

Under the Magnifying Glass

– gender perspective in work environment
and work organisation



Knowledge Compilation

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– gender perspective in work environment and
work organisation

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A bibliometric report by Professor Ulf Sandström can be found as an
appendix on page 73

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Foreword

The Swedish Work Environment Authority has been commissioned by the government to inform and disseminate knowledge on areas of significance for the work environment. Thus, in the coming years, a number of knowledge compilations will be published, in which renowned scientists summarise the state of knowledge within a number of themes. A scientific review of this report has been carried out by Professor Lena Gonäs. The authors themselves are, however, responsible for the final design.

These reports are available free of charge on the Swedish Work Environment Authority website. There you will also find material from the seminar series the Swedish Work Environment Authority is organizing in conjunction with the publication of the reports.

Project manager for the compilation at the Swedish Work Environment Authority has been Ulrika Thomsson Myrvang. We also wish to thank other colleagues at the Swedish Work Environment Authority who have assisted in the work with the reports.

The opinions expressed in this report are those of the authors and do not necessarily reflect the perception of the Swedish Work Environment Authority.

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1. Introduction

The Swedish Work Environment Authority has been commissioned by the Government and the Ministry of Employment to undertake special efforts in order to prevent women from being excluded from working life due to work environment-related problems (A2011 / 2209 / ARM). The assignment shall include knowledge acquisition, information, training of inspectors and a national supervision activity. Part of the work with this assignment is this knowledge compilation.

This knowledge compilation primarily presents gender research about work environment and work organisation, with the primary focus being research regarding the organisation of work. The knowledge compilation concludes with the identification of knowledge gaps and the possible gains that would result from cooperation across the different scientific areas. As an appendix, there is a bibliometric study, conducted by Professor Ulf Sandström at the Royal Institute of Technology (KTH), of research regarding work environment and work organisation on the basis of gender.

The literature upon which this report is based on comes from KTH's library search engine KTHB Primo, which provides access to the university's online subscriptions and includes "scholarly journal articles, print journals and e-journals, print books and e-books, conference proceedings, theses and dissertations, bibliographic databases". In addition, searches have been carried out through EndNote and therein the Social Sciences Citation Index at Web of Science (ISI) and LIBRIS and KVINNSAM. The most frequent keywords have been work organisation, organisation, work, sex, gender, women, men, femininities, masculinities health, occupational health, sick leave, work environment, psychosocial work environment, as well as their Swedish counterparts.

The knowledge compilation begins with a section that describes how today's working life looks, and what kind of structural gender differences are to be found in the labour market and at workplaces. This is followed by current statistics on sickness absence and sick rate.

The bibliometric study (see Appendix 1, Figures 3 and 5) shows that research on occupational health on the basis of gender studies perspectives is limited. The part of the report providing insight into this research tradition is therefore not very extensive. It follows then that research with a gender perspective on employee health in

relation to organisational aspects is also limited. A smaller section highlights women's social care work and the difficulties in assessing potential work environment risks in work that involves emotional aspects.

A complement to this publication is the knowledge compilation on gender and physical load that the Swedish Work Environment Authority is planning to issue during 2013. This report's theoretical centre lies in the section on the importance of sex and / or gender in organisations.

Finally, there are examples of how change management can be structured as well as a presentation of knowledge gaps in the research.

1.1 SEGREGATION ON THE LABOUR MARKET

In Sweden we have had one of the most gender-segregated labour markets in Europe (SOU, 2004: 43), despite the fact that we live and operate in a country that, in the international arena, is known for its gender equality. A gender equality that, among other things, consists of a balanced representation of women and men in the Swedish government and parliament, a high presence of women on the labour market, and social assistance in the form of well-developed parental insurance and preschool activities. However, Sweden is not characterized by an even balance between the genders when it comes to responsibility for the children and the home, in professions and occupations, as well as sick leave (SCB, 2010).

That the labour market is segregated by gender is shown in a traditional professional division, consisting of a majority of men in the technical sector and a majority of women in health care and social care (SCB, 2010). The concept of segregation can, in itself, be problematic when linguistically it means to distinguish someone from something, in this case, the prevailing norm (Gonäs, p. 250, 2005).

Segregation in EU member states, including Sweden, has, in recent years, fallen slightly (Bettio and Verashchagina, 2009). Today the Eastern European countries such as Estonia, Latvia, Slovakia and Finland, have the largest gender segregation on the labour market.

Segregation patterns among well-paid women look slightly different than those for women in low-paid jobs (ibid.), where the causes of segregation are more prominent in the latter group than among young well-paid women. The mechanisms that clearly affect segregation patterns can be found at both labour market level and

organisational level. Reasons highlighted in the research and the European Commission Expert Group "Gender and Employment" (Bettio and Verashchagina, 2009) are, education (Holt and Lewis, 2011, Walby, 2011), employment rate (number of hours of work) (Kjeldstad and Nymoén, 2012), ideas and expectations about how women and men should be (Wahl, 2008), as well as organisational practices (Acker, 1990).

An interesting question is, can we talk about the myth of Swedish equality where women's activity in the labour market is facilitated and made possible through well-developed childcare (Friberg et al., 2004, Fürst, 1999)? The question is based on the above patterns and the fact that men and women still do not share equal responsibility for the family (SCB, 2012b).

The state inquiry "Because the power is yours" (1998: 6) considered the economic power and the resources in both the private and the public sphere. The results were presented on the basis of the areas of family, work and education. The study showed that women's and men's earnings over time had become closer, and that unemployment does not affect women more than men. There were large gender differences, however, in terms of hourly wages, where a woman's salary was on average only 80 percent of a man's (SOU 1998: 6, p 133)

Ten years later, Statistics Sweden (2010) statistics for the different sectors on the labour market show that women's wages within our county councils are 73 percent of men's pay, and within the private sector, 86 percent. Taking into account age, education and working hours, the figures are significantly more even, 93 and 91 percent respectively (SCB 2010).

The female-dominated jobs in health care and social care were, based on pay, less valued than male-dominated jobs of equivalent level in manufacturing. Figures were also produced about the dividend education yields per year, given in the form of bonuses based on salary. In the female-dominated professions it gave a return of 2.2 percent per year of education and in male-dominated occupations over 4 percent per year of education. For a long time there have been more women than men who go on to tertiary education, and according to Statistics Sweden, since the mid-2000s two thirds of those who graduate from higher education are women (SCB 2011). Despite women's higher educational level, an investigation of women's power showed differences when it comes to leadership and gender. One example is that 58 percent of private workplaces lacked female managers altogether.

The structure of working life was in 1998 and is even today in 2012, largely designed for the average man's way of life and their value patterns (SOU 1998: 6 SCB 2010). In 2008, 75 percent of executives in the private sector were men and 62 percent of the managers in the public sector were women (SCB 2010). The figures show that the structures on the labour market persist and that it is easier for a woman to gain a leading position in the public sector than in the private sector. In the municipality and county council in 2008, the proportion of women employed was 79 percent. The corresponding figure for the private sector was 38 percent (SCB 2010).

1.2 NEW WINDS AFFECT THE WORKING LIFE STRUCTURES

In recent years, great changes have taken place in the workplace. At labour market level, there is a restructuring from industrial operations to more knowledge-intensive organisations. We see, for example, uncertainties and changes in ownership constellations in engineering and vehicle manufacturers.

Information technology development has enabled flexibility and increased efficiency in organisations. It manifests, for example that workers are becoming more flexible in where work can be done, purely physically. At the same time this flexibility provides employers with the possibility to control and demand constant presence through ICT functions such as email, text messaging, wireless connectivity in the form of, for example, Skype, and sometimes even social media. The boundaries between leisure and work are therefore difficult to draw, especially for officials. Within work that is boundless, the tendency towards gender disparities increases (Allvin, 1999).

Economic downturns and, with them, the demand for effective and leaner organisations has led to a steadily increasing work pace in the public and private sector in recent years. We see today that the healthcare sector, in its quest for efficiency, is adopting the organisational concept Lean production, already well-established in the manufacturing industry (Brännmark et al 2012). A large and clear change that has been carried out in the healthcare sector is the privatization of health care providers. In 2011, the media debate on procurement and private healthcare providers has been lively. The focus has primarily been on the patients' vulnerability because of the obvious shortcomings in quality, but the employees also suffer due to an ever-clearer focus on efficiency and results.

Is the gender order reproduced in the privately-owned, former public sector, organisations or has the change opened up new patterns and conditions with regard to women's and men's working

conditions? There is a need to examine how the privatization of health care affects the content of the work and what significance the restructuring has had from the perspectives of gender and health of employees and managers.

What we know today is that the sick leave rate and being excluded from the labour market particularly affects women in the public sector. Changes that 'stress' employees rather than developing them, may involve obvious health risks for those individuals who find it difficult to set limits at work (Härenstam, 2000) (p 133). In the MOA-project,¹ researchers point out that women and men at female respective male dominated workplaces are affected differently by changes in the work (Härenstam, 2000). A result that can be explained by the gender order prevailing in society, where men generally have higher status than women and hence a position of power from which to operate (Hirdman, 1988). Women also tend to have a lack of boundaries between themselves as individuals and the work in which they operate, which, combined with social subordination, among other things, can lead to that women more often than men tend to burden themselves with debts (Härenstam, 2000).

Social subordination in combination with boundless work and/or reduced resources in the work plus a tendency towards a feeling of guilt and inadequacy affect health in the workplace. There is thus a correlation between social conditions and structures of working life as well as the physical work environment. This connection means that to reduce the number of sick days for women with musculoskeletal disorders, which is one of the dominant causes of sick leave (Försäkringskassan, 2011), we need to not only improve the physical work environment from a traditional ergonomics perspective including those factors that cause back problems (Vingård et al., 2000).

To develop the optimal work environment, we also need to highlight the importance of social aspects in organisations. If the gender differences that exist in the workplace today (Göransson, 2007) are not processed, we will not be able to achieve a sustainable working life (Forslin, 2009).

¹ MOA is an abbreviation for modern working and living conditions for women and men. The research project was conducted in Sweden during the second half of the 1990s. The aim was to develop methods for exposure assessment and analysis strategies suitable for population studies.

2. Sickness absence, sickness presenteeism and work environment

This section presents current statistics of sick leave, as well as psychosocial and physical work environment factors. The intention is not to give an in depth overview of the state of research in these areas, but rather to show the current figures and possible gender differences.

For those who are interested in deeper knowledge of sickness absence and its relationship to work and health, we recommend, for example Kristina Alexandersson's (2004b) article on sick leave and gender differences. In addition, there is Bengt Järvholm and Christer Olofsson's (2005) book on sick leave, which highlights sickness absence and the doctor's practice, but without the construction of a sex or gender perspective. The Swedish Work Environment Authority also plans to issue a separate knowledge compilation that deals with the physical work environment and gender, (Arbetsmiljöverket, 2013).

From a growth perspective, it is crucial to understand which organisational as well as physical factors cause women's higher percentage of sick leave (see Figure 1). Moreover, understanding these causes and identifying measures will with all certainty improve content of work but also men's occupational health. In addition, from a democratic perspective it is crucial that men and women operate under equal rights, opportunities and obligations.

The Swedish Social Insurance Agency statistics on sick leave (more than 14 days) shows that in all professions women have higher sick absence than men (see Figure 1). The official statistics on sick leave in Sweden, divided into all professions and diagnoses made by physicians shows only those individuals who choose to take formal sick absence. In addition, there are unreported cases consisting of *sickness presenteeism* at work. Statistics on sick absence is thus not a reliable measure of health at work (Aronsson et al., 2011), but it gives an indication of the status when it comes to work health.

The number of individuals in Sweden that have activity compensation (www.forsakringskassan.se), are most frequent in the regions of Västra Götaland county, Stockholm county and Skåne county. From a gender perspective, the highest number of women

are to be found in the region of Västra Götaland and the equivalent for men is in Stockholm County. During the year 2012 there was a total of 382,250 (223,763 women and 158,487 men) individuals who had these benefits. This is about 110 000 fewer individuals than nine years ago (2003), and it shows a positive trend in sick leave statistics with fewer individuals receiving benefits, although there are still more women than men who are absent from work. We should however be aware of the unrecorded numbers in terms of sickness presenteeism, that is employees working despite illness or injury.

The highest rate of sick absences per 1000 employees are to be found in process and machine operators work, work without vocational requirements as well as service, care and sales work (see Figure 1) (Försäkringskassan, 2011).

Sick absence figures for men are highest in work without vocational requirements, craft and related trade workers in construction, etc. and plant and machine operation work, etc. (See Figure 1) (Försäkringskassan, 2011). The above means that the occupations with the highest sick absence based on sick leave for 14 days or more (sick leave) are plant and machine operation work, etc., work without the need for vocational training as well as service work and shop sales work.

Causes of sick absences are dominated by diagnoses related to musculoskeletal and mental health (see Figure 2) (Försäkringskassan, 2011, Sandmark, 2011). Sick leave due to problems with the heart, lungs or occupational injuries is the only diagnostic group that is dominated by men (Försäkringskassan, 2011).

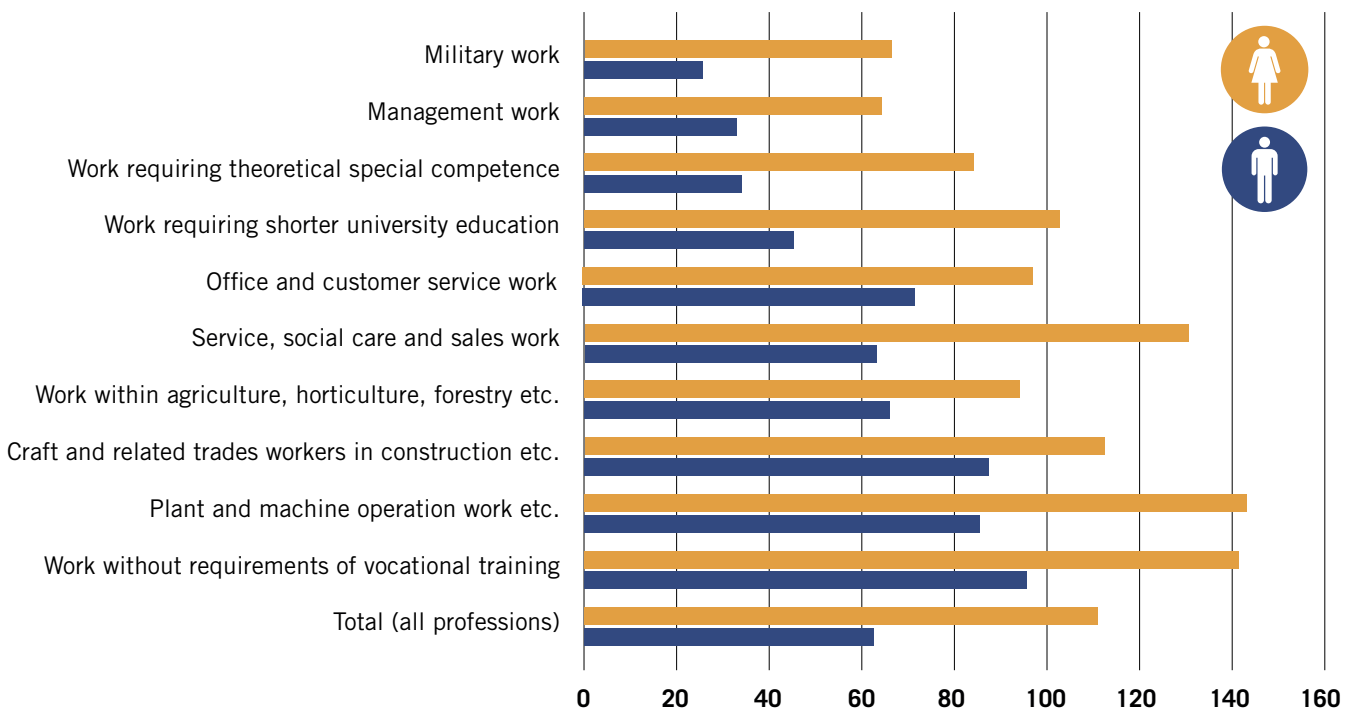


Figure 1: Social Insurance Agency statistics of started sick leave (> 14 days) per 1 000 employees, by gender and occupational group respectively for the year 2009 (Försäkringskassan, 2011).

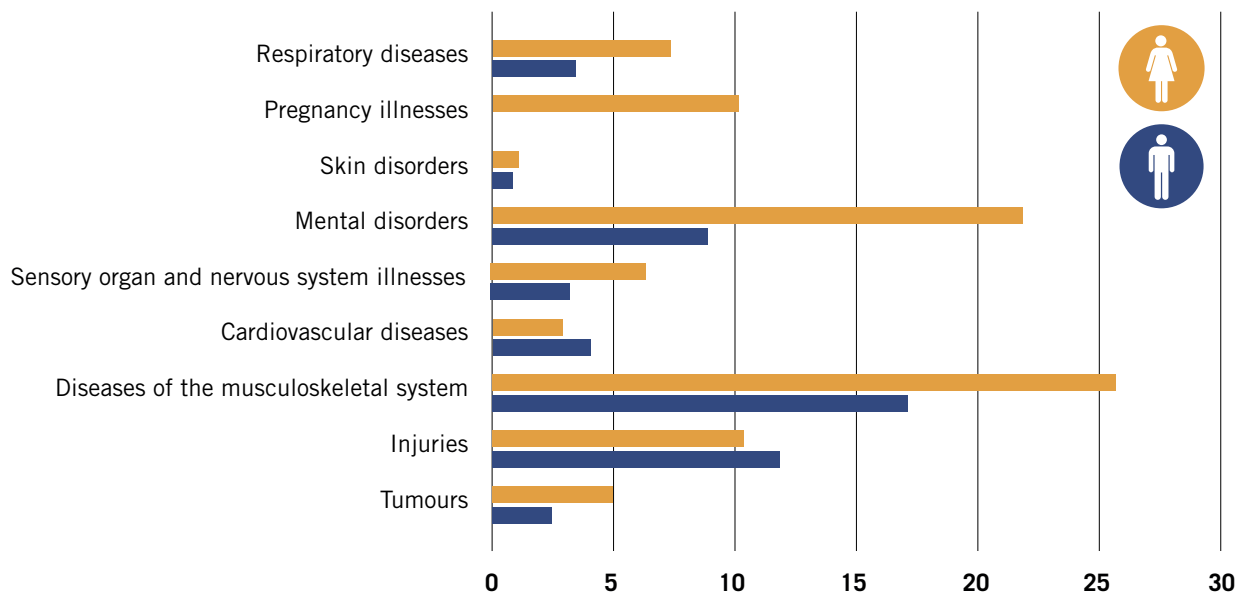


Figure 2: Social Insurance Agency statistics of started sick leave (> 14 days) per 1 000 employees for some common diagnostic groups in 2009 (Försäkringskassan 2011).

Musculoskeletal disorders are characterized primarily by “osteoarthritis and other joint diseases, pain and problems of the back and shoulders, arthritis and fibromyalgia” (ibid. P 13). Nearly 30 percent of sick leave within the plant and machine operation work etc. is due to these problems. For the group of women in the latter occupational category, almost 40 percent more are sick-listed than in the group of management and executive positions (ibid.). A figure that can be partially explained by the physical nature of the work, with repetitive and monotonous tasks (Vingård and Hagberg, 2000), but also from professional roles and work situations with imbalance between factors such as work demands, control over working and living conditions, as well as social support (Karasek and Theorell, 1990).

For men, sick leave due to problems with the musculoskeletal system is most common in the group of work without the requirement of vocational training (Försäkringskassan, 2011).

Mental ill-health as a cause of sick leave is diagnosed on the basis of “depression, anxiety disorders, reactions to severe stress, alcohol abuse and sleep disorders” (ibid. P 14). In terms of percentages, these diagnoses are most common in work demanding theoretical specialist competence, shorter higher education as well as managerial work (ibid. P 15).

