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**Company efforts to improve occupational
health? The case of the Norwegian electric
energy sector in a restructuring period.**

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Abstract

During the 1990's the individual employees have experienced changes in job content and increased demands on flexibility and learning. In the same period the psychosocial work problems and sick leave have increased. The aim of this study was to identify company initiated interventions to improve occupational health during a restructuring period, to study the effect of these interventions and to compare company departments with a positive versus a negative development in occupational health in the defined intervention period. The study was part of the project "Restructuring the electric energy industry: Work design, productivity and health" funded by the Norwegian Research Council as part of the "Health in Working Life" program. The sample consisted of 13 electric energy companies in Norway. Survey data from two measurements and qualitative interview data were used. In contrast to the findings in the literature where most of the interventions were individual and concentrated on reducing the effects of stress, rather than its sources, most of the company initiated interventions in this study fell in the work-oriented group as either primary or secondary interventions. In reporting on the improvement activities carried out, the managers and supervisors only with rare exceptions discriminated between primary and secondary/tertiary interventions. Performance appraisals, HES agendas and safety audits were among the most common interventions. For the respondents that reported that they had participated in intervention, the occupational health interventions had a positive, but limited effect on commitment, job satisfaction, efforts, skill discretion, decision authority and organizational climate variables.

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1 Introduction

During the last decades, different branches and sectors, like the electric energy sector in Norway, have experienced a wave of deregulations and intensified market competition followed by organizational restructuring and downsizing. Cameron (1994) argues that this period has seen a shift in the assumptions underlying organizational performance and effectiveness. Due to new competitive and political environments which organizations face, downsizing and decline, as well as growth, are seen as natural and even desirable phases of an organization's development. Since the late 1980's, nearly all of the Fortune 1000 firms have engaged in downsizing (Kets de Vries & Balazs, 1997). However, most of them do not succeed in improving performance. According to a survey for the Society of Human Resource Management, more than 50% of the 1468 restructured firms surveyed reported that productivity either remained stagnant or deteriorated after downsizing (Henkoff, 1990). Deteriorating effects on wellbeing, health, personal attitudes, family relationships, and other personal factors have also been documented (see Kozlowski, Chao, Smith & Hedlund, 1993, for review). At the governmental level in Europe there has been an increased interest in reducing workplace absenteeism and premature exit of the employee from the workplace as a result of bad working conditions and workplace stress (Gründemann & Van Vuuren, 1997). On the company level, managers look for interventions to reduce sick leave, low morale and productivity losses. The aim of this study was to identify company initiated interventions to improve occupational health during a restructuring period, to study the effect of these interventions and to compare company departments with a positive versus a negative development in occupational health in the defined intervention period.

1.1 Success criteria for successful organizational restructuring and sustainable development

Deregulation leads to increased competition for a whole branch. Within the companies it changes the focus from a specific field, such as engineering in the electric energy branch, to a customer focus and attention to costs. This means organizational restructuring and often also job redesign and downsizing. Restructuring refers to how the organization is structured and the process by which decisions are made and communication carried out. Job redesign deals with who should be doing what, where, how much and for how long (Curtin, 1994). Freeman and Cameron (1993) have identified two major approaches for organizational changes. The change models distinguish between revolutionary and discontinuous change on the one hand and incremental and evolutionary change on the other. Organizational downsizing refers to a set of activities, undertaken on the part of the management of an organization and designed to improve organizational efficiency, productivity, and/or competitiveness. It represents a strategy implemented by managers that affects a) the size of the firm's workforce, b) the costs, and c) the work processes (Cameron, 1994). It is implied in this definition that downsizing is usually undertaken in order to improve organizational performance. Downsizing, therefore, may be reactive and defensive, or it may be

proactive and anticipatory. Cameron (1995) identified three types of downsizing strategies that match these change models: a workforce reduction strategy in which the primary aim is to reduce head count mainly through layoffs, attrition, or incentive packages (e.g. early retirement); a work redesign strategy in which the primary aim is to reduce work through eliminating redundant levels, functions, or activities; and a systemic strategy in which the primary aim is to change the organization's culture so that all employees take responsibility for never-ending improvements in efficiency, value-adding activity, and waste reduction. The consequences of restructuring and downsizing to the employee will depend on the type of change model.

Looking at the prevention of stress, two facets in particular may be considered in (1) worker versus work-oriented interventions and 2) primary versus secondary/tertiary interventions (Geurts & Gründemann, 1999). Worker-oriented interventions focus on the individual (or group) in such a way that employees learn to deal more effectively with experienced stress or to modify their appraisal of a stressful situation so that the perceived threats are reduced. Work-oriented interventions focus on the work environment (or organization) in such a way that the fit between an individual worker and the workplace is improved. Primary prevention is concerned with taking action to modify or eliminate the sources of stress. Secondary/tertiary prevention is essentially aimed at the reduction or elimination of the effects of stress. Secondary prevention concerns preventing employees, who are already showing signs of stress, from getting sick (for example, by increasing their coping capacity), and tertiary prevention concerns treatment activities for employees with serious stress-related health problems (for example, the rehabilitation after long-term absenteeism).

