Differences between psychosocial assessment of office and field workers in a utility company from a cross-sectional study

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Abstract. This paper investigates the effect of the differences in the nature of work on the psychosocial assessment of people working under the same management, and in the same organizational environment. 32 field workers and 14 office workers of a utility company were voluntarily subjected to a psychosocial assessment. The short version of the Copenhagen Psychosocial Questionnaire was used. Statistical analysis yielded a significantly higher esteem score for the field workers. An odds ratios analysis carried out for the nature of work for CoPsoQ subscales did not reveal significant differences. Results are interpreted under the light of socio-technical systems theory.

Keywords. Macroergonomics, Administrative work, Blue-collar workers, Organizational management.

1. Introduction

A macroergonomics perspective can assist practitioners in devising strategies to increase worker satisfaction and improve work conditions (Coelho et al., 2012). This paper investigates whether the differences in nature of work can have an effect on the psychosocial assessment of people working in the same company, under the same management, and in the same organizational environment. Field workers and office workers of a utility company were subjected to an ergonomic assessment and a psychosocial assessment. Given the difference in the nature of the work between office and field workers, the ergonomic assessment is not directly comparable between office and field workers, as different instruments were used to guide the assessment. However, in what concerns organizational, psychological and social aspects, the short version of the Copenhagen Psychosocial Questionnaire was used for both groups, hence yielding comparable results. The hypothesis underlying the comparison is that workers who combine physical and administrative functions (e.g. fieldworkers), despite laboring in the same overall organizational environment, demonstrate higher satisfaction with work and less dissatisfaction than workers that only have administrative tasks. The reasoning for the proposition embedded in this hypothesis is in line with earlier studies relating the quality of work and job satisfaction (e.g. Loher et al., 1985).

2. Methods

There are various psychosocial risk factors, with stress affecting most individuals worldwide. According to the European Agency for Safety and Health at Work, work-related stress is one of the biggest challenges for health and safety in Europe. Nearly one in four workers is affected by stress, and studies suggest that it is responsible for between 50% to 60% of working days lost. Therefore, this represents a huge cost in terms of human

suffering and impaired economic performance. Thus, stress is a large problem in the world that causes major concern and since the description of the "adaptation syndrome" by Hans Selye in 1936 (Selye, 1976), a breadth of research was done, leading to the development of several methods for assessing the factors that cause stress.

Between 1997 and 2005 (Pejtersen & Kristensen, 2009), a group of researchers from the National Institute of Labor Health in Denmark, led by Tage S. Kristensen, developed an instrument to assess psychosocial risks called Copenhagen Psychosocial Questionnaire (CoPsoQ) (the original CoPsoQ was subsequently revised into a second version, see Pejtersen et al., 2009). This instrument was adapted for Spain by a working group of the Institute of Labor Union, Environment and Health (ISTAS) (Moncada et al., 2005). It surveys the following 6 major groups of psychosocial factors: psychological demands of work (concerned with the volume of work in relation to the time available and management of emotions), workers control over work (concerning the opportunities that the job provides for active, meaningful work, that contribute to develop the individual's skills), insecurity towards the future (concerning worries about the future in terms of job loss or unwanted changes in work conditions), social support and leadership quality (concerning relationships with co-workers and superiors), conflicting demands (in relation to the need to compromise between time and tasks for work, family and socialization), and, finally, esteem (concerning respect, rewards and justice experienced in exchange for the work effort). Psychological demands of workers were considered as a dissatisfaction measure, while the workers control over work was considered a satisfaction sub-scale. Insecurity towards the future was considered a dissatisfaction sub-scale, while social support and leadership quality were considered a satisfaction sub-scale. Finally, conflicting demands were considered as a dissatisfaction sub-scale, and the esteem group of questions of the short version of the CoPsoQ was considered a satisfaction sub-scale. The paper presents the results of an odds ratios analysis that was carried out for the nature of work (office versus field work) for each one of these six CoPsoQ sub-scales.

2.1 Company studied and nature of work

The company focused was a utility company covering an area of 6393.2 square kilometers corresponding to about 7% of the Portuguese continental territory, in a mountainous area, with a complex and sparsely populated territory. The resident population of this territory was about 230,000 inhabitants according to the 2010 Portuguese population census, which represents less than 2.3% of the Portuguese population, and the territory had a population density of around 35 inhabitants per square kilometer, a third of the national average. The office studied was located in the ground-floor of a recently built multi-storey building of concrete structure in a Portuguese district capital city and provided administrative and financial services to the company's field operations, as well as service to its utility customers. As a utility company, customer service is an important aspect of the operation, and consumes part of the 32 administrative workers' attention. The office workers labored from 9am to 6pm on week days. Office workstations are based on an office chair and a work desk, equipped with a personal computer, and respective display, keyboard and hand held pointing device, as well as a telephone. The activities performed by the office worker necessitate handling of paper documents filed in the same room or in rooms adjacent to the one where the employee has her or his desk. The other major activity was maintenance and coordination of the development of the field infrastructure as well as dispatching field maintenance and picket teams, and generating and handling bills and delayed payments. Moreover, the office also dealt with all the company's management systems (quality, environmental, occupational health and safety). The company had 82 blue-collar workers, who worked in the field, either permanently in field stations, or as part

