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STRESS AND BURNOUT IN HEALTHCARE WORKERS

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**Karolinska
Institutet**

Stockholm 2008

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ISBN 978-91-7409-041-3

”...we learn from one another how to be human by identifying ourselves with others, finding their dilemmas in ourselves. What we all learn from it is self-knowledge. The self we learn about...is every self. It is universal – the human self. We learn to recognize ourselves in others...(it) keeps alive our common humanity and avoids reducing self or other to the moral status of object.”

Jean Watson

ABSTRACT

Work-related stress (of which burnout might be an example) is one of the most common work-related health problems. Currently, psychiatric illness (particularly depression, anxiety disorders, and stress related conditions) is the most common cause for long-term sick-leave in Sweden for women, and the second largest for men. Finding adequate strategies to prevent stress and burnout therefore seems important.

This thesis is based on a questionnaire survey among all employees in a Swedish County Council. The overall response rate was 65% ($n = 3976$).

The aims of the thesis were to:

- (1) Investigate how four burnout categories (non-burnout, disengaged, exhausted, and burnout) are linked to constellations of work characteristics, including self-reported sickness absence, sickness presence and overtime.
- (2) Test the Job Demand-Resources model in a sample of Swedish healthcare workers.
- (3) Investigate how burnout relates to self-reported physical and mental health, sleep disturbance, memory and lifestyle factors.
- (4) Test the effect of participating in a reflecting peer-support group on self-reported health, burnout, and on perceived changes in work conditions.
- (5) Investigate the factorial structure of the Swedish translation of the Oldenburg Burnout Inventory, and its predictive validity on future long-term sickness absence.

Results revealed that burnout is associated with poorer self-rated health, more depression and anxiety, overtime work, and with future long-term sickness absence as measured by register data. Burnout as a possible pathway to an exhaustion disorder is discussed.

Contrary to the general belief, that job demands make all the difference, results indicated that it was the access to/lack of adequate job resources that determined whether an employee was classified as burnt out or not.

Additional support for the Job Demands-Resources model was found, insofar that job demands were more closely related to exhaustion, while lack of job resources was more associated with disengagement.

Reflecting peer-support groups, using a problem-based method, was tested in a randomized controlled trial, and showed positive intervention effects in self-reported health, participation and development opportunities at work, support at work, and in work demands.

Based on the result in this thesis, a fair and empowering leadership, a positive social climate at work, control of decision, and support from superiors, as well as a reasonable work load appear to be important factors in the prevention of burnout.

Reflecting peer-support groups using a problem-based method could be a useful and comparatively inexpensive tool in alleviating work-related stress and burnout. Further research is needed, before any conclusions about the usefulness of the method for men can be drawn.

LIST OF PUBLICATIONS

This thesis is based on the following studies, which will be referred to by their Roman numerals I-IV:

- I. Peterson, U., Demerouti, E., Bergström, G., Åsberg, M. and Nygren, Å. (2008). Work characteristics and sickness absence in burnout and non-burnout groups: A study of Swedish health care workers.
International Journal of Stress Management, 15 (2), 153-172.
- II. Peterson, U., Demerouti, E., Bergström, G., Samuelsson, M., Åsberg, M. and Nygren, Å. (2008). Burnout and physical and mental health among Swedish healthcare workers.
Journal of Advanced Nursing, 62 (1), 84-95.
- III. Peterson, U., Bergström, G., Samuelsson, M., Åsberg, M. and Nygren, Å. Reflecting peer-support groups in the prevention of stress and burnout: randomized controlled trial.
Accepted for publication in the Journal of Advanced Nursing.
- IV. Peterson, U., Demerouti, E., Gustavsson, J.P., Bergström, G., Åsberg, M. and Nygren, Å. Predictive validity of the Swedish translation of the Oldenburg Burnout Inventory on long-term sickness absence.
Submitted

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LIST OF ABBREVIATIONS

CI	Confidence interval
CFA	Confirmatory factor analysis
DA	Discriminant analysis
EFA	Exploratory factor analysis
JD-R model	Job Demands-Resources model
MBI	Maslach Burnout Inventory
OLBI	Oldenburg Burnout Inventory
RCT	Randomized controlled trial
SRH	Self-rated health
QPS Nordic	The General Nordic Questionnaire for Psychological and Social Factors at Work

INTRODUCTION

This thesis is a result of my curiosity about whether reflecting peer-support groups, utilizing a problem-based method, might be useful in preventing burnout and stress, and also about how people who experience burnout, compared to those who do not, relate to different work conditions and health indicators, including sickness absence.

I became practically involved with the problem-based method in the middle 1990s, as one of the group-leaders in a rehabilitation project conducted by Kerstin Ekberg, professor at Linköping University, Sweden. That project was directed at women with long-term musculoskeletal pain. My experience from that was very positive, and it was to me a new kind of thinking in rehabilitation, and most of all it was the pedagogical approach I found attractive. This raised the question of whether the method also could serve effectively in a preventive intervention.

According to the Fourth European Working Conditions Survey (2005), work-related stress is one of the most common work-related health problems, affecting 22% of European workers. Currently, psychiatric illness (particularly depression, anxiety disorders, and stress related conditions) is the most common cause for long-term sick-leave in Sweden for women, and the second largest for men (National Social Insurance Board, 2007). Possible reasons for the increased rate of sick-leave due to psychiatric disorders have been debated, often focusing on recent changes in the psychosocial work environment (National Social Insurance Board, 2003; Theorell, 2006). This suggests that burnout, defined as a work-related stress reaction, might be an intervening link between an adverse psychosocial work environment and work stress-related psychiatric disorder (Tennant, 2001; Paterniti *et al.*, 2002; Borritz *et al.*, 2005; Wang, 2005; Ylipaavalniemi *et al.* 2005).

Finding adequate prevention strategies to combat work-related stress (of which burnout might be an example) therefore seems important.

