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Psychosocial work environment among Swedish audiologists

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Abstract

Objective: The study examined the self-reported psychosocial work environment for audiologists working in three practice types (public, completely private, and private but publicly funded). *Design:* A cross-sectional e-mail survey using the demand-control-support questionnaire, a short version of the effort-reward imbalance (ERI) questionnaire, and descriptive data. *Study sample:* Five-hundred Swedish licensed audiologists. *Results:* Overall, the results indicate differences in psychosocial work environment pertaining to the practice types. These differences are small and the type explains few percent of the variability accounted in the measures of psychosocial work environment. Social support seems important for the psychosocial work environment and is considered a reward in itself. Using the demand-control model, 29% of the audiologists reported working in a high-stress psychosocial work environment. Using the ERI-ratio to estimate the imbalance between effort and reward it was shown that that 86% of the participants experienced an unfavorable work situation where the rewards do not correspond to the efforts made. *Conclusions:* The organizational framework has minor effect on self-reported psychosocial work environment for Swedish licensed audiologists. The percentage of unfavorable ERI-ratios seen in Swedish audiologists seems conspicuously high compared to other working populations in general, but also compared to other health service workers.

Key Words: Audiologist; healthcare professional; occupational stress; organizational form

Organizational changes are currently being carried out in audiological services in the different regions in Sweden. The financial impact of these changes has been monitored and, to some extent, evaluated. However, the effect on the psychosocial work environment for the audiologists has not been examined at all. The present paper examines the effect of organisational framework on self-reported psychosocial work environment.

Traditionally, audiological services in Sweden have been conducted within the public sector in a number of geographical regions. There are currently 20 regions in Sweden and they have some political and financial sovereignty from the government. Most of the Swedish audiologists have been employed at clinics financed and organized in these regions although a few have been employed by the government or the municipality. One of the functions of the regions is to finance and provide health care to the inhabitants. When doing so, the regions have to obey national laws and guidelines. Nevertheless, the regions have been able to provide their own framework for the organization and their own guidelines. This has resulted in a range of different organizational solutions and different guidelines regarding to whom the audiological services should be provided, how, and to what cost. The audiological services have often been defined as only hearing-aid intervention, and financial calculations when organizational changes are incurred have often been based solely on hearing-aid costs.

Within the regions three types of practice types can be identified; (1) the traditional organization type, public tax-funded employment 'public', (this is still the most common type), (2) 'completely private' where the patients pay everything for the services, and (3) the private tax-funded employment 'private but publicly funded', where private companies receive financial compensation from the region for each patient. Swedish health-care legislation applies to all of these practice types. Since 2006, all practicing audiologists need to have a special licence issued by the National Board of Health and Welfare (NBHW, 2011). The minimum requirement to obtain this licence is a three-year bachelor degree from a university, but during the introduction of the licence exceptions were granted for audiologists with shorter formal education (1 or 2 years) but with longer clinical experience. In the requirements of the license, documentation is mandatory and it is stated that all practice shall be based on state-of-the-art scientific knowledge and well-tried experience (SFS,

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Abbreviations

DCSQ	Demand-control-support questionnaire
ERI	Effort-reward imbalance

2010). This means that if there is solid scientific evidence that a certain protocol improves e.g. the audiological rehabilitation efficacy, the licensed audiologist shall perform the rehabilitation using that protocol. This also means, for example, if a patient is deemed to need continuous long-lasting rehabilitation, a licensed audiologist shall provide it. Due to the requirements of the license, the different practice types should thus meet the same standards.

However, the different practice types (i.e. public, the completely private, and the private but publicly funded) are subjected to different degrees of external review by the regulatory authorities. For example, the private but publicly funded type is revised on more or less an annual basis, while the other two practice types are revised only when organizational changes are planned, or complaints about malpractice reach the authorities (i.e. The National Board of Health and Welfare). Furthermore, the companies in the private but publicly funded type are subjected to additional binding guidelines to receive permission to provide audiological services (e.g. authorization). In some parts of Sweden, any company abiding by the additional guidelines receives hearing aids from the region and USD240 for each patient (e.g. Region Skåne, 2011). These also receive an additional USD110 that is paid by the patients themselves. Since companies need to make a profit to pay e.g. wages and taxes according to Swedish standards, this means that the number of return visits that a patient may receive is limited before the patient becomes a financial loss for the company. Thus, for example in the case of a patient needing long-lasting rehabilitation, the demands from the company may actually be in conflict with the demands of the licensed practice. This may put strain on the practicing audiologist. This conflict is less likely to occur in the public and the completely private practice types, since no limitations regarding e.g. number of visits apply.

In medical and paramedical professions, higher stress is believed to reduce the quality of patient care (Campbell et al, 2001; Maytum et al, 2004; Bruce et al, 2005; Marriage & Marriage, 2005). Generally, time demand as stressor seems to affect public practitioners more than private practitioners but overall the combination between heavy case loads and shorter appointment times seems to induce time related stress (Jolma, 1990; Freeborn et al, 2002; Kluger et al, 2003; Mott et al, 2004; Tyson & Pongruengphant, 2004; Severn et al, 2011). Also in audiological practice, time demands provide stress but different aspects of time demands affect those working in public (e.g. staff shortage and waiting list) and private settings (e.g. appointment time and time to write reports), but those working in a public setting seem to experience more stress than those working in private settings (Severn et al, 2011). However, self-reported occupational stress among audiologists seems to be related to a number of other factors such as accountability, administration or equipment, audiological management, patient contact, and clinical protocols (Severn et al, 2011).