Psychosocial work environment factors, socioeconomic classification and gender

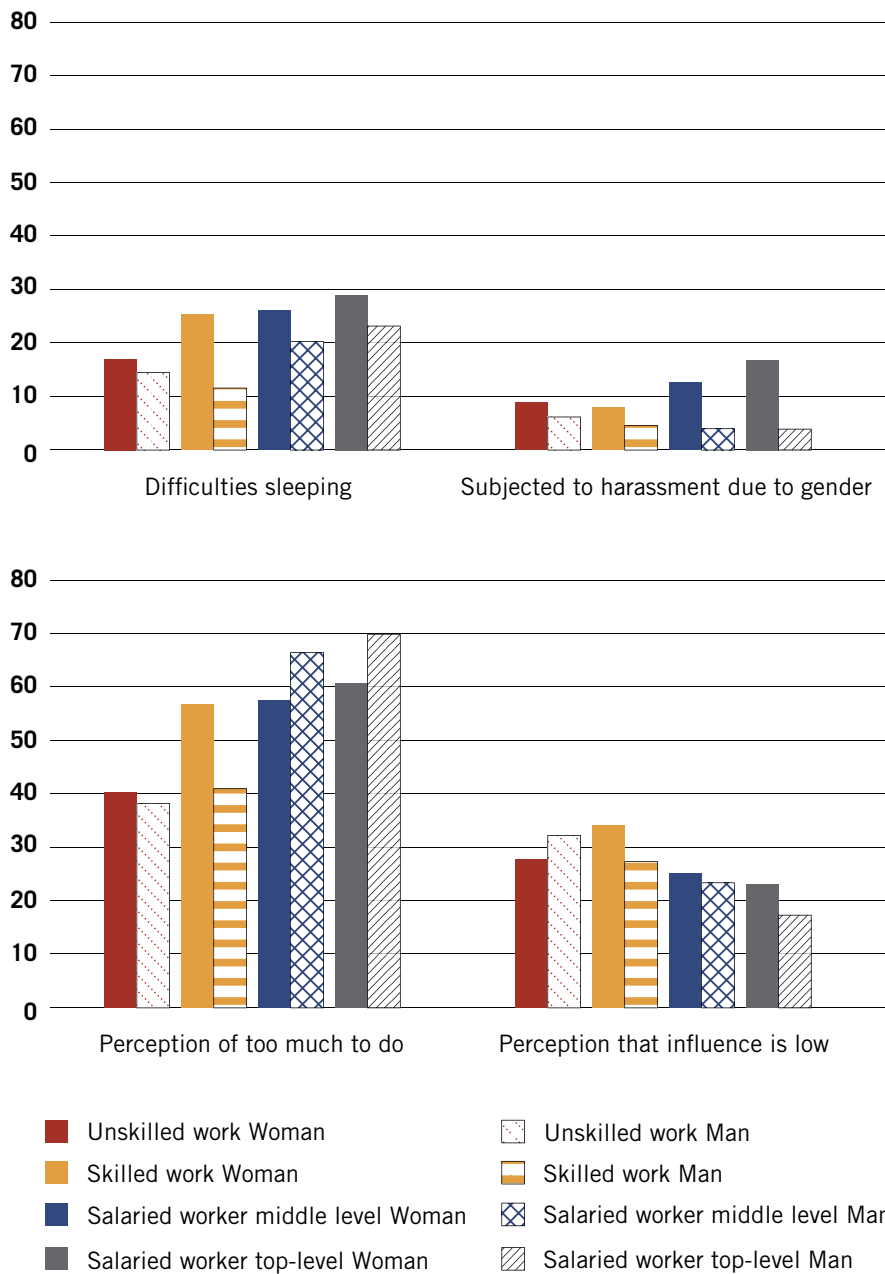


Figure 3: Selected points in the Swedish Work Environment Authority survey of psychosocial work environment factors, gender and socioeconomic classification for 2011 (Arbetsmiljöverket, 2012). The columns show the percentage of those employed between the ages 16-64 years who had fixed salaries, according to the survey.

A summary of respondents' answers to the Swedish Work Environment Authority's work environment survey (Arbetsmiljöverket, 2012) shows that, of those who have difficulty sleeping because of thoughts about their job for at least one night a week, women predominate in all socio-economic divisions (see Figure 3). Just under 30 percent of the women who are senior officials and included in the survey have responded affirmatively to this question. Nearly 25 percent of the women who are skilled manual workers and salaried workers respectively, also indicate these sleep problems. Notable is that 55-60 percent of women in the groups requiring some form of training, find that they have too much to do. For men, this perception is strongest among both categories of salaried workers (60-70 percent of respondents). In today's work organisations where a national and international trend in both the private and public sectors is to operate on the basis of methods inspired by Lean production, it is interesting that such a high proportion of workers in the current study believe they have too much to do.

As for the statistics of physical work environment issues such as heavy lifting, repetitive work and an increased pace, there are too few men and women responding (less than 400 individuals) in the Work Environment survey for the results to be reported. The questions in these areas aimed at examining whether the tasks and pace had increased during the past five years.

In Figure 4, we see, however, that in the tasks in which employees work bent forward without support for at least 1/4 of the time, in a twisted posture for at least 1/4 of the time, and sit for a maximum of 1/10 of the time, women predominate in all socio-economic categories. Furthermore it is a question of figures between 40 and just over 60 percent of respondents in the categories of unskilled workers and skilled workers.

Physical loads, socioeconomic classification and gender

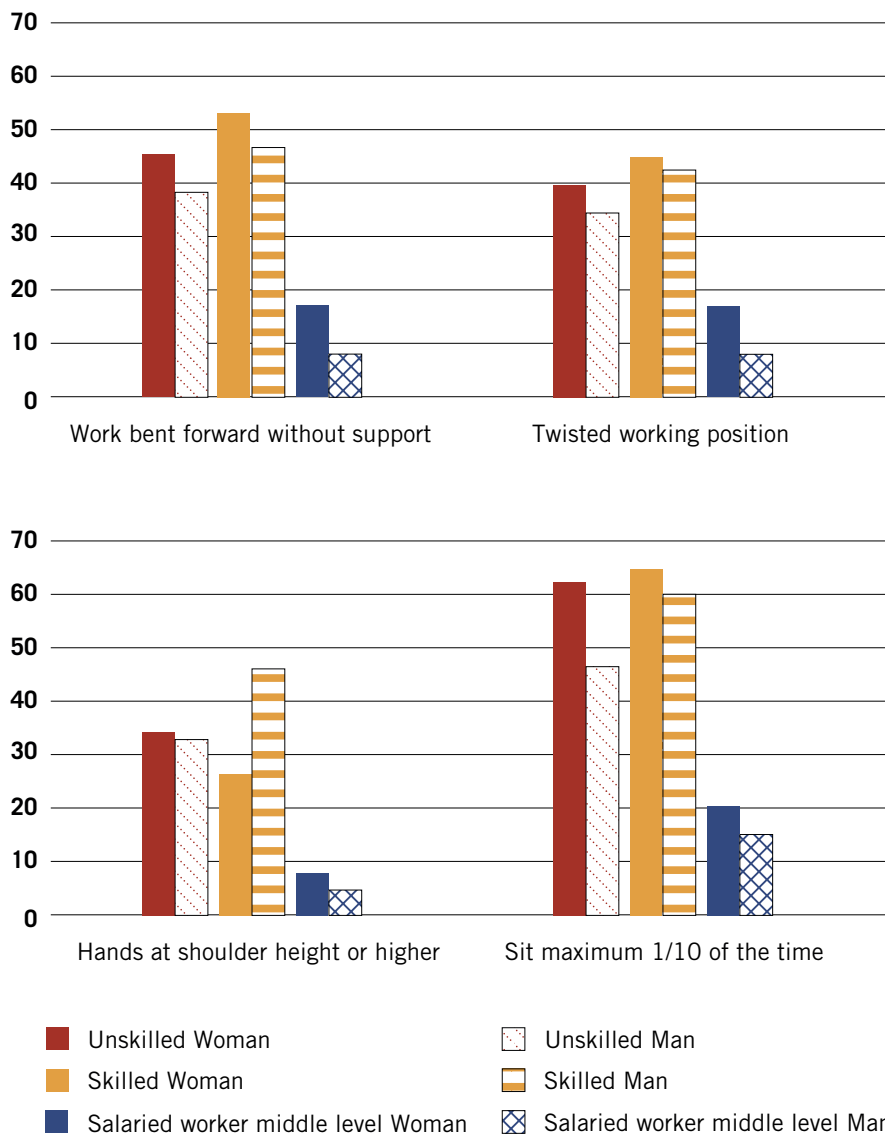


Figure 4: Incidence of physical tasks that constitute a risk of musculoskeletal disorders for women and men in the groups of unskilled workers, skilled workers and salaried workers at middle level. The columns show the percentage of those employed according to the survey ages 16-64 years who had a fixed salary in 2011.

In Figure 4 we find, in the categories of unskilled workers and skilled workers, the highly segregated professions of ward assistants, assistant nurses, child minders, corporate sales representatives, truck and lorry drivers, and warehouse assistants (SCB, 2012b),

where the first three professions are dominated by women and the rest are dominated by men. About 70 percent of the women and 70 percent of the men who are active in the labour market can be found in segregated occupations, that is, where the gender balance corresponds to about 60 percent or more of one gender.

In the state commission of inquiry about gender segregation in the labour market (SOU 2004: 43), Kristina Alexanderson (2004a) summarizes her contribution by saying that there is little research on the significance for occupational health of gender segregation in the labour market and in labour organisations. However, there is a tendency that the more gender-integrated a workplace is, the better the health of employees (*ibid.*). There is, in other words, a knowledge gap when it comes to research on the different segregation mechanisms and their impact on women's and men's health in the workplace. Interestingly, none of the studies that were carried out until the above investigation was conducted could show the causes of the higher sickness absence in the gender-segregated occupations than in the gender-integrated occupations (*ibid.*). By gender-segregated occupations is meant those professions where a majority of the employees are women or men. An equal distribution between the sexes is estimated in the range 40-60 percent, which means that a profession with, for example, 45 percent men and 55 percent women, is considered to be gender-integrated.

Aspects that we know affect the health of individuals and their stress level are the balance between the level of demands and the degree of control in their own work (Karasek and Theorell, 1990). The availability of informal networks and social support are other factors affecting individual well-being (*ibid.*, Borders, 1993). Being in the minority in the workplace entails visibility due to a deviation from the prevailing norm (Kanter, 1993). To deviate is also a breeding ground for victimization and sexual harassment. Mechanisms that are more prevalent in male-dominated environments than in mixed-gender and female-dominated environments (Wahl et al., 1998).

In addition, we should be aware that in professions requiring higher education, there are often opportunities for those who are sick to work from home instead of taking sick leave. This boundless work causes, in other words, unrecorded numbers when it comes to obtaining a picture of health in the workplace. Gunnar Aronsson (2011) highlights in his research that of those groups who have sickness presenteeism, and themselves report different symptoms of ill-health, factors such as individuals with back and neck problems and signs of fatigue are observed. Diagnoses that, in the official

statistics from the Social Insurance Agency about sick leave, are dominated by women. Sickness presenteeism is a phenomenon that is probably influenced by factors such as lower job security, increased overtime, unclear career paths and the degree of social support (Caverley et al., 2007). A Swedish survey based on a study of just over 8000 individuals from Swedish Longitudinal Occupational Survey of Health (SLOSH) shows that further research is needed to understand the causes of presenteeism and sickness absence (Leineweber et al., 2012). The phenomena correlate with each other, that is, individuals choose to not be on sick leave due to illness, or are present at work despite illness (Leineweber et al., 2012). Usually, those who are or will be on sick leave also show sickness presenteeism.

2.1 OCCUPATIONAL SICKNESS ABSENCE

American sociologist Arlie Hochschild's (2001) classic work "The Time Band" shows that women's increased participation in the labour market reproduces rather than deconstructs the traditional gender norms. Despite workplace and government attempts to give employees the opportunity to balance work - family, the expectations for women and men are traditional, hence attempts to break the norm and the traditional order of things being limited (Wharton, 2012, Hochschild and Machung, 2012). Workplaces can thus be described as sluggish organisations with great power over our lives (Hochschild, 2003; Hochschild, 2001).

Research has shown that economic booms and recessions affect sickness absence in that these numbers will increase during a boom because more individuals with poorer health are employed (Angelov, 2011). The opposite effect is seen recessions, when the choice of employment is lower and the risk of withdrawal from the labour force increases. We also know that more women than men have temporary and/or part-time work, which makes them more vulnerable to bad economic times (ibid.) (RFV, 2004).

Current statistics show that after the first child, women's sickness absence due to illness is higher than men's (Angelov, 2011). In addition, this discrepancy has increased over the last 30 years, and to some extent it can be explained by women's increased participation in the labour market (McDowell, 2001). The average difference between men and women's higher sick leave is significant. According IFAU (Institute for Labour Market Policy Evaluation), 14,5 million daily sickness allowance days were paid out to women and 9,5 million daily sickness allowance days to men. These are not days of parental leave but of absence due to illness.

Women's hours outside paid work are more extensive than men, partly because of the gender roles in Swedish society. A pattern that shows itself in the fact that women account for 76 percent of the withdrawal of days with parental benefit, that more women than men have temporary employment, and that women work fewer hours than men per week (SCB, 2012a) (SCB, 2012b). Women's valuation of leisure time is based on responsibilities in the private life and in the family (SOU, 1998: 6). In other words, the loss in terms of care of the family becomes high if the woman becomes sick for a long time (Angelov, 2011). Based on this reasoning, women's unpaid work is described as worth more than the same is for men (Hirdman, 1988, SOU, 1998: 6). At the same time an explanation for women's sick leave after the first child could be this unpaid work, possibly in combination with psychosocial work environment factors such as the feeling of having too much to do at work, and finding it hard to sleep because of the thoughts of work.

What affects our health in working life?

We need to discuss the concept of health, and ask ourselves whether it should be measured in terms of presence at work. The objective for the employer should perhaps be higher than that, and involve factors that contribute to creating a good physical and psychosocial work environment with freedom to discuss, which we know generates good health (Jeding, 1999). Research on the characteristics of an unhealthy work environment shows factors such as sickness absence, reduced efficiency, increased staff turnover, accidents at work and conflicts between employees (Jeding, 1999 Sandkull, 2008). A further factor that can be added to these is gender. We know that with a non gender-equal organisation comes the psychosocial aspects of conflict, harassment and staff turnover. A gender-equal workplace however, leads to a creative environment, good health and increased productivity. Researchers Arundel, Lorenz and Lundvall et al (2007) also show the latter when they indicate that the countries in the EU that have a more stable economy are characterized by democratic, learning organisations with more freedom and delegated responsibility.

Overall aspects for the individual employee that affect health are forms of employment, working hours and where the work is performed (Jeding, 1999). We know that women predominate among those who have a looser connection to the labour market, or part-time employment. Women also dominate among employees in the health sector where work according to a schedule, with the irregularities that entails, is common. Research has shown that most accidents at work occur during shifts at night and early morning due to a lack of sleep (Åkerstedt and Beck, 1996).

When it comes to where the work is done, we are moving towards a more boundless work environment through opportunities for connectivity from home or other physical locations. Women tend to have greater boundlessness between paid and unpaid work than men (Hochschild and Machung, 2012), which is given the opportunity to increase further with the help of information and communication technology (ICT). Difficulty setting limits for and in the work is the basis of high psychological demands and low self-control, and involves the risk of stress reactions, which can ultimately lead to burnout (Karasek and Theorell, 1990).

To explain sickness absence and to develop methods to reduce women's work-related health problems, physical work environment needs to be put into context. Knowledge of the physical work environment in interplay with the organisational structures and processes from a gender theoretical perspective needs partly to be compiled and partly to be developed (Sandkull, 2008). We can probably reduce the sick leave rate if we, based on gender critical perspectives, can gain knowledge of how the organisation, leadership and ergonomic aspects affect women's and men's health in working life.

Gender research with a perspective on work and health from the fields of social sciences, behavioural sciences, medical sciences, engineering sciences, and natural sciences, however, is currently limited (see Appendix 1). There is, in other words, a potential for increasing knowledge about our work environment. Gender-critical perspectives are most common in stress research and research on burnout as well as, to some extent, in areas such as research on sick leave and "effort-reward" (ibid.). Generally, Sweden has a larger than expected proportion of articles published in the areas of "participatory ergonomics" and "low-back pain." Research on sick leave does occur but not to the same degree as in many EU countries. In the social science sections of work science, Sweden has, according to the bibliometric study, high activity in areas such as burnout and professions (ibid.). Other forms of publications than scientific articles, however, affect the bibliometric results in this field.

Within the female-dominated public sector, long-term sick leave is overrepresented. Causes of absence due to illness are physical loads, which sometimes manifest themselves in the form of repetitive strain injuries as well as reactions to stress that manifest themselves in mental ill-health.

2.2 SUMMARY

The above section shows that:

- The highest number of sick-listed (> 14 days) women per 1,000 employees is in plant and machine operators, etc., work without training requirements as well as service workers, care workers, and sales workers (Försäkringskassan, 2011).
- The highest number of sick-listed (> 14 days) men per 1,000 employees, is in jobs without required training, craft and related trades workers in construction, etc. as well as plant and machine operators, etc. (Försäkringskassan, 2011).
- Mental ill-health as a cause of sick leave is, in percentage terms, common in work demanding theoretical specialist competence, shorter higher education, as well as managerial work (Försäkringskassan, 2011).
- Women's increased participation in the labour market reproduces rather than deconstructs the traditional gender norms (Hochschild, 2001).
- There is a tendency that the more gender-integrated a workplace is, the better the health of the staff (Alexanderson, 2004a).
- Women's absence due to illness increases after the first child (Angelov, 2011).
- Women's hours outside paid work are more comprehensive than men as a result of, among other things, societal gender patterns.
- When it comes to sleeping problems and difficulties sleeping because of thoughts about work for at least one night a week, women predominate in all socio-economic categories (see Figure 3).
- Sickness presenteeism is a phenomenon that is probably influenced by factors such as decreased job security, increased overtime, unclear career paths and the degree of social support (Caverley et al., 2007).
- Factors such as sickness absence, reduced efficiency, increased staff turnover, accidents at work and conflicts between employees characterize an unhealthy workplace (Jeding, 1999, Sandkull, 2008).
- With a non gender-equal organisation come the psychosocial aspects of conflict, harassment and staff turnover.
- Women tend to have greater boundlessness between paid and unpaid work than men (Hochschild and Machung, 2012). Difficulties setting limits for and in the work means a risk of stress reactions, which can ultimately lead to burnout (Karasek and Theorell, 1990).

- Gender research with a perspective on work and health from the fields of social sciences, behavioural sciences, medical sciences, engineering sciences, and natural sciences is currently limited (see Appendix 1). There is in other words, a potential for increasing knowledge about our work environment.

3. Swedish working life – knowledge and organisation

3.1 SWEDISH WORKING LIFE RESEARCH WITH A GENDER PERSPECTIVE

Since the 1970s, Swedish working life research has, internationally, had a strong position and tradition. After the establishment of the state-funded Centre for Working Life (ALC) in 1977, which had its foundation in employee participation and the introduction of the Co-determination in the Workplace Act (MBL) (SFS 1976: 580) followed the creation of the FA Council (Council for Business Management and Workplace Issues) in 1981. The FA Council was an independent research institute founded by the Swedish Employers' Confederation (SAF).

Research about women's working life in the context of ALC activity can be described from the study "A question of gender" (Gonäs, 1989) which gave a picture of structural change paths, as well as from researchers such as Annika Baude (1985, 1987) Gunnel Forsberg (1986, 1989) and Ewa Gunnarsson (1984, Gunnarsson et al., 1985, Gunnarsson et al., 1989). The research focus was mainly on women and structural changes, introduction of image processing, and gender issues in the workplace and in private life. In the FA Council we can particularly mention Anna Wahl's (1992) dissertation on the career development of female economists and graduate engineers.

In the late 1980s, The Work Environment Institute (AMI) was developed, whose research previously belonged to the Board of Occupational Safety and Health. One of the major funders of the research was (the Swedish) Work Environment Fund. In the mid-1990s, this research institute, together with the Swedish Centre for Working Life created the National Institute for Working Life (ALI).

The latter meant that two different research traditions came together, the social sciences tradition at the ALC, and the natural scientific, medical and somewhat technical scientific perspectives at the Work Environment Fund. Research on women and men as a biological category of research work was incorporated in the same organisation as the more critical and reflective research into, primarily, women's working life.

Just over ten years later, in 2007, a change of government and a government decision would lead to ALI being closed down. The then on-going research work was divided between the Swedish

universities. An attempt at cohesive links for today's research on working life is a forum for working life research, FALF (www.falf.se, 2012), which annually organizes research seminars, as well as, with the support of FAS (Swedish Council for Working Life and Social Research), providing a graduate school of work science.

The common thread in work organisation research has, since Taylorism and until today, been the productivity and the national economy, but also concepts such as democracy, participation and learning organisations (Ellström, 1996).