BACKGROUND

DEFINITION OF PROFESSIONAL BURNOUT

The concept of professional burnout was first used by Freudenberger in 1974 to describe a state of exhaustion (most often emotional and mental) observed among volunteer workers. The consequences of burnout were described in terms of physical outcomes (*e.g.*, frequent headaches, sleeplessness, gastrointestinal disturbances, and shortness of breath), and in behavioural outcomes (*e.g.*, frustration, irritation, difficult to hold in feelings, cynicism). Freudenberger also suggested that it seemed to be those who “work too much, too long and too intensively” and those who had a “need to give” that were prone to burnout (p. 161). He also pointed at the experience of “less challenges at work” and “monotony of work” as possible risk factors leading to burnout.

Several developmental models of burnout have been outlined since then, but according to Schaufeli and Buunk (2003) a comprehensive theoretical framework is still lacking. Burnout is most often conceptualized in the framework of stress research, but several authors have suggested that stress (strain) and burnout are two different constructs (Cordes & Dougherty, 1993; Pines and Keinan, 2005; Smith *et al.*, 2006). Burnout has also been described from an existential perspective (Pines, 1993; Pines & Keinan, 2005), and according to Pines (1993), one underlying assumption in the existential model of burnout is that only highly motivated individuals can burn out - “in order to burn out, one has to first be on fire” (p. 41). A recent study by Hallberg, Johansson and Schaufeli (2007), followed this line of research, by examining possible relationship between Type A behavior, work engagement, and burnout. Schaufeli and Buunk (2003) distinguished three overall theoretical approaches to burnout; individual (*e.g.*, a discrepancy between expectations and reality), interpersonal (*e.g.*, lack of reciprocity, social comparison), and organizational (*e.g.*, mismatch between person and job, burnout as a virulent process, or as a reality shock).

Burnout was originally observed among those who work in the human services and health care (Maslach *et al.*, 1996), but research of the past decade has shown that burnout can be observed in virtually any occupational group (Bakker *et al.*, 2002; Demerouti *et al.*, 2001a; Leiter & Schaufeli, 1996).

Maslach and Goldberg (1998b) described burnout from a multi-dimensional model, and defined it as “a psychological syndrome of emotional exhaustion, depersonalization and reduced personal accomplishment” (p. 64).

Another, later definition of burnout was formulated by Maslach, Schaufeli & Leiter (2001a): “a psychological syndrome in response to chronic interpersonal stressors on the job. The three key dimensions of this response are an overwhelming exhaustion, feelings of cynicism and detachment from the job, and a sense of ineffectiveness and lack of accomplishment” (p. 399). These three key dimensions also constitute the three subscales of the Maslach Burnout Inventory (MBI), which is the most frequently used instrument to assess burnout (Schaufeli & Enzmann, 1998).

In this thesis, an alternative measure of burnout is used; the Oldenburg Burnout Inventory (OLBI; Demerouti *et al.*, 2001a; Demerouti *et al.*, 2003). The OLBI conceives of burnout as a syndrome of work-related negative experiences, including feelings of *exhaustion* and *disengagement from work*. *Exhaustion* was defined by Demerouti *et al.* (2003) as an extreme form of fatigue, a consequence of prolonged and intense physical, affective, and cognitive strain caused by chronic exposure to adverse working conditions. *Disengagement* refers to distancing oneself from one's work, work objects (e.g., computers, clients), or work content (e.g., software programming, providing services) and represents an extensive and intensive reaction in terms of an emotional, cognitive, and behavioral rejection of the work.

The third burnout component, reduced personal accomplishment (Maslach *et al.*, 1996) is excluded from this definition of burnout because it is not thought to constitute a core dimension of the condition (Shirom, 2002).

In the present thesis, the Job Demands – Resources model of burnout (JD-R; Demerouti *et al.*, 2001a; Bakker & Demerouti, 2007) was used as theoretical framework (Figure 1).

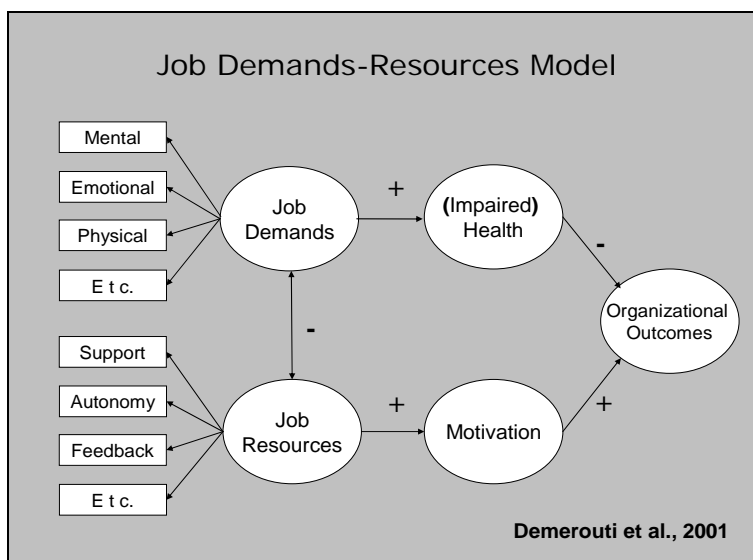


Figure 1. The Job Demands-Resources model (presented below).

BURNOUT AND WORK CHARACTERISTICS

The Job Demands-Resources model was developed by Demerouti *et al.* (2001a) in order to explain the development of burnout. One central assumption of the J D-R model is that although every occupation may have its own specific work characteristics associated with burnout, it is still possible to model these characteristics in two broad categories, namely *job demands* and *job resources*.

Job demands refers to those physical, psychological, social or organizational aspects of the job that require sustained physical and/or psychological (cognitive and

emotional) effort, and are therefore associated with certain physiological and/or psychological costs. Job demands can, for example, consist of high workload, overtime, learning demands, and an unfavourable physical environment.

Job resources refer to those physical, psychological, social, or organizational aspects of the job that either/or: (1) are functional in achieving work goals; (2) reduce job demands, and the associated physiological and psychological costs; (3) stimulate personal growth and development. It is also proposed that access to relevant job resources might have a motivational potential, which in turn might lead to high work engagement. Job resources can, for example, consist of pay, career opportunities, supervisor and co-worker support, participation in decision making, autonomy, and performance feedback (Demerouti *et al.*, 2001a).