The psychosocial work environment has an impact on both psychological wellbeing and physical health (Karasek & Theorell, 1990; Theorell & Karasek, 1996; Kinsten et al, 2007). The psychosocial work environment can be analysed using the demand-control model (Karasek & Theorell, 1990; Theorell & Karasek, 1996). The model is a theoretical framework based on empirical findings. It suggests that some work environments are characterized by low demands and others by high demands. At the same time the employee's control over work content can be low or high. Hence, your work environment could provide low demands and low control (i.e. passive work), high demands but low control (i.e. high stress work), low demands but high control (i.e. low stress work), or high demands and high control (i.e. active work). The model assumes that if you have lower control over but higher demands in your work, the likelihood for poorer health and less wellbeing increases (Karasek & Theorell, 1990; Theorell & Karasek, 1996; Kinsten et al, 2007). Furthermore, if the employee is provided with higher work control the individual is more likely to accept higher demands (Theorell & Karasek, 1996). A conflict between the requirements of licensed practice and financial profit could theoretically create a work environment resembling high stress work, i.e. low control and high demands.

Also, previous studies indicate that persons experiencing an imbalance between effort and reward at work have an increased risk of reporting both physical and psychological health symptoms (Tsutsumi & Kawakami, 2004; Kivimaki et al, 2006). The theoretical model of the effort-reward imbalance (ERI) assumes that the lack of reward associated to the effort made at work results in strong negative emotions. These emotions have long-term effects on the worker's health (Siegrist, 1996; Leineweber et al, 2010). A reward in this perspective is e.g. salary, job security, possibility to be promoted, and esteem (Leineweber et al, 2010). The instability of the work place affects both psychological and physical health (Godin & Kittel, 2004). A work place with high instability is characterized by changes posing possible threats such as relocation, downsizing, or redundancy. Godin and Kittel (2004) demonstrated that work instability in combination with recurrent high effort provided more adverse health conditions. It is not known whether an imbalance between effort and reward exists among audiologists or not.

The aim of the present study is to examine the effect of the organizational framework on self-reported psychosocial work environment for Swedish licensed audiologists working in three practice types (public, completely private, and private but publicly funded) using the demand-control model and the ERI model. The study also examines the relationship between self-reported psychosocial work environment and age, education length, time in profession, appointment time, the number of clients per day and self-reported social support at work.

Method

Participants

In Sweden there are currently 1139 licensed audiologists of working age (age $\leq$65 years) (Ollars, 2012). In the beginning of December 2011, a web-based survey was distributed electronically by e-mail to 1107 audiologists in Sweden. The e-mail addresses were collected during spring and summer 2011 from a national registry of audiologists provided by the hearing-aid companies association (HLF, 2011) and the member registry of the largest labour union for audiologists (SRAT, 2011). After removing duplicates, the survey was initially sent to 1107 unique e-mail addresses through the SRAT-survey system. Of these 75 were 'hard bounces' and could not be delivered which means that the addresses were incorrect. The targeted population thus consisted of 1032 possible respondents. During the period from the 23 of December 2011 to the 16 of February 2012, 583 participants responded to the survey yielding an initial response rate of 56.5%. Of these 583 participants, 41 (including 14 students) quit the survey directly and eight were not working as audiologist or were retired; the latter group of participants responded only to a

few initial demographic questions and were then excluded, since the purpose was to survey practicing audiologists. Since 14 participants were students, this indicates that our request for participation did not reach licensees only, and that our sample possibly was contaminated by those not yet having a license. After these exclusions, a second response rate of 534 participants or 51.7% was yielded. Of these, only 500 completed both the control-demand questionnaire and the ERI questionnaire, yielding a final response rate of 48.5%. In Table 1 descriptive data is presented for all 1139 licensed audiologists (age ≤ 65 years old) during year 2011 according to The National Board of Health and Welfare (Ollars, 2012), in comparison to descriptive data for participants yielding the second and final response rates. Additional descriptive data are also presented in Table 1 for the participants yielding the second and final response rates. The labour union SRAT administrated the survey, collected informed consent electronically, and anonymized the participants for the researchers.

The final 500 participants were pooled into three groups according to the practice type they reported to be working in (c.f. Table 1). Three hundred and ninety-five participants, or 79.0%, worked in the public tax-funded type (more specifically, 359 participants with regional employment, 22 with governmental, and 14 municipal employment), 60 participants or 12.0% in the private but tax-funded type, and 45 participants or 9.0% in the completely private type. Descriptive data on these groups of participants are presented in Table 2.

Survey

The survey consisted of three sections. The first part consisted of a descriptive data form (22 questions) assessing e.g. age, gender, practice type, education level, time in profession, part-time/full-time employment, time limits for appointments, work assignments (tasks), further training, and specific methods used in practice.

Table 1. Demographic data for the participants yielding the final response rate (n = 500) in comparison to participants yielding the second response rate (n = 534), and to reference data, i.e. all working licensed audiologists (N = 1139) in Sweden during the year 2011 according to the National Board of Health and Welfare (Ollars, 2012). This type of reference data for the years 2009 and 2010 are not currently available from the source. N/a indicates that data are not available.