Working life research in Sweden was primarily funded in the 1990s by the former Working Life Fund, and the Work Environment Fund. In total, funds were allocated for 25 000 projects by these players. The funders' impact on Swedish working life research was therefore considerable. Today the research funds' economic opportunities have dwindled, and at the same time we are seeing increased globalization, recessions, and the privatization of the public sector. These are major issues directly affecting labour organisations, the leadership, and staff. With increasing internationalization, a need for additional knowledge and understanding of different cultures and the meaning of gender in different contexts also arises.

The Swedish innovation agency Vinnova has, in the 2000s, and especially after the closure of the National Institute for Working Life, been a visible player in working life research, with a focus on innovation, sustainable growth and collaboration with technology companies. The concept of innovation has, at the expense of the social aspects, developed a technical character. Over the past ten years, however, there has, within the framework of Vinnova's activities, been an investment in both gender mainstreaming (Gunnarsson, 2007b) and targeted financing for gender equality, gender and innovation, which also includes social aspects.

One of the conclusions from the projects carried out within the framework of these efforts at Vinnova, is that gender equality projects need to be based on one's own business needs and gender studies. It also became clear that there are a lack of methods of change management aimed at improved gender equality in organisations (Gunnarsson, 2007b) (www.vinnova.se). Other targeted investments from Vinnova are women's entrepreneurship and funding for female researchers.

The other major financier of Swedish working life research is the Swedish Council for Working Life and Social Research (FAS, today FORTE), which has a broader role with a focus on basic research

and applied research. Every year calls are made for larger research projects with prioritisation committees within areas such as work organisation, the labour market, work, environment and health, as well as work, every-day living and health (www.fas.se). Examples of projects with a gender-related focus are work organisational research, and research based on the concept of gender about work environment, risk and exposure.

3.2 GENDER EQUALITY AND WORKING LIFE RESEARCH

The state commission of inquiry about women's power (with Professor Anita Nyberg as primary secretary) was presented in the late 1990s (SOU, 1998: 6) in a context where the on-going political agenda was to integrate gender in main activities, so called mainstreaming (Berg, 2001).

The concept of mainstreaming was founded, in the international arena, in integrating women in decision-making in development and aid work (Berg, 2001) This starting point was based largely on women bringing change and development, which in turn would lead to better conditions for the group, women. The risk was, however, that women's choices instead became different adjustment strategies in relation to the power structures that permeate the work organisations (Gunnarsson, 1994, Wahl et al., 1998; Lindgren, 1999 Hirdman, 1988). The policy was partly based on the problem being with the group of women, and that if this category was integrated, equality would result.

In the 1990s, the concept of mainstreaming was developed into a strategy in which all sectors of society had the responsibility for gender equality (Berg, 2001) (page 19). Mainstreaming was thus developed from a pure women's issue to a gender-equality issue linked to various activities in society. When the focus shifted from women to gender equality the man was also to be included and the term was changed to "gender mainstreaming" (Ds 2001: 64).

One criticism that can be levelled against "gender mainstreaming" is that the gender equality question is in danger of disappearing in the "noise" of other issues and support functions of an organisation's activities. It is therefore central that the organisation's management not only legitimizes the issue, but also commits to actively pushing forward gender equality in their own activities (Berg, 2001 Vånje, 2005). To realize this strategy demands knowledge in stakeholders about gender equality and the importance of gender in organisations, and in particular in their own operations (Abrahamsson, 2000). To achieve sustainable change also demands that all relevant stakeholders are involved in the development of

values as well as objectives (Vänje, 2005, Ekman Philips, et al., 2003, Gustavsen, 2001)

Within the framework of the National Institute for Working Life's interdisciplinary research program "Gender and Work", the methodological approach of initiating research on the basis of dialogue conferences on the theme of gender equality was applied. The approach showed trials to, within the framework of a research institute, weave gender theoretical research together with practical equality work. The approach, which was partly new in gender research, can be seen from the on-going discourses in society where equality became more evident in the political agenda and which was also reflected in the research structure and content. The research focus thus shifted from research on women in working life to research where women's working life was placed in relation to the concept of equality.

Researchers in the program "Gender and Work" highlight that Swedish working life in the 2000s faced openings and opportunities in terms of gender equality and that prevailing power structures and norms may change. The gender equality work that was going on the entire time, however, typically for the time, dealt with working with equality on the basis of the previous Equality Act (SFS 1991: 433) and the then Equality Ombudsman's' recommendations.

Equality itself was expressed during the 2000s in terms of equal pay, that is, a fair salary regardless of gender. The structural segregation of women and men in different professions had its natural explanation in terms of women's and men's different preferences in employment (Gonäs, 2005). Furthermore, the general perception in the community was that the presence of women in working life contributes to a better psychosocial work environment (it will be nicer in the workplace) and the men's presence contributes to a higher quality of work due to competence (professionalism) (Eriksson and Eriksson, 2003). In other words, gender issues were simplified in order to gain access to women's and men's different skills; not to question and change conditions and prevailing power structures.

The most important result of the studies in the research programme are, however, according to the study "On the Verge of Breakthrough" (Gonäs, 2005), that there was a clear discrepancy between the results of the questionnaire survey, interviews and observations conducted by the researchers, and on the other hand, how the workers and employers interpret the meaning of gender and gender equality. The latter group reacted to the problem of different conditions for

men and women in working life as a non-issue. An approach that showed a social discourse where the natural and biological was an explanation rather than an uneven balance of power, economically, socially as well as health-wise.

Unlike the research program “Gender and Work” the MOA project (Modern working and living conditions for women and men), conducted during the second half of the 1990s, had a purely basic research-focused purpose, namely to develop methods for exposure assessment and analysis strategies appropriate for population studies. Population studies could shed light on the importance of paid work for health development, the risks at societal level that are associated with ill-health, and contribute to work with preventive health (Härenstam, 2000).

3.3 HEALTH CARE AND SOCIAL CARE WORK IN TODAY'S WORKING LIFE

Changes in the Swedish model and the on-going privatization trend have a big impact, from several aspects, on the former non-profit organisations in health care (Magnusson, 2006). Today's efficiency trends, with a focus on results means that labour organisations, in order to function properly, are relying more and more on individuals' emotional and invisible work (Hochschild, 2001).

Women entering the labour market occurred partly through health care and social care work and involved a transformation from the natural private care work to public professional care work (Fine, 2005). With the professionalization of care work, women's bodies become a tool where physical contact is the essence of these occupations. Thus, there is what could be described as an integrated vulnerability in these occupations (Fine 2005). It consists of an emotional commitment (Hochschild, 2003) and of heavy physical labour. The professional area also includes physical contact with patients in taboo intimate areas, i.e. outside of what is appropriate according to the social norm (Fine, 2005). Care work can be, based on the above, described as physically and mentally demanding tasks performed by above all ward assistants, assistant nurses and, to some extent, nurses.

The Canadian researchers (Kosny and MacEachen, 2010) argue that organisational changes in the wake of efficiency, include an expansion of women's invisible work (Messing, 1998). This invisible work is often taken for granted at the same time that it, because of its nature, is not valued based on qualification, and therefore, wage. With invisible care work also comes work environment risks, which are not necessarily visible to the naked eye (Messing, 1998 Kosny

and MacEachen, 2010). One criticism made in the research is that the invisible work usually done by women has historically been regarded as safe and without risks, because these tasks are in the zone of the non-visual (ibid).

The above study is based on empirical data from three different aid organisations (operating with the help of paid labour). The results (ibid.) show the various forms of invisible work; background work, empathetic work, and emotional work. Background work can be described on the basis of concrete practical work that is included in the execution of the different tasks without it being in either the formal or informal job descriptions. Empathetic work was described as various forms of relationship-building activities. Added to these two aspects of invisible work is the employee's ability to manage their own emotions, in this case in relation to the care recipients / patients, that is, the emotional work.

The latter can also be described as "emotional management" (Hochschild 2003, ibid.), where workers control their emotions in order to perform their duties in an expected way. The standard for healthcare related jobs is also to not show emotions and is influenced by intersectionalities such as gender norms, class, position in the organisation, current cultural factors, and contextual prerequisites (Wharton, 2012). The above means that the employees are involved with emotional individual capital outside the confines of paid work (Hochschild, 2003). A form of boundlessness arises therefore between paid and unpaid work and the individual's public and private identity (Hochschild and Machung, 2012).

Medical doctors are a professional group that traditionally have power over their labour situation based on status, a high degree of self control and higher compensation than other healthcare jobs (Fine, 2005) (Lindgren, 1999). Their work is not as physically demanding as that of nursing staff, since they do not carry out the heavy and dirty care work described above.

The professional group of physicians is also affected by the restructuring taking place in the sector based on increasing demands on performance, combined with fewer resources. In the autumn of 2012 a larger hospital in Sweden sounded the alarm about the safety of patients being affected due to resource shortages as a result of savings demands (www.tv4play.se, 2012). In addition, research has previously shown that the group of female physicians is one of the professions that has the highest suicide rate (Schernhammer, 2004). Women who are physicians find themselves in a minority position in a previously male-dominated profession

with informal demands to work more than men in order to achieve the same performance level (Schernhammer, 2004), and may have difficulties obtaining the support of the medical staff as a result (Lindgren, 1999).

3.4 SUMMARY

This section on the organisation of work and gender equality discourses in Swedish working life shows that:

- Common themes in Swedish research about labour organisations have been concepts such as democracy, participation, and learning organisations.
- Gender equality projects need to start from the needs of one's own organisation and a gender theoretical ground (www.vinnova.se (Gunnarsson, 2007b)).
- In the 1990s, the concept of mainstreaming developed into a strategy in which all sectors of society had the responsibility for gender equality (Berg, 2001) (page 19).
- Research focus shifted during the early 2000s from research on women in working life to research into where women's work was placed in relation to the concept of gender equality.
- Typically for the time, gender equality work that took place during the late 1990s and early 2000s was about working with gender equality on the basis of the previous Equality Act (SFS 1991: 433).
- There is a tendency towards attitudes to women's presence in the workplace contributing to improving the psychosocial work environment and that men's presence contributes to a higher quality of work (Gonäs, 2005).
- Women's entry into the labour came about partly through health care and social care work, and involved a transformation from the natural private care work to public professional care (Fine, 2005).
- Today's efficiency trends in the healthcare field (see, inter alia, www.leansjukvard.se) with a focus on results, means that labour organisations, in order to function properly, rely increasingly on individuals' emotional and invisible work (Messing, 1998 Kosny and MacEachen, 2010, Hochschild, 2001).
- Invisible work is often taken for granted at the same time as, because of its nature, it is not valued on the basis of qualifications and wages.

- With invisible care work also comes work environment risks that are not noticeable to the naked eye (Messing, 1998 Kosny and MacEachen, 2010).
- Employee involvement in the form of individual emotional capital, outside the confines of paid work (Hochschild, 2003) causes a form of boundlessness between the individual's public and private identity (Hochschild and Machung, 2012).

4. Occupational health

In the anthology “Perspectives on women’s health in the workplace” (Sandmark, 2011) the claim is made “... *that in the research female gender is often seen as a risk factor in itself.*” (Leijon, 2011) (page 85).

The reasoning in the quote is based on a conceptual model in which the biological gender, woman, is seen as an answer to why some individuals are affected to a greater extent by work-related physical disorders and stress related diseases than others. The assessment that there is a “risk” in being a woman in working life has, over time, been addressed by various forms of formal and informal adjustment strategies, largely from individuals and organisations. Examples of such strategies are part-time work and gender marking (Westberg, 2001) of work tasks in order to reduce the physical and psychosocial load and thus improve health in the workplace.

Gender differences in work-related ill-health can be explained based on women’s and men’s different conditions or based on it being natural (see Table 1). There, the natural can be described as a more or less innate nature explanation, what we are predisposed to as women and men (Robert and Uvnäs Moberg, 1994). The reasoning is based on a clear dichotomisation of the biological sexes. The nature-based explanation does not threaten any power structures, because the theoretical framework is based on the state of affairs being natural. Thus, we do not open up to the need for change and development. In medical gender research, however, criticism of the biological rationale has grown in the 2000s, and with this, the question of power has also been highlighted (Vetenskapsrådet, 2004).

Table 1: Different perspectives give different explanations for the gender difference currently existing in society (Wahl, 2001) (page 39).

| Analytical levels | Perspective | |
|-------------------|---------------------|----------------------|
| | General evaluations | Research |
| Description | Gender differences | Gender differences |
| Explanation | Our nature | Different conditions |
| Interpretation | Nature | Social order |

If we instead follow the discourse about different conditions, and choose to look at gender differences in the reporting of work-related disorders and ill-health from a more critical perspective, we open up opportunities for change and development. It then simultaneously

becomes more threatening and difficult to treat, because it requires a critical examination of our prevailing norms and structures, not only in the workplace but also in private life. Not least because such scrutiny includes the question of power and our beliefs and expectations about how women and men should be. Cultural values that are deeply rooted in our workplaces (Gherardi, 1994).

The approach's different conditions are based in women's and men's bodies being mostly physiologically comparable and that gender differences are socially constructed. Traditionally, however, the starting point was that women's bodies are weaker in comparison to men's bodies in terms of muscle strength and fitness.

From a biological perspective, men and women have different kinds of reproductive organs and systems, and different sets of (the same) sort of hormones (Fausto-Sterling, 1992).

In addition, the biological differences are not as great as we previously thought. They are surrounded to some extent by myths and partly by how we live, as well as by social constructions. The American scientist and biologist Ann Fausto-Sterling (1992) suggests that the growth hormone, which is one of several components that regulate our future height and muscle strength, begins to develop during early childhood and is affected by how much we physically move our bodies. Greater physical activity early in life gives us a longer and more protracted period of growth, which in turn leads to increased height and thus increased muscle strength (ibid.).

Statistically speaking, women reach 80 percent of men's strength in the upper limbs, arms and shoulders, when body size is the same in both sexes (ibid. p 217). In the lower extremities, the difference for the same body size in men and women is only seven percent in favour of men. If the starting point for the calculation of the lower extremities is pure weight, i.e. without body fat, the figures are reversed. The women then have almost six percent stronger legs than men (ibid. p 217). To be noted is that the above statistics apply to women and men with the same body size. If we compare men and women, the physical potential is, in other words, virtually the same in the lower limbs while men can achieve greater muscle strength in the upper extremities. These differences are general and not individual, which means that a physically fit woman may well be stronger in the upper limbs than an unfit man.

The above reveals that

- women and men have the same kind of hormones, though in different amounts

- human physical activity in the early years affects the amount of growth hormone and development of the muscles and strength (in combination with genetic prerequisites)

- women and men with the same body size have the potential for equal strength in the lower extremities.

Social factors have, in other words, influential power in the biological evolution of our bodies. Boys, teenage boys, and adult men have, in contrast to girls and women, until not so long ago, had a social norm that meant that physical education and sport is not only permitted but expected (Fundberg, 2003). Cultural values that meant that men's bodies received more favourable conditions in terms of physical development. A concrete example of how this norm has affected women's and men's physical endurance is how record times for women running marathons has evolved from times of around 3.00 to 3.30 (around 2.10 for men) during the 1960s to 2.22 (2.08 for men) in 1983 (see table 2). In 2012, the world record at this distance for women is 2,15,25 and for men 2,03,38. With the rise of women athletes, and with exercise and increased physical activity in younger years, times have improved by over an hour for women and about five minutes for men since the 1960s. Since the turn of the last century, the women's record in marathon running has improved by three hours and 25 minutes, the corresponding figure for men is one hour and 15 minutes.

Table 2: Statistics on women and men's world best and / or world record in the marathon (42,195 meters) (http://en.wikipedia.org/wiki/Marathon_world_record_progression)

| Period of time Gender | 1896-1918, year within () | 1960s, year within () | 2003-2011, year within () | Development of time over 1 century in hours |
|--------------------------|------------------------------|--------------------------|------------------------------|---|
| Women | 5,40 (1918) | 3,19,33 (1964) | 2,15,25 (2003) | 3,25 |
| Men | 3,18.00 (1896) | 2,15,15 (1963) | 2,03,38 (2011) | 1,15 |
| Difference Women-men | 2,22,00 | 1,04,18 | 0,11,87 | 2,10 |

What significance does this knowledge have for the workplace, the work environment and the promotion of a sustainable working life? Above all, the above facts show that it is not always gender that is decisive for the ability to cope with various forms of physical stress.

Equally important is body size/body height and fitness. Regarding the latter, we have seen that women have approached men in endurance, i.e. sub-maximal load, over time. In other words human biology and the social structures interact in close interplay with each other.

We can, however, not explain gender differences in working conditions and the different prerequisites in working life for women and men on the basis of biology.

4.1 RESEARCH ON OCCUPATIONAL HEALTH FROM A GENDER THEORETICAL PERSPECTIVE?

When it comes to research on work and health, most studies up to the 1980s, were based on data consisting of men and thereafter on women and men, only women or only men. Analyses of work-related factors and their impact on health from a gender perspective or gender theoretical perspectives have been and are rare (see Appendix 1). The two main research areas of work safety and hygiene factors had an empirical focus on men in the workplace. Men are also the group, from a normative assessment, that are more risk-taking than women and therefore better served by the results based on the former research direction.

In line with increased globalization, structural changes based on women's increased participation in the labour market and in higher-level work, and men's increased responsibility in the private sphere, the need for knowledge about women at work, including ergonomic and psychosocial issues, increased (Sandmark, 2011).

Researchers Artazcoz et.al (2007) believe that there are knowledge gaps regarding the segregation in the labour market and the implications for occupational health (see also Chapter 2). Not least on the basis of analyses that, in addition to health, include gender and social class. Intersectional studies on employment, private life, gender and social class are also called for (Artazcoz et al., 2007).

The interdisciplinary research program "Modern working conditions and adjoining living conditions for women and men" (the MOA project) conducted in Sweden in the late 1990s, was an attempt to weave together the theoretical aspects of gender and occupational health. The aim was to develop methods for exposure assessment and analysis strategies appropriate for population studies. Population studies could shed light on the significance of paid work for health development, risks at societal level that are associated with ill-health, and contribute to preventive health work (Härenstam, 2000). Here were, in other words, those intentions that

were called for on the international scene about ten years later. The methods were organisational descriptions through interviewing managers and open individual interviews with informants who also answered a public health survey (ibid.). In addition, physical function tests and assessments of psychosocial conditions and ergonomic exposure conditions were carried out (ibid.)

The researchers stated that the group of study individuals, the informants, were heterogeneous based on aspects such as gender, sector, occupation, position and employment conditions.

In short, the MOA project resulted in knowledge about survey questions and analysis models in order to study the interplay between work, living conditions and health. A comprehensive analysis of men's and women's working and living conditions from a health perspective was also carried out. If the subsequent research program "Gender and Work" at the Institute gave answers to questions about various discourses on the issue of gender equality at all levels of society, the MOA project gave quantitative data on women's and men's working and living conditions. The two research programs can be said to be typical of their respective times. Where the MOA project was developed based on past gender-blind research on health at work as well as social science research on women's work, "Gender and Work" was, in turn, a reflection of the 2000's gender equality policy with the Equality Act, gender equality plans and mainstreaming in focus.

Unique to the MOA was that both sexes, men *and* women, were analysed from a gender perspective and that there were prerequisites to compare men and women with objectively the same work situation. These gender-matched samples were carried out based on the type of occupation and level of qualification of the work, based on socio-economic classification (ibid. page 7). The parameter life situation was assessed by scientists as practically impossible to match on the basis of the difficulty of finding men and women who had both the same work and the same life situation.

Within the framework of the so-called gender-matched sample, gender differences were found in 21 of the 95 variables that would measure both the work and living conditions (Härenstam, 2000). The 21 variables were found in the areas of psychosocial working conditions, chemical and physical working conditions, employment conditions, as well as the private sphere and the boundary to the sphere of work.

Overall, it was clear that women's work situation was more time-pressured and consisted of more hindrances in the everyday work

than men. In addition, women had longer travel time and had higher demands on attendance at work. Women also had greater responsibility to see that family and home functioned, and spent more time per week on unpaid work in the home. The women also had less time for leisure and relaxation than men. However, they had larger social networks than men and more influence over when the work at home would be done (ibid.).

For the men in the MOA study, the results were that they had higher circulatory strain at work, often extra work outside of regular working hours, the main responsibility for supporting the family, and higher heart rate increase during leisure time (ibid.). It should be pointed out that the above results are from the gender-matched sample where men and women worked in the same industry and the same profession, and objectively had the same tasks (in several cases at the same workplace).