The relationships between *job demands* and *exhaustion*, as well as between *job resources* and *disengagement*, have been supported by using observers' ratings of job demands and job resources (*ibid*). These relationships were also tested in Study I in this thesis.

A second proposition in the JD-R model is that work characteristics may evoke two different and fairly independent processes. First, high job demands (i.e., work overload) may deplete employees' mental and physical resources, and may therefore lead to exhaustion or to health problems (e.g., Demerouti *et al.*, 2000; Demerouti *et al.*, 2001b). Second, job resources might have a motivational potential, whereas poor access to adequate job resources can preclude goal accomplishment, which is likely to cause failure and frustration. In such a situation, disengagement from work can be an important self-protection mechanism that may prevent the future frustration of not obtaining work-related goals.

BURNOUT IN RELATION TO HEALTH AND LIFE-STYLE

Recent overviews of the burnout literature suggest that our knowledge is more extensive regarding predictors (work characteristics) of burnout than possible consequences for health. Maslach (2001b) even raised the question of whether burnout actually has anything to do with health, and suggested that "burnout may be more significant in mediating job outcomes, such as behaviours that affect the quality of work" (p. 611).

Previous research has shown that it is the exhaustion component of the burnout syndrome that correlates positively with other stress-related outcomes (Maslach, 2003), but several authors have also suggested that stress and burnout are two different constructs (Pines and Keinan, 2005; Smith *et al.*, 2006). However, it has been emphasized that focusing exclusively on the exhaustion dimension might lead to loss of appreciation of other aspects of the burnout syndrome (Maslach *et al.*, 2001a).

From a recent review of the evidence of health consequences of burnout, it was concluded that "yet the accumulating evidence suggests that chronic burnout may harm physical health through different pathways" (Shirom *et al.*, 2005, p. 32). An association between burnout and depression (Toppinen-Tanner *et al.*, 2005; Ahola *et*

al., 2005; Wang, 2005), as well as between burnout and anxiety (Bargellini *et al.*, 2000), has previously been described. Several authors have also concluded that depression and burnout are two distinct and separable constructs (Glass & McKnight, 1996; Melamed *et al.*, 2006; Ahola & Hakanen, 2007), and that the exhaustion component of the burnout syndrome is more strongly related to depression (Glass & McKnight, 1996; Schaufeli & Enzmann, 1998).

Research on the possible relationship between life-style and burnout has yielded somewhat inconsistent results. For example, Gorter *et al.* (2000) found that a high-risk group for burnout had an unhealthier life-style regarding sporting/physical exercise and an increased alcohol consumption, while Burke (1994) and Shanafelt *et al.* (2002) found no associations between at-risk alcohol use and burnout. In a review by Shirom *et al.* (2005), it was concluded that current evidence did not support viewing health behaviours as either moderating or mediating the relationships between burnout and health.

Study II tested how burnout and non-burnout respondents related to self-reported health and life-style factors.

BURNOUT, SICKNESS ABSENCE AND SICKNESS PRESENCE

Research on the possible relationship between burnout and sickness absence is rather limited. For example, Schaufeli and Enzmann (1998) found only ten studies in their literature review that investigated the relationship between burnout and sickness absence; they concluded that “despite the popular assumption that burnout causes absenteeism, the effect is rather small and is most related to emotional exhaustion” (p. 91). However, in the last few years, an association between burnout and increased risk of future sickness absence has been found. For example, Toppinen-Tanner *et al.* (2005) found a relationship between burnout and risk of future absence because of mental and behavioral disorders and diseases of the musculoskeletal system. Ahola *et al.* (2008) found, after adjusting for mental disorders and physical illness, that severe burnout was associated with sickness absence.

In addition to research on sickness absence, the phenomenon of sickness presenteeism, that is, being at work while sick, has been studied (Aronsson *et al.*, 2000). However, the possible relationship between sickness presence and burnout has, to my knowledge, previously not been investigated.

Study I investigated the relationship between burnout and self-reported sickness absence and sickness presence, and Study IV investigated the relationship between burnout and future long-term sickness absence (> 90 days) using register data.

INTERVENTIONS

A search of three electronic databases: Psych INFO, PubMed and The Cochrane Library using burnout intervention (Psych INFO) or burnout (PubMed and The Cochrane Library) as free text was made in September, 2006. The search included studies, reviews and overviews published in English from 1990 to 2006. All types of

interventions aimed at decreasing burnout levels were included, and the search was limited to studies with a randomized control design (the person-directed studies), using the Maslach Burnout Inventory (MBI) as an outcome measure. Dissertations were excluded.

In all, 92 studies were found, and 11 of them fulfilled the inclusion criteria (presented in Appendix 2). Six of these studies showed statistically significant changes in positive direction on burnout scores. Particularly changes in the two subscales emotional exhaustion and perceived professional accomplishment were found. The interventions tested were: mindfulness-based stress reduction 8 weeks (Cohen-Katz *et al.*, 2005), mindfulness-based stress reduction 4 weeks (Mackenzie *et al.*, 2006), improving coping strategies (Rowe, 1999; Zolnierczyk, 2005), training in psychosocial interventions (Ewers *et al.*, 2002), and training in emotion-oriented care (Schrijnemaekers *et al.*, 2003).

Five studies showed inconsistent or no changes in burnout levels. The interventions tested were: recreational music-making (Bittman *et al.*, 2003), education for caregivers (Carnevale *et al.*, 2002), autogenic training (Kanji *et al.*, 2006), test of effectiveness of primary nursing on burnout levels (Melchior *et al.*, 1996), and test of self-management tools based on passage meditation (Oman *et al.*, 2006).

The interventions found by this overview vary a lot with respect to *e.g.*, strategies used and sample sizes, which makes it impossible to draw conclusions about which interventions should be preferred in order to reduce burnout levels. The majority of the interventions were person-directed, and only two of the 11 studies were work-directed. One of the work-directed studies (Schrijnemaekers *et al.*, 2003), showed modest positive effect on the MBI, while the second study (Melchior *et al.*, 1996) showed no influence on the burnout level. Results from previous reviews on work-directed interventions are somewhat inconsistent *e.g.*, van der Klink *et al.* (2001), found no effect for organization-focused interventions, while van der Hek *et al.* (1997), found some evidence that organization-wide approaches have an effect on all levels of outcomes.

