in Finland.
The data were collected from young employees (N=609, 19–35 years old) working in (N=34) ICT-companies. The electronic questionnaire consisted of the SOC-13 questionnaire, a question on self-rated health, and questions on socio-demographic factors. 182 employees took part in this study (response rate 30 %). The data were analyzed with quantitative methods.
The sense of coherence of the young ICT-employees was generally good. Most respondents (96 %) rated their health as very good or good. Sense of coherence and self-rated health were strongly interrelated, in that the employees with a strong sense of coherence also rated their health very good. The relationships between self-rated health and all three dimensions of sense of coherence were strong. Self-rated health was also explained by socio-demographic factors, especially gender and age.

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1 Introduction

In recent decades, the globalization, new technology and changes in the world economics and politics have affected work in general, changing the world of work as well as the characteristics of work. The demography of the workforce has changed, and the security of jobs and careers has decreased. [1] At the same time, the changes in work characteristics have resulted in new demands of work, as especially cognitive [1], mental and emotional demands have increased [1,2]. Workload, demands of information and communication technology (ICT), and the feeling of being underqualified have predicted cognitive complaints among the working population [3]. Moreover, different ICT-related demands (e.g., availability, learning, workload and response expectations) have been positively related with increased strain, stress and burnout [4]. The mental demands seem to be related to upper white collar jobs with higher education [2]. Similarly, for the knowledge workers in Denmark, high workload, role conflicts, the unpredictability of work, and lack of recognition were factors related to cognitive stress symptoms [5].

The occupational health services in Finland aim to promote the health and work ability of employees, the functionality of the whole work community, and the safety and health of work environments, in addition to the traditional prevention of health-related accidents and illnesses [6]. In the year 2010, 86 % of the Finnish employees were covered by occupational health services [7]. During a one-year study period, 52 % of the Finnish employees solely visited occupational health services for their primary health care visits, while 74 % of employees visited either occupational health services or municipal health care services. Furthermore, between one third and one half of the employees with any lifestyle-related risks, depressive disorders or other health problems visited occupational health services, enabling occupational health care professionals to detect possible health risks.[8] There is also a strong relation between health problems impairing work ability and long-standing illnesses and the number of visits of occupational health care professionals in Finland. The role of the Finnish occupational health care services in the primary health care of Finnish employees provides occupational health professionals opportunities to learn more about work ability and well-being at work in addition to the information gathered from general check-ups and surveys. [9]

Generally, workplaces have been shown to be potential arenas for promoting the health of workforce. In OECD countries, the average weekly working time was 38.5 hours in the year 2011 [10] and several systematic reviews have summarized the effects of different workplace health promoting interventions. The results have been

good, with small improvements in health behavior [11,12,13] and there have also been indications of positive outcomes on promoting mental health and well-being at the workplaces [14]. Interventions aiming to reduce stress and high level of absenteeism are most efficient, while ones focusing on improving working conditions are harder to achieve [15].

In Finland, as in all European Union Member States, the population is aging [16]. As the number of pensioners and their proportion in the total population has risen in Finland since the year 2010 [17], it is important for the younger generations starting their careers to be and stay healthy throughout their careers. Generally, young Finns perceive their health as good, as 79 % of 20-34-year-old males and 77 % of females estimated their health as good or reasonably good on a 5-step self-rated health scale, and only 3 % perceived their health as bad or fairly bad [18]. However, there are many points to consider: How do young people perceive their health, especially at the beginning of their careers? What do they consider their personal resources? How do they perceive their work ability at the beginning of their careers? Salutogenic approach is a method that can be used when trying to find answers to these questions.

1.1 Salutogenic orientation

The goal of the salutogenic orientation is to understand what generates health [19]. It aims to increase health with positive outcomes, opportunities and favorable conditions instead of just decreasing risk factors, possible health threats and unfavorable conditions. The salutogenic orientation focuses on finding solutions that are needed in order to improve health and not only to avoid possible risks. [20] The orientation is applicable at individual, group and society level [19].