By combining worker versus work-oriented interventions and primary versus secondary/tertiary interventions, a conceptual framework arises, indicating four types of stress prevention (Figure 1) (Kompier et al., 1998). Examples of interventions that are categorized in the first quadrant include job enrichment, increasing workers' autonomy and participation in decision making, and changing work time schedules. Interventions in the second quadrant are similar to those in the first quadrant, but directed at employees who already show signs of stress (for example, special work schedules for older workers or for those recovering from serious health problems, such as heart attack or surgery). Examples of interventions in the third quadrant, often affecting groups rather than specific individuals, are found in the domains of personnel policy (for example, corporate fitness programs and relaxation and psychotherapy). Through a review of the available literature, Geurts and Gründemann (1999) draws three conclusions about the prevalence of stress prevention activities in Europe and the United States: 1) Activities in the field of stress management are disproportionately concentrated on reducing the effects of stress, rather than its sources. 2) A consequence of the relatively high prevalence of secondary and tertiary interventions, most activities seem to be primarily directed at the individual, rather than at the work environment or the organization. 3) A systematic risk assessment, as well as serious research into the effects of all the activities, are often lacking in the practice of stress prevention.

1.2 Individual consequences following restructuring and downsizing

Most published research has shown that downsizing has more often had a negative effect on both organizations and individuals than a positive effect (Brockner, 1992; Kozlowski, Chao, Smith & Hedlund, 1993; Henkkoff, 1994; Cameron, 1997). More than one-half of survivors after restructuring and downsizing report increased job stress and symptoms of burnout (Cascio, 1993). However, some survivors do not experience emotional distress. Instead, they are energized and consider downsizing to be an opportunity for personal growth (Emshoff, 1994; Henkoff, 1994). Some survivors increase their good organizational citizenship behaviors (Bies, Martin & Brockner, 1993), whereas others withdraw (Brockner, 1992). However, Cameron (1995) shows that the way in which downsizing occurs may be more important than that downsizing occurs. The experience of job insecurity during restructuring and downsizing is characterized by ambiguity and uncertainty as individuals anticipate changes in their circumstances (Noer, 1993). Survivors of organizational downsizing have also been shown to pay a price (Burke & Leiter, 2000; Burke & Nelson, 1998) in terms of reduced morale, increased cynicism and diminished emotional wellbeing (Cascio, 1993, 1995; Marks, 1994; Noer, 1993).

Downsizing has been associated with increased rates of fatal occupational injuries in the U.S. (Richardson, 1997), absenteeism and musculoskeletal injuries in Finland (Vahtera, 1997) and minor psychiatric disorders among English male government employees (Ferrie, 1998). In the U.S. health care industry, studies have suggested an association between downsizing, understaffing and stress among registered nurses (American Nurses Association, 1995), occupational injuries among nurses (Shogren, 1997), and back injuries among aides in nursing homes (Service Employees International Union, 1995; Wunderlich, 1996).

In this study two research questions have guided the investigation: 1) What kind of restructuring or improvement activities is carried out in the companies? 2) What are the effects of these interventions, and 3) how do the most effective downsizing/restructuring departments (successful departments) differ from the least effective departments in their implementation approaches?

2 Methodology

2.1 Research setting

European utilities for electricity supply are under increasing pressure to become competitive (Geddes, 1998). After the United Kingdom, Norway has been the most aggressive of the European countries in introducing competition into electricity markets. The 1990 Norwegian Energy Act, which became effective in January 1991, calls for increased competition in the production and sale of electricity (NVE 1999b).

Norway shares the world's first trans-national electricity spot and financial exchange market with Sweden. As the local distribution companies' rights to monopoly supply were removed in 1991, individual consumers at all levels now have choice of supplier.¹

By the new law the competitive capacity of the companies became dependent on their capacity to restructure the organization in order to reduce costs and meet market demands. In 1996 and 1997 NVE imposed new efficiency and profitability requirements on the monopoly activities (transmission and distribution) of the electricity utilities. These requirements were introduced in order to reduce transaction costs, and have been the subject of extensive monitoring by the water resources and energy authorities (Langset & Torgersen, 1997). Efficiency analysis implementation has evolved gradually. In 1997 an income cap was set for each utility based on reported costs in 1994-1995 (Hillgaard, 1997). The same year a general productivity requirement of 2% was put into practice. In 1998 efficiency requirements were identified for each distribution/transmission utility on the basis of technical and cost efficiencies reported for the two years 1994 and 1995 (Langset, Karlsen & Neurauter, 1998). From 1999 NVE efficiency requirements have been in operation for national and regional grid operators on the basis of similar analyses.