A systematic review by Marine *et al.* (2006) evaluated the effectiveness of interventions in preventing stress in health care workers. Both work-directed and person-directed interventions (the latter restricted to RCT:s) were included. All types of interventions aimed at preventing or reducing stress arising from work were included. In all, 14 RCT:s, 3 cluster-randomized trials and 2 crossover trials were included. Two trials were of high quality. Three studies with the MBI as an outcome measure (Cohen-Katz, 2005; Ewers, 2002; Rowe, 1999) were included in a meta-analysis, which showed that exhaustion and personal accomplishment were positively changed by the interventions, while depersonalization was not. Overall the authors conclude that “limited evidence is available for the effectiveness of person- and work-directed interventions to reduce stress levels in healthcare settings” (p. 10).

Michie and Williams (2003) made a systematic review of studies aimed at reducing work related psychological ill health and sickness absence. They found 40 studies, of which one used the MBI as an outcome measure, but was uncontrolled. The authors concluded that successful interventions that improved psychological health contained:

(1) training and organizational approaches to increase participation in decision making and problem solving, (2) increased support and feedback, and (3) improved communication.

Schaufeli and Enzmann (1998) reviewed more than 30 different approaches to preventing or combating burnout. Their overview does not present criteria for inclusion of a study. The authors concluded that “there appears to be no general recipe” and that most interventions were rather general and not specifically tailored to reduce burnout. It was also concluded that individual based cognitive and behavioural strategies appear to reduce burnout, particularly the exhaustion component of the burnout syndrome.

Taken together, there is limited evidence for the effectiveness of person-directed interventions aimed at reducing burnout levels, and previous research on work-directed interventions shows somewhat inconsistent results.

PREVENTION

Finding adequate strategies aimed at preventing stress and burnout seems important, and would not only decrease the amount of unwanted suffering for the employee, but would also benefit the organization as a whole.

Maslach and Goldberg (1998b), outlined several possible reasons that might contribute to burnout, and some of them were related to the cultural context, for example, “various social, political, and economic factors that shape the work environment” (p. 64). Maslach and Leiter (1997) developed a model of possible causes of burnout, and proposed that the greater the mismatch between the person and the job is, the greater the likelihood of burnout. They identified six areas of mismatch: work overload, lack of control, insufficient reward, breakdown of community, absence of fairness, and value conflict. According to Maslach (1998a) this model expands the range of options for interventions, and may therefore be useful in developing interventions at the workplace. From a literature review, Schaufeli and Enzmann (1998) classified possible causes of burnout into personality characteristics, work-related attitudes, and work and organisational characteristics.

This suggests that interventions aimed at preventing and combating burnout need to be directed at the organizational, as well as the individual, and the societal level.

Several researchers have suggested that peer-support groups might be quite useful in preventing burnout (*e.g.*, Maslach & Goldberg, 1998b; Schaufeli & Enzmann, 1998). For example, in order to prevent burnout Freudenberger (1974) suggested that by sharing experiences with others “you begin to learn what to look for, what to do and not to do” (p. 164). According to Schaufeli *et al.* (1998), peer-support groups have the potential to provide almost all types of support *i.e.*, appraisal, emotional, instrumental and informational support. Although prior research in the relationship between support and burnout shows somewhat inconsistent results (for an overview see Schaufeli *et al.*, 1998; Burke *et al.*, 2001; Shirom *et al.*, 2005), several studies have shown that higher levels of support from co-workers were related to lower levels of emotional exhaustion (Janssen *et al.*, 1999; Coffey *et al.*, 2001; Jenkins *et al.*, 2004).

The concept of social support has been broadly defined as the resources provided by other persons (Cohen *et al.*, 1985). Cohen *et al.* (1984) emphasized the necessity of considering it as a multidimensional concept, and several forms of social support have been described *e.g.*, informational, instrumental and emotional support (Taylor, 2007). Benefits of social support for mental and physical health have previously been described in a number of studies (for an overview see Taylor, 2007). In the peer-support groups presented in this thesis, social support refers to peer-support, that is, support from similar others.

A problem-based rehabilitation method, PBR, (Ekberg, 1995; 1997; Ekberg *et al.*, 1998) was used in the peer-support groups in Study III. The method has previously been used in health promotion and rehabilitation (Arnesson *et al.*, 2005; Medin *et al.*, 2003; Tingström *et al.*, 2002), and has to my knowledge not been tested in stress or burnout prevention. This method was somewhat modified and adjusted to fit the preventive approach, and was enhanced by a modified Metaplan visualization technique (Schnelle, 1979; Knox, 2003). The PBR method was originally adopted from problem-based learning, PBL, (Neufeld *et al.*, 1974; Maudsley, 1999a).

The reflecting peer-support group is meant to be a working group, and not a therapeutic group, and the purpose with the group is to:

- provide an opportunity for discussion and reflection together with colleagues, focusing on work-related stress and burnout, with one's own unique situation and experience as starting point
- provide an opportunity for mutual support between colleagues, to share and compare experiences with colleagues, and also learn from each other
- work with individual goals for change in order to find out alternative ways to handle perceived stressful situations.

From a review of workplace stress in nursing, McVicar (2003) pointed out that the sources of stress seem to differ between practice areas, and that there is a variation between individuals in their perception of the workplace. The problem-based method used in the peer-support groups, where the themes discussed during the sessions are suggested by the participants themselves, seems particularly well suited to address this complexity. The themes emerge from the participants own beliefs about causes of stress and burnout, and from their own unique situation, and thus reflect what they think is the important focus.

AIMS

The overall aim of this thesis was to deepen the knowledge about burnout and its relation to health, work characteristics, and sickness absence, and to evaluate an intervention aimed at preventing stress and burnout.