Sense of coherence (SOC) is one of the key concepts of the salutogenic approach. With sense of coherence, it is possible to measure how confident a person is about their ability to structure, predict and explain stressors faced in life, and how confident they feel about having enough resources for meeting the demands caused by these possible stressors. [19] Meeting these challenges is not only dependent on having the resources (e.g., money, intelligence, traditions, and social support), but also requires personal understanding and feeling of confidence of having and finding the right inner and external resources to cope with challenges [21]. Sense of coherence includes three dimensions: comprehensibility, manageability, and meaningfulness. Comprehensibility is the cognitive side of sense of coherence, and describes how understandable one finds stimuli in his or her inner and external environment in any given situation. Manageability, the second component, describes how one perceives of his or her own resources as adequate when facing challenges in life. Lastly, the final component, meaningfulness, is the motivational component of sense of coherence. It describes one's understanding and acceptance of meeting challenges and how some challenges in life are worthy and need to be addressed. All these dimensions are equally important in forming a strong sense of coherence, and it is, therefore, recommendable to measure them as whole instead of

examining the interrelations between the dimensions.[19] However, there has been a number of studies individually reporting mean values of the dimensions [22].
The SOC questionnaire has been widely used and proven to be a reliable and valid instrument for gathering information about how well the population in question is managing in the possibly stressful situation [22]. It could thus also provide general information about the well-being of young employees and how well they are managing overall. This information could be used in developing new instruments or models for occupational health care services and also, more generally, for health promotion at workplaces.
In recent years, there have been several international studies about the sense of coherence of employees in different lines of work. The studies show that sense of coherence protects employees from possible unfavorable effects of work [23], helps in coping with stressful working conditions [24] and with negative work strain in general [25]. A stronger sense of coherence also seems to protect employees in stressful organizational changes [26].
To date, there are only few studies specifically describing the sense of coherence of young employees. A recent Italian study [27] indicated that young employees with better employment prospects also had a stronger sense of coherence. Moreover, young employees with a higher education had stronger manageability, which is an instrumental dimension of the sense of coherence. There were also similar results in a Finnish study [28], which concluded that good career development enables the development of a stronger sense of coherence, especially for employees under 30 years of age.
Sense of coherence is strongly related with perceived health [29]. The relationship is particularly strong between sense of coherence and mental health [28]. Employees with a stronger sense of coherence also rated their health better and had no symptoms of mental disorders [30]. Employees with strong sense of coherence were at a smaller risk to be on sick leave due to depression [31]. Strong sense of coherence seems to also protect individuals from mental disorders in a longer period of time [32,33].
It is possible to understand the systems strengthening sense of coherence by finding the factors accommodating individuals to perceive their lives as meaningful, rewarding, and positively challenging [34]. Therefore, as the previous research has provided general information about the sense of coherence of employees, this study focuses on increasing knowledge about the sense of coherence of young employees in particular.

1.2 Study aims and study questions

The purpose of this study is to describe the sense of coherence and self-rated health of young employees (19-35 years old) in information and communication technology in the Helsinki metropolitan area in Finland. A further purpose is to describe how sense of coherence is related to self-rated health and how the socio-demographic factors possibly affect sense of coherence and self-rated

health.
The study questions are following:
1. How strong is the sense of coherence of young employees working in information and communication technology?
2. How do young employees in information and communication technology perceive their health?
3. How is the sense of coherence of the young employees in information and communication technology related to their perceived health?
4. How are the sense of coherence and the self-rated health of the young employees in the information and communication technology related to socio-demographic factors (age, gender, family status, education, and socio-economic status)?

2 Methods

2.1 Study design

This was a descriptive and cross-sectional survey that focused on young ICT (information and communication technology) employees in Helsinki metropolitan area in Finland.
The study design and the questionnaire were approved by the Ethical Committee of the Helsinki Deaconess Institute. The purpose of the study and the study methods were described in an e-mail sent to the human resource departments of the ICT-companies and also in an e-mail forwarded to possible participants. It was also expressed in the e-mail that participation was voluntary and that filling in the electronic questionnaire was considered as providing informed consent.

2.2 Data collection

The data were collected in the February and March of 2012. Information about the study design, voluntary participation, anonymity and the procedure of informed consent was sent by e-mail to 175 ICT companies in Helsinki Metropolitan area in Finland. Out of these companies, 34 agreed to participate, 29 turned down the invitation to participate and 112 companies did not reply. The contact persons of the participating companies were asked to distribute the e-mails including description of the study and a link to the electronic questionnaire to the young employees working in the companies. In these 34 participating companies, there were in total 609 employees who belonged to the focus group.182 of them filled in the electronic questionnaire.
The electronic questionnaire consisted of the SOC-13 questionnaire, the question on self-rated health, and five questions about the socio-demographic status of the respondents. The socio-demographic status included questions about gender, age, family status, degree of education, and socio-economic status.
The SOC-13 questionnaire included questions describing all three dimensions of