Electricity companies are thus required to adjust their strategic orientations towards renewed focusing on customer requirements, cost reductions, and benchmarking with respect to available organizational and economic efficiency measures. These newly imposed objectives have repercussions with respect to individual and collective learning at group and organizational levels in the Norwegian electric energy sector.

2.2 Research design and methods

This longitudinal study was part of the project: "Restructuring the electric energy industry: Work design, productivity and health" funded by the Norwegian Research Council as part of the intervention program "Health in Working Life". The branch organizations established contact with the companies. In each company the project had a contact-person to help with the practical administration of the project.

The sample consisted of 13 electric energy companies in Norway with a total of 180 departments and 3335 employees. Two measurements by a postal questionnaire were used in this study, the first one in November 1999 and the second one in November 2000. The response rate was 73 % in 1999 and 72 % in 2000. At the second measurement, work units that first had been registered were kept unchanged. Thus work units that were closed, merged or in other ways changed were kept as the original ones

¹ From 1997, the costs incurred by individual customers in changing suppliers were reduced significantly. Some 5% of all households now have a supplier of electricity that differs from the local provider, and the market share of dominant suppliers to the households have been reduced from almost 100% in 1991 to 90% in 1997 (NVE 1999a).

in the analysis of the survey data. This was due to the sample that consists of individual employees with department as one of the variables describing them.

Individual survey data at the two measurements were used to identify the work units (departments) with either an increase or a decrease in occupational health in the period between the two measurements. To identify those departments in each company that had had significant positive versus negative change, the following variables were used: job satisfaction, job stress, subjective health complaints, anxiety and characterizations of own health level. In 79 of a total of 180 departments the average score for the department had significantly changed on at least one of these variables. In three companies there were no departments with significant changes on these variables. The departments that had both improved and had a negative development on the five variables were excluded. In total, 64 departments were included in the final sample for identifying occupational health interventions and for comparison between the departments with a positive and negative development (Table 1). To diagnose the situation in the organizational units and to identify the interventions and improvement activities carried out, qualitative interviews with the managers in these selected work units were carried out. In addition, the top manager of the company and union representatives were interviewed. The interviews were taken in two periods, the first one just after the first postal questionnaire and in 2001, and the second one after the second survey measurement. Formal policy documents, action plans and reports from the health, environment and safety work (HES) were also used in the identification of occupational health interventions.

Data Analysis

Conclusions in the paper were drawn on the multiple data collection methods, interpreting data focusing on regulations, patterns and explanations (Miles & Huberman, 1994). Triangulation across data sources (multiple informants in different organizational units and levels) and across data collection methods (individual survey data, interviews and documents) further strengthened the emerging descriptions (Orlikowski, 1993).

Standard statistical tests from the SPSS package (Norusis, 1997) were used for all analyses reported. If there were less than 50% missing values within one scale, mean values of the other items within that particular scale for that individual were computed, and thus scale scores could be computed. Otherwise the scale was regarded as missing. When using a tolerance level of up to 50% of missing data on a scale, results should be treated with caution. Missing data in the analysis were treated by listwise deletion.

To test the magnitude and direction of the impact of the intervention (the interaction effects of change over time by group) subsequent repeated measures ANCOVA were conducted. In the presentation of the results two F tests are used (Table 2). The first F test shows the change over time for all participants. The second F test compares change in the participation group with change in the non-participation group.

2.3 Measurement instruments

In the interviews with the managers and union representatives an interview guide was used. This interview guide contained detailed questions as to phases in the restructuring process, a mapping of business development activities as well as occupational health interventions. Questions were also posed on the content of changes in human resource policy and internal quality control routines.

In the measurement of organizational characteristics of the improvement and deterioration departments, single item questions were used to get detailed information about specific changes.

Perceived job stress was measured by Cooper's Job Stress questionnaire (Cooper, 1981). This instrument consists of 22 questions and each answer is rated on a six-point scale ranging from zero to five. In this study two items were added to the original instrument: Stress connected to the implementation of new technology, and stress due to lack of learning and developing opportunities. A high score indicates high experience of stress in the work situation. A summated scale of all the 24 items, "Perceived job stress," gave a Cronbach's alpha of .92.

Subjective health complaints were measured by the Subjective Health Inventory (SHC). The instrument consists of 29 items and describes subjective and psychological health complaints experienced during the previous 30 days (Ursin, Endresen & Ursin, 1988; Eriksen, Ihlebæk & Ursin, 1999). The dimensions in the instrument are: pseudoneurological problems (sadness/depression, anxiety, sleep problems, tiredness, dizziness), (eight items), muscle pain (six items) cold/influenza (two items), allergy (three items) and gastrointestinal problems (seven items). The complaints were scored on a scale from 0 (no complaints) to 3 (severe complaints). A sum score for all the complaints was computed and the scale had a Cronbach's alpha of .79.

Anxiety was measured by Spielberger State-Trait Anxiety Inventory (STAI Form Y-1) (Spielberger et al., 1970; Håseth, Hagtvedt & Spielberger, 1990). The STAI's Trait Anxiety was used. Response options to this inventory are on a 4point scale ranging from "almost never" to "almost always." Cronbach's alpha for the scale was .82.