Specific aims:

- The aim of **Study I** was twofold: (1) to investigate how four burnout categories (non-burnout, disengaged, exhausted, and burnout) are linked to constellations of work characteristics, including self-reported sickness absence, sickness presence and overtime, (2) to test the Job Demand-Resources model in a sample of Swedish healthcare workers.
- The aim of **Study II** was to investigate how burnout relates to self-reported physical and mental health, sleep disturbance, memory and lifestyle factors.
- The aim of **Study III** was to test the effect of participating in a reflecting peer-support group on self-reported health, burnout, and on perceived changes in work conditions.
- The aim of **Study IV** was to investigate the factorial structure of the Swedish translation of the Oldenburg Burnout Inventory, and its predictive validity on future long-term sickness absence (> 90 days).

METHOD

DESIGN AND DATA COLLECTION

The four studies (I-IV) were carried out on the basis of a questionnaire survey among all employees in a County Council area of Sweden during 2002. Before the survey started, the project was discussed in several group meetings with representatives from different trade union confederations, and the project was also supported by the County Council management. Participants were informed about the purpose of the study via information meetings at the workplace and via the County Council's intranet. Questionnaires covering areas such as self-reported health, life style, and psychological and social factors at work, were sent to home addresses and were accompanied by a letter explaining the purpose of the study, and a pre-stamped envelope. The voluntary nature of participation was emphasized, and respondents were guaranteed confidentiality. Four weeks later, questionnaires and a follow-up letter were mailed to non-respondents. All respondents received a letter containing individual feedback, including a health profile based on pre-defined criteria, and their result in perceived psychosocial work environment in relation to a reference group (Bergström *et al.*). If the results indicated that they were at risk for any medical condition, they were advised to contact the Occupational health service, and given an opportunity to contact the author in case of any questions.

Studies I and II were cross-sectional using data from the questionnaire survey.

Study III was a randomized controlled trial. Those who scored above the 75th percentile in the exhaustion dimension of the Oldenburg Burnout Inventory in the questionnaire (n=660), were invited to participate in an intervention aimed at preventing stress and burnout, that is, reflecting peer-support groups. After giving informed written consent, were those who agreed to participate randomized to either an active treatment group, which received intervention and follow-up questionnaires, or to a control group, which only received follow-up questionnaires. Respondents were stratified by three geographic regions, based on the location of the three hospitals in the County Council, and block randomization was performed within each region.

Participants met 10 times, once a week, with a follow-up meeting after 4 weeks, and each session lasted for 2 hours. Each group was managed by a group-leader, who was instructed to supervise and facilitate the work procedure and the group process, rather than interfere in the discussions (*cf.* Maudsley, 1999b; Neufeld *et al.*, 1974). The group-leaders were preferably recruited from the Occupational health service and were physicians, social workers or physiotherapists with previous group-leader experience. They were introduced to the method during 3 days by the author and a teacher employed at the County Council. A manual was formulated containing aim and background to the intervention, and a description of each point in the method (for more information see Study III). The participants were personally invited by the group-leader before the first session.

After informed consent from the supervisor, participation in the peer-support group took place during working hours.

Study IV used a cross-sectional and a prospective design. Data from the questionnaire survey was used in the factor analyses, and besides that, long-term (> 90 days) sickness absence register data for these respondents were collected from the insurance company that supplies complementary sickness insurance for all County Council employees in Sweden. Data included diagnoses based on the doctor's certificate, and were classified in accordance with the International Classification of Diseases (ICD) (World Health Organization, 1992). Data was collected for the 28 months preceding the survey on burnout, and for the 44 months thereafter.

ETHICAL CONSIDERATIONS

The studies were approved by the Research Ethics Committee of Linköping University, Sweden.

PARTICIPANTS

Questionnaires were sent to all employees in a County Council (N=6118) and resulted in an overall response rate of 65% (N=3976).

Studies I and II

A total of 3719 (61%) respondents had completed the OLBI, and were included in Studies I and II (presented in Table 1). 82% were women. Ages ranged from 22 to 66 years and the mean age for the sample was 47.0 years (SD 9.0), for women 46.9 years (SD 9.1), and for men 47.5 years (SD 8.9).

Table 1. Demographics of respondents which had completed the Oldenburg Burnout Inventory (N=3719).

Profession	n	Age Mean (SD)	Female %	Org.tenure Years (SD)	50 years or older (%)
Physicians	241	47.5 (9.1)	35	11.3 (9.6)	42.9
RN Assistant nurses	1252	45.6 (9.6)	91	14.2 (10.8)	37.8
Paramedics	874	48.8 (7.9)	89	21.2 (11.3)	51.9
Dentist	264	44.7 (9.3)	83	10.9 (8.5)	31.9
Dental nurses	70	50.4 (9.2)	49	14.0 (9.3)	54.4
Secretaries	169	49.1 (7.9)	97	18.2 (9.9)	47.2
Service staff Technical support	265	45.9 (8.7)	98	15.5 (11.6)	34.8
Others	149	46.9 (8.9)	79	18.7 (12.5)	39.7
Professions not reported	125	46.6 (9.9)	35	14.3 (10.3)	46.4
Total group	206	49.6 (7.8)	74	15.1 (11.2)	52.8
	104	49.1 (9.6)	76	16.1 (9.9)	52.7
	3719	47.0 (9.0)	82	16.0 (11.3)	43.1

Note. RN= registered nurses including midwives and biomedical technicians, Paramedics including social workers, occupational therapists, physiotherapists, psychologists. Org. tenure = organizational tenure.

Study III

151 (22.9 %) of the 660 respondents scoring above the 75th percentile in the exhaustion dimension of the OLBI agreed to participate in the intervention. 88.7% were women. A flowchart of the participants is presented in Figure 2.

Due to the requirement that each intervention group should have eight participants, there were more controls in each geographic region, and consequently, the intervention group finally comprised 51 participants, and the control group comprised 80. There was a higher frequency of women in the intervention group, compared with the control group. Mean age was somewhat higher in the intervention group.