	Present study (second response rate)		*Present study (final response rate)*		*Reference data*	
	Percent (%)	*Frequency (n)*	*Percent (%)*	*Frequency (n)*	*Percent (%)*	*Frequency (n)*
Age (years)						
20–29	10.5	56	11.0	55	13.4	153
30–39	23.8	127	24.2	121	24.2	276
40–49	27.3	146	26.6	133	25.2	287
50–59	28.8	154	28.6	143	23.9	272
60–65	9.6	51	9.6	48	13.3	151
Total	*100.0*	*534*	*100.0*	*500*	*100.0*	*1139*
Gender						
Female	93.8	501	93.8	469	91.5	1042
Male	6.2	33	6.2	31	8.5	97
Total	*100.0*	*534*	*100.0*	*500*	*100.0*	*1139*
Practice type						
Public tax-funded	77.9	416	79.0	395	n/a	n/a
Completely private	9.9	53	12.0	45	n/a	n/a
Private-public	12.2	65	9.0	60	n/a	n/a
Total	*100.0*	*534*	*100.0*	*500*	n/a	n/a
Education (years)						
1	10.9	58	10.8	54	n/a	n/a
2	33.9	181	33.6	168	n/a	n/a
3	44.6	238	44.6	223	n/a	n/a
4	7.5	40	7.6	38	n/a	n/a
5 or longer	3.2	17	3.4	17	n/a	n/a
Total	*100.0*	*534*	*100.0*	*500*	n/a	n/a
Years in profession						
0–5	20.6	110	21.4	107	n/a	n/a
6–10	18.5	99	18.6	93	n/a	n/a
11–15	10.9	58	10.2	51	n/a	n/a
16–20	11.2	60	11.2	56	n/a	n/a
21–25	13.3	71	12.8	64	n/a	n/a
26–30	12.2	65	12.6	63	n/a	n/a
31–35	5.2	28	5.6	28	n/a	n/a
36–40	6.0	32	5.6	28	n/a	n/a
41 or more	1.9	10	2.0	10	n/a	n/a
Missing	0.2	1	–	–	n/a	n/a
Total	*100.0*	*534*	*100.0*	*500*	n/a	n/a

Table 2. Descriptive data on participants working in the public tax-funded type (n = 395), the completely private type (n = 45), and the private but tax-funded type (n = 60). Significant effects were post hoc analysed and significant ones after Bonferroni correction are shown as: *($p < 0.05$), **($p < 0.01$), or ***($p < 0.001$).

						Post-hoc comparison		
	All participantss	*1. The public tax-funded type*	*2. The private but tax-funded type*	*3. The completely private type*	*H-value*	*1–2*	*1–3*	*2–3*
Age (years)								
Mean	44.7	45.2	43.0	42.7	3.448	n/a	n/a	n/a
SD	11.2	11.0	12.4	11.5				
Range	22–64	23–64	22–63	25–64				
Gender (%)								
Male	6.2	4.3	13.3	13.3	11.606**	*	n.s.	n.s.
Female	93.8	95.7	86.7	86.7				
Education (years)								
Mean	2.6	2.5	2.9	2.6	10.797**	**	n.s.	n.s.
SD	0.9	0.9	1.0	0.7				
Range	1–5	1–5	1–5	1–4				
Years in profession								
Mean	16.9	17.7	12.9	15.0	12.286**	**	n.s.	n.s.
SD	11.6	11.5	11.4	11.0				
Range	0–44	0–44	1–41	2–39				
Employment (%)								
Full-time	65.6	63.5	70.0	77.8	4.203	n/a	n/a	n/a
Part-time	34.4	36.5	30.0	22.2				
Number of appointments each day								
Mean	6.1	6.1	7.3	4.5	25.309***	***	n.s.	***
SD	2.4	2.1	2.5	3.3				
Range	0–20	0–18	0–20	0–14				
Time for assessment (minutes)								
Mean	63.3	64.0	65.2	54.1	4.454	n/a	n/a	n/a
SD	34.4	35.9	22.4	33.1				
Range	0–480	0–480	0–150	0–120				
Time for HA fitting (minutes)								
Mean	55.1	55.3	58.0	49.0	2.702	n/a	n/a	n/a
SD	30.6	32.3	17.5	29.0				
Range	0–420	0–420	0–120	0–120				
Time for return visits (minutes)								
Mean	50.3	52.5	43.1	40.5	45.871***	***	***	n.s.
SD	25.9	25.9	23.1	26.5				
Range	0–270	0–270	0–180	0–120				
DSCQ support subscale								
Mean	10.0	10.2	9.6	8.4	17.078***	n.s.	***	n.s.
SD	3.1	3.1	3.0	2.8				
Range	6–24	6–24	6–18	6–18				

The second part consisted of the control-demand-support questionnaire (DCSQ) (Johnson & Hall, 1988; Karasek & Theorell, 1990; Theorell & Karasek, 1996). The DCSQ contains 17 items divided into three subscales; psychological demands (five items), control or decision latitude (six items) and social support (six items) (Sanne et al, 2005b). The demand subscale examines the effect of workload and task related requirements on mental alertness or arousal (Theorell & Karasek, 1996; Sanne et al, 2005b). The control subscale examines intellectual discretion and authority over decisions (Theorell & Karasek, 1996; Sanne et al, 2005b). There are four possible responses on the demand and control subscales ranging from 1 (Yes, often) to 4 (No, almost never). A lower score on the demand subscale indicates higher demands. A lower score on the control subscale indicates more control. The social support subscale examines the experience of support at work and there are three possible responses ranging from 1 (I totally agree) to 4 (I totally disagree). A lower score on this subscale indicates more social support. The scores on separate items are added forming subscale scores ranging from 5 to 20 for the demand subscale and from 6 to 24 for the control and social support subscales.