sense of coherence. There were five questions describing comprehensibility and four questions of both manageability and meaningfulness. Each question was measured with a seven-point Likert scale (1-7). The total score of the SOC-13 questionnaire ranged between 13 and 91. The score of comprehensibility ranged between 5 and 35 points, and the scores of manageability and meaningfulness between 4 and 28 points. The scale had also been proved to be valid and reliable (Cronbach's α ranging from 0.70 to 0.92) cross-culturally [22]. The scale proved to be internally reliable also in this study (Cronbach's $\alpha = 0.84$).
The self-rated health was measured with the question "How would you rate your health at this moment?" The single question of self-rated health included the process of gathering information about health in different contexts and comparing that information with personal experiences of health currently and previously, and also with the health of others. The question has been widely used and has proved to give adequate information about health status [35]. In this study, four response options were available: "very good", "good", "bad" and "very bad".

2.3 Statistical analysis

The data were analyzed with SPSS for Windows (version 19.0) in frequencies, percentages, averages, Spearman's rho and multivariate analyses of variances. The relationship between groups was tested with ANOVA. In the analysis, $P<0.05$ was considered statistically significant.
In addition, the sense of coherence was categorized into strong, moderate, and weak sense of coherence according to the median of this study, which was 65 points. The highest quartile (72–91 points) was considered to signal a strong sense of coherence, the two middle quartiles (59–71 points) were seen as moderate sense of coherence and the lowest quartile (31–58 points) was perceived as a weak sense of coherence.

3 Main Results

3.1 Background Information

The participants of the study were 182 young employees, aged between 19 and 35 years, working in 34 ICT companies in Helsinki Metropolitan area in Finland. The response rate was 30 %. Participant characteristics are summarized in Table 1. Nearly two thirds (63.7 %, n=116) of the respondents were male and over half of all (n=102) participants belonged to the age category of 30–35 year-olds. Nearly two thirds (65.9 %, n=120) were married or cohabiting and 23.6 % (n=43) had children. Half of the participants (50.0 %, n=91) had completed a higher-degree level of tertiary education and 37.9 % (n=69) had a lower-degree level tertiary education. Over one third (39.0 %, n=71) of the respondents were upper-level employees.

3.2 Sense of Coherence

The sense of coherence of the young ICT-employees in Finland was generally good as the total mean of the SOC-13 questionnaire was 64.1 points and the results emphasized the higher end of the possible range of 13-91 points. The young employees with strong sense of coherence in this study (25 %) had considerably high scores in the SOC-13 questionnaire as the results ranged between 72 and 91 points. The respondents with moderate sense of coherence (50 %) scored between 59 and 71 points in total and even the respondents with the weakest sense of coherence (25 %) had fairly good total scores, ranging from 31 to 58 points.

The results describing each of the three dimensions (comprehensibility, manageability, and meaningfulness) of the sense of coherence were also good. All three dimensions seemed to be equally strong, as the results were in line with the results of the total sense of coherence. The sense of comprehensibility of the young ICT-employees was generally good (mean 24.6 points and range 14-35 points), as were also the senses of both manageability (mean 19.8 points) and meaningfulness (mean 19.8 points). However, the respondents' results in the dimension of manageability varied more (ranging from 6 to 28 points) than the results on meaningfulness (ranging between 9 and 28 points).

Table 1: Socio-demographic characteristics and sense of coherence (SOC)

Characteristic	**N**	**%**	**SOC Mean (SD)**
Sex			
Male	116	63,7	64,07 (10,3)
Female	66	36,3	62,91 (10,2)
Age Groups (years)			
19-24	12	6,6	59,42 (7,6)
25-29	68	37,4	63,85 (11,1)
30-35	102	56,0	64,76 (9,8)
Family status			
Living with parents	1	0,5	56,00
Single, no children	59	32,4	61,32 (9,5)
Married or cohabiting, no children	79	43,4	65,01 (10,0)
Married or cohabiting, with children	41	22,5	65,95 (11,4)
Single parent	2	1,1	73,50 (3,5)
Education			
No post-basic level education	0	0	0
Upper secondary level education	21	11,5	61,95 (13,0)
Lowest level tertiary education	0	0	0
Lower-degree tertiary education	69	37,9	63,96 (9,9)

Higher-degree tertiary education	91	50,0	64,42 (9,7)
Researcher	1	0,5	85,00
Socio-economic status			
Student	5	2,7	52,80 (13,3)
Manual worker	50	27,5	62,94 (10,4)
Lower-level employees	56	30,8	63,80 (9,9)
Upper-level employees	71	39,0	65,87 (9,8)

3.3 Self-Rated Health

Most of the respondents (95.6 %) rated their health as very good or good (31.9 % very good and 63.7 % good). Only 4.4 % rated their health as bad, and none of the respondents rated it as very bad.