Research is needed on why these gender differences occur. Even in countries where a higher proportion of women study at university and University College, patterns occur which show that women have poorer psychosocial work environment and career development than men, and more often encounter discrimination (Artazcoz et al., 2007).

4.2 REGIONAL PRACTICES ARE GOVERNED BY EDUCATIONAL LEVEL AND CLASS

Within the framework of the research program "Gender and Work" a population survey covering about 5000 individuals in Östergötland County was carried out a few years later. This survey showed that more women than men reported musculoskeletal disorders and symptoms in the neck, shoulders, hands, upper back, hips, and feet (Gonäs, 2005, Bildt and Karlqvist, 2004). The group of men reported in turn a higher proportion of knee pain (ibid.).

Based on the survey results, researchers stress that although work-related disorders in the form of musculoskeletal symptoms are closely interwoven with social class in the form of education, these symptoms are also common among highly educated men and women (ibid.). It is possibly not only monotonous repetitive work in professions requiring a low level of education that cause this type of musculoskeletal disorder.

Mental health was also investigated using the above questionnaire, among other things in the form of psychological well-being. Interesting to note is that as many as 20 percent of respondents claimed to have impaired psychological well-being. Of those who

considered themselves happy, harmonious and full of energy, most were men. The opposite, that is, reports of fatigue and sadness, came from a majority of women (ibid. page 159). We can assume from the above results that the social structures and norms of the organisations not only affect psychosocial health, but also physical well-being.

Research on demands, control and social support (Karasek and Theorell, 1990) in the work has shown that these factors have proven connections (Jeding, 1999 p 41) with physical and mental ill-health. More basic gender-theoretical analyses of the practices and processes that lead to the level of demands, control and social support at work can be found in the work organisation research. Studies where these research traditions meet are, however, rare (see Appendix 1).

4.3 THE QUESTION OF WHETHER COMPETENCE AFFECTS HEALTH

The most common variables for long-term sick-listing in women of the population were, according to Sandmark (2011) (p 118) that the sick-listed women considered themselves to

- lack the skills to fully carry out their duties
- thrive less in their workplaces
- have excessively heavy physical work.

The variables show that the causes of long term sick leave are complex and depend both on the organisational aspects and the physical work environment. A central question in relation to the latter, however, is the degree to which different factors interplay with each other and increase the risk of long-term sick leave.

Alarming in Sandmark's (ibid.) study, the variable is the feeling of not fully having the skills for their work. Organisational research into women's and men's skills shows that men tend to overestimate and women to underestimate their skills in the workplace (Abrahamsson and Gunnarsson, 2002). Women are also not always considered obvious skills carriers (Vänje, 2005, Gunnarsson, 1994). This is particularly evident in traditionally male gender-labelled professions such as physicians, lawyers and the technical sector professions as well as in roles such as manager or leader (Westberg, 2001, Westberg, 1998, Gunnarsson, 1994, Vänje, 2005).

Aspects that promote health in the workplace and thus prevent sick leave among women in elderly care and home care services were, according to Sandmark (2011) (p 120) ; (i) rewarding jobs despite their low status, (ii) supportive and social networks as well as (iii) coping ability. The latter is about the ability to handle any difficulties in the

work and outside the work. Important factors for health at work were to be in the right jobs, i.e., sense of competence in their work, and to live in a gender equal relationship (ibid. page 120).

Worth pointing out here is that the feeling of being in the right job is not the same as the formal skills that the individual has for the actual work. It is largely about what is being performed in the work being rewarded by managers, employees and possible patients.

4.4 SUMMARY

In the above section on occupational health and work it is shown, among other things that:

- Analyses of work-related factors and their impact on health from critical gender perspectives have been and are rare (see Appendix 1).
- Strategies to improve women's health in the workplace can be described in terms of adjustment to prevailing norms on the basis of opportunities for part-time work and gender marking of tasks (Westberg, 2001). If we instead apply the perspective of different conditions and choose to look at gender differences in the reporting of work-related problems from a critical perspective, we open up opportunities for change and development.
- Physical differences between men and women are general and not individual, which means that a physically fit woman may well be stronger than an unfit man.
- Women also, over time (due to social factors), approached the men in endurance, that is, developed the ability to cope with sub-maximal loads.
- Previous research shows that women are more likely than men to feel that they have significant barriers at work (32 percent of women and 17 percent of men) (Härenstam, 2000).
- The same research shows that men (23 percent) more than women (8 percent) felt that social support and backing increased in connection with organisational change (Härenstam, 2000).
- A population study showed that of those who considered themselves happy, harmonious and full of energy, most were men. The opposite, that is, reports of fatigue and sadness, came from a majority of women (Gonäs, 2005).
- Key factors for health at work are: to be in the right job based upon sense of competence for the work, and to live in a gender-equal relationship (Sandmark, 2011).

5. From research on women only to the importance of variation

5.1 WHAT IMPACT DOES GENDER HAVE ON A WORKPLACE?

Research on the meaning of gender in our work and our work organisations has moved from a focus on women to including the interaction between intersectionalities such as gender, class and ethnicity (De los Reyes and Mulinari, 2005).

Research about gender and gender-theoretical aspects of working life from a social constructionist perspective and research on work environment, health and gender from a natural science and medical perspective has, until today, been separate and carried out within two different tracks. The bibliometric study conducted within the framework of the work with this knowledge compilation also shows this (see Appendix 1).

Work organisation research was, for many years gender-blind, and to some extent still is. Considering the doing of gender in organisations and workplaces is not obvious, although research and government inquiries over many years have shown that it plays a role in our working life (Kvande, 2003; Rasmussen, 1994, Korvajärvi, 1998, SOU, 1998: 6, SOU, 2004: 43, Wahl, 1992).

From an international perspective, research on organisation and gender became visible on the scientific agenda since a sociology conference in the late 1980s in the United States included the track "A Feminist Critique of Bureaucracy" (Acker, 1999) (p 178). In Sweden, research with a gender perspective in the work organisation came relatively early, with published texts during the early 1980s (Gunnarsson et al., 1985, Ressner, 1985). The focus was on women and segregation in organisations. The first doctoral theses in Sweden about the organisation and gender were, among others, Gerd Lindgren (1999) "Comrades, colleagues and women," Gunilla Fürst's (1994) "The retreat from man's work," Marta Blomqvist (1994) "Gender Hierarchies in Flux" and Ewa Gunnarsson's "Dare to be Equal!" (Gunnarsson, 1994). This area can also include Anna Wahl's (1992) dissertation on the career paths of female economists and graduate engineers.

Today, research on organisation and gender is well-established (Vänje, 2005). The perspective has shifted from highlighting the group women in the structures to emphasizing contextual aspects and process, including the value of power.

Masculinity research has evolved and taken shape. A pioneer in this discourse is Robert Connell (1999), who, in his book "Masculinities," weaves together psychoanalytic and social scientific research in his quest to understand the individual as well as gender relations and the significance of social structure.

Political scientist Bo Rothstein (Rothstein, 2012) makes an attempt to explain why Sweden, which is designated as one of the world's most equal countries, has such a clear and traditional division of labour between heterosexual couples with children. According to Rothstein, it is irrelevant if the pairs are young or a little older, rather it is the heterosexual norm governing the distribution of everyday tasks (ibid. p 326). Although the formal structures of society pave the way for equal conditions on the basis of access to education and childcare, the traditional norm is still strong. A norm and social structure that is maintained by a gender order in which men and women are segregated as well as in the hierarchy separate from each other (Hirdman, 1988).

The theory of gender order can be used to understand power relations as it is based on two logics, segregation and hierarchism between the sexes on a structural level. Where power is the very basis of social superiority and subordination as well as the vertical differentiation between women and men (Hirdman, 1988).

If we describe how the pattern looks today, we find that, in most workplaces, there are processes in the form of hierarchies and the segregation of women and men, to different positions and tasks (Acker, 1990). Where hierarchisation in most cases shows that, the higher the organisational level, the fewer women there are (Kanter, 1993). Concrete example of this are the business and limited liability companies where only 19 percent of board members are women and 12 percent are board chairs (SCB, 2012b).

The phenomenon of fewer women higher up in work organisations is called either "the leaking pipeline" (Soe, 2008) or allocation of men. The former explanation puts women in focus as the group leaving the career system. The latter explanation talks instead about homosocial factors contributing to the number of men increasing in scale the higher up the hierarchical layers we go.

Research within the framework of the program “Gender and Work” at the Institute for Working Life was based on a comprehensive plan from studying (i) segregation and integration processes in working life, (ii) the link between working conditions and health / ill-health and (iii) the interaction between labour market, welfare state, and family / household. The three objectives take the starting point in (i) the level of organisation, (ii) the individual level, and (iii) the labour market level (Gonäs, 2005). Common to the three levels was focusing on the processes and mechanisms that affect the gender division of labour in working life, from a horizontal perspective as well as from a vertical perspective.

The objectives can be said to illuminate both hierarchies and segregation as more qualitative values of the various levels of working life. This can be read in Hirdman’s (1988) gender order as well as Ackers (1990), more process-oriented perspective on constructions of gender. The research was carried out at a temporal breakpoint where intersectionality was introduced as a concept (De los Reyes and Mulinari, 2005) and so was the issue of ethnicity, which became increasingly topical (Gonäs and Knocke, 2004).

Restoring is a term that recurs in gender studies research. This applies above all to the mechanisms and processes that constitute barriers to change and the integration of mainly women and men (Abrahamsson, 2000). Rothstein (2012 p 328) argues that explanations based on the gender order (Hirdman, 1988) do not take into account the micro-activities leading to the restoring, and the non gender-equal structures.

The economic rationality, according to Rothstein (2012), is an activity that affects the structures and plays a role in the distribution of work in private life, as well as the time for establishment on the labour market. The latter is based on men largely living with women who are younger and have thus entered the labour market later (Rothstein, 2012). A situation that gives men an economic advantage that is constantly growing and providing a stronger platform and better wages (ibid.). The choice of which party should take parental leave and take the greater responsibility for the home will be made, according to Rothstein (2012), on the basis of this economic rationality - the woman. Unanswered questions after Rothstein’s review of this rationality are partly why the man often is the older partner in heterosexual relationships, and why traditional motherhood in itself is so strong?

The American sociologist Hochschild (1997, 2002) has developed five different models showing how families manage a balancing

act between public and private life. One of these is based on the traditional values and perceptions of what is feminine and masculine in our Western culture.

If we wish to understand how these structures are created and how we can initiate change in prevailing values, theories that highlight the activities, practices and actions going on in our workplaces are useful (Ahrenfelt, 2001, Acker, 1990; Gherardi, 1994).

Organisation researcher Joan Acker (1990, 1999) has clearly demonstrated the importance of micro-activities in organisations. Acker (ibid.) argues that organisations can not only be understood in terms of complete systems, but rather that they consist of the processes and the dynamics that occur when people interact with each other. One of these processes is the construction of gender patterns in organisations. Concrete examples of various practices that are creating these patterns are division of labour and distribution of tasks, acceptable behaviour and expectations of staff, as well as hierarchies in groups and between departments. The latter was clearly shown in a study of change management at an engineering company where the female managers were responsible for departments that were not as obviously valued as the technology area, and thus had a lower status (Vänje, 2005).

The construction of symbols and ideas (images) that explain and reinforce the gender differences are also those processes that contribute to the significance of sex / gender at work (Acker, 1990). It can be about general values around different activity areas or individual beliefs about what can be expected of women and men. Processes around symbolism are reflected, among other things, in the values of women's skills within a professional area (Vänje, 2003b).

Interactions between women and men, between women and women as well as between men and men create partly superiority and inferiority, and partly networks (Acker, 1990). These interactive processes set frameworks, which are not always transparent, for inclusion and exclusion of different constellations in the workplace, for example, who participates in informal networks.

Profession, position, as well as formal and informal work tasks, are often marked on the basis of gender codes (Westberg, 2001), and influence the processes that shape an individual's professional identity (Acker, 1990). In a series of interviews with women who were working as managers and engineers at an international engineering company, most responded that the image of an engineer was an introverted man (Vänje, 2003a).

If we wish to develop a sustainable work environment, we need to work in parallel with the above processes. It is not enough to, for example, only increase the proportion of women in a working area through recruitment. This does not lead to the fading of gender labelling of tasks within the organisation's other areas, or values on different tasks changing. Based on the processes Acker (1990) highlights, we can estimate dimensions such as structures, interaction, symbols, and professional identity, which everyone together contributes to the gender-creation processes in the workplace (Vänje, 2005). This is easiest to describe in a model of the dimensions and the role between them (see Figure 5).

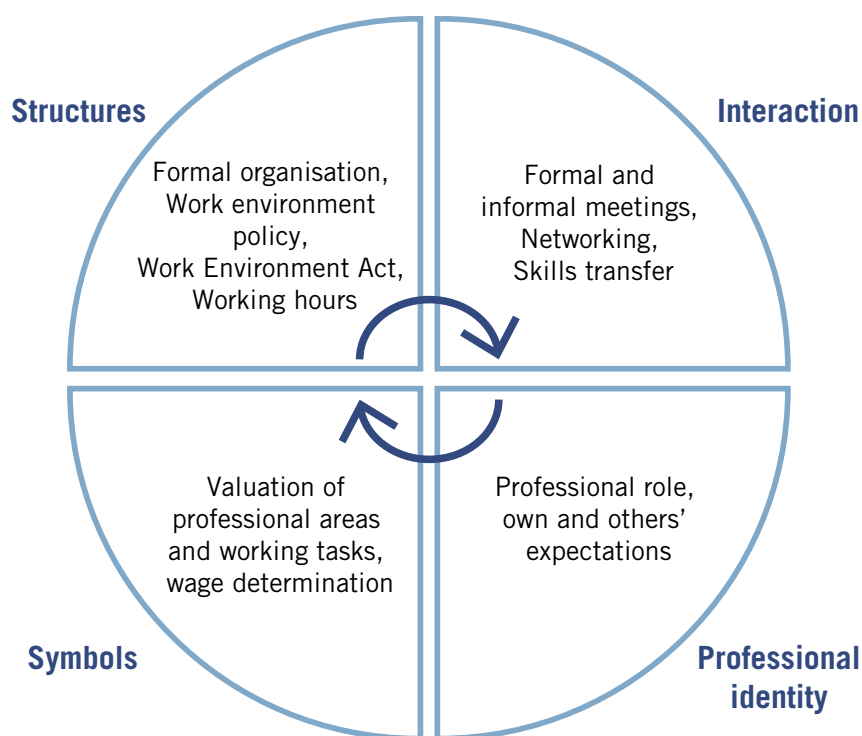


Figure 5: Four dimensions consisting of processes that, individually and together, create the significance of gender in the workplace (Acker, 1990, Korvajärvi, 1998).

5.2 MEN AND MASCULINITY

Organisations are rarely described in feminine terms, but instead such concepts as powerful and effective are used, which are reminiscent of what we, in our culture, associate with masculinity (Acker 1999).

An important crossroads in the research on the importance of gender at work is the understanding of the variations housed by concepts such as femininities and masculinities (Korvajärvi, 1998, McDowell, 2001). Added to this is also that gender cannot be seen as a concept that stands for woman and femininities, but also houses men and masculinities. Gender research has recently also raised questions about masculinities and men's interactions with each other, and especially in the area of leadership (McDowell, 2001, Collinson and Hearn, 1996, Roper, 1996).

Men's perspectives and working methods have become the norm in the workplace. Women have, on the basis of their minority position, fallen outside the norm and thus received the role of "intruders", which gender research has demonstrated through a variety of case studies of workplaces carried out during the period between the mid-1980s until the 2000s. Here, for example, we can include Cynthia Cockburn's (1993) work on women in the technology field, Elin Kvande and Bente Rasmussen's (1990) research about the organisation's various expressions of femininity and masculinity, Gerd Lindgren's (1985, 1992, 1999) research on the importance of gender and profession in health care, and Eva Gunnarsson's (2003) research on the construction of gender in modern flexible forms of organisation.

Hegemonic masculinity is a concept that Connell (1999) uses and which he describes, among other things, in terms of power and social superiority in the category men. It is thus men who possess power over other men in any form; based upon means, position and / or sports performance. The hegemonic masculinity builds up practices that form an ideal for how you should be as superior man and leader. As the majority of managers and leaders today are males, this category forms the norm of how a good leader should act. In the construction of hegemonic masculinity among men in leading positions, in other words, homosociality plays an important role (Roper 1996; Andersson, 2003; Robertsson 2003 Holgersson 2003). Hegemonic masculinity norms, such as to be strong and dominant, can be said to contain behaviour that affects occupational health (Artazcoz et al., 2007), partly based on difficulty setting limits for psychological and physical strain at work.

In the early 2000s, the British researcher Lisa McDowell (2001) called for research on constructions of masculinity across class lines within a single organisation, namely the analysis of possible conflicts between different forms of masculinity / groups of men. She argues that, for example, Collinson and Hearn (1994) have made great efforts in research on men and masculinities in our

workplaces, but that there is no comparison between the different professions and positions (McDowell, 2001). Studies with relational perspectives exist today, ten years later, published in the journal "Gender, Work and Organisation" (Pacholok, 2009, Bird, 2003), among others. An example of such research is a study of how social groupings are built up among fire fighters in the field, where some men have a higher status, higher prestige and receive more rewards, partly based upon strategies that seek to undermine groups other than their own (Pacholok, 2009). These strategies can be described as a social dynamic between men that, for example, consists of questioning colleagues' credibility and competence in their profession. According Pacholok (2009), this is basically about men who do not believe that other men (colleagues) meet the criteria of masculinity that they themselves consider to be valuable and status-filled.

Bird (2003) shows in his study of salaried workers that men's different ways of relating to other men and women in the workplace have large individual variations. A better working environment can be created if organisations' conscious and unconscious beliefs and expectations about how women and men should be can be identified and the structures can become more "open" for individual variations (Bird, 2003).

5.3 STEREOTYPES - A WAY OF CONVEYING THE COMPLEX

In order to illustrate the results of empirical studies and the importance of gender in the daily life of work organisations, different stereotypes have been used. This was particularly common in the 1990s in order to describe variations in reality. Examples of the use of stereotypes as a form are Elin Kvande and Bente Rasmussen's (1990) descriptions of four different groups that male and female engineers may face in their everyday work. The names of these variations are (i) cavaliers, (ii) competitors, (iii) comrades and (iv) comets (ibid.). (Göransson, 2004, Kanter, 1993).

Cavaliers (i) are paternalistic older men who, because of their seniority and long professional experience, do not see female engineers as competitors, but rather take a more fatherly role. At the same time, they find it difficult to relate to women as colleagues and to see women as professional engineers. Competitors (ii) are also described as paternalistic men on their way up the hierarchy. Unlike the cavaliers however, they see female colleagues as competitors for positions at the higher levels.

Comrades (iii) are described as men who are relatively recent university graduates or who lack the ambition to make a career in

the traditional sense and therefore enter into competition with their female colleagues. The comets (iv), who are highly educated men, differ from the other groups in that they have a career they are happy with and therefore do not feel threatened by women.

Based on a number of case studies, the research team of Collinsson and Hearn (1994) developed and presented five different forms of masculinity or discourses in work organisations that, to some extent, compete with each other. The five discourses are described as various - isms with the directions (i) authoritarian, (ii) paternalistic, (iii) entrepreneur, (iv) informal and (v) career (ibid. P 13).

Where the authoritarian discourse is characterized by an aggressive masculinity usually based on seniority and power relations based on control and obedience. Aggressiveness is a way to distance themselves from the men and women who are weaker on the basis that they do not have power and influence (ibid. P 13). Paternalism, is however, based on cooperation and the exercise of power by appealing to the loyalty and getting employees to identify with the organisation / workplace (ibid. P 13). Aggressiveness is absent and leadership can be described as a practice where superior men create loyal bonds with each other and with subordinate men in order to strengthen their masculinity (ibid. P 13). The group women are excluded regardless of professional orientation and position. Femininities are also strengthened in a similar manner, by inclusion and exclusion. A big difference is that women are usually not within the power structures with the potential to influence their work situation (Göransson, 2004, Kanter, 1993)

The entrepreneurial - ism is described as a more competition-oriented concept based on modern management trends. Men who are leaders seek out and identify with other men who are equally competitive, flexible and wish to maintain a fast pace (Collinsson, 1994) (page 14). The researchers believe that it usually involves young men with the attitude that the private life and family do not belong in professional life. This perspective means that women will be excluded based on their (expected) role as a parent to young children, and thus greater responsibility in the home. The above research was conducted in the mid-1990s in the UK. In today's working life in Sweden, more and more men take parental leave and are active parents who make demands on employers. Nevertheless, the old structures and discourses remain, which contributes to segregation and hierarchies in the labour market (Gonäs, 2005).