The third part consisted of a short version of the ERI questionnaire (Siegrist et al, 2004; Leineweber et al, 2010). The ERI examines the perceived demands (effort subscale) and rewards (reward subscale) at work and also coping strategies (over-commitment subscale) (Siegrist et al, 2004). In the used version of the ERI only the two first subscales were assessed, thus excluding the over-commitment subscale in order to reduce the number of questions in the survey. The effort subscale contains five items. Sometimes a sixth item pertaining to physical work lead is added, but the five-item version is more valid when assessing white collar workers (Siegrist et al, 2004). The reward subscale contains 11 items. In both subscales, the participant responds on the items in two steps: First, the participant

agrees (Yes) or disagrees (No) on a statement that describes a typical experience and, second, the participants who agree rate the amount of distress they usually feel by this experience on a scale ranging from 1 (Agree, but I don't feel distressed) to 4 (Agree, and I am very distressed) (Siegrist et al, 2004). Hence, the score on each item may range between 1 and 5. The scores on separate items are added forming subscale sum scores ranging from 5 to 25 for the effort subscale (a higher score indicates that more demands are perceived as stressful) and from 11 to 55 for the reward subscale (a higher score indicates that the participants experience a higher level of reward) (Siegrist et al, 2004). Using the theoretical model, the most relevant measure is the imbalance between effort and reward. Based on this assumption, the effort-reward ratio can be calculated.

For each individual participant the effort-reward ratio was calculated using the formula *e/(rc)* where *e* is the sum score of the effort subscale, *r* the sum score of the reward subscale, and *c* is a correction factor which is 0.454545 using five items in the effort subscale (5/11) (Siegrist et al, 2004). A ratio *below* 1.0 is considered as a situation at work where the participant put in relatively low effort but receives high reward. A ratio above 1.0 is considered as a work situation where the participant put in a lot of effort at work but does not receive adequate reward or the expected reward (Siegrist et al, 2004). Sum scores on the effort and reward subscales, and the effort-reward ratio are reported in the present study.

Pilot testing

During the development feedback was given on two previous versions of the survey by 10 participants. This was done to improve wordings and identify missing items in the descriptive data form.

Results

Psychometric properties

Initially, for the DCSQ and the ERI questionnaires, a principal components analysis (PCA) using varimax rotation and Keiser normalization was made to confirm that the items were represented in the previously reported subscales (i.e. three for DCSQ and two for ERI). Since the PCA was confirmatory, the number of factors was set to three for DSCQ and two for ERI.

For DSCQ, the unrotated PCA verified that three factors met Kaiser's criterion (eigenvalues exceed 1.0) and lay above the Cattell's point of inflexion. These three factors together accounted for 51.3% of the total variance. After rotation, factor 1 accounted for 21.3% of the variance in scores, factor 2 accounted for 18.1%, and factor 3 accounted for 11.8%. The factor loadings are shown in Table 3. Generally, the factor loadings above 0.30 verified the previous reported division of the questionnaire into the three subscales: psychological demands, control or decision latitude, and social support. All further analysis was conducted using the subscales rather than single items.

For ERI, the unrotated PCA verified that two factors met Kaiser's criterion (eigenvalues exceed 1.0) and lay above the Cattell's point of inflexion. These two factors together accounted for 36.8% of the total variance. After rotation, factor 1 accounted for 20.6% of the variance in scores and factor 2 accounted for 16.2%. The factor loadings are shown in Table 4. Overall, the factor loadings above 0.20 verified previous reported division of the questionnaire into the two subscales, effort (factor 2) and reward (factor 1), but there are some inconsistencies for the last two items in the reward subscale that loads higher on factor 2 than 1. Despite this discrepancy, we decided to use the previously suggested subscale division rather than single items in further analysis, in order to be able to compare the present findings with previously reported.

Differences between different types of practices

Differences in descriptive (practice type, age, education length, time in profession, number of appointments each day, part-time/full-time employment, time limits for appointments, and DSCQ support subscale) and dependent variables (DSCQ demand and control subscales,

Table 3. Rotated factor loadings for the three factors in the DSCQ using a confirmatory principal components analysis with varimax rotation (n = 500). Loadings less than 0.30 are not displayed.

Variable	*Factor 1*	*Factor 2*	*Factor 3*
Psychological demands			
Does your job require you to work very fast?		0.765	
Does your job require you to work very hard?		0.753	
Does your job require too great a work effort?		0.735	
Do you have sufficient time for all your work tasks?		−0.751	
Do conflicting demands occur in your work?		0.540	
Control/decision latitude			
Do you have the opportunity to learn new things in your work?			0.614
Does your job require skills?			0.530
Does your job require creativity?			0.626
Does your job require doing the same tasks over and over again?			−0.392
Do you have the possibility to decide for yourself *how* to carry out your work?		−0.312	0.620
Do you have the possibility to decide for yourself *what* should be done in your work?			0.594
Social support			
There is a quiet and pleasant atmosphere at my place of work	0.614	−0.451	
There is good collegiality at work	0.843		
My co-workers are there for me (support me)	0.836		
People at work understand that I may have a bad day	0.739		
I get along well with my supervisors	0.624		
I get along well with my co-workers	0.844		

Table 4. Rotated factor loadings for the two factors in the ERI using a confirmatory principal components analysis with varimax rotation (n = 500). Loadings less than 0.20 are not displayed.