Job satisfaction was measured by Quinn and Shepard (1974), and four items were used. Job satisfaction was presumed to be a global construct where the various job dimensions, both events and agents are aggregated into an overall orientation termed job satisfaction. Cronbach's alpha was .80.

Organizational Commitment was measured by the short form of the Organizational Commitment Questionnaire (OCQ) (Mowday, Steers, & Porter, 1979). The OCQ is a nine-item scale subsuming 1) a desire to maintain membership in the organization, 2) belief in and acceptance of the values and goals of the organization, and 3) a willingness to exert extra effort on behalf of the organization. Cronbach's alpha was .87.

Effort was measured by six items from the effort reward imbalance scale (Siegrist, 1996; Siegrist, & Peter, 1996). The scale included items like "I have a constant time pressure due to a heavy work load" and "I am often pressed to work overtime". Cronbach's alpha was .65.

The demands, control and support dimensions were measured by a questionnaire developed by Theorell, Michélsen, and Nordemar (1991), a short version of the “Job Content Questionnaire” (Karasek et al., 1985). The instrument consists of 17 items, where five items cover the demands dimension (work fast, work hard, excessive work, enough time, and conflicting demands). A test of reliability of the five items in the *demands* measurement gave a Cronbach’s alpha of .71. *Skill discretion* was measured by four items (keep learning new things, job requires skill, job requires creativity, repetitive work (scored negatively)). Here the Cronbach’s alpha was only .53, but were kept unchanged due to the international validation of the scale (Landsbergis, et al., 2002). *Decision authority* was measured by two items (have freedom to make decisions, can choose how to perform work), with Cronbach’s alpha of .70. *Social support* was measured by six items (i.e. “We support each other” and “I get along with my superiors”). Cronbach’s alpha was .83.

Health and safety climate, organizational climate and participation were measured by 11 items from the Organizational Assessment Survey (Dye, 1996). Health and Safety Climate had four items and Cronbach’s alpha was .76. *Organizational climate* was measured by four items and Cronbach’s alpha was .73. *Participation* was measured by three items and Cronbach’s alpha was .87.

One-item questions were used to assess the employees’ own health and for self-reported participation in health promoting interventions and organizational changes in the organizational unit the respondents belonged to.

3 Results

3.1 Company level changes

The deregulation in the electric energy branch started a restructuring and downsizing process within all the companies in this study. Interviews with top managers in each of the company revealed that all the companies could be categorized within an incremental change model. Only one of the companies had used lay offs as a chosen downsizing strategy. The other companies used a mixture of incentive packages, early retirement and freeze hiring.

As a consequence of incremental changes, old traditional work design coexisted together with new work designs. In addition to the traditional split between the office work and the manual work in this branch, a polarization between the operators on all levels with an engineering background and the new groups of financial and marketing staff personnel developed. New business and information communication technology (ICT) administration systems in the companies had consequences for the way the employees in the other departments had to organize and do their work, and created discussions and conflicts that needed special attention and interventions to map and solve. The implementation of ICT in the companies came at about the same time as the deregulation. ICT facilitated novel forms of communication between the employees and

supported new flexible work patterns, more centralization of decision authority and made organizational boundaries more permeable. The need for collaboration between the engineer groups, the maintenance groups and the finance group with responsibility for selling the energy when the price was high caused conflicts, but also organizational learning.

The introductions of the ICT systems also lead first to a competence gap in the organizations. After some years the administrative personnel caught up with the new demands, but the manual workers using most of their time doing line work or production work were usually left behind in training although perceiving a demand for new communication skills. This created a cultural distance within the companies and suspicions developed between the administration and the other departments. Trust between management and the employees became a success factor for organizational restructuring.

3.2 Participation in change activities

Only 12.7% (N= 221) of the employees received a new position within the company last year and only 9.1% (N=158) had experienced a change in organizational unit. Out of the total sample, however, 46% (N=790) reported that their organizational unit had been involved in restructuring activities. All the companies had different improvement activities on business development or occupational health and safety, and 36% (N = 603) of the employees reported that they had participated in activities and interventions to improve the psychosocial work environment and occupational health last year.