Informal networks at the workplace are built up between the men on the basis of common traditional practices (Andersson, 2003),

such as interests in sports and cars, sexual jokes, and even sexual harassment. Practices that aim to strengthen their own group and to exclude other groups who do not have the same interests (ibid.). Formal and informal male networks are developed through these relationships and so-called “male bonding”. Research team Collinsson and Hearn (1994) demonstrate how effectively mechanisms for exclusion and inclusion work to concentrate power and strengthen a grouping. This also includes large amounts of knowledge and information disseminated through informal social networks. Ekman (2003) highlights the importance of small talk when it comes to the construction of norms and beliefs in organisations. Unfortunately Ekman does not carry out any gender analysis of those participating in small talk, for example, whether it is based on different prerequisites for women and men and whether that in turn affects the constructions of masculinities and femininities.

To identify power relations is central during analysis of organisations. According to Collinsson and Hearn (1994) it is difficult to, on the one hand, highlight and emphasize variations of femininities and masculinities, and on the other hand give a picture of the structures that form the asymmetric power relations on the basis of which organisations function (Kanter, 1993, Acker, 2009, Gunnarsson et al., 2003).

For middle class men, the search for a stable masculinity based on traditional patterns is often expressed in the focus on hierarchical career opportunities (Collinsson and Hearn, 1996). Forging a traditional career is a way to consolidate their masculinity and therefore many are willing to work long hours and travel a great deal. A lifestyle that includes the denial of indications of stress, the need for good food and exercise in the pursuit of rewards in the form of higher wages and various perks (Artazcoz et al., 2007). Based on Collinsson and Hearn’s (1996) reasoning, this would mean that the distribution of parental leave in families is not only based on the man’s higher wages and economic rationality, which Rothstein (2012) (see above on page 30) highlights, but also on strengthening their own masculinity and self-esteem.

5.4 IMAGES AND EXPECTATIONS - A SECURITY THAT CEMENTS

Also interesting is the perspective that James McDonald (2012) emphasizes, which is that there are few studies conducted in female-dominated professions and how women and men construct the importance of gender and engage in practices designed to not follow the prevailing gender order (ibid.). A current question in

connection with this is whether new constructions of masculinities and femininities really are ways to relate to the current norm, or a way to get away from gender order and deconstruct the meaning of gender (ibid.)?

In his article, McDonald presents what he calls the principles that men in female-dominated professions use to strengthen their masculine identity, namely to

- distance themselves from female colleagues
- embody masculine values
- try to reconstruct the professional role
- renegotiate and redefine the concept of masculinity (ibid. P 3).

A concrete example of the above is how a man relates to the professional role of nurses without losing self-esteem and identity (Robertsson, 2003).

An important aspect based on the above reasoning is how easy it is to end up in a Catch-22 situation if we always base constructions of the social in the biological categories of woman and man. If we removed the biological categorization of gender in analyses of femininities and masculinities, it opens up possibilities for understanding beyond stereotypes and traditional notions (McDonald, 2012).

New constructions and variations of femininities and masculinities *can be* a part in the breaking down of prevailing norms around gender (ibid.). Expectations of how to be as woman and man, however, make it easy to find security in continuing to sort and categorize.

Important questions to ask in connection with changes in femininities and masculinities are how they affect different hierarchical relationships and valuations of the tasks performed, formal or informal.

5.5 SUMMARY

What is the significance of this more theoretical knowledge of the work environment? It helps us understand the social processes at workplaces, but, above all, it gives us tools to work with sustainable change projects. If we understand how the formal and informal power structures and the prevailing norm look at a company or in an organisation, we know what aspects are central

in change management that aims to create improved physical and psychosocial work environment. The following perspectives may be mentioned again:

- Our expectations of how we should be as woman and man lead us to find a security in continuing with the sorting and categorizing to which we are accustomed.
- Women are rarely in power structures with possibilities to influence their own work situation (Göransson, 2004, Kanter, 1993).
- It is still not obvious to consider the importance of gender in organisations, at workplaces, even if research and government inquiries have, over many years, shown that it plays a role in our working life (Wahl, 1992, Kvande, 2003; Rasmussen, 1994, Korvajärvi, 1998 SOU, 1998: 6, SOU, 2004: 43).
- Concrete examples of various practices that create gender patterns in work organisations are job sharing and allocation of tasks, permitted behaviour and expectations of employees, as well as hierarchies in groups and between departments.
- Interactive processes between individuals set frameworks, which are not always transparent, for inclusion and exclusion of who, for example, participates in formal and informal networks.
- An important crossroads in the research on the importance of gender in working life is the understanding of the variations that the concepts femininities and masculinities house (Korvajärvi, 1998, McDowell, 2001).
- New constructions and variations of femininities and masculinities *can be* a part in the deconstruction of prevailing norms around gender (McDonald 2012).
- A concrete example of the above is how a man can struggle to relate to the professional role of nurses without losing self-esteem and identity (Robertsson, 2003).
- The hegemonic masculinity norms, such as to be strong and dominant, can be said to contain behaviour that affects occupational health (Artazcoz et al., 2007), partly based on difficulty setting limits for psychological and physical strain at work.

6. Change management

6.1 FORCES AND COUNTERFORCES IN CHANGE MANAGEMENT

Dialogue conferences as a method pave the way for the development of knowledge and initiate change based on collaboration between researchers and practitioners (Gonäs, 2005). The method is derived from action research and rests on the foundation of initiating change based on interactive action between local actors and researchers (Gustavsen, 1992; Smith, 2002). The aim is jointly processed knowledge, between researchers and practitioners (managers and staff) in working life, that leads to both local knowledge that can be applied in practice as well as generalizable knowledge for research in that field.

To understand where gender differences are based, it becomes crucial to identify counterforces that act negatively upon the work environment and gender equality. The intersection points between the shortcomings in the work environment and the gender equality and opportunities for improvement of these dimensions in the organisation are forces for the development of sustainable change. If these resistance processes are brought to the surface, we contribute to raising awareness of how gender actually affects every-day working life (Berge and Ve, 2000; Andersson and Däldehög, 2012).

A concrete example of the practice of change management and that the conditions of working life have significance for work environment and health, is described in the case study "Working conditions and work environment at three grocery stores" (Gonäs, 2005). The purpose of the case study was partly to deepen the knowledge about the employees' work environment and partly to initiate development work on the basis of local knowledge. Some of the research consisted of observations of the different working situations with a focus on "physical design of the workplace, work equipment and working methods" (Gonäs, 2005) (ibid. P 170). The conclusions were that physical strain combined with low control over the work, low social support, as well as irregular working hours pose a risk for stress-related illness and health (ibid. P 178). The results are in line with other studies in the food industry (Hedenmo, 2000, Jämställdhetsombudsmannen, 1993).

What is interesting in the actual study was, however, the ambition, based on local knowledge, to initiate a development project. A new organisational structure was implemented which included the job rotation of groups with the aim of enabling skills development, increased physical mobility in the store and changed working hours

(Drejhammar and Karlqvist, 2006). The next step in the process was to introduce more flexible work and increased influence, which could be combined with clearer responsibilities and participation in work planning and implementation (Drejhammar and Karlqvist, 2006). To counteract the re-creation of the old regime in this form of organisational change, it is central to be aware of the meaning of gender in the organisation and how the power structure looks when it comes to job roles and tasks.

Continuous improvements in the work environment can be seen as innovations (Gustavsen, 2001). A focus on workplace processes means that it is not possible to determine the ready-made frameworks and structures for how change management should be conducted (Gustavsen, 2001). Instead, we need to ensure local prerequisites such as what the sector, number of employees, gender order looks like in the current case, formal and informal structures as well as existing work environment problems. A survey of the work environment that leads to non-pre-planned changes and improvements in the workplace can be described as innovations (ibid.). To achieve continuous improvements and renewal in work environment management demands that the workplace is not a hotbed of traditional values and patterns. It is therefore crucial to identify and process the prevailing values and norms about what is feminine and masculine in the work organisation.

To pursue active work environment management based on continuous improvement requires management's support and knowledge of work environment issues in general, but also specific knowledge about the doing of gender in organisations. Such legitimacy is crucial when improvement work may require investment and influence the prevailing structures.

One of the conclusions from the projects undertaken within the framework of gender initiatives at Vinnova is that gender equality projects should be based on operational needs and a gender theoretical basis. From Vinnova's efforts, it became clear that there was a lack of methods for change management aimed at improving gender equality in organisations (Gunnarsson, 2007a) (www.vinnova.se).

6.2 SUMMARY

- The intersections between shortcomings in the work environment and gender equality and opportunities for improvement of these dimensions in the organisation are forces to develop sustainable change. If we lift these resistance processes to the surface, we contribute to the awareness of how gender actually affects

the everyday life at work (Berge and Ve, 2000; Andersson and Däldehög, 2012).

- Continuous improvements in the work environment can be seen as innovations (Gustavsen, 2001). A focus on workplace processes means that it is not possible to determine the ready-made frameworks and structures for how change management should be carried out (Gustavsen, 2001). Instead, we need to look at local contextual conditions such as sector, number of employees, how the gender order looks in each particular case, formal and informal structures, as well as the existing work environment problems.
- In order to achieve constant improvements and innovations in the work environment requires that the workplace is not a hotbed of traditional values and patterns. It is therefore crucial to identify and process the prevailing values and norms about what is feminine and masculine in the work organisation.
- Gender equality projects should be based on their own operational needs and a gender scientific basis. However, there are no methods for change management aimed at improved gender equality in organisations (Gunnarsson, 2007a).

7. Under the magnifying glass – a summary

In the state commission of inquiry about the gender-segregated labour market (SOU 2004: 43) Kristina Alexanderson (2004a) summarises her contribution by saying that there is little research on what impact gender segregation in the labour market and in labour organisations has on occupational health. However, there is a tendency that the more gender-integrated a workplace is, the better the health of employees (ibid.). There is, in other words, a knowledge gap when it comes to research on the different segregation mechanisms and their impact on women and men's health at work (see Appendix 1).

Gunnar Aronsson (2011) in his research highlights that, of the groups which have sickness presenteeism, and themselves report symptoms of ill-health, individuals are observed with back and neck problems and signs of fatigue. Diagnoses that, in the official statistics from the Swedish Social Insurance Agency, women dominate when it comes to sick leave.

Sickness presenteeism is a phenomenon that is probably influenced by factors such as worsened job security, increased overtime, unclear career paths and the degree of social support (Caverley et al., 2007). A Swedish investigation based on a survey study of just over 8000 individuals from Swedish Longitudinal Occupational Survey of Health (SLOSH) shows that further research is needed in order to understand the causes of sickness presenteeism and sickness absence (Leineweber et al. 2012).

The American sociologist Arlie Hochschild's (2001) classic work "The Time Band" shows that women's increased participation in the labour market reproduces rather than deconstructs the traditional gender norms. Despite workplace and government attempts to give employees the opportunity to balance work - family, the expectations of women and men are traditional, thus attempts to break the norm and the traditional order, are limited (Wharton, 2012; Hochschild and Machung, 2012). Our workplaces can thus be described as sluggish organisations with great power over our lives (Hochschild, 2003; Hochschild, 2001).

We need to discuss the concept of health, and ask ourselves whether it should be measured in terms of attendance at work. The objective for the employer should perhaps be higher than that

and involve factors that contribute to creating a good physical and psychosocial work environment with room for open discussions, which we know generates good health (Jeding, 1999). Research on the characteristics of unhealthy work shows factors such as sickness absence, reduced efficiency, increased staff turnover, accidents at work and conflicts between employees (Jeding, 1999; Sandkull, 2008). Another factor that can be added to these is gender. We know that with a non-gender equal organisation comes the psychosocial aspects of conflict, harassment and attrition. An equal workplace however, leads to a creative environment, good health and increased productivity. The latter is also shown by researchers Arundel, Lorenz and Lundvall et al (2007) as they indicate that countries in the EU with more stable economies are characterized by democratic learning organisations with room for open discussions and delegated responsibility.

To explain sickness absence and to be able to develop methods to reduce women's work-related health problems, the physical work environment needs to be placed in context. Knowledge about the physical work environment in interaction with the organisational structures and processes based on gender theoretical perspectives need partly to be compiled and partly to be developed (Sandkull, 2008). We can probably reduce part of the sick rate if we, on the basis of gender critical perspectives, can gain knowledge of how organisation, leadership and ergonomic aspects interact with each other and affect women's and men's health in the working life.

Today's efficiency trend in health care (see site about lean health care among others) with a focus on results means that work organisations, in order to function properly, rely more and more on individuals' emotional and invisible work (Hochschild, 2001). Organisational changes in the wake of the efficiency trend include an expansion of women's invisible work (Messing, 1998 Kosny and MacEachen, 2010). Work that is often taken for granted at the same time as it, because of its nature, is not valued based on qualification and thus wage determination. With invisible care work comes work environment risks that are not necessarily visible to the naked eye (Messing, 1998; Kosny and MacEachen, 2010).

Previously implemented strategies to improve women's health in working life can be described in terms of adjustment to prevailing norms through opportunities for part-time work and the gender labelling of working tasks. If we instead apply the perspective of different conditions and choose to look at gender differences in the reporting of work-related problems from a critical perspective, we open up opportunities for change and development.

A regional population study showed that of those who considered themselves happy, harmonious and full of energy, most were men. The opposite, that is, reports of fatigue and sadness, came from a majority of women (Gonäs, 2005). Research into factors for good health shows that being in the right job, that is, a sense of competence in the work, and living in an equal relationship has positive effects.

One reason for women's ill-health is certainly that this group less often finds itself in power structures with the potential to influence their work situation (Göransson, 2004, Borders, 1993). Concrete examples of various practices that are creating these gender patterns and power structures are job sharing and allocation of tasks, permitted behaviour and expectations of staff, as well as hierarchies in working groups and between departments.

To achieve continuous improvements and renewal in the work environment management, it demands that the workplace is not a hotbed of traditional values and patterns. It is therefore crucial to identify and process the prevailing values and norms regarding ideas and expectations about how women and men should be.

To pursue active work environment management based on continuous improvement requires the support and knowledge of work environment issues in general, but also specific knowledge about the importance of gender in organisations. Legitimacy in the form of management support is crucial when improvement work may require investment and influence the prevailing structures.

7.1 KNOWLEDGE GAPS AND STRENGTHS

The bibliometric study conducted in connection with this knowledge overview shows that there are no gender critical analyses in the research area of occupational health. Examples of such areas are behavioural research but also research in the medical field (see Appendix 1). Most studies that are conducted in these fields and have a gender dimension are based on a purely quantitative perspective, that is, based on a division of women and men without critical analysis and gender theory.

There is need for research about the gender segregation and the restructuring underway in the Swedish labour market, which has consequences for occupational health. One example is the female-dominated health care sector, which is undergoing major changes based on trends of privatization and efficiency. How does this restructuring affect work content and occupational health? Research has shown that occupational health is better in gender-integrated

occupations than in gender-segregated occupations (Alexanderson, 2004a). What these differences are due to is not clear.

There are few studies conducted in female-dominated professions about how women and men both construct the significance of gender and also exercise practices designed to not follow the prevailing norms (McDonald 2012). A current issue in this regard is whether new constructions of masculinities and femininities really aim at maintaining order, or if this leads to deconstructing the meaning of gender (Powell et al., 2012, Deutsch, 2007). Do possible changes in the way women and men relate to their profession, gender and work organisation, affect work environment and occupational health?

Frontier research within the so-called “doing gender tradition” (West and Zimmerman, 1987) today is about gender-creation processes in relation to non-gender-creation processes.

Causes of long-term illness are complex and due to organisational aspects as well to the physical work environment. A central question in relation to this fact is the degree to which different physical and social factors (including the doing of gender) interplay with each other and increase the risk of ill-health?

In connection with the above, there is a need to develop methods to drive change management aimed at more gender-equal workplaces. The methods must be tailored to the level of knowledge and the context in which the organisation finds itself. The question is timely because we know that non-gender equal organisations have poorer psychosocial work environment with conflicts, harassment and attrition. A gender equal workplace, on the other hand, leads to a creative environment, good health and increased productivity.

An important question to consider is how changes in women’s and men’s professional roles and relationship to their work organisation can contribute to the improvement of the work environment and occupational health. Additional knowledge about the interaction between physical and social factors, including the construction of gender is needed to positively develop our working life and create good jobs.

7.2 CONCRETE ADVICE FOR ACTION

The points below are suggestions for action and can be used to obtain a picture of gender equality in the workplace as well as initiate improvements in the work environment and gender equality.

- Create a picture of where women and men are in the organisation and how these structures look. Use questions such as: which professional roles and forms of employment do women and men have, respectively? Which tasks do women and men have, respectively? In which organisational levels are women and men, how is the gender distribution in terms of who can take formal decisions, et cetera.
- Identify how the gender distribution looks in terms of various professional groups' degree of demands at work, individual control, and social support.
- Are there differences in pay? How do they look? Are tasks valued the same within the same professional categories for women and men?
- What opportunities for professional development and learning are there in the work for different professions, how does the gender distribution look in terms of skill-enhancing activities? Do women and men have equal opportunities to participate in learning?
- In change management, participation is an important concept. Participation creates motivation and knowledge of the coming change. Identify, using proven methods and observations, the physical design and different working methods at the workplace. Analyse the results with the organisational aspects as a basis (see points above). In order to create a more sustainable change and improvement of the work environment and gender equality, the stakeholders from all levels in the organisation and the partners in the employer organisations should be involved in development work.

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Bibliometric report

International research with a gender
perspective in occupational health and work
environment

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SUMMARY

This report works with bibliometric methods in order to search for patterns in research on working life and health. What do the research fronts look like, and which research fronts seem to work more closely with gender differences and gender theoretical perspectives? The presentation is divided into two parts. Part one relates to occupational health and work environment in medical, scientific and technological research, while part two refers to social and behavioural research focusing on gender and work.

The results indicate a relatively weak presence of research focusing on gender differences in the former areas. The matter looks somewhat different if we turn to the social and behavioural side, but even here, those areas that Swedish work science in particular works with are underrepresented in terms of the strength of interest in gender differences.

The conclusion of the study presented is that work environment research, to a great extent, lacks an explicit gender perspective and that there would be considerable potential for further research within the respective area with a more elaborated interest in gender differences and gender perspectives.

INTRODUCTION

The report aims to identify and analyse the international work environment research with respect to knowledge interests, current research fronts and gender perspective.

The approach uses a three-pronged strategy to identify relevant journals: (1) a selection of well-known work environment publications have formed the starting point; (2) thereafter the publications that tend to refer to the aforementioned group of well-known work environment journals have been identified; (3) Furthermore, all indexed journals have been checked for citation surroundings, and publications related to the selection have been added.

MATERIAL

The material for the survey consists mainly of two separate parts of work organisation, as well as work environment and occupational health-related research. Firstly, we have identified the international occupational health and work environment research publications, and secondly, international work organisational and more social science and behavioural science literature focused on the differences and similarities between men and women regarding incidence, perceptions and effects of occupational health problems. The report

deals with the period 2004-2011 and focuses on original research (Articles) in international scientific journals. One advantage of the indexing database Web of Science (WoS) is that it includes a summary of each article, a so-called Abstract. The complete list of articles comprises more than 45 000 items.²

Let us begin with “work environment”, i.e. the research that is usually published in journals that circle around the term “*occupational*”. In order not to exclude near-lying research that might quote occupational health and work environment research, we set the limits generously and included some publications from near-lying areas, for example, *Journal of Public Health* or the *Journal of Epidemiology and Community Health*. The idea is to cast as wide a net as possible, and our analysis suggests that there are substantial citation relationships between journals within public health and work environment.

The thirty publications that can be found in Appendix 1 provide material of about 25 000 items for the period 2004-2011. Close to 1000 articles have at least one author with a Swedish address affiliation.

The second study refers to the (more) social and behavioural research on perceived problems and the psychological effects of work environment. Within social research there are few specialized journals, and themes around work are particularly common in psychological, sociological, political and economic journals. For this reason, the study was based on a search strategy based upon on two key terms: “work*” and “gender*”.³

In all probability, there are a number of publications that could have been included in the first survey. Which these are, is shown in Appendix 3.