Thirteen participants in the active treatment group dropped out before the intervention started, and reasons for that were “don’t have time” (n=6), “participate in a rehabilitation program” (n=1), “will commence an education” (n=2), “the time for the meetings was unsuitable” (n=1), “for personal reasons” (n=1) and “leaving the job” (n=2). Seven participants in the control group dropped out, and reasons for that are unknown. Four participants in the intervention group and seventeen in the control group did not respond at 12 months follow-up, and the overall drop out rate was therefore 41 individuals. Their mean age was 48.2 (SD 6.4), and 83% of them were women, and their mean score in exhaustion was similar to the participants.

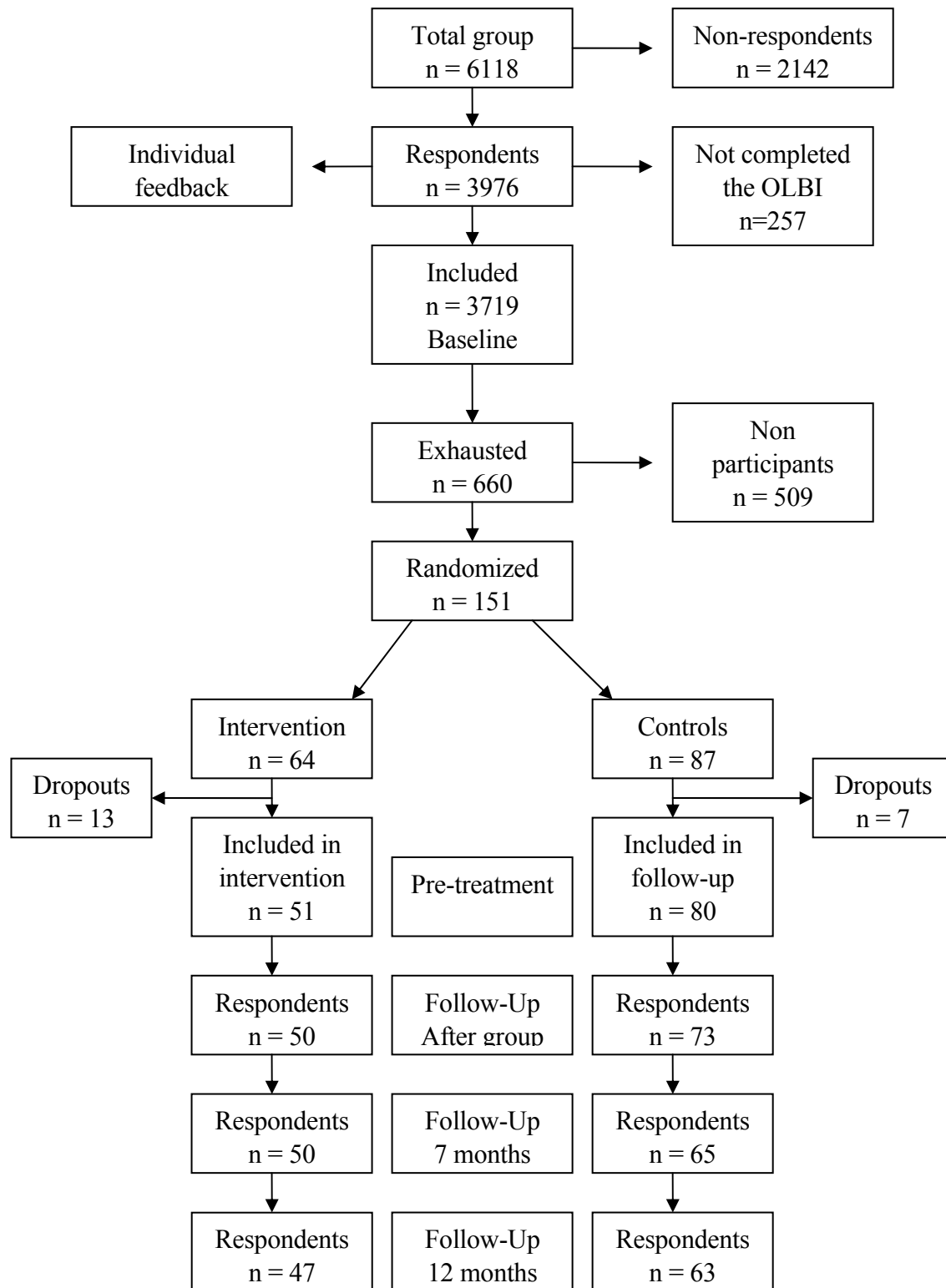


Figure 2. Flowchart of respondents

Study IV

Utilized the data sample described in studies I and II. In order to study the influence of burnout on future sickness absence, respondents who had been on long-term sick-leave (>90 days) during the 28 months preceding the survey on burnout were excluded in the analyses. Thus, those who had, or had not, been on long-term sick-leave at any occasion during the 44 months *after* the survey on burnout were included in the polyserial correlation analyses (N = 3700).

MEASURES

The Alcohol Use Disorders Identification Test (AUDIT) (Study II) was used to measure problems with alcohol consumption (Saunders *et al.*, 1993). AUDIT includes three domains: alcohol consumption, drinking behaviour and alcohol-related problems. The scale consists of ten items with five response alternatives ranging from “Never” and “Less than monthly” to “Daily”, giving a maximum possible score of 40. The total score for the three domains was used in the discriminant analysis. A study among 997 persons randomly selected from the general Swedish population showed that the internal and test-retest reliability were satisfactory (Bergman & Källmén, 2002). Cronbach’s alpha in Study II was 0.75.

Change in work conditions during the last six months (Study III), for example, time pressure at work, work load, support at work when needed, perceived participation at work and in work tasks, and the individual’s own development opportunities at work (Härenstam *et al.*, 2004). The response alternatives were “Reduced”, “Unchanged” or “Increased”.

The Hospital Anxiety and Depression Scale (HAD) (Study II) is a self-assessment scale, developed for assessing change in non-psychiatric patients’ emotional state, as well as for assessing clinically significant degrees of anxiety (HAD-A) and depression (HAD-D) (Zigmond & Snaith, 1983). The HAD consists of 14 items, seven for depression and seven for anxiety. Each item has four response alternatives, ranging from 0 - 3. Cut off scores for both anxiety and depression are, as suggested by Zigmond and Snaith (1983), 8-10 for doubtful cases and 11 or more for definite cases. A Swedish version of the HAD has shown acceptable validity and internal consistency (Lisspers *et al.*, 1997). A review by Bjelland *et al.* (2002) showed that the HAD performed well in screening for separate dimensions of anxiety and depression in both somatic, psychiatric and primary care patients and in the general population. Cronbach’s alpha in Study II was .85 for HAD-D and .86 for HAD-A.