3.3 Effects of participation in company initiated interventions

Table 2 shows the effect of company initiated interventions. The multivariate analysis by repeated measures ANCOVA of each of the occupational change variables showed effect of change over time for both job stress (Pillai's Trace = .008, F = 12.402, p = .000), for subjective health complaints (Pillai's Trace = .003, F = 5.731, p = .017), commitment (Pillai's Trace = .015, F = 24.766, p = .000), effort (Pillai's Trace = .252, F = 542.004, p = .000), skill discretion (Pillai's Trace = .009, F = 14.625, p = .000), social support (Pillai's Trace = .005, F = 8.229, p = .004), and organizational climate (Pillai's Trace = .006, F = 9.262, p = .002) (Table 2) . The interaction effect (change in the dependent variables over time * participated/ not participated in interventions) were significant for commitment (Pillai's Trace = .004, F = 6.056, p = .0014), job satisfaction (Pillai's Trace = .005, F = 7.902, p = .005), effort (Pillai's Trace = .005, F = 8.732, p = .003), skill discretion (Pillai's Trace = .003, F = 5.210, p = .023), social support (Pillai's Trace = .004, F = 6.380, p = .012), participation (Pillai's Trace = .004, F = 6.363, p = .012), organizational climate (Pillai's Trace = .003, F = 5.126, p = .024) and health and safety climate (Pillai's Trace = .004, F = 5.767, p = .016). In both groups the stress level increased in the period as an effect of change over time, but independent of reported participation in the interventions. Subjective health complaints declined for both groups. There were no effects of change over time for job satisfaction, participation and health and safety. On many variables, the groups that reported that they had been part of

interventions improved their situation, whereas the non-participation group had a negative development on most variables. Generally participation in interventions had a positive effect or buffering effect against an overall negative effect of change over time on the occupational health and organizational characteristics included in the analysis (Table 2)

On the first measurement the employees in the departments that improved had been significantly less number of years in the company than employees in the departments with a negative development, but there were no other differences between the two groups of departments as to other background variables (Table 3).

Table 4 presents the occupational health characteristics of the two groups of departments on the two measurements. At the first measurement, the departments that improved had a significantly higher level of job stress (mean = 26.95, Std.dev. = 18.03) than the other group (mean = 24.36, Std.dev. 16.19), but there were no other differences. (Table 4)

In the 64 departments with significant change on the occupational health variables job satisfaction, job stress, subjective health complaints, anxiety and characterization of own a total of 441 interventions were reported and could be categorized in accordance with the concepts of Kompier et al. (1998). The most frequent interventions reported are presented in Table 5.

The companies only with rare exceptions discriminated between primary and secondary/tertiary interventions. The interventions were at the same time used for both proactive and reactive purposes. There were few attempts to use specific interventions to solve clearly defined problems. The only exception to this was the secondary/tertiary worker oriented interventions to find job tasks for employees on long-term sick leave.

Most of the interventions fall in the work-oriented group. Performance appraisals, safety audits, management development and health and safety agenda on meetings on department level were among the most popular interventions. Physical exercises, competence development and training plans were the most used worker-oriented primary interventions. Except for smoking cessation courses, specific health related interventions like nutrition courses and stress management were not widespread in the branch. Due to increased absenteeism, the managers on the department level reported an increased interest for and use of secondary/tertiary worker oriented interventions. Individual talk with employees being on sick leave and follow up on these individuals were more frequent used than before.

Table 6 shows some main differences on organizational characteristics between the departments that improved or deteriorated at first and second measurement. In both the two groups of departments there was an increase in the use of personal computers. At the second measurement the standard deviation is little smaller in the use of computers. This might mean that the use of computers was more even within the improvement group (mean = 2.56, std.dev. = .77) than in the deterioration group (mean= 2.46, std.dev. = .82). (Table 6)

The greatest difference between the two groups of departments on the second measurement is on the use and perceptions on performance measurement. Small

changes on this human resource management element seem to be connected with a more positive development. Interestingly, the group that improved had a reduction in the use of performance measurements, whereas the departments with a negative development had an increased use. In the interviews the managers, supervisors and union representatives also reported conflicts between the employees and managers on introducing performance measurements and the selections of indicators for this purpose (see also Mikkelsen, Nybø & Grønhaug, 2002).

From the first to the second measurement, the group that improved had an increase in trust and feedback whereas the group with a negative development on occupational health had a decrease in trust and feedback. At the second measurement the group that improved had a mean on 3.71 (std.dev. 1.12) and the deterioration group a mean of 3.57 (std.dev. .96).

At the first measurement, the opportunities to learn new things were higher in the group that improved than in the group that deteriorated (mean= 3.63, std.dev. = 1.15; mean = 3.48, std.dev. 1.25). This difference had increased at measurement two (mean = 3.69, std.dev. 1.03; mean = 3.47, std.dev. = 1.12). The difference between the two groups on freedom to take a break during the work day had a similar pattern (mean = 3.58, std. dev. = .69; mean = 3.54, std.dev. = .63) (mean = 3.65, std.dev. = .56; mean = 3.49, std.dev. = .64).

Work climate stayed stable and had a reduced variation in the group that improved from measurement one to measurement two, but in the group that deteriorated the climate had a negative development. At measurement two the group that deteriorated (mean = 1.27, std.dev. = .44) more often expected to experience an undesirable change in the work situation in the future, than the other group (mean = 1.22, std.dev. = .42). At the second measurement more employees in the departments that deteriorated than in the departments that improved in the five selected variables – job satisfaction, job stress, subjective health complaints, anxiety and self-reported health, reported changes in working time arrangements.