BIBLIOMETRIC METHODS

The term bibliometrics refers to a number of (research) activities that include the publication count, citation analysis, and strategic analysis of emerging research areas. Bibliometric methods include a number of procedures (algorithms) to put together articles that are similar in several respects. For an overview of the state of research we are looking for a method that sorts and organizes the material so that we obtain appropriate and recognizable groups.

2 Note that some of these articles in WoS are doubly classified, partly as “Articles” and partly as “Proceeding Papers”

3 In this study, the document categories “Letter” and “Proceedings Paper” are included in the analysis

Such a method is clustering, based on the properties of the material. In this case we allow the grouping of the articles to take place with a fairly straightforward and simple method. This method uses common references as a measure of similarity. The method is usually called “bibliographic coupling”. Greater similarity means that the articles brought together into a group of items - a cluster. Each such group is considered here as a research area where some items are further ahead and others are followers. Frontier researchers work to cover more and more questions, and try to reach consensus on specific research results. They work with similar questions and therefore use common references, i.e. they are based on a common knowledge base.

The data is processed in a program developed to perform different algorithms:

- clustering the documents based on their bibliographic couplings (similarity in references)
- visualization of these clusters.

When the material is grouped, a method of adding easy-to-understand tags is needed. To determine the content of the respective clusters, we use a method for producing noun phrases that can be used to label the clusters. Every scientific article has an “abstract” (Web of Science), which consists of about 200 words. Furthermore, there is the article’s title and the key terms generated by the article. These text-based elements are used as input for a method that identifies key phrases and calculates the frequency of the material.⁴ This NLP method⁵ has, provided that there is a summary available, extracted all noun phrases in articles. These have been grouped into respective clusters. The twenty highest term frequencies for each cluster of articles have thus been used to characterize and label each cluster.

In most cases it is necessary to consult with experts for the labels to be successful. Subject matter experts can relatively easily identify what the cluster is about and to what articles it refers. In these reported studies, experts from the Department of Work Science in Industrial Economics and Management (INDEK) as well as the experts from the School of Technology and Health participated in group discussions about cluster labelling. In this case, it took place without major problems or disagreements. It appears that the experts, when they sit together, find it relatively easy to classify and understand the current

4 Lists of so-called stop words, terms that are common and lack significance, have been used to exclude these.

5 NLP=Natural Language Processing

research lines. It is easy for the experts to identify and label the research put under the microscope, particularly when they are given access to information about the most cited articles in each cluster. It should be noted that it is not necessary for the most frequent terms to become labels, there may very well be some term among the other nineteen that is more relevant.

RESEARCH FRONTS IN WORK ENVIRONMENT RESEARCH

Visualization, based on bibliographic coupling, of the working material facing medical sciences, natural sciences and engineering sciences are given in Figure 1. The figure shows all 25,000 items and they are grouped into clusters based on common references. Cluster labels, which emerged in the process with experts, have been inserted at the node that has the highest number of links to other articles. In this visualization we content ourselves with a noun phrase (cluster term) per cluster (not all clusters can fit a label).



Figure 1: Visualization of material with cluster labels.

All the clusters shown in Figure 1 cannot be considered directly relevant to occupational health. An advantage of the chosen approach is that it is possible to include material in order to not miss something that could prove to be of importance. This can, in later steps, be removed, or be held outside the analysis in another way.

Table 1. The twenty most frequent terms per larger clusters (other clusters in the Appendix)

| Name | Noun Phrases | #P |
|---------------------------|--|------|
| hiv discourse | stigma health hiv women care research discourse patient identity narrative ltd cam policy masculinity cancer hiv/aids medicalisation interview participant rights | 2182 |
| neighbourhood | neighbourhood neighborhood inequity income inequality income deprivation health physical activity mortality obese green space women suicide active? community level associates social participation trust walkable | 1044 |
| traffic accidents | crash road belt traffic injury driver vehicle seat seat belt pedestrian road safety accident fatal collision motorcycle safety intersection helmet motorcyclist model | 992 |
| asthma | dust endotoxin asthma silicosis silica occupational asthma exposure allergen flour respiratory symptom lung function quartz lung worker bioaerosol respirable bakery diacetyl fev1 airway | 896 |
| inequity | inequity mortality health ses women socioeconomic position childhood social class life course status income health inequity age socioeconomic status socioeconomic inequity birth suicide occupational class education association | 866 |
| posture | posture muscle ergonomic trunk task exertion shoulder musculoskeletal disorder force flexion emg load kinematic motion wrist spine pipette manual material grip discomfort | 848 |
| effort-reward imbalance | eri job effort-reward job strain effort-reward imbalance burnout stress job insecurity strain cortisol insecure depression job control imbalance work stress social support job stress health occupational stress job demand | 818 |
| spine pain | disc fusion spine degeneration interbody herniates pain patient decompress implant surgery intervertebral disc odi stenosis lumbar spine cage myelopathy screw spondylolisthesis lumbar disc | 753 |
| accidents/ human error | air traffic human factor human error error accident system situation awareness safety aviat air traffic control accident investigation patient safety team analysis hfacs design domino risk traffic task | 745 |
| driver performance | automate driver task phone in-vehicle perform? distracter auditory alarm display workload mental workload cell phone lane driver distraction cue visual search warning traffic road | 704 |

A more detailed characterization of each cluster has been conducted with the help of subject matter experts. In this case, we worked on categorizing the material as either “Work science”, “Public health”, “Medical research, not occupational health,” “Scientific research” or “Social science research”. One of the purposes of this categorization is to provide a basis for further investigation as to whether the gender dimension is present in the work of scientific research. In order to do so it is necessary to sort the material so that the “occupational scientific “ material is clearly visible.

Instead of doing this sorting of material at journal level or publication category, we can do it at the cluster level. We keep together the articles dealing with similar and related issues. Those clusters containing frequent usage of terms related to work or employment will then be added to the work science clusters. Naturally, this is a large part of the material. Figure 2 shows where the work-related clusters are located on the map.

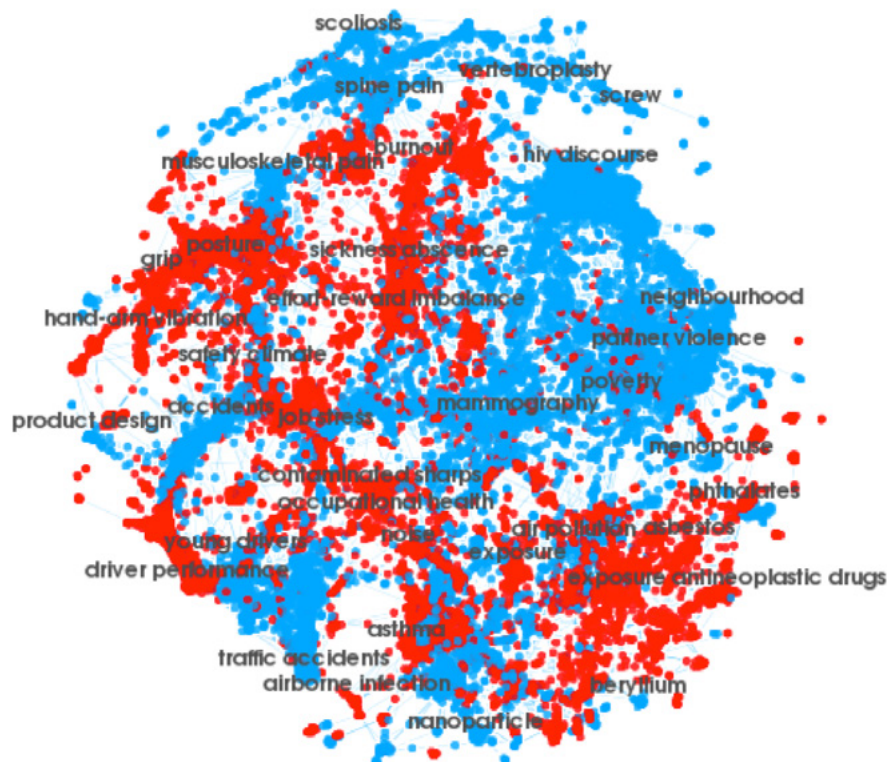


Figure 2. Work Scientific cluster marked in red.

In figure 2 there is a shaft from northwest to southeast with the muscular areas at top left and exposure to various substances down to the right. In the middle and as a separate continent which strives in the northerly direction is absenteeism, job stress and productivity issues. Roughly speaking, the categorization seems reasonable, and areas in blue are either purely medical, public health-oriented, or technical issues that are not of direct work scientific importance, or have not yet been given such significance.

Where is the gender-related work science research in this map? To find the answer to that question, we use the noun phrases that emerged in our cluster analysis. We start from “multi-words”, i.e. two or three words (in most cases nouns), which in a succinct way characterise the contents of the documents. This is the idea of value C; to obtain a statistical measure based on a weighting of the candidate terms (Frantzi et al. 2000). High C-values almost always indicate a high frequency of words, meaning that we can relatively effectively describe the contents of the clusters and articles. Isolated terms always have a low C-value, because of their individual nature, and also because they are general. The term “gender” is given a low C-value because it is single but also because it has a low signal value. However, a specific term such as “gender difference” has a high C-value, which means that we can discern clusters containing interesting gender-related terms with high C-values. In practical terms, this means highlighting gender-related terms and then letting the clusters with a greater proportion of such terms be the subject of a specific analysis.

Before we move on to this specific gender analysis, however, we will give the general picture. Figure 3 shows the incidence of gender terms with an inclusive definition of gender (i.e. including individual terms such as gender, women, etc.) per article. It can clearly be seen that most of the (possible) gender perspective looks to be located to the right of the map, i.e. in public health research. There is evident lack of interest in the medical, scientific and technical oriented work science research. The muscular part seems to completely lack these perspectives, the exposure related (in the southeast) research has a little more but there are still relatively few and not very frequent. The stress and productivity research situated like a continent from the centre and the north, however, has slightly more comprehensive gender-related research.



Figure 3. Gender-related Items marked in red.

It is within stress and productivity research that the gender perspective has come to be used. The cluster “burnout” has by far the most instances of gender terms in the articles. If we, for simplicity’s sake assume that the same article does not use these terms more than twice per abstract, just over ten percent of the articles would have an explicit gender perspective. To a rather smaller extent, the clusters “effort-reward imbalance”, “violence risks nursing”, “sickness absence”, “posture” and “hand-arm vibration” have a use of terms suggesting that there is a gender-sensitive discussion, at least in the background. We can also mention that in the following clusters, there is a discussion, but relatively few articles (<3%): “Productivity absenteeism” return-to-work “and” occupational injury “. Finally, it should be mentioned that in one of the clusters, a research object, the menopause, occurs, which more or less precludes doing research on gender differences.

SPECIALIZATION PATTERNS

In this section, we go over to examining only the research that we operationally defined as focused on occupational health and work environment. The issue is whether Swedish research specialises

in certain areas and whether other countries have quite different profiles. This should, of course, also be seen in relation to the gender perspective as discussed above.

Specialization is measured as “revealed comparative advantage” (RCA) i.e. in the way that economists tend to analyse export revenues. Here publications are regarded as export of knowledge to the international publishing market. The countries that have special advantages (knowledge) may publish more than expected in international journals.

Table 2 shows how specialisation advantages look for a group of industrialized countries, most from Europe, with regard to the work science clusters. We concentrate our interest to Sweden where we find that “participatory ergonomics” together with “low-back pain” are the two clusters where we publish more articles than could be expected given our share of the total publishing. Sweden has a strong presence in several of the clusters that explicitly look to work with a gender perspective. Sickness absence is an area that looks to be strong in a number of EU countries, but has not had a particularly marked presence in the Swedish research, however, slightly above expected values.

Table 2. Specialization advantages

| CLUST | AUS | BEL | CAN | DEN | ENG | FIN | FRA | GER | NET | NOR | SOK | SWE | SWI | USA | Total | LABEL |
|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------------------------|
| 11 | 1,43 | 0,00 | 1,32 | 2,76 | 0,23 | 1,23 | 0,81 | 0,39 | 1,20 | 0,59 | 0,58 | 3,81 | 0,00 | 0,70 | 1 | participatory ergonomic |
| 27 | 0,73 | 0,46 | 1,17 | 1,93 | 0,87 | 1,23 | 0,50 | 0,54 | 0,79 | 0,93 | 0,58 | 2,83 | 1,23 | 0,85 | 1 | low back pain |
| 24 | 0,22 | 0,00 | 1,50 | 0,00 | 2,83 | 1,40 | 0,49 | 0,08 | 0,00 | 0,00 | 1,21 | 2,62 | 0,00 | 0,79 | 1 | hand-arm vibration |
| 14 | 1,20 | 0,95 | 0,97 | 1,37 | 1,42 | 1,27 | 0,86 | 0,96 | 0,02 | 1,11 | 0,44 | 2,60 | 0,98 | 0,83 | 1 | effort-reward imbalance |
| 4 | 1,26 | 2,44 | 1,01 | 2,32 | 1,14 | 2,92 | 0,95 | 1,04 | 0,80 | 1,66 | 0,94 | 1,72 | 2,55 | 0,48 | 1 | effort-reward imbalance |
| 43 | 0,75 | 2,35 | 0,64 | 1,33 | 0,39 | 0,00 | 0,43 | 1,20 | 1,66 | 0,00 | 2,59 | 1,45 | 1,04 | 1,08 | 1 | exposure antineoplastic |
| 47 | 1,53 | 1,08 | 2,17 | 0,73 | 0,67 | 0,13 | 0,34 | 0,37 | 1,86 | 1,31 | 0,38 | 1,41 | 1,47 | 0,79 | 1 | return-to-work |
| 51 | 0,43 | 0,97 | 0,72 | 1,44 | 1,07 | 0,78 | 1,22 | 2,06 | 0,96 | 2,52 | 0,65 | 1,24 | 0,81 | 0,86 | 1 | asthma |
| 22 | 0,41 | 0,95 | 1,99 | 0,63 | 0,53 | 0,20 | 0,87 | 0,35 | 1,20 | 0,16 | 2,30 | 1,24 | 0,11 | 1,08 | 1 | posture |
| 50 | 0,85 | 0,96 | 0,52 | 3,90 | 0,96 | 3,17 | 0,15 | 0,59 | 3,34 | 1,20 | 0,47 | 1,23 | 0,44 | 0,47 | 1 | sickness absence |
| 64 | 0,69 | 2,05 | 0,55 | 0,65 | 0,47 | 2,19 | 0,59 | 1,38 | 2,45 | 2,21 | 0,00 | 1,21 | 0,71 | 0,83 | 1 | burnout |
| 21 | 1,23 | 1,09 | 1,11 | 1,35 | 0,61 | 1,36 | 0,70 | 1,63 | 0,60 | 0,81 | 1,51 | 1,11 | 0,26 | 0,98 | 1 | noise |
| Total | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Average |
| 60 | 1,25 | 1,06 | 1,04 | 0,11 | 1,37 | 1,42 | 0,64 | 0,31 | 1,04 | 1,42 | 1,74 | 0,93 | 3,56 | 0,88 | 1 | heat |
| 55 | 2,51 | 0,19 | 0,99 | 1,09 | 0,92 | 0,94 | 0,78 | 0,08 | 0,73 | 4,58 | 0,05 | 0,86 | 1,43 | 0,96 | 1 | safety climate |
| 62 | 0,55 | 0,39 | 2,51 | 1,21 | 1,14 | 0,41 | 0,41 | 1,34 | 1,32 | 0,23 | 3,67 | 0,80 | 0,00 | 0,63 | 1 | low-back-pain; vibration |
| 34 | 0,80 | 0,00 | 0,83 | 3,06 | 0,72 | 0,07 | 1,45 | 0,39 | 0,30 | 0,00 | 0,55 | 0,76 | 0,00 | 1,43 | 1 | motion sickness |
| 58 | 2,34 | 8,15 | 0,84 | 0,50 | 2,17 | 3,49 | 0,00 | 0,44 | 0,18 | 0,00 | 1,74 | 0,72 | 1,35 | 0,56 | 1 | low-back-pain |
| 7 | 0,85 | 0,85 | 0,67 | 0,27 | 0,88 | 0,40 | 1,75 | 0,65 | 0,39 | 0,42 | 1,18 | 0,68 | 0,32 | 1,41 | 1 | exposure |
| 20 | 0,81 | 0,69 | 0,68 | 1,49 | 1,28 | 0,66 | 1,81 | 1,61 | 0,74 | 1,03 | 1,53 | 0,67 | 0,00 | 0,98 | 1 | exposure arsenic |
| 26 | 0,16 | 1,33 | 0,44 | 0,60 | 0,20 | 0,48 | 1,01 | 4,43 | 0,08 | 0,83 | 1,97 | 0,64 | 0,79 | 1,16 | 1 | phthalates exposure |
| 16 | 0,77 | 0,00 | 0,57 | 0,24 | 0,65 | 1,42 | 1,05 | 0,21 | 0,28 | 0,00 | 0,76 | 0,62 | 0,89 | 1,60 | 1 | slips, trips, and falls |
| 44 | 0,47 | 4,31 | 0,25 | 0,66 | 3,87 | 1,82 | 1,23 | 0,55 | 2,07 | 0,43 | 0,00 | 0,59 | 0,13 | 0,44 | 1 | occupational health |
| 1 | 0,84 | 0,44 | 0,69 | 0,26 | 0,65 | 0,48 | 0,14 | 0,30 | 0,78 | 0,10 | 0,23 | 0,53 | 0,82 | 1,65 | 1 | productivity absenteeism |
| 19 | 0,17 | 0,33 | 0,67 | 0,30 | 0,58 | 0,63 | 0,85 | 4,01 | 0,83 | 3,34 | 0,60 | 0,44 | 0,25 | 0,98 | 1 | bitumen |
| 30 | 2,74 | 0,68 | 0,80 | 0,00 | 2,25 | 0,18 | 2,34 | 0,73 | 0,26 | 2,81 | 0,00 | 0,42 | 1,05 | 0,83 | 1 | implementation intention |
| 46 | 0,88 | 0,55 | 1,42 | 0,00 | 0,71 | 0,60 | 1,23 | 0,19 | 0,43 | 0,00 | 0,08 | 0,42 | 0,00 | 1,51 | 1 | violence risks nursing |
| 65 | 0,44 | 0,66 | 0,33 | 0,00 | 0,67 | 0,41 | 1,62 | 4,69 | 0,90 | 0,00 | 2,43 | 0,39 | 7,96 | 0,69 | 1 | vertebroplasty |
| 28 | 2,06 | 0,05 | 1,05 | 0,24 | 1,33 | 1,13 | 2,90 | 0,50 | 0,30 | 0,73 | 1,00 | 0,35 | 0,22 | 1,03 | 1 | asbestos |
| 23 | 0,96 | 0,44 | 1,26 | 1,06 | 0,80 | 1,06 | 1,25 | 0,25 | 0,24 | 0,57 | 0,48 | 0,33 | 1,24 | 1,35 | 1 | occupational injury |
| 31 | 1,43 | 0,72 | 0,53 | 0,07 | 1,22 | 0,18 | 1,91 | 1,08 | 1,06 | 0,24 | 0,42 | 0,31 | 1,35 | 1,22 | 1 | driver performance |
| 52 | 0,06 | 0,00 | 0,22 | 0,00 | 0,84 | 0,16 | 0,27 | 0,58 | 0,26 | 0,36 | 0,90 | 0,13 | 0,81 | 1,91 | 1 | airborne infection |
| 35 | 1,67 | 0,00 | 1,07 | 0,00 | 0,34 | 0,00 | 1,71 | 1,40 | 0,21 | 0,29 | 4,53 | 0,08 | 0,00 | 1,29 | 1 | grip |
| 5 | 0,72 | 1,86 | 0,24 | 0,09 | 3,81 | 0,03 | 1,66 | 0,87 | 0,51 | 0,03 | 0,51 | 0,01 | 1,79 | 0,92 | 1 | contaminated sharps |
| 29 | 5,51 | 1,47 | 0,92 | 1,19 | 4,17 | 1,17 | 0,44 | 0,27 | 0,96 | 0,00 | 0,69 | 0,00 | 0,56 | 0,17 | 1 | telework |

Note: AUS=Australia, NET=The Netherlands; SOK=South Korea; SWI=Switzerland.