Variable	*Factor 1*	*Factor 2*
Effort		
I have constant time pressure due to a heavy work load		0.735
I have many interruptions and disturbances in my job		0.573
I have a lot of responsibility in my job		0.482
I am often pressured to work overtime		0.646
Over the past few years, my job has become more and more demanding		0.640
Reward		
Do you receive the respect you deserve from your superiors?	0.847	
Do you receive the respect you deserve from your colleagues?	0.792	
Do you experience adequate support in difficult situations?	0.464	0.208
Are you treated unfairly at work?	− 0.429	
Considering all your efforts and achievements, do you receive the respect and prestige you deserve at work?	0.766	
Are your job promotion prospects poor?	0.388	0.200
Does your current occupational position adequately reflect your education and training?	0.226	0.242
Considering all your efforts and achievements, are your work prospects adequate?	0.641	
Considering all your efforts and achievements, is your salary/income adequate	0.429	
Have you experienced or do you expect to experience an undesirable change in your work situation?	0.225	0.548
Is your job security poor?	0.207	0.402

effort and reward subscales, and ERI ratio) between three types of practice types (public, private but publicly funded, and completely private) were tested using an independent-samples Kruskal-Wallis test with Bonferroni corrections; alpha levels < 0.05 after correction were considered statistically significant. Significant differences displayed in the Kruskal-Wallis test were further explored using post hoc Mann-Whitney U-tests; alpha levels < 0.05 after Bonferroni correction were considered statistically significant. Tables 2 and 5 show the results of this analysis.

As seen in Table 2, the groups did not differ in age, part-time/full-time employment, appointment time provided for assessment, and appointment time provided for hearing-aid fitting. The number of males and education length were significantly lower in the public type compared to the private but publicly funded (p = 0.021 and 0.003, respectively). Those working in the public type had worked significantly more years in profession than those working in the private but publicly funded type (p = 0.003). The private but publicly funded type showed a significantly higher number of appointments each day than both the public and the completely private types (p < 0.001). The public type showed significantly longer appointment times for return visits than seen for the other two types (p < 0.001 and p = 0.001, respectively). Those working in the public

Table 5. Average results on the DSCQ and ERI questionnaires in participants working in the public tax-funded type (n = 395), the completely private type (n = 45), and the private but tax-funded type (n = 60). Significant effects were post hoc analysed and significant ones after Bonferroni correction are shown as: *(p < 0.05), **(p < 0.01) or ***(p < 0.001).

	All participants	*1. Public tax-funded type*	*2. Private but tax-funded type*	*3. Completely private type*	*H-value*	*Post-hoc comparison*		
						1–2	*1–3*	*2–3*
DSCQ psychosocial demands								
Mean	10.5	10.5	9.7	11.4	20.158***	**	**	***
SD	1.9	1.8	2.1	1.8				
Range	6–17	6–17	6–13	8–16				
DSCQ control/decision latitude								
Mean	9.4	9.5	9.5	9.1	n.s.	n/a	n/a	n/a
SD	1.9	1.8	2.0	1.9				
Range	6–15	6–15	6–14	6–14				
ERI effort								
Mean	16.9	16.7	18.4	16.7	9.370**	**	n.s.	n.s.
SD	3.6	3.5	4.0	4.1				
Range	10–25	10–25	10–25	10–25				
ERI reward								
Mean	28.2	28.7	28.0	23.8	17.915***	n.s.	***	*
SD	7.6	7.6	7.8	6.6				
Range	17–53	17–53	17–46	17–42				
ERI effort-reward ratio								
Mean	1.39	1.34	1.50	1.64	20.277***	**	**	n.s.
SD	0.40	0.37	0.37	0.55				
Range	0.55–2.75	0.55–2.66	0.86–2.46	0.64–2.75				

Table 6. Distribution of sample (n = 500) on type of work according to the demand-control model and organizational type. Only the differences between the organizational types in low stress were significant using chi-square (two-sided p = 0.032).

	Low demands			*High demands*					
		%	*n*		%	*n*		%	*n*
	Passive			*High stress*			*Low in control*		
Low control	Public	23.5	93	Public	29.1	115	Public	52.7	208
	Private but publicly funded	30.0	18	Private but publicly funded	25.0	15	Private but publicly funded	55.0	33
	Completely private	24.4	11	Completely private	37.8	17	Completely private	62.2	28
	Total	24.4	122	Total	29.4	147	Total	53.8	269
	Low stress			*Active*			*High in control*		
High control	Public	26.1	103	Public	21.3	84	Public	47.3	187
	Private but publicly funded	33.3	20	Private but publicly funded	11.7	7	Private but publicly funded	45.0	27
	Completely private	11.1	5	Completely private	26.7	12	Completely private	37.8	17
	Total	25.6	128	Total	20.6	103	Total	46.2	231
	Low in demands			*High in demands*			*Total*		
	Public	49.6	196	Public	50.4	199	Public	100	395
	Private but publicly funded	63.3	38	Private but publicly funded	36.7	22	Private but publicly funded	100	60
	Completely private	35.6	16	Completely private	64.4	29	Completely private	100	45
	Total	50	250	Total	50	250	Total	100	500

type reported significantly more social support at work than those working in the completely private type ($p < 0.001$).