Based on the analysis, sense of coherence and self-rated health were strongly interrelated (p=0.002), as the employees with a strong sense of coherence also rated their health as very good (Table 2). On average, the respondents who rated their health as very good had a stronger sense of coherence (mean 67.3) than the respondents who evaluated their health as good (mean 62.7) or bad (mean 60.8).

Table 2: Sense of coherence in the groups of self-rated health

	Categories of Self-rated health		
Sense of Coherence	**Bad**	**Good**	**Very good**
N	8	116	58
Average	60.75	62.67	67.33
Median	58.00	63.50	68.00
Standard deviation	10.77	10.13	9.80
Minimum	47	37	31
Maximum	81	85	91
Quartiles, Q1	53.25	55.25	61.75
Q3	67.75	71.00	73.00

The relationship was tested with ANOVA. The averages of the self-rated health groups differed statistically significantly (p=0.011). Furthermore, there were strong interrelations between self-rated health and all three dimensions of sense of coherence. Comparing the groups, statistically significant differences were found in the averages of comprehensibility (p=0.019) and manageability (p=0.027) between those who rated their health as very good and those who estimated it as good. However, there were no statistically significant differences between the groups in the averages of meaningfulness. (Table 3).

Table 3: Averages of the sense of coherence and its dimensions in the groups of self-rated health (ANOVA)

Sense of Coherence and its dimensions	**Differences in averages of the categories of self-rated health**	
	F	**P**
Sense of Coherence	4.603	0.011*
Manageability	3.705	0.027*
Meaningfulness	2.434	0.091
Comprehensibility	4.058	0.019*

* The differences in the averages are statistically significant ($p<0.05$)

3.4 Relationships between Sense of Coherence, Self-Rated Health and Socio-Demographic factors

The socio-demographic factors did not explain results in the dimensions of sense of coherence, comprehensibility or manageability. However, the factors explained meaningfulness (p=0.022). The aspects of socio-economic status (p=0.018) and family situation (p=0.032) particularly explained meaningfulness. (Table 4). The rates for self-rated health were also explained by the socio-demographic factors ($p<0.001$), especially gender and age (Table 5).

Table 4: The effect of socio-demographic factors to sense of coherence and its dimensions (multivartiate ANOVA)

Sense of Coherence and its dimensions	**Model**	**Gender**	**Age Categories**	**Family Status**	**Edu-cation**	**Socio-economic status**
Sense of Coherence	F=1.699	F=1.982	F=0.206	F=1.713	F=1.142	F=1.796
	p=0.065	p=0.161	p=0.814	p=0.149	p=0.334	p=0.150
Manageability	F=1.429	F=4.439	F=0.044	F=1.461	F=1.609	F=0.812
	p=0.150	p=0.037*	p=0.957	p=0.216	p=0.189	p=0.489
Meaningfulness	F=2.015	F=0.687	F=1.338	F=2.713	F=0.132	F=3.465
	p=0.022*	p=0.408	p=0.265	p=0.032*	p=0.941	p=0.018*
Comprehensibility	F=1.487	F=3.660	F=0.936	F=0.712	F=1.063	F=0.755
	p=0.127	p=0.057	p=0.394	p=0.585	p=0.366	p=0.521

* The differences in the averages are statistically significant ($p<0.05$)

Table 5: The effect of the socio-demographic factors to the self-rated health (multivariate ANOVA)

	Model	**Gender**	**Age categories**	**Family status**	**Edu-cation**	**Socio-economic status**
Self-rated Health		F=5.818	F=7.310	F=1.214	F=1.814	F=1.328
	p=0.000*	p=0.017*	p=0.001*	p=0.307	p=0.147	p=0.267

* The differences in the averages are statistically significant ($p<0.05$)

4 Discussion

4.1 Discussion based on results

As work characteristics and the world of work in general have changed in the recent years, young employees are facing new challenges at the start of their careers. Even though mental challenges in particular are common for knowledge workers, which employees in ICT-companies generally are, the young Finnish ICT-employees who participated in this study perceived their health and sense of coherence as good.

The sense of coherence of the young ICT-employees in Finland, measured with the total mean score of SOC-13, was similar to the sense of coherence of young Finnish employees (under 35 years of age) working in an industrial company [32], and somewhat higher than the mean of young Italian employees under 30 years of age [27]. Generally sense of coherence was not quite as strong among the participants in this study as in studies of older employees [26,32,33], which is in line with earlier findings by Antonovsky [19] and several studies [22,23] that have suggested that SOC strengthens with age.