SOCIAL AND BEHAVIOURAL SCIENCES

Web of Science also provides a database of social science research - SSCI (Social Science Citation Index). When we approach this database we do so with a slightly different approach than applied in the previous section. Work science research cannot easily be confined to a small number of publications. Of course it would be possible, but the result would most likely be skewed and not representative.

Instead, the starting point is that all the journals in the SSCI database are potential carriers of a working scientific focus. There may be single articles per journal but those that are published can be of considerable importance to this investigation. For this reason it was assessed that for this survey, a different approach to the delineation of the data was needed. The search strategy has, in a straightforward way, been to produce all articles with “work *” and “gender *” in the title or abstract. This means that we obviously cannot work with similar questions as in the previous survey. Here, the focus has already largely been directed toward gender research questions, but in principle it would be possible that the articles with a focus on work would be a lot different from the number of articles focusing on gender issues.

The search yielded nearly 20,000 items (articles). The material was clustered based on common references (articles without references were thus not included) giving fifty clusters with between 50 and 1500 articles. The clusters were given labels using NLP (Natural Language Processing) and were then assessed by three mutually independent experts. Almost half (21) of the clusters were considered to have a work science perspective (see Table 1). Other clusters were removed from the study. Around 7,500 articles remained. Table 3 shows noun phrases, cluster numbers, number of articles (papers) and labels for these 21 clusters.

Table 3. Noun phrases in the social science material

| Cluster # | 1st Term (Noun Phrases, 20 most frequent) | Papers # | Label |
|-----------|---|----------|----------------------|
| 0 | women emotional labour emotional labor police emotion masculine labour article organ research identity manage discourse token practice workplace process service worker sex work | 536 | emotional labor |
| 1 | health women employer job injury inequity stress worker mortality mental health tooth status restoration association health inequality socioeconomic position women's health risk unemployed? distress | 362 | gender & health |
| 2 | alexithymia gender role conflict men nurses nurse masculine male nurse pornography tas 20 student arab masculine role tas male role norms tas-20 role career forgiveness cmni grc female pornography actors | 104 | gender role conflict |
| 9 | physician career faculty specialty student women practice resident medical student medical school optometrist care medicine surgeon surgery satisfaction gps orthopaedic health doctor | 443 | physician career |
| 11 | stereotype threat stereotype leadership women performers emotional intelligence leader sexism threat ocb benevolent sexism student leadership style math task effect attitude research participant behavior | 471 | gender stereotypes |
| 12 | job satisfaction job satisfaction al commitment commitment justice organizational justice employee procedural justice distributive justice otd clergy turnover intention female clergy invariance justice perceptions leisure service athletic trainer extension officer money | 118 | job justice |
| 16 | diverse team dissimilarity relationship conflict diversity management team climate relational demography lmx work group faultline gender diversity demography relationship performers director leader-member organizational demography effect organization leader-member exchange | 197 | team work |
| 18 | career self-efficacy student value work value school motive adolescent women research aspiration self-concept job person model self-determination theory goals achievement career maturity orientation | 465 | career |
| 19 | morningness circadian sleepiness morningness-eveningness night rhythm sleep shift shift work chronotype rls daytime sleepiness circadian rhythm insomnia apnea schedule shiftwork dlmo osa permanent night | 162 | morningness |
| 21 | cortisol job stress effort-reward effort-reward imbalance eri job strain health depression women strain burnout ambulatory blood pressure ambulatory blood blood overcommitment alcohol model hrv job stress | 495 | effort-reward |

| Cluster # | 1st Term (Noun Phrases, 20 most frequent) | Papers # | Label |
|-----------|---|----------|-----------------------|
| 26 | harass sexual harasser workplace incivility women victim workplace aggression workplace harassment behavior gender harassment sexual attention aggression sexual hostile work perpetrator hostile work environment reasonable woman hangover perception reasonable person | 275 | harassment |
| 27 | wfc conflict wif job spillover family-to-work role women work-home interference satisfaction family-to-work conflict employee fiw work-life relationship balance support dual-earner enrichment | 350 | work-familyconflict |
| 31 | pain injury lbp shoulder neck musculoskeletal disorder posture muscle worker carpal tunnel cts disabled' spine neck pain health tunnel fracture factor risk musculoskeletal symptom | 892 | muscle pain |
| 37 | women inequity job segregates wage market earnings employer labor occupational sex occupation labor market network sex career sex segregation race neighborhood occupational sex segregation workplace | 369 | occup sex segregation |
| 38 | burnout suicide job emotional exhaustion stress physician exhaust job satisfaction satisfaction maslach personal accomplishment maslach burnout nurse resident violence depersonalize burnout syndrome maslach burnout inventory self-harm | 310 | burnout |
| 42 | women caregiver role health care parent depression sar life identity multiple role distress stress droplet employer support relationship elder abuse job job search intensity | 311 | caregiving |
| 45 | women stigma student health social work physiotherapy hiv dengue research ageism attitude ipe concept map disclosure hiv/aids experiment article practice educator therapy | 305 | profession |
| 47 | sick sickness absence absence fatigue absentee long-term sick long-term sickness absence chronic fatigue women cfs disability pension health sick-leave psychosocial work mup employee sickness certificate chronic fatigue syndrome pension pain | 218 | sickness absence |
| 48 | cancer exposure comet benzene genotoxic micronucleus dna micronuclei lymphocyte radiator comet assay adduct pesticide dna damage occupational exposure lung damage assay worker risk | 334 | occupational exposure |
| 54 | wage earnings gender wage gap gender wage gap job market women worker employer labor labour education decomposition gender earnings inequity paper discriminant segregation gender earnings gap | 584 | wage gap |
| 55 | mentor career protege expatriate relationship women female expatriates career success protean manager subjective career mentorship subjective career success developmental relationship job mentee success career self-management boundless experience | 163 | mentor |

Eight of the twenty one clusters contain high frequencies (> 33%) of articles with specific gender-related terms (e.g., gender differences). As shown in Table 4, the general article frequency for gender terms is relatively high (about 30%). Far down the list we find, however, research on “occupational exposure” “morningness”, “muscle pain”, “burnout”, “effort-reward”, “career”, areas that refrained from being affected by the gender theoretical discourse (provided that we can access this by means of our gender terms). The ten most frequent gender-related terms are shown in Table 5 below.

One explanation for the pattern that emerges is that there is a considerable overlap between the various databases for medicine and social sciences in Web of Science. The clusters 21 (effort-reward); 31 (muscle pain); 47 (sickness absence) and 48 (occupational exposure) are all based on medical journals appearing in Appendix 5 where the most frequent publication per cluster is reported. Possibly cluster 1 (gender & health) should also be removed from the analysis. Since these have already been analysed in the previous section, it is not necessary to analyse them again, but we allow these medical clusters to be included – for comparison purposes if nothing else.

Table 4. Frequency of articles with gender-related terms per cluster (1 = pos; 0 = neg)

| Cluster | 0 | 1 | Term |
|---------|--------|--------|------------------------------|
| 54 | 54% | 46% | wage gap |
| 37 | 56% | 44% | occupational sex segregation |
| 0 | 56% | 44% | emotional labor |
| 2 | 58% | 42% | gender role conflict |
| 11 | 60% | 40% | gender stereotypes |
| 45 | 64% | 36% | professions |
| 16 | 65% | 35% | team work |
| 9 | 67% | 33% | physician |
| 26 | 68% | 32% | harassment |
| 55 | 69% | 31% | mentor |
| 1 | 69% | 31% | gender & health |
| 27 | 70% | 30% | work-family-conflict |
| 12 | 71% | 29% | job justice |
| 42 | 72% | 28% | caregiving |
| 18 | 75% | 25% | career |
| 21 | 80% | 20% | effort-reward |
| 47 | 82% | 18% | sickness absence |
| 38 | 84% | 16% | burnout |
| 31 | 86% | 14% | muscle pain |
| 19 | 87% | 13% | morningness |
| 48 | 88% | 12% | occupational exposure |
| Total | 70,61% | 29,39% | |

Table 5. Most frequent gender-related terms

| Term | Number |
|--------------------|--------|
| gender difference | 462 |
| gender roles | 109 |
| gender wage gap | 85 |
| gender gap | 64 |
| gender inequality | 60 |
| gender equality | 55 |
| gender issues | 37 |
| gender relations | 33 |
| gender-specific | 29 |
| gender perspective | 29 |

A visualization of article material clarifies what we can see in terms of percentages and numbers. Figure 4 (below) shows the clusters' location in relation to each other. Bottom right (southeast corner) is "exposure" and "muscle pain" and similar (medical) fields. Across the left flank are areas that are more directly associated with the gender-theoretical discussion, gender roles, gender stereotyping, harassment etc. In the centre are areas that can both have and not have strong elements of such a discussion. This is even more apparent from Figure 5, which marks the nodes according to the frequency of gender related concepts (1 = pos; 0 = neg.). Figure 5 clearly shows that the southeast corner, to a greater extent, lacks elements of a gender perspective.

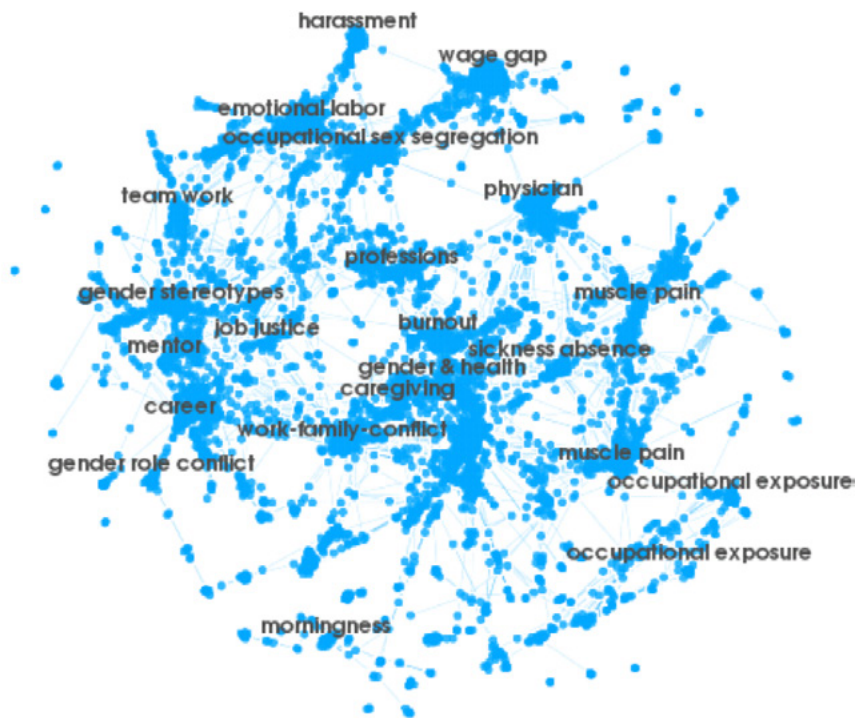


Figure 4. Cluster image for social and behavioural research

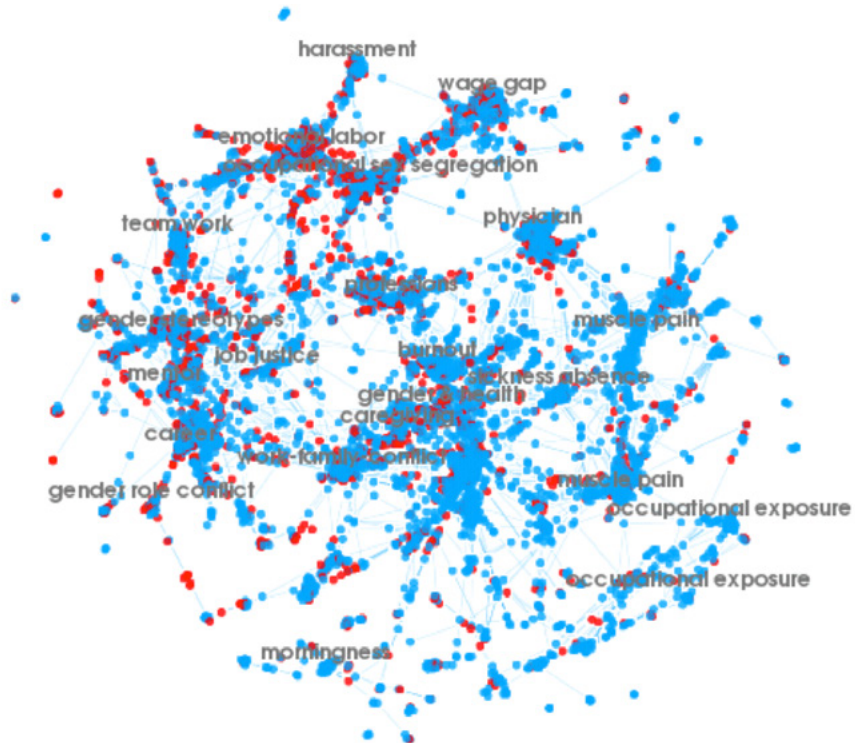


Figure 5. Cluster image for social and behavioural research with gender related articles marked red = gender-related concepts exist in the article; blue = do not occur

SPECIALIZATION PATTERNS IN THE WORK SCIENCE OF SOCIAL SCIENCES

The rudimentary (to say the least) search strategy for social scientific work science gives us more of a snapshot of the situation and research fronts in the research. It does not allow for an in-depth analysis. Perhaps we should stay here, but let this cautious attitude put a grid over the continued analysis. We will thus continue with a specialized analysis of the same kind that was included in the previous section. The result is shown in Table 6. In this case, however, we consider it necessary to take out the mostly medical clusters. In the analysis, we also take out the US in order to clarify the results.

Table 6. Specialization advantages per country, social scientific work science

| AUS | BEL | CAN | DEN | ENG | FIN | FRA | GER | NET | NOR | SOK | SWE | SWI | Total | LABEL |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|------------------------|
| 1,5 | 1,1 | 0,9 | 0,0 | 1,6 | 0,4 | 0,0 | 0,7 | 0,2 | 0,9 | 0,0 | 1,6 | 0,7 | 1 | professions |
| 0,8 | 0,6 | 0,3 | 0,0 | 0,5 | 2,4 | 3,9 | 1,2 | 0,5 | 1,0 | 1,5 | 1,5 | 2,0 | 1 | burnout |
| 1,3 | 0,3 | 0,4 | 2,3 | 0,7 | 2,2 | 1,4 | 1,0 | 1,3 | 1,7 | 0,6 | 1,4 | 0,3 | 1 | morningness |
| 1,5 | 0,0 | 1,5 | 2,7 | 0,6 | 1,0 | 1,5 | 0,2 | 1,2 | 0,4 | 0,0 | 1,1 | 0,0 | 1 | harassment |
| 1,0 | 0,0 | 1,1 | 2,1 | 0,6 | 0,1 | 0,5 | 0,8 | 1,3 | 2,8 | 0,4 | 1,1 | 3,3 | 1 | physician |
| 1,3 | 6,0 | 1,3 | 0,0 | 0,4 | 1,4 | 1,3 | 0,5 | 0,6 | 1,3 | 2,8 | 1,1 | 0,0 | 1 | job justice |
| 1,4 | 0,0 | 0,7 | 1,2 | 2,2 | 0,4 | 0,3 | 0,3 | 0,4 | 0,5 | 0,4 | 1,0 | 0,3 | 1 | emotional labor |
| 0,2 | 1,3 | 1,2 | 0,0 | 0,8 | 0,1 | 0,9 | 2,2 | 1,7 | 0,3 | 0,8 | 1,0 | 2,2 | 1 | occup. sex segregation |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Average |
| 1,3 | 1,9 | 1,0 | 0,4 | 0,8 | 1,5 | 0,6 | 1,0 | 0,9 | 1,1 | 1,0 | 0,9 | 0,4 | 1 | career |
| 0,6 | 0,0 | 1,3 | 0,0 | 0,4 | 4,9 | 1,9 | 0,5 | 0,0 | 0,7 | 3,0 | 0,9 | 0,0 | 1 | gender role conflict |
| 0,5 | 0,7 | 1,0 | 0,6 | 1,4 | 0,3 | 1,5 | 2,0 | 0,5 | 0,7 | 2,1 | 0,9 | 0,8 | 1 | wage gap |
| 0,9 | 1,7 | 2,2 | 0,6 | 1,0 | 0,5 | 0,5 | 0,3 | 0,6 | 0,4 | 1,1 | 0,8 | 0,2 | 1 | caregiving |
| 0,5 | 1,4 | 0,9 | 1,8 | 0,5 | 2,4 | 0,0 | 0,8 | 2,7 | 1,1 | 0,9 | 0,7 | 1,4 | 1 | work-family-conflict |
| 1,1 | 0,8 | 0,7 | 1,0 | 0,8 | 0,8 | 1,9 | 0,6 | 1,7 | 0,3 | 3,6 | 0,7 | 1,4 | 1 | team work |
| 1,1 | 1,6 | 1,4 | 0,0 | 0,8 | 0,5 | 1,6 | 1,8 | 0,9 | 0,0 | 0,5 | 0,6 | 0,7 | 1 | gender stereotypes |
| 0,6 | 7,7 | 1,6 | 0,0 | 1,1 | 0,3 | 0,9 | 1,1 | 1,2 | 0,0 | 0,9 | 0,0 | 0,0 | 1 | mentor |

Notes: AUS=Australia, NET=The Netherlands; SOK=South Korea; SWI=Switzerland.

Sweden has relatively high activity in three clusters: "professions" "morningness", "burnout". Low activity in areas that deal with gender stereotypes and also mentorship. In the rest of the fields, Sweden has a level of activity that is in line

with expected values. Broadly, the result is likely to do with the publication patterns in each area. What differs between countries is the propensity to work on the international publishing markets. Compare, for example, Finland, which has a significantly higher activity in areas such as “gender role conflict” and “work-family-conflict”. In summary: everything suggests that there is considerable potential for increased awareness of gender perspectives even in the social and behavioural science-oriented research on work and health.

Appendix 1 – Publications in the sample (occupational)

Accident analysis and prevention
American journal of industrial medicine
Annals of occupational hygiene
Applied ergonomics
Ergonomics
European spine journal
Human factors
Human factors and ergonomics in manufacturing
Industrial health
International archives of occupational and environmental health
International journal of hygiene and environmental health
International journal of industrial ergonomics
International journal of occupational and environmental health
International journal of occupational medicine and environmental health
International journal of occupational safety and ergonomics
Journal of epidemiology and community health
Journal of occupational and environmental hygiene
Journal of occupational and environmental medicine
Journal of occupational health
Journal of occupational health psychology
Journal of occupational rehabilitation
Journal of public health
Occupational and environmental medicine
Occupational medicine-oxford
Safety science
Scandinavian journal of work environment & health
Social science & medicine
Sociology of health & illness
Spine
Work and stress
Work-a journal of prevention assessment & rehabilitation.
Work-a journal of prevention assessment & rehabilitation.