Discussion

This study has shown that the organizational changes in the electric energy branch in Norway following deregulation and increased market competition were incremental. The branch had for several decades been in a monopoly situation, with stable market conditions and high income. When monopoly existed, profits were high, growth was easily attained, and additional staff was easily absorbed and hidden. After the deregulation law, the companies were under considerable pressure from the Norwegian Water Resources and Energy Authorities (NVE) to pay attention to business development project on how to reduce costs, increase the interest and focus on the customer and how to increase the competence in this field. Due to the pressure from the authorities through NVE, restructuring was defined by the companies as a misaligned company structure. However, since management had limited experience in restructuring, the overall focus was reduction in costs by reducing the workforce (Mikkelsen, Nybø, & Grønhaug, 2001; DeMarie, & Keats, 1996). In this way the activities also became reactive and the companies tried to cope with present problems, and were not directed to position the company to the future. This was especially the case in the smaller companies, whereas the bigger ones had more professional staff resources and were able to get a longer perspective on their activities.

The organizational changes in the companies were stepwise and most often taken over years. In spite of only one case of downsizing by layoffs, company specific turbulence occurred connected to changes in the workforce, cost reduction and suggested and implemented changes in the work processes. Only 13% of the sample reported that they had changed job titles last year, and only 9% had changed their organizational unit. The attention given to restructuring and improvement activities were, however, great. 46% of the employees reported that their own department had been involved in restructuring activities last year, and 36% had been part of occupational health interventions.

In contrast to the findings in the literature reviewed by Geurts and Gründemann (1999), where most of the interventions were individual and concentrated on reducing the effects of stress, rather than its sources, most of the company initiated interventions in this study fell in the work-oriented group as either primary or secondary interventions. In reporting on the improvement activities carried out, the managers and supervisors only with rare exceptions discriminated between primary and secondary/tertiary interventions. The reason for this may be that the managers had limited competence in the occupational health and the business development field. It may also be that the restructuring activities of the company overshadowed the occupational health activities and that the dominating view was that the same activities that would improve business development also would promote job satisfaction and occupational health. The interventions were meant to address the emergent issues and idiosyncrasies of the organizations and at the same time to have business development purposes. Interventions like performance appraisals and management development were examples of interventions introduced with this double aim.

In this study we see an overall negative development over time on occupational health variables. This finding, at least for job stress, might appear to be the result of regression to the mean. However, for the departments that deteriorated, job stress rose at Time 2 to a level far higher than for the other departments at Time 1. Thus, this result could not be primarily due to regression to the mean.

For the respondents that reported that they had participated in intervention, the occupational health interventions had a positive, but limited effect on commitment, job satisfaction, efforts, skill discretion, decision authority and organizational climate variables. This is in line with earlier research in this field where organizational job stressor-reduction interventions seem to have a buffering effect during change processes (i. e. Landsbergis, & Vivona-Vaughan, 1995; Mikkelsen, & Saksvik, 1998; Mikkelsen, & Saksvik, 1999; Mikkelsen, Saksvik, & Landsbergis, 2000; Parkes, & Sparkes, 1998).

In order to try to identify some best practice indicators, the total sample in this study was used to identify those departments with only significant positive or negative changes on key occupational health variables. The main difference between the identified departments that improved or deteriorated seemed to be related to lack of or a slower speed in introducing specific changes in the work situation. Differences between the best practice departments and the departments with a negative development were related to the frequency in the use of personal computers, changes in risk demands, performance measures and working time arrangements. It also seems that just the expectation of threatening change might have had a negative impact on the employees. A positive development in occupational health may also depend on a stable or improved organizational climate and job autonomy.

The findings correspond to the studies in public sector done by O'Donnell, Peetz & Allan (1998) and Allan (1998). They found that three aspects of exploitation of the work force provided negative consequences: broader jobs, reduced employment security and work intensification. The eagerness of the top management to introduce changes on these matters was the main conflict area in all the companies and culminated in concrete negotiations between management and the unions on the implementation of performance measurement. The goal of restructuring and downsizing should be to reassess and alter the company's practices. As reported elsewhere (Mikkelsen, Nybø & Grønhaug, 2002), many of the leaders that were confronted with demands on cost reduction, knew that they had to do something, but that they did not actually know what to do. They knew that organizational design, human resource policy, work processes, organizational culture and management style should be changed, but did not know how to do it and how the future organization and work designs should look like. This may be one of the main causes of lack of clearer and stronger results of all the company initiated interventions surveyed in this study.