Memory (Study II) was assessed with ten items (Nilsson *et al.*, 1997), for example “I have lost things because I did not remember to take them with me when leaving”, “How do you find your memory today, compared to five years ago?” Each item had five response alternatives ranging from “never” to “usually” or “much better” to “much worse”. Reliability analysis and validation of this scale are not yet available. Cronbach’s alpha in Study II was 0.82.

Neck and back pain, the questions concern problems several times during the last year, or if neck and back pain is present right now and if the respondent several times has been or is right now on the sick list due to those problems.

A Swedish version of the *Oldenburg Burnout Inventory (OLBI)* (Studies I-IV) was used to assess burnout (Demerouti *et al.*, 2001a). It was translated into Swedish by two physicians at the Karolinska Institute, Stockholm. Translations from both the English and German versions of the OLBI were made in parallel, and the two versions were then compared to reach consensus on the Swedish translation. The

Swedish text was then back translated into German by a bilingual native German speaker, and the two German texts were compared by another German speaker experienced with the scale, and the scale's original creator, showing acceptable correspondence between the two versions. The OLBI has two dimensions: exhaustion and disengagement. Each subscale consists of eight items, four are positively worded and four negatively. Each item has four response alternatives, ranging from 1 (totally disagree) – 4 (totally agree). The positive and negative exhaustion and disengagement items were presented in mixed order. A study among 232 employees from different occupational groups confirmed the factorial and convergent validity of the OLBI and the Maslach Burnout Inventory – General Survey (Demerouti *et al.*, 2003). Cronbach's alpha for both exhaustion and disengagement was .83.

Overtime (Study II) was assessed by one item with six response alternatives: every day, a couple of days/week, one day/week, a couple of days/month, less than a couple of days/month or never.

Oral problem (Study II) was assessed with one item and the response alternatives were Yes/No.

Open-ended questions (Study III). All participants were requested to evaluate the group participation by two open-ended questions; "What was it like to participate in a peer-support group?" "What impact, if any, has participation had for you?"

Physical exercise (Study II), the frequency was assessed on a 5-point scale scoring from "never" to "three times per week or more". Exercising two times per week or more was classified as high, and "never" or "irregularly" was categorized as low physical activity (Engström *et al.*, 1993).

The General Nordic Questionnaire for Psychological and Social Factors at Work (QPS Nordic) (Studies I and III) was used for the assessment of psychological, social, and organizational work conditions (Dallner *et al.*, 2000). The QPS has been validated in data collected from four Nordic countries and was found to have a good conceptual structure and to provide reliable information on different work organizations (*ibid*). The QPS consists of 118 questions grouped into 13 content areas, and includes 26 Likert-type scales. From these scales, nine were selected for the discriminant analysis in study I, because they were thought to reflect the two dimensions of the JD-R model. *Demands* were estimated on the following 3 scales, presented with Cronbach's alphas (α): Quantitative (4 items, $\alpha = .78$), Decisional (3 items, $\alpha = .70$) and Learning (3 items, $\alpha = .51$) demands. *Resources* were estimated on the following 6 scales: Control of decision (5 items, $\alpha = .67$), Positive challenges at work (3 items, $\alpha = .70$), Social support from superior (3 items, $\alpha = .86$), Fair (3 items, $\alpha = .79$) and Empowering (3 items, $\alpha = .86$), leadership and Social climate at workplace (3 items, $\alpha = .80$). The quantitative demand scale (4 items) *e.g.*, overtime and workload, was also used in study III. All the scales had five response alternatives: 1 = very seldom/never and 5 = very often/always, except Social climate at workplace, where the alternatives were 1 = very little/not at all and 5 = very much.

Sickness absence (Study I) during the last twelve months was self-reported, and the

five response alternatives were: None, 1-7 days, 8-24 days, 25-99 days, or 100-365 days.

Long-term sickness absence register data (> 90 days) (Study IV) were collected from the insurance company that supplies complementary sickness insurance for all County Council employees in Sweden. Data included diagnoses based on the doctor's certificate, and were classified in accordance with the International Classification of Diseases (ICD) (World Health Organization, 1992).

Sickness presence (Study I) during the last twelve months was assessed with one single item: "Has it happened over the previous 12 months that you have gone to work despite feeling that you really should have taken sick leave because of your state of health?" with four response alternatives: Never, Once, 2-5 times, and More than 5 times (Aronsson *et al.*, 2000).

The Short Form Health Survey (SF-36) (Sullivan *et al.*, 1994; 1995; 1998). SF-36 is a multi-purpose, short-form health survey with 36 items grouped into 8 scales: physical functioning, role limitations due to physical problems, bodily pain, general health perception, vitality, social functioning, role limitations due to emotional problems, and mental health. *Vitality* and *general health* were used in Study III. The vitality score (4 items) measures the frequency with which the respondent feels full of life and has a lot of energy, or feels fatigue. The general health score measures perceived general health status and consists of 5 items. Cronbach's alpha exceeded .70 across all measurement occasions for the groups.

Self-rated health (SRH) was measured in Study II with one single item from the SF-36: "In general, how would you describe your health?" The item has a standardized response format with five alternatives, ranging from 1-5, where 1= "excellent", 2= "very good", 3= "good", 4= "fair" and 5= "poor". The scales were transformed to a 0-100 scale using a transformation formula, where 100 represents best possible health status.

Sleep disturbance was measured with three items (presented in Table 2, Study II), with five response alternatives ranging from "Never" to "Always/Every day" (Åkerstedt *et al.*, 2002).

Tinnitus (Study II) was assessed with one item and the response alternatives were Never/Sometimes/Often/Always.