As seen in Table 5, those working in private but public funded type reported significantly lower psychosocial demands than the public, and the completely private types ($p = 0.008$ and $p < 0.001$, respectively). Also, those working in the completely private type reported higher psychosocial demands than those in the public type ($p = 0.009$). No differences were seen between the types for reported scores on the control/decision latitude subscale. Those working in the private but publicly funded type reported significantly higher scores on the ERI effort subscale than those working in the public type ($p = 0.007$). Those working in the completely private type reported significantly lower scores on the ERI reward subscale than those working in the public and private but publicly funded types ($p < 0.001$ and $p = 0.012$, respectively). Those working in the public type showed significantly lower effort-reward ratio than those working in the private but publicly funded and completely private types ($p = 0.008$ and $p = 0.001$, respectively).

Dichotomized responses on the control and demand subscales and ERI ratio

The participants' responses on the DSCQ psychosocial demands and control/decision latitude subscales were dichotomized where a score below the median value on the subscale was considered as high demands and high control work, respectively, while a score above the median was considered as low demands and low control work, respectively (Krantz & Ostergren, 2000; Sanne et al, 2005a; Bethge et al, 2009). The results are shown in Table 6. The distribution differences seen between the different types of practice types were only significant for *Low stress* (chi-square (2) = 6.887, p = 0.032), but there is an overall tendency indicating that the majority of the participants experience low control and half of the participants experience low demands, while the other half experience high demands. The figure indicates that about 24% of the participants has a psychosocial work environment that is low in demands and low in control (i.e. *passive*), about 26% an environment that is low in demands and high in control (i.e. *low stress*), about 29% an environment that is high in demands and low in control (i.e. *high stress*), and about 21% has a psychosocial work environment that is high in demands and high in control (i.e. *active*).

The participants' ERI ratios were dichotomized; a score below 1.0 was considered as favourable working conditions where the participant puts in relatively low effort but receives high reward, and a score equal to or above 1.0 was considered as an unfavourable work situation where the participant put in a lot of effort at work but did not receive adequate reward or the expected reward. The results are shown in Table 7. The distribution differences seen between the different types of practice types were significant (chi-square (2) = 8.238, p = 0.016). Overall, the table indicates that only 14 % of the participants report favourable work conditions (low effort and high reward), while 86% report unfavourable work conditions (high effort and low reward).

Table 7. Distribution of sample (n = 500) on ERI ratio and practice type. The differences between the practice types are significant ($p < 0.05$) using chi-square (two-sided).

Favourable			*Unfavourable*					
	%	*n*		%	*n*		%	*n*
Public	16.2	64	Public	83.8	331	Public	100	395
Private but publicly funded	3.3	2	Private but publicly funded	96.7	58	Private but publicly funded	100	60
Completely private	8.9	4	Completely private	91.1	41	Completely private	100	45
Total	14	70	Total	86	430	Total	100	500

Prediction of psychosocial work environment

A multiple linear regression analysis using forward stepwise regression was made to identify associations between potential explanatory variables (practice type, age, gender, education length, time in profession, part-time/full-time employment, number of clients each day, time limits for appointments, and self-reported social support) and the dependent variables (DSCQ psychosocial demands, DSCQ control/decision latitude, ERI effort, ERI reward, and ERI ratio); p-values < 0.05 were considered statistically significant. Multiple linear regression was used rather than logistic since not all dependent variables could be dichotomized. Only results of the multiple regression analysis providing valid models (i.e. significant) are presented in Table 8.

For the DSCQ psychosocial demands subscale, the strongest predictor identified was the DSCQ social support that could be used as a single predictor ($R^2 = 0.051$, $p < 0.001$) or together with age ($R^2 = 0.066$, $p \leq 0.004$), or together with age and gender ($R^2 = 0.074$, $p \leq 0.019$). The last model suggests that participants experiencing higher demands also report less social support, are older, and females. For the DSCQ control/decision latitude subscale, the strongest predictor identified was the DSCQ social support that could be used as a single predictor ($R^2 = 0.091$, $p < 0.001$) or together with age ($R^2 = 0.0127$, $p < 0.001$), or together with age and number of return visits ($R^2 = 0.138$, $p \leq 0.007$). The last model suggests that participants experiencing lower control also report less social support, are younger, and have fewer return visits. Generally, the scores on the DSCQ social support subscale could be used to predict about 5–9% of the variability observed in the other two subscales of the DSCQ. Age, gender, and the number of return visits accounted for between approximately 1% and 4% of the variability. In total, the models could account for about 5% to 12 % of the variability.

For the ERI effort subscale, the strongest predictor identified was the DSCQ social support that could be used as a single predictor ($R^2 = 0.065$, $p < 0.001$) or together with age ($R^2 = 0.076$, $p \leq 0.008$), or together with age and number of return visits ($R^2 = 0.087$, $p \leq 0.009$). The last model indicates that participants experiencing that they put in higher effort report lower social support and are older. Also, the more 'private' the practice type is, the higher effort is reported. For the ERI reward subscale, the strongest predictor identified was the DSCQ social support that could be used as a single predictor ($R^2 = 0.277$, $p < 0.001$) or together with practice type ($R^2 = 0.282$, $p \leq 0.03$). The last model indicates that participants experiencing higher reward report lower social support and the more 'private' the practice type is, the less reward is reported. For the ERI

Table 8. Models extracted from the possible explanatory variables (practice type, age, education length, time in profession, time limits for appointments and self-reported social support) using multiple linear regression analysis using forward stepwise regression (n = 500). Only valid models (i.e. significant, with $p < 0.05$) are presented.