Organizational phenomena as participation and work place democracy implies substantial investments have to be made in employees. Short term individual and organizational interventions do not seem to be sufficient to stem the flow of negative developments in a company or facility. Specific interventions for specific problems (Eriksen et al., in press), and a proper implementation process seems to be necessary (Saksvik et al., 2002). Work-based support and employee involvement programs may be

moderators in addressing the effects of organizational uncertainty and job insecurity (Lim, 1997; Martin, Parsons & Bennett, 1995). The best practice departments in this study had a higher rating on management trust and feedback than the others. Other parts of this study show that time constraints and customer demands have few moderators (Mikkelsen, Øgaard & Landsbergis, 2002). Landsbergis, Cahill and Schnall (1999) show that when organizations are becoming lean there is a negative health effect on their employees. As also shown by Schweikhart and Smith-Daniels (1996) general work practices should be redesigned in periods of restructuring and downsizing to avoid just having fewer people doing inefficient operations. In his study interventions were mostly reactive, and most often initiated when management experienced that something was wrong, without knowing exactly what. Most managers and supervisors were inexperienced in handling psychosocial work problems.

Because the success of organizations that have downsized in the past has not been particularly laudable it is crucial to continue research on how to combine consideration for the productivity of the company and the wellbeing of the employees, and for specific interventions and development programs for defined problems. When several authors report that the effects of interventions are not consistent or lacking (Briner, & Reynolds, 1999), the reason may be that we are looking for general effects on occupational health variables or job characteristics. One of the main problems in restructuring the energy companies after deregulation was the lack of knowledge on how to anticipate and manage the social effects of corporate restructuring and of models of how the new organizations should look like. The creativity as to the development of interventions and in imitating other companies' interventions were great, but the companies did lack intangible resources in understanding, anticipating and managing change caused by a new regulation of the branch. Experience learning on how to manage change in a socially intelligent way is therefore given priority in the branch organizations and in many of the companies. In occupational health research, learning models should guide the development and implementation of interventions.

A design limitation in this study was that the participation in the interventions was self-reported. We knew from the interviews that all the companies had initiated interventions, restructuring activities and motivated the middle managers to introduce occupational health interventions. On the department level, the interviews were only carried out in the departments that improved or deteriorated. Most likely there is a high correlation between reporting to have been part of an intervention and a more objective registration of the fact. On the other hand, both the managers and the employees may have inflated their reports on improvement activities to satisfy the researchers. It might, however, also be possible that employees unfamiliar with improvement activities would underreport them. From this study we only can conclude that perceiving oneself to be part of a health promoting intervention has a buffering effect on one's perceived health. For future research we could hypothesize that being a passive part of an intervention or working in a department that carries out improvement activities that employees do not perceive, identify with or understand, do not have a protective effect on health. If this is the case, participatory organizational interventions grounded on dialogue between managers and all the employees will still be important in health promotion in the future.

4 References

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Appendix

Table 1: The improvement and the deterioration departments

Company	N	Departments that improved	N	Departments that deteriorated	N
1	618	15	211	8	92
2	34	0		1	34
3	10	0			0
4	80	2	43	1	14
5	31	0		0	
6	79	0		0	
7	640	7	83	8	128
8	69	1	6	0	
9	338	5	90	6	71
10	156	1	7	1	24
11	57	1	5	3	29
12	145	0		1	51
13	178	1	23	2	56
Total	2435	33	468	31	499

Table 2: Effects of self-reported participation in company initiated interventions.

	Participated in interventions			Did not participate in interventions			Factor 1 (T ₁ -T ₀)	Factor 1* Participation in interventions
	N	Time 1	Time 2	N	Time 1	Time 2	(Pillai's Trace) F	(Pillai's Trace) F
Job stress	584	25.58	26.39	1059	24.84	26.67	12.402***	1.830
Subjective health complaints	582	6.32	5.92	1056	6.70	6.54	5.731*	1.032
Anxiety	554	16.46	16.37	1026	16.81	16.75	.586	.020
Sick leave last 6 month	597	1.69	1.66	1076	1.62	1.64	.046	2.049
Commitment	593	31.33	31.00	1064	29.24	28.26	24.766***	6.056*
Job satisfaction	594	10.58	10.63	1063	10.24	10.07	2.303	7.902**
Effort	574	6.93	8.07	1038	6.92	7.80	542.004***	8.732**
Job demands	592	13.22	13.31	1069	13.02	12.92	1.248	.527
Decision authority	591	6.61	6.58	1069	6.43	6.39	1.365	.030
Skill discretion	594	12.30	12.25	1074	11.92	11.70	14.625***	5.210*
Social support	594	19.42	19.40	1070	19.12	18.79	8.229**	6.380*
Participation	569	10.70	10.98	997	9.94	9.84	1.392	6.363*
Organizational climate	583	15.94	16.37	1036	15.55	15.62	9.262**	5.126*
Health and safety climate	574	16.64	16.83	1028	15.95	15.76	.000	5.767*

*** p-value of F-test is significant at the 0.001 level; **p-value of F-test is significant at the 0.01 level;

*p-value of F-test is significant at the 0.05 level;

Table 3: Background characteristics of departments that improved or deteriorated at the first measurement

		N	Mean	Std.dev.	F
Year of birth	deteriorated	608	55.30	10.407	.003
	improved	346	56.85	10.397	
Year of education	deteriorated	602	12.45	2.546	.000
	improved	344	13.40	3.043	
Number of year in company	deteriorated	610	3.46	.922	20.810***
	improved	244	3.21	1.041	