Although there are no official limits to categorize the sense of coherence into strong, moderate and weak, there have been some suggestions on how this could be done [36]. One of the methods is to categorize sense of coherence by using the median of the current study and then by categorizing the results into quartiles of strong (highest quartile), moderate (two middle quartiles) and weak (lowest quartile) sense of coherence [32,36]. This method was also used in this study. It does not give exact answers about the strength of sense of coherence, but, instead of merely comparing means, the method provides more information about the distribution of the total scores and about the results that can be considered to illustrate strong, moderate or weak sense of coherence in the current study. The scores describing the categories of strong, moderate and weak sense of coherence in this study were similar to the ones used in earlier studies that utilized the SOC-13 questionnaire [36].

As Antonovsky [19] recommended measuring sense of coherence as whole instead of interrelations of the three dimensions, there are only few studies describing the strengths of the three dimensions of sense of coherence. In this study, the aim was

to describe the three dimensions of the sense of coherence, and not the interrelations between them. The means of all the dimensions were in line with the total sense of coherence. Based on our results, the means of all three dimensions of sense of coherence were slightly higher than the means of young employees under 30 years old in an earlier study [27].

The participants perceived their health as good, as 96 % rated their health as either good or very good. The results were slightly better than in the earlier studies of young (20-34 years of age) Finns in general, out of whom 79 % of males and 77 % of females perceived their health as good or reasonably good. [18]. The mean of self-rated health in this study was slightly above three on a 4-step Likert scale and somewhat better than in an earlier study by Hasson et al [37], where the average was 64 on the VAS scale (0-100).

In agreement with earlier studies, our results showed a strong positive relationship between strong sense of coherence and good self-rated health [22,37]. As in earlier studies, our results also revealed a statistically clearly significant ($p=0.002$) relationship. The relationship was also strong between all three dimensions of the sense of coherence and self-rated health.

According to our results, there is some evidence that socio-demographic factors are related to sense of coherence and self-rated health. Based on our results, there was some evidence that the sense of coherence gets stronger with age, confirming the results of earlier studies [22,23]. However, although some of the studies have shown differences between genders regarding averages in sense of coherence [22], the differences were not statistically significant in this study. Based on our results, socio-economic status was the only other socio-demographic factor that was related to sense of coherence. Tomotsune et al [23] also found differences in the strength of sense of coherence according to socio-economic status, even though, in this study, the difference was statistically significant only between students and higher level employees. Despite the fact that the other socio-demographic factors were not related to sense of coherence, the model of sense of coherence and socio-demographic factors indicated that the socio-demographic factors explained a statistically significant amount of the sense of coherence.

4.2 Limitations of the study

The response rate of this study was only 30 %. When comparing general response rates of electronic and paper questionnaires, the response rates have been lower in electronic questionnaires than in paper questionnaires. However, the response rates have varied between studies, as the response rates of electronic questionnaires have ranged between 24 % [38] and 51 % [39] while the response rates of paper questionnaires were 76 % [38] and 64 % [39] in these studies. Nevertheless, the response rate in this study was low and this needs to be taken into consideration when interpreting the results.

It is also possible that a direct e-mail contact to the target group could have resulted in a higher response rate. By recruiting participants with the help of the

contact persons, the invitation and the reminders of this study were sent only to the contact persons, who needed to be interested in the study in order to forward the questionnaires to the target group. With a low response rate, it is also possible that the results are based on the responses of a somewhat selected group of participants. This also needs to be taken into account when interpreting the results. The study was also focused on young employees in ICT-companies in southern Finland, and, therefore, it gives only a view of the sense of coherence and self-rated health of this selected group of young employees. Additional research is needed in order to form a more general view of the sense of coherence of the young employees.

5 Conclusion

This study has provided general information about the sense of coherence of young employees. The information can be used in planning the occupational health services and health promotion focused on young employees. However, future research is needed to clarify the multidimensional and abstract concept of sense of coherence. There is also a need to apply other research methods, such as focus interviews, theme interviews, and essays, to study sense of coherence, as it is important to recognize how young employees are defining sense of coherence and how it is affecting their life situation. Future research also requires multidisciplinary collaboration, as widely different disciplines deal with the concept of sense of coherence, especially the field of health sciences.

The selected socio-demographic factors did not completely explain sense of coherence, even though some of the factors explained the dimension of meaningfulness. Future studies should test which work related factors might be related to sense of coherence in order to learn more about the resources that young employees have. Based on this study, sense of coherence and self-rated health were strongly interrelated, which is essential to take into account in health promotion activities.

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