		Regression coefficients				
Model	*Variables entered*	*Coefficient Beta*	*S.E.*	*Adjusted R^2*	*t*	*p*
DSCQ Psychosocial demands						
1.	DSCQ social support	− 0.231	0.027	0.051	− 5.293	< 0.000
2.	DSCQ social support	− 0.224	0.027	0.066	− 5.175	< 0.000
	Age	− 0.127	0.007		− 2.925	0.004
3.	DSCQ social support	− 0.228	0.026	0.074	− 5.281	< 0.000
	Age	− 0.144	0.007		− 3.285	0.001
	Gender	0.103	0.343		2.349	0.019
DSCQ Control/Decision latitude						
1.	DSCQ social support	0.304	0.026	0.091	7.128	< 0.000
2.	DSCQ social support	0.314	0.025	0.127	7.506	< 0.000
	Age	− 0.195	0.007		− 4.655	< 0.000
3.	DSCQ social support	0.312	0.025	0.138	7.508	< 0.000
	Age	− 0.197	0.007		− 4.726	< 0.000
	Number of return visits	0.113	0.003		2.721	0.007
ERI Effort						
1.	DSCQ social support	0.258	0.051	0.065	5.967	< 0.000
2.	DSCQ social support	0.252	0.050	0.076	5.858	< 0.000
	Age	0.114	0.014		2.655	0.008
3.	DSCQ social support	0.271	0.051	0.087	6.242	< 0.000
	Age	0.123	0.014		2.859	0.004
	Practice type	0.114	0.252		2.627	0.009
ERI Reward						
1.	DSCQ social support	0.527	0.984	0.277	13.856	< 0.000
2.	DSCQ social support	0.514	0.095	0.282	13.352	< 0.000
	Practice type	− 0.083	0.47		− 2.179	0.030
ERI Effort-Reward ratio						
1.	DSCQ social support	− 0.283	0.058	0.078	− 6.593	< 0.000
2.	DSCQ social support	− 0.251	0.005	0.113	− 5.872	< 0.000
	Practice type	0.194	0.027		4.541	< 0.000

ratio, the strongest predictor identified was the DSCQ social support that could be used as a single predictor ($R^2 = 0.078$, $p < 0.001$) or together with practice type ($R^2 = 0.113$, $p < 0.001$). The last model indicates that participants experiencing more favourable ERI ratios report lower social support, and the more 'private' the practice type is, the less favourable ratios are reported. Generally, the scores on the DSCQ social support subscale could be used to predict about 7%–28% of the variability observed in the two subscales of the ERI and the ERI ratio. Age and practice type accounted for between approximately 1% and 3% of the variability. In total, the models could account for about 8% to 28% of the variability.

Discussion

The present findings indicate that there are differences in psychosocial work environment pertaining to the different practice types, but these differences are small overall and the type explains one or a few percent of the variability accounted in the measures of psychosocial work environment. The social support experienced at the work place seems important for the psychosocial work environment and seems to be considered to be a reward in itself. The most conspicuous finding is the alarmingly high ERI ratios encountered among Swedish audiologists.

Approximately half of the licensed audiologists in Sweden answered to the present web survey. In a previous study on Swedish audiologists, we reported a final response rate of 58.3% (i.e. 586 participants) (Brännström et al, 2010). Similar response rates have been reported previously in other working populations and among audiologists (Siegrist et al, 2004; Severn et al, 2011). However, the number of participants is both the strength and the weakness of the present study: The results represent the views of 500 audiologists, but it may not represent the views of the majority of the audiologists in working age in Sweden, which could affect the generality of the present findings. There are several possible explanations to this response rate: There is no complete database in Sweden containing personal contact information, such as e-mail addresses, for audiologists. E-mail addresses from several databases were collected and compiled but it is likely that some audiologists did not receive the survey. Also, several addresses were incorrect, and some recipients had changed work place or were on leave. How many of the two latter groups that actually got the survey is difficult to estimate. Further, the duration of the survey was approximately two months and during this period three reminders were sent out to those who had not replied. A prolongation of the survey time may have resulted in more participants, but it seemed valuable to collect the sample during a limited time period to avoid any seasonal effects that would have been the case if winter passed to spring. Finally, the psychometric properties of the DSCQ and ERI questionnaire resemble previously reported (e.g. Sanne et al, 2005b; Leineweber et al, 2010). This indicates that the present findings can be compared to previous.

Demand-control model

Using the demand-control model about 24% of the Swedish audiologists seem to have psychosocial work environment that can be defined as passive (low control and low demands), about 26% a psychosocial work environment that can be defined as low stress (high control and low demands), and about 21% a psychosocial work environment that can be defined as active (high control and high demands). About 29% of the Swedish audiologists work in a psychosocial work environment that can be defined as high stress (low control and high demands). There were differences in distribution between the different practice types but, generally, they were not significant. On the other hand, the average scores on the control subscale indicated that those working in the private but publicly funded practice experienced significantly more control. Notably, the number of participants that were classified as working in high-stress environment in the present study were approximately 15% higher than has been reported previously in general work forces (Sanne et al, 2005a). This may have impact on the health care provided, since higher stress in medical and paramedical professions is believed to reduce the quality of patient care (Campbell et al, 2001; Maytum et al, 2004; Bruce et al, 2005; Marriage & Marriage, 2005). Also, previous studies demonstrate that those working in low control environment have an increased risk to develop for example cardiovascular disease (Theorell & Karasek, 1996; Eller et al, 2009). Those working in high stress environment have an increased risk to develop anxiety and depression (Sanne et al, 2005a), but also common complaints by women seen in general practice such as heartburn, headache, and tiredness (Krantz & Ostergren, 2000). These previous findings may not be applicable and further studies are required to assess any relationships for the Swedish audiologists.