*** p-value of F-test is significant at the 0.001 level;

** p-value of F-test is significant at the 0.01 level;

* p-value of F-test is significant at the 0.05 level;

Table 4: Occupational health characteristics of departments that deteriorated or improved at first and second measurement

		First measurement				Second measurement			
		N	Mean	Std.dev.	F	N	Mean	Std.dev.	F
Job satisfaction	deteriorated	590	10.22	1.85	0.024	429	9,96	1,97	7,004**
	improved	343	10.20	1.84		247	10,36	1,86	
Job stress	1	586	24.36	16.19	5.068*	422	28.73	17.04	6.385*
	2	341	26.95	18.03		247	25.30	16.89	
Subjective health complaints	1	587	6.90	6.16	0.023	421	6.82	6.46	5.805*
	2	340	6.83	5.94		243	5.64	5.37	
Anxiety	1	577	16.67	4.40	0.385	418	17.11	4.62	6.900**
	2	330	16.86	4.46		244	16.13	4.57	
I-item self-evaluation of own health	1	589	2.15	.68	0.523	430	2.26	.72	7.275**
	2	343	2.12	.68		248	2.10	.67	

*** p-value of F-test is significant at the 0.001 level; ** p-value of F-test is significant at the 0.01 level; * p-value of F-test is significant at the 0.05 level;

Table 5: Company initiated interventions

	Interventions	
	Primary	Secondary/Tertiary
Work oriented	Performance appraisals (40) Safety audits (39) Management development (36) Health and safety agenda on meetings (32) General meeting (24) Physical work environment (22) Health and safety training (19) Climate and satisfaction surveys (15) Social arrangement (13) Others (76) (Total = 316)	
Worker oriented	Physical exercises (25) Training plan (20) Smoke ending (18) Stop drinking support (14) Career planning (6) Nutrition courses (5) Stress management (2) Retirement courses (2) (Total = 92)	Individual talk (12) Follow up on sick leave (8) Active sick leave (7) Reduction in working hours (3) Others (3) (Total = 33)

Table 6: Differences on organizational characteristics between the departments that deteriorated or improved at first and second measurement.

		First measurement				Second measurement			
		N	Mean	Std.dev.	F	N	Mean	Std.dev.	F
<i>New technology:</i> Use of personal computer	Deteriorated	613	2.26	.87	5.938*	446	2.36	.82	11.502***
	Improved	348	2.46	.84		252	2.56	.77	
<i>New demands:</i> Are errors in your work associated with the risk of economical loss	Deteriorated	611	2.68	1.00	.348	444	2.75	.92	3.858*
	Improved	345	2.66	1.02		251	2.70	1.00	
<i>Performance measurement:</i> Work group is rewarded for its performance as a group	Deteriorated	570	2.69	1.26	1.385	415	2.74	1.15	3.973*
	Improved	333	2.66	1.17		243	2.76	1.23	
Result measures are used to assess the overall performance of the group	Deteriorated	464	3.75	1.15	1.150	341	3.89	.99	13.180***
	Improved	285	3.64	1.07		200	3.61	1.16	
Quality of service is compared with the quality of other companies	Deteriorated	464	3.77	1.10	.451	326	3.84	1.01	4.289*
	Improved	277	3.62	1.07		194	3.51	1.12	
<i>Trust and feedback:</i> Supervisor expresses confidence in your ability to do a difficult task	Deteriorated	600	3.65	1.02	.485	441	3.57	1.07	5.583*
	Improved	345	3.62	1.06		250	3.71	.96	
Is the quality of you work evident from the things that you do?	Deteriorated	601	3.91	.74	.216	448	3.91	.70	4.198*
	Improved	344	3.91	.76		252	3.93	.80	
<i>Autonomy:</i> Time to learn new things	Deteriorated	600	3.48	1.25	5.752*	436	3.47	1.12	6.748**
	Improved	343	3.63	1.15		249	3.69	1.03	
I can decide myself when to take a break	Deteriorated	613	3.54	.63	.384	444	3.4865	.64	17.023***
	Improved	347	3.58	.69		252	3.6508	.56	
<i>Climate:</i> There is a good work climate on the job	Deteriorated	613	3.06	.67	.168	447	2.9553	.70	5.754*
	Improved	347	3.01	.68		252	3.0238	.61	
<i>Change:</i> Expect to experience an undesirable change in work situation	Deteriorated	-	-	-	-	415	1.2627	.44	5.693*
	Improved	-	-	-	-	239	1.2218	.42	
Got more overtime work	Deteriorated	-	-	-	-	337	.04	.01	7.767*
	Improved	-	-	-	-	154	.02	.01	

*** p-value of F-test is significant at the 0.001 level; ** p-value of F-test is significant at the 0.01 level; * p-value of F-test is significant at the 0.05 level;