Appendix 2 – Clusters within medicine, science and technology

| Name | Noun Phrases | #P |
|---------------------------|--|------|
| hiv discourse | stigma health hiv women care research discourse patient identity narrative ltd cam policy masculinity cancer hiv/aids medicalisation interview participant rights | 2182 |
| neighbourhood | neighbourhood neighborhood inequity income inequality income deprivation health physical activity mortality obese green space women suicide active? community level associates social participation trust walkable | 1044 |
| traffic accidents | crash road belt traffic injury driver vehicle seat seat belt pedestrian road safety accident fatal collision motorcycle safety intersection helmet motorcyclist model | 992 |
| asthma | dust endotoxin asthma silicosis silica occupational asthma exposure allergen flour respiratory symptom lung function quartz lung worker bioaerosol respirable bakery diacetyl fev1 airway | 896 |
| inequity | inequity mortality health ses women socioeconomic position childhood social class life course status income health inequity age socioeconomic status socioeconomic inequity birth suicide occupational class education association | 866 |
| posture | posture muscle ergonomic trunk task exertion shoulder musculoskeletal disorder force flexion emg load kinematic motion wrist spine pipette manual material grip discomfort | 848 |
| effort-reward imbalance | eri job effort-reward job strain effort-reward imbalance burnout stress job insecurity strain cortisol insecure depression job control imbalance work stress social support job stress health occupational stress job demand | 818 |
| spine pain | disc fusion spine degeneration interbody herniates pain patient decompress implant surgery intervertebral disc odi stenosis lumbar spine cage myelopathy screw spondylolisthesis lumbar disc | 753 |
| accidents/ human error | air traffic human factor human error error accident system situation awareness safety aviat air traffic control accident investigation patient safety team analysis hfacs design domino risk traffic task | 745 |
| driver performance | automate driver task phone in-vehicle perform? distracter auditory alarm display workload mental workload cell phone lane driver distraction cue visual search warning traffic road | 704 |

| Name | Noun Phrases | #P |
|--------------------------|---|-----|
| exposure | pesticide cancer exposure suicide mortality farmwork benzene nhl lymphoma smr worker trichloroethylene tce pcb leukemia leukaemia pcbs dioxin pesticide exposure risk | 685 |
| exposure metal wood | mwf dust exposure sampler dermal exposure aerosol inhalant particle concentration wood mist wood dust benzene permeation fluid mwfs mg/m respirator air hood | 607 |
| young drivers | driver crash older driver young driver gdl traffic dui road hazard perception novice driver novice violator motorcycle license passenger celeration teenage driver vehicle offend? accident | 594 |
| return-to-work | rtw fce pain rehabilitation disability return-to-work lbp return work disability functional capacity evaluation functional capacity worker injury sick clbp claimant occupational rehabilitation intervention workers' compensation compensable | 561 |
| overtime job stress | sleepy shift work shift shiftwork overtime osa night sleep fatigue worker circadian nap apnea alert driver night shift daytime sleepiness metabolic syndrome schedule insomnia | 557 |
| sickness absence | sick sickness absence work ability absence retirement wai long-term sickness pension disability pension employee cfs fatigue health ihr job women fibromyalgia disability intervention eap | 555 |
| productivity absenteeism | presentees obese productivity loss health migraine employee cost weight bmi absentees women sick products lpt depression fibroid work productivity short-term disability indirect cost sickness absence | 518 |
| occupational injury | injury occupational injury worker construction fatal cancer workers' compensation accident safety occupational accident compensable eye injury construction industry bladder cancer risk immigrant occup industry rate health | 495 |
| phthalates exposure | pfoa phthalate mercury cadmium dehp g/l pfos urine toluene blood bills perfluorooctanoic exposure metabolite concentration level geres bl g/dl pbde | 492 |
| musculoskeletal pain | keyboard cts computer mouse computer use upper extremity pain posture muscle musculoskeletal symptom computer work wrist shoulder carpal tunnel carpal tunnel syndrome symptom neck forearm workstyle ergonomic | 462 |
| transactional sex | ipv violence women hiv intimate partner intimate partner violence microbicide partner condom domestic violence abuse pregnancy contraception unintended pregnancy prison sexual violence sexual abuse intimate hiv prevention rape | 456 |

| Name | Noun Phrases | #P |
|-----------------------|--|-----|
| postpartum depressive | ptsd depression pms women world trade center postpartum world trade epds symptom veteran postpartum depressive mental health firefighter postnatal depression disaster pregnancy gdm maternal depression pmdd depressive symptoms | 439 |
| poverty | malaria health care informal care wtp maternal health abortion household discrete choice informal payment valuation discrete choice experiment decentralized? women infant mortality mortality vaccine service payment maternal health service | 425 |
| air pollution | pollution air pollution pm10 pm2 air particle no2 particulate matter asthma mortality g/m ambient air pollution nitrogen dioxide exposure ambient ozone concentrator tsp dioxide nitrogen | 422 |
| immigrant | immigrant women chd wisewoman health racial discrimination cvd statin discrimination ethnic racism disparity acculturate heart asians birth risk disease migrant south asians | 397 |
| burnout | burnout soc emotional exhaustion work engagement work-home workaholic conflict incivility job harasser emotional labor wfc spillover exhaustion workhome interference interpersonal conflict engage employee psychological detachment job resource | 373 |
| low back pain | lbp pain work compatibility patient transfer injury musculoskeletal disorder musculoskeletal symptom factor nurse ems msd ergonom worker compatibility transfer job neck/shoulder risk msds musculoskeletal injury | 353 |
| mammography | mammography hpv cervical cancer pap women cancer vaccine lesbian breast papillomavirus human papillomavirus mammogram hpv vaccine breast cancer pap smear sexual orientation smear sexual minority pap test mammography use | 353 |
| exposure arsenic | arsenic glycol exposure pregnancy pesticide ether birth arsenic exposure rat sperm cancer veterinarians mtbe dmf semen spontaneous abortion arseniasis semiconductor malformation urine | 349 |
| scoliosis | scoliosis pedicle screw idiopathic fusion pedicle screw cobb thoracic spine adolescent idiopathic kyphosis adolescent idiopathic scoliosis idiopathic scoliosis deformity ais vertebra scoliotic cobb angle lordosis angle | 344 |
| safety climate | safety climate safety climate safety culture safety performance culture safety manager safety behavior leadership safety-specific accident safety participation behavior management commitment commitment safety behaviour manager injury employee safety leadership | 322 |

| Name | Noun Phrases | #P |
|-------------------------------------|--|-----|
| exposure antineoplastic drugs | antineoplastic rat antineoplastic drug antioxidant peroxide oxide dna lipid peroxidation genotoxic afb comet melatonin dna damage sod mg/kg oxidative stress vcm glutathione pfib cyclophosphamide | 301 |
| low-back-pain; vibration | vibration wbv whole-body vibration seat whole-body backrest apparent mass iso 2631-1 posture driver lbp iso fore-and-aft whole body vibration wbv exposure biodynamic joystick vibration exposure seat pan acceleration | 278 |
| asbestos | asbestos mesothelioma chrysotile asbestosis fiber amphibole malignant mesothelioma asbestos exposure fibre lung cancer lung cancer tremolite crocidolite exposure hrct mortality brake peritoneal mesothelioma asbestosrelated disease | 269 |
| heat | heat firefighter temperature heat stress thermal comfort ensemble wbg thermal manikin insulator moisture glove skin temperature helmet rectal temperature thermal insulation thermal sensation dexterity evaporative resistance microclimate manikin | 261 |
| nanoparticle | particle nanoparticle nanomaterials manganese rat indium mwcnt welder concentration ultrafine carbon ito exposure mice toxicity nanotube inhalable parkinson lung fume | 253 |
| grip | grip torque grip force force glove touch finger cursor hand hand tool pen fits keyboard plier task pistol laparoscopic normal force wrist key size | 232 |
| noise | noise hpd noise exposure hpd exposure nihl styrene occupational noise dba hpd use solvent khz audiometric protection device audiometry solvent exposure occupational noise exposure loss worker toluene | 219 |
| vertebroplasty | vertebroplasty fracture kyphoplasty thoracolumbar cement vertebral body spine vertebra osteoporotic screw pmma vertebral compression vertebral compression fracture vertebral fracture pedicle percutaneous vertebroplasty augmenter percutaneous endplate burst | 217 |
| screw | screw pedicle spine odontoid cervical spine lateral mass fixation fusion cervical pedicle transarticular resection metastases lateral mass screw spinal cord patient cervical pedicle screw odontoid fracture fracture cord osteotomy | 217 |
| bitumen | bitumen pah asphalt acrylamide jp-8 bitumen fume polycyclic hydrocarbon aromatic hydrocarbon fume pyrene exposure naphthalene dermal exposure asphalt work retinyl urinary 1-ohp creatinine adduct paver | 216 |

| Name | Noun Phrases | #P |
|-----------------------------|---|-----|
| indoor air | mold fungi odor chemical sensitivity indoor air sbs indoor environment spore mcs air pellet carpet allergen cockroach symptom mite damp wood pellets concentration dust | 209 |
| smoking smokefree | smoke-free shs tobacco cotinine smoke smoker tobacco control ets nicotine ban cessation environmental tobacco environmental tobacco smoke bar secondhand smoke restaurant cigarette shs exposure casino smoke-free legislation | 199 |
| menopausal symptom | hot flash women menopausal symptom hrt flash menopause hormone estrogen postmenopausal women isoflavone raloxifene soy vasomotor whi hormone therapy women's health therapy osteoporosis vasomotor symptom hormone replacement | 197 |
| slips, trips, and falls | friction slip slippery cof footwear floor heel ladder shoe rcof slipmeter floor slipperiness gait fall anti-slip roughness stf friction measurement surface friction coefficient | 196 |
| violence risks nursing | violence rops workplace violence injury agricultural injury farm tractor assault pedestrian farmer children physical assault workplace homicide workplace violence prevention unintentional injury homicide agriculture toddler risk aggression | 192 |
| hand-arm vibration | vibrator hav hand-arm hand-arm vibration finger vibration exposure vwf handarm vibration syndrome white finger finger blood finger blood flow fst biodynamic fbf vibrotactile cold provocation htv acceleration iso raynaud's | 188 |
| airborne infection | respirator n95 facepiece facial dimension aerosol facepiece respirator particle test panel ffr surgical mask filter wpfs wpf tuberculosis tst workplace protection factor n95 respirator sars leakage penetration | 176 |
| magnetic field | magnetic field mobile phone electric field phone emf cancer electromagnetic electromagnetic field field breast breast cancer exposure neuroma cosmic radiation acoustic neuroma magnetic field exposure elf-mf mobile phone base mobile phone base station mobile phone use | 160 |
| implementation intention | helmet implementation intention bicycle helmet intent tpb bicycle helmet use crowd subjective norm evacuation behavioural control theory head injury norm bicycle helmet use behaviour disability behavior allegation pedestrian | 159 |
| occupational health | occupational physician thor ops occupational health occupational medicine physician ebm health tw] opra occupational disease ill-health mental ill-health medicine ohs disease occupational health service occup srss thor-gp | 141 |

| Name | Noun Phrases | #P |
|-------------------------|---|-----|
| participatory ergonomic | osteoarthritis knee participatory ergonomic ergonomic knee osteoarthritis floor layers action checklist participatory participatory ergonomics intervention hip enterprise intervention low-cost improvement farmer small enterprises net-cost urban referents knee disorders musculoskeletal disorder worker | 135 |
| contaminated sharps | sharps sharps injury needlestick hcws influenza vaccine blood exposure nsis hbv needlestick injury bloodborne nsi hepatitis bbf hcv blood-borne ili injury hepatitis b body fluid | 132 |
| low-back-pain | backpack carriage lbp load carriage load school furniture furniture backpack load pain schoolchildren schoolbag school classroom furniture backpack carriage gait posture scoliosis chair desk classroom | 129 |
| motion sickness | motion sickness fishermen seafarer simulator sickness amputation motion injury sickness case-crossover commercial fishermen crab transient risk transient risk factor merchant acute hand boater case-crossover study vessel acute hand injury commercial crab | 122 |
| product design | product form luminance legibility kansei ambient illumination product design product design font color usability contrast ratio aesthetic creative semantic illuminant mobile phone display affect luminance contrast | 105 |
| telework | telework erp enterprise resource high performance work mobile work erp system ict labour process high performance work systems workplace partnership organise centre enterprise alternative research agenda healthcare information systems bpr erp implementation new biotechnologies connectivity technologies employee resistance | 89 |
| beryllium | beryllium cbd beryllium sensitivity bes chronic beryllium chronic beryllium disease belpt beryllium lymphocyte beryllium lymphocyte proliferation alloy beryllium lymphocyte proliferation test copper-beryllium e69 ipf lymphocyte beo sensitivity worker beryllium exposure be-lpt | 83 |
| whiplash | whiplash neck pain whiplash injury neck pain cervical spine wad best evidence vba best evidence synthesis spine neck injury frontal impact injury joint decade chronic neck pain acceleration rid2 cervical traction traction | 82 |

Appendix 3: Methodological Appendix

About the data: sources and processes

Source

Thomson Reuters Web of Science.

Selection

Publications indexed as “Articles”; “Letters”; “Proceedings Papers” or “Reviews”, where at least one author stated the address to Swedish academies in the databases SCI-EXPANDED, SSCI and AH&CI.

Indicators

Number of publications (P)

Number of publications in which at least one author stated the address to the current units.

Number of fractionalised publications (Frac P)

The sum of publication shares with addresses to the relevant units, where each address stated in a publication represents the equivalent of one divided by the publication’s total number of addresses.

Clustering

Source

Thomson Reuters “Web of Science”.

Clustering methodology

Multi-level Aggregation (“Louvain Method”); se V.D. Blondel, J.L. Guillaume, R. Lambiotte and E. Lefebvre (2008), “Fast unfolding of communities in large networks”, *Journal of Statistical Mechanics: Theory and Experiment* p. P10008; se även L Zhang, XH Liu, F Janssens, LM Liang, & W Glänzel (2009), “Subject clustering analysis based on ISI category classification”, *Journal of Informetrics* 4, Issue 2, April 2010, 185-193.

Appendix 4. Magazines not included in the survey sample

Work-related magazines: (crossed magazines included in the selection - others not included)

| Cluster | So | cross |
|---------|---|-------|
| 0 | Bmc public health | |
| 0 | Toxicology and industrial health | |
| 1 | American journal of public health | |
| 3 | International journal on disability and human development | |
| 4 | Work-a journal of prevention assessment & rehabilitation | x |
| 4 | American association of occupational health nurses journal | |
| 4 | Bulletin of the world health organization | |
| 4 | International journal of qualitative studies on health and well-being | |
| 4 | Journal of clinical epidemiology | |

| Cluster | So | cross |
|---------|---|-------|
| 4 | Journal of medical screening | |
| 4 | Perspectives in public health | |
| 6 | Neuroepidemiology | |
| 7 | Public health nursing | |
| 7 | Puerto rico health sciences journal | |
| 9 | Accident analysis and prevention | x |
| 9 | American industrial hygiene association journal | x |
| 9 | American journal of industrial medicine | x |
| 9 | Annals of occupational hygiene | x |
| 9 | European spine journal | x |
| 9 | Human factors | x |
| 9 | Human factors and ergonomics in manufacturing | x |
| 9 | Industrial health | x |
| 9 | International archives of occupational and environmental health | x |
| 9 | International journal of hygiene and environmental medicine | x |
| 9 | International journal of industrial ergonomics | x |
| 9 | International journal of occupational and environmental health | x |
| 9 | International journal of occupational medicine and environmental health | x |
| 9 | Journal of epidemiology and community health | x |
| 9 | Journal of occupational and environmental hygiene | x |
| 9 | Journal of occupational and environmental medicine | x |
| 9 | Journal of occupational health psychology | x |
| 9 | Journal of public health | x |
| 9 | Occupational and environmental medicine | x |
| 9 | Occupational medicine | x |
| 9 | Occupational medicine-oxford | x |
| 9 | Safety science | x |
| 9 | Work and stress | x |
| 9 | Anales del sistema sanitario de navarra | |
| 9 | Annali dell'istituto superiore di sanità | |
| 9 | Annual review of public health | |
| 9 | Archives des maladies professionnelles et de l'environnement | |
| 9 | Aviation space and environmental medicine | |
| 9 | Economics & human biology | |
| 9 | Environmental health | |
| 9 | Environmental health perspectives | |
| 9 | Environmental research | |
| 9 | Environnement risques & sante | |
| 9 | Epidemiologic reviews | |

| Cluster | So | cross |
|---------|--|-------|
| 9 | European journal of public health | |
| 9 | High altitude medicine & biology | |
| 9 | International journal of circumpolar health | |
| 9 | Journal of community psychology | |
| 9 | Journal of environmental health | |
| 9 | Journal of epidemiology | |
| 9 | Journal of exposure analysis and environmental epidemiology | |
| 9 | Journal of public health medicine | |
| 9 | Journal of the royal society for the promotion of health | |
| 9 | Journal of toxicology and environmental health-part a-current issues | |
| 9 | Tobacco control | |
| 11 | Health & place | |
| 13 | Public health | |
| 15 | Applied ergonomics | x |
| 15 | Australian journal of rural health | |
| 15 | Chronic diseases in canada | |
| 15 | Health risk & society | |
| 17 | International journal of hygiene and environmental health | x |
| 18 | Fluoride | |
| 20 | International journal of occupational safety and ergonomics | x |
| 20 | Journal of occupational rehabilitation | x |
| 20 | Scandinavian journal of work environment & health | x |
| 20 | Social science & medicine | x |
| 20 | Administration and policy in mental health and mental health services research | |
| 20 | American journal of community psychology | |
| 20 | American journal of epidemiology | |
| 20 | American journal of health behavior | |
| 20 | American journal of health promotion | |
| 20 | American journal of preventive medicine | |
| 20 | Annals of agricultural and environmental medicine | |
| 20 | Annals of human biology | |
| 20 | Archives of environmental & occupational health | |
| 20 | Asia-pacific journal of public health | |
| 20 | Australian and new zealand journal of public health | |
| 20 | Biomedical and environmental sciences | |
| 20 | Bundesgesundheitsblatt-gesundheitsforschung-gesundheitsschutz | |
| 20 | Cancer epidemiology biomarkers & prevention | |
| 20 | Epidemiologia & prevenzione | |

| Cluster | So | cross |
|---------|--|-------|
| 20 | Epidemiology | |
| 20 | Ethnicity & disease | |
| 20 | European journal of epidemiology | |
| 20 | Global public health | |
| 20 | Health | |
| 20 | Health care for women international | |
| 20 | Health education & behavior | |
| 20 | Health environments research & design journal | |
| 20 | Health promotion in australia | |
| 20 | Injury prevention | |
| 20 | International journal for equity in health | |
| 20 | International journal of environmental health research | |
| 20 | International journal of epidemiology | |
| 20 | International journal of health geographics | |
| 20 | International journal of injury control and safety promotion | |
| 20 | International journal of public health | |
| 20 | Journal of primary prevention | |
| 20 | Journal of public health management and practice | |
| 20 | Journal of safety research | |
| 20 | Journal of toxicology and environmental health-part b-critical reviews | |
| 20 | Journal of urban health-bulletin of the new york academy of medicine | |
| 20 | Journal of womens health | |
| 20 | Noise & health | |
| 20 | Prevention science | |
| 20 | Preventive medicine | |
| 20 | Psychology & health | |
| 20 | Psychology, health & medicine | |
| 20 | Public health genomics | |
| 20 | Public health nutrition | |
| 20 | Research in social & administrative pharmacy | |
| 20 | Revue d epidemiologie et de sante publique | |
| 20 | Rural and remote health | |
| 20 | Scandinavian journal of caring sciences | |
| 20 | Scandinavian journal of public health | |
| 20 | Statistics in medicine | |
| 20 | Who technical report series | |
| 20 | Women & health | |
| 22 | Journal of occupational health | x |
| 22 | Sociology of health & illness | x |

| Cluster | So | cross |
|----------------|---|--------------|
| 24 | Canadian journal of public health-revue canadienne de sante publique | |
| 24 | Cancer causes & control | |
| 24 | Journal of environmental science and health part b-pesticides food contaminants and agricultural wastes | |
| 24 | Journal of exposure science and environmental epidemiology | |
| 24 | Public health reports | |
| 25 | Journal of womens health & gender-based medicine | |
| 31 | Journal of aerosol medicine | |
| 31 | Sozial- und präventivmedizin | |
| 32 | Annals of epidemiology | |

Appendix 5. Social and behavioural sciences cluster, most frequent journal per cluster.

| Cluster | Count |
|---|-------|
| 0 GENDER WORK AND ORGANIZATION GENDER & SOCIETY HUMAN RELATIONS POLICING-AN INTERNATIONAL JOURNAL OF POLICE STRATEGIES & MANAGEMENT WORK EMPLOYMENT AN | 124 |
| 1 SOCIAL SCIENCE & MEDICINE JOURNAL OF EPIDEMIOLOGY AND COMMUNITY HEALTH EUROPEAN JOURNAL OF PUBLIC HEALTH SCANDINAVIAN JOURNAL OF PUBLIC HEALTH AMERICAN J | 87 |
| 2 PROFESSIONAL PSYCHOLOGY-RESEARCH AND PRACTICE JOURNAL OF ADVANCED NURSING PSYCHOLOGY OF MEN & MASCULINITY PSYCHOTHERAPY JOURNAL OF COUNSELING AND DEV | 32 |
| 9 ACADEMIC MEDICINE MEDICAL EDUCATION JOURNAL OF GENERAL INTERNAL MEDICINE MEDICAL TEACHER JOURNAL OF WOMENS HEALTH | 78 |
| 11 SEX ROLES JOURNAL OF APPLIED SOCIAL PSYCHOLOGY JOURNAL OF SOCIAL ISSUES JOURNAL OF EXPERIMENTAL SOCIAL PSYCHOLOGY JOURNAL OF PERSONALITY AND SOCIAL PSYCHOL | 110 |
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