of dispatch teams. Field workers had week day only work times from 8am to 5pm, while dispatch teams worked in rotational shifts, covering 24h of the day, 7 days of the week. Ergonomic analysis was reported by Tavares et al. (2013) for the office workers and by Coelho et al. (2014-b) for the field workers.

2.2 Participating subjects

Six men and eight women, permanent administration workers in the office under focus, participated in the study, as a sample of the office workers, totaling 14 subjects (44% participation rate). The participating sample of office workers had a mean age of 37.14 (sd=6.11). The sample of field workers was comprised only of men, totaling 32 subjects (39% participation rate) with a mean age of 39.69 (sd=9.67). Overall, the age range of the population included in the study (46 participating subjects) was 26 to 55 years of age (mean of 38.9 and standard deviation of 8.75). Subject data was treated anonymously; moreover, the company did not authorize the dissemination of its identity.

2.3 Method of analysis

The results were analyzed with the assistance of the IBM SPSS Statistics 20 package. Two major analyses were carried out, using non-parametric statistics, following the approach described in Coelho et al. (2013). First, the independent samples Mann-Whitney U Test was applied to the six psychosocial sub-scale scores across the two groups of workers, to test the null hypothesis stating that the distributions of individual psychosocial scores were identical across groups. Next, the individual results were coded according to the severity of the results, between severe and not severe, as presented in ISTAS 21 materials (Moncada et al., 2005). An odds ratios analysis was then carried out to investigate whether working in the field was a determinant factor for the risk of obtaining severe ratings in the psychosocial sub-scales.

3. Results

The mean and standard deviation of the results across groups are shown in Table 1. Overall, the most severe results concern high psychological demands, great insecurity towards the future, low esteem, and conflicting demands (for the office workers). When breaking down the results of the office workers across genders, despite the small subject counts (8 women and 6 men), some differences in severity of the average scores can be appreciated (Table 2). Interestingly, the pattern of severity is verified again, compared to the overall results shown in Table 1, with the important difference, in terms of conflicting demands. Conflicting demands (in relation to the need to compromise between time and tasks for work, family and socialization) are on average more acute and severe for women office workers than for their male counterparts (independent sample Mann-Whitney U-test statistic U=31.5; p-value=0.017).

Table 1: *Results for office and field workers obtained in each of the six psychosocial sub-scales - severe mean results are underlined, according to Moncada et al. (2005).*

CoPsoQ sub-scale	Total sub-scale range (**severe range**)	Office workers (n=14)		Field workers (n=32)		U-test
		Mean	St. Dev.	Mean	St. Dev.	p-value
Psychological demands	0-24 (**12-24**)	**12.5**	3.96	**11.7**	2.96	0.415
Insecurity towards the future	0-16 (**10-16**)	8.7	4.01	**9.6**	3.93	0.308
Conflicting demands	0-16 (**7-16**)	**8.3**	4.34	6.4	2.19	0.110
Workers control over work	0-40 (**0-18**)	23.1	5.20	25.7	5.52	0.287
Social support and leadership quality	0-40 (**0-24**)	26.1	9.96	30.0	5.47	0.184
Esteem	0-16 (**0-9**)	**7.4**	3.80	10.3	3.20	0.012

Table 2: *Results for office workers obtained in each of the six psychosocial subscales, shown separately for men and women - severe mean results are underlined, according to Moncada et al. (2005).*

CoPsoQ sub-scale	Male off. workers (n=6)		Female off. workers (n=8)		U-test
	Mean	St. Dev.	Mean	St. Dev.	p-v.
Psychological demands	11.0	5.14	**13.6**	2.61	0.345
Insecurity towards the future	9.3	4.80	8.2	3.58	0.852
Conflicting demands	4.8	3.27	**11.2**	2.64	0.017
Workers control over work	22.2	5.81	23.8	4.98	0.573
Social support and leadership quality	28.0	13.39	24.6	7.13	0.142
Esteem	**8.0**	5.25	**6.9**	2.53	0.662

3.1 Results of the Independent Samples Mann-Whitney U-Test

When testing a null hypothesis consisting of "the distribution of the psychosocial sub-scale is the same across categories of workers (field versus office)", the results led to retain the null hypothesis in all but one psychosocial scale. In particular, the null hypothesis test for 'esteem' (concerning respect, rewards and justice experienced in exchange for the work effort) led to consider rejecting the null hypothesis with a p-value of 0.012 (U=190).