Overall, the regression analysis indicated that participants reporting higher social support also reported lower demands and higher control. It is not possible to discern any causal relationship from the present data; it is possible that psychosocial work environments characterized by higher amount of social support tend to reduce the experience of demands and increase the experience of control, but the results could also suggest that in psychosocial work environments characterized by low demands and high control increase the experience of social support. The experience of demands increases with increasing age. It is possible that these increased demands contribute to the increased risk of burnout in older audiologists reported by Severn et al (2011). At the same time as demands increase with increasing age, the experience of control also increases. There are several possible explanations for this latter finding; for example, younger audiologists may lack experience providing the sense of control and the younger audiologists cope better with psychosocial demands which may be due to labour market inexperience. On the other hand, older audiologists have worked more years in the profession and are more confident in themselves providing the sense of control. The practice type could not be used as a predictor for demand and control subscales at all.

Effort-reward imbalance

Significantly higher scores on the ERI effort subscale were seen for those working in the private but publicly funded practice type compared to those working in the completely public and private types. Also, those working in the completely private type reported significantly lower scores on the ERI reward. However, it is probably more appropriate to examine the imbalance between effort and reward at work since the theoretical model of the effort-reward imbalance assumes that the lack of reward associated to the effort made at work results in strong negative emotions and these emotions have long-term effects on the worker's health (Siegrist, 1996; Leineweber et al, 2010).

The ERI ratio was used to estimate the imbalance between effort and reward at work and a ratio *below* 1.0 is considered as a favorable situation at work where the participant put in relatively low effort but receives high reward, while a ratio *above* 1.0 is considered as an unfavorable work situation where the participant put in a lot of

effort at work but does not receive adequate reward or the expected reward (Siegrist et al, 2004). The ERI ratio showed that 86% of the participants experienced an unfavorable work situation where the rewards do not correspond to the efforts made. Previous studies on different working populations indicate that between 2.2% and 31% usually demonstrate unfavorable ERI ratios (Wang et al, 2012; Peter et al, 1998; Vearing & Mak, 2007; Bethge et al, 2009; Inoue et al, 2011; Seibt et al, 2012). Peter and colleagues (1998) reported unfavorable ERI ratios in about 27%–31% in Swedish workers. Similar ERI ratios are seen among health service workers (Klein et al, 2011; Xie et al, 2011). We have identified only one study reporting similar occurrences of unfavorable ERI ratios; Msaouel and colleagues (2012) reported unfavorable ERI ratios in 80.7% in Greek public health service workers, but these data may have been influenced by the financial crisis in Greece taking place during data collection. Overall, the percentage of unfavorable ERI ratios seen in Swedish audiologists seem alarmingly high compared to other working populations in general but also compared to other health service workers. More specific, about five out of six audiologists working in the public practice type report an unfavorable ERI ratio. The corresponding numbers for the completely private type are approximately 9 out of 10, and 19 of 20 in the private but publicly funded type. These differences seem not to depend on differences in part-time/fulltime employment between the practice types, but they could to some extent depend on differences in remuneration, but future studies need to assess this. Unfavorable ERI ratios seem related to increased risk for high blood pressure and cardiovascular disease and depression (e.g. van Vegchel et al, 2005; Eller et al, 2009). Further studies are required to examine whether these risks also apply for Swedish audiologists or not and also, in future studies, it would be valuable to examine the relationship between self-reported psychosocial work environment and the occurrence of self-reported health problems such as mental and/or physical illness among audiologists.

The regression analysis revealed that participants with higher effort reported lower social support, but participants with lower reward reported *more* social support. These two latter findings may seem contradictory, but it is possible that the lack of work related reward is compensated by social support from colleagues. This is supported by the finding that participants with higher ERI ratios also experience more social support, which could suggest that audiologists cope with poorer working conditions because of supportive colleagues. Also, the regression analysis suggested that the more 'private' the practice type is, the higher effort, the less reward, and the less favourable ratios are reported. More studies are required to further examine these relationships.

Conclusions

The present study examined the effect of the organizational framework on self-reported psychosocial work environment for Swedish licensed audiologists working in three practice types (public, completely private, and private but publicly funded). The overall findings suggest that there are differences in the psychosocial work environment pertaining to the different practice types, but these differences are generally small and the practice type explains one or a few percent of the variability accounted in the measures of psychosocial work environment. The social support experienced at the work place seems important for the psychosocial work environment and seems to be considered to be a reward in itself. The majority of the participants seem to work in less stressful psychosocial work environments (i.e. *Passive*, *Low stress,* or *Active*), but approximately one out of four seems to work in a high-stress environment (high in demands but low in control). Finally, the percentage of unfavorable ERI ratios seen in Swedish audiologists seem alarmingly high compared to other working populations in general, but also compared to other health service workers.

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