Gender biases (Coelho et al., 2014-a) could be at play in the results but these were only confirmed in what concerns the conflicting demands sub-scale. Moreover, no female workers were included in the field workers sample (the company did not have female field workers at the time of the study). Therefore, another set of independent samples Mann-Whitney U tests were carried out for comparisons within the psychosocial sub-scale scores across office and field workers, including only the 6 male workers in the office sample, and keeping the 32 male workers in the field sample. The results of the latter tests led to retain the null hypothesis consisting of "the distribution of the psychosocial sub-scale is the same across categories of workers (field versus office)" for all sub-scales.

3.2 Results for the Odds Ratios Analyses

Odds ratios were calculated for the two entire sample sets, considering as exposure factor the condition of working in the terrain as opposed to working in the office. The variables of interest were considered the conditions of severe psychosocial sub-scale

ratings. The odds ratios are shown in Table 3, with 95% confidence intervals (Szumilas, 2010). The odds ratios obtained are all lesser than 1. This would suggest that the exposure (working in the terrain) is associated with lower odds of outcome (obtaining a severe score in a psychosocial sub-scale). However, all 95% confidence intervals cross the value 1, suggesting lack of association between exposure and outcome, which is confirmed by the p-values obtained from the Chi-Square tests. Given the gender biases detected in previous analyses, the odds ratios were also calculated, considering only male gender workers (Table 4). Analysis of Table 4 does not reveal any improvement in significance of the odds ratios. Interestingly, when the female office workers are absent from the odds ratios analysis, working in the terrain becomes a risk factor for severity in both the psychological demands and conflicting demands scores, albeit with eroding significance, given the greater imbalance within subject counts (only 6 office workers included in the analysis, as opposed to 14, when including women). Moreover, the odds ratio for 'insecurity towards the future' approaches null (1), albeit without attaining significance. This notwithstanding, the exposure (working in the terrain) does not seem to affect the odds of this outcome (attaining a severe score in the 'insecurity towards the future' sub-scale). Consequently, the hypothesis underlying the study is hence rejected.

Table 3: *Results for odds ratios with lower and upper bound 95% confidence intervals considering severe psychosocial sub-scale scores as interest variables and working in the terrain (or not) as the exposure factor (analysis including female office workers) (n=46).*

Psychosocial sub-scale	Odds Ratio value	p-value	95% Confidence Interval	
			Lower	Upper
Psychological demands	0.521	0.38	0.120	2.265
Insecurity towards the future	0.722	0.71	0.127	4.116
Conflicting demands	0.583	0.40	0.164	2.073
Workers control over work	0.463	0.31	0.103	2.078
Social support and leadership quality	0.259	0.09	0.049	1.361
Esteem	0.309	0.10	0.072	1.322

Table 4: *Results for odds ratios with lower and upper bound 95% confidence intervals considering severe psychosocial sub-scale scores as interest variables and working in the terrain (or not) as the exposure factor (analysis excluding female office workers) (n=38).*

Psychosocial sub-scale	Odds Ratio value	p-value	95% Confidence Interval	
			Lower	Upper
Psychological demands	1.909	0.47	0.329	11.082
Insecurity towards the future	0.867	0.90	0.085	8.849
Conflicting demands	1.556	0.64	0.248	9.750
Workers control over work	0.370	0.30	0.053	2.596
Social support and leadership quality	0.517	0.59	0.044	6.019
Esteem	0.567	0.54	0.091	3.546

4. Discussion and Conclusion

No women worked as fieldworkers in the company under study, and hence, given the gender related imbalances detected within the office sample, especially for conflicting demands, the differences between office and field workers were focused on male workers. This led to a very small sample of male office workers, making it harder to find significant differences across the two groups (field and office workers), making a factor 2 error plausible as the reason for very few significant differences. Field workers seem to enjoy higher levels of workers control over work in comparison to their office counterparts. Another striking result encountered was the indication that field workers suffered higher levels of psychological demands, with almost twice the odds of incurring in a severe level of psychological demands, when compared to their office counterparts. From a socio-technical systems perspective (Artis & Smith-Jackson, 2014), the results suggest that for most psychosocial dimensions, the organizational design and management system in place in the company studied, as well as the overall cultural environment in which it operates, create a much stronger and decisive impact on the measurements made than other possibly contributing factors. Hence, individual differences (within same gender subjects) as well as alternative job content and technological systems in use in both of the company scenarios considered are bound to come in second place as contributing factors to the differences in psychosocial assessment, considering the results obtained. Given the small sample, further studies are necessary to ascertain these findings.

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