DATA ANALYSES

Analyses of covariance (ANCOVA) were used in Study III to test differences in change in outcome measures between the intervention and the control group, by using scores at 12 months follow-up as the dependent variable, and pre-treatment scores as the covariate.

Analyses of variance (ANOVA) were used in Studies I and II to test differences in mean between the four groups, and *post hoc* comparisons were made according to Dunnett's *t*-test.

Bartlett's test of sphericity (Study IV) was applied before the factor analyses were run in order to test the hypothesis that the matrix is an identity matrix.

Collinearity statistics (Study II) including the *Variance Inflation Factor (VIF)*, which shows how much the variance of the coefficient estimate is inflated by multicollinearity, and its reciprocal *Tolerance*, which is the proportion of variance in a variable that is not accounted for by the other independent variables (for an overview see O'Brien, 2007). Collinearity statistics are not presented in Study I, and are therefore presented in the result section of this thesis (Table 2).

Confidence interval (CI) (Studies I – III). Differences between groups were estimated by comparing proportions, and were tested for statistical significance of the differences on the basis of 95% CI.

Confirmatory factor analysis (CFA) (Study IV) was used to assess the factor structure of the proposed two-factor model of the OLBI. The following measures of fit were used: χ^2 goodness-of-fit, comparative fit index (CFI), nonnormed fit index (NNFI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA). According to Brown (2006), recommendations for an acceptable model are: CFI and NNFI close to or greater than .95, SRMR close to .08 or below, and RMSEA around .05.

LISREL v.8.8 (Jöreskog & Sörbom, 2006) was used.

Cronbach's alpha coefficients were used to assess the internal consistency coefficients for the scales included.

Exploratory factor analysis (EFA) (Study IV) was used to assess the factor structure of the OLBI. The principal component method with direct oblimin rotation, allowing unlimited number of factors (using eigenvalues > 1.0 as a criterion) was run.

Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) (Study IV) was applied before the factor analyses were run in order to examine potential multicollinearity. KMO measures in the .80s or .90s support the use of factor analysis for the data (Munro, 2005).

Linear discriminant analyses (DA) were used in Studies I and II in order to investigate whether it was possible to discriminate between four burnout groups (non-burnout, disengaged, exhausted, burnout) on the basis of work characteristics, health indicators and life-style. This form of statistical treatment of the problem offers the advantage of making use of the common variance of the individual aspects. DA is divided in two major areas: (1) *Descriptive DA* in which the objective is to identify factors that are able to separate predefined groups (2) *Predictive DA* focuses on the classification of future observations into groups (Duarte Silva & Stam, 1995). In SPSS the relationship between predicted and observed group *i.e.*, the proportion of respondents classified correctly or falsely, is presented together with the result of the descriptive DA.

Pearson's product-moment correlation coefficient was applied to evaluate associations between the variables used (Studies I and II), and to test the correlation between the two subscales (Study IV).

Polyserial correlations (Study IV) were used to estimate association between the subscales of the OLBI and future long-term sickness absence. The polyserial correlation is used when one variable is ordinal and the other is continuous (Jöreskog & Sörbom, 2006).

PRELIS v.2.8 (Jöreskog & Sörbom, 2006) was used.

Qualitative content analyses (described in Graneheim *et al.*, 2004) were used in order to analyze the themes discussed in the peer-support groups, and the open-ended questions concerning the participant's experiences from group participation.

RESULTS

STUDY I

Discriminant analysis was used to search for constellations of work characteristics, that discriminate respondents who experience burnout from those who do not, and also from those who score high in exhaustion but not in disengagement, and *vice versa*. To identify the four groups we utilized the following cutoff scores: scores ≥ 2.25 on exhaustion and ≥ 2.1 on disengagement were considered to be high. These scores on the OLBI corresponded to the mean scores on the MBI of a group of Dutch burned-out employees as diagnosed by a physician (Schaufeli *et al.*, 2001).

This yielded the following target groups for the discriminant analysis:

- low exhaustion and low disengagement (non-burnout group) n= 1302
- low exhaustion and high disengagement (disengaged group) n= 469
- high exhaustion and low disengagement (exhausted group) n= 697
- high exhaustion and high disengagement (burnout group) n= 1251.

The collinearity statistics for the variables included in the discriminant analysis (Table 2) showed that the variance inflation factors (VIF) ranged from 1.29 to 2.73, and thus multicollinearity might not be a serious threat in this study (O'Brien, 2007). The highest correlation between variables was found between "fair leadership" and "support from superior" ($r = .70$), and the correlations between the others were considerably lower.

The result revealed that the four burnout groups (non-burnout, disengaged, exhausted, and burnout) related in different ways to work characteristics. The non-burnout group was more satisfied with the social climate at work and with the leadership, and experienced more control at work, and they also reported less overtime, compared with the burnout group. The burnout group, on the other hand, reported both high job demands and poor access to relevant job resources (a fair and empowering leadership, a positive social climate at the workplace, control of decision and support from superiors). The result also revealed that it was the access to/lack of relevant job resources that determined whether an employee was classified as burnout or as non-burnout. This does of course not mean that job demands can be neglected, since individuals can fail to successfully adapt when they experience long-lasting strain.

Self-reported sickness related outcomes (sickness absence and sickness presence) and overtime appeared to be more related to exhaustion than to disengagement, while a combination of high levels of both dimensions, that is, a burnout syndrome, was associated with the highest levels of sickness absence and sickness presence.

In summary, the result additionally supported the Job Demand – Resources model (JD-R), insofar that job demands were more closely associated with the exhaustion component of burnout, while lack of job resources was more associated with disengagement. Contrary to the general belief that job demands make all the difference, it seems as if it is job resources that are crucial for whether an employee

was classified as burnt out or not. The burnout group reported both high job demands and poor access to relevant job resources. The most common professions in the burnout group were, unexpectedly, dental nurses, secretaries, and service staff.

Table 2. Pearson’s correlation coefficients, and tolerance and variation inflation factors (VIF), for the variables included in the discriminant analysis in Study I.

Correlations	1	2	3	4	5	6	7	8	9	10	Tolerance	VIF
1. Decis. demands											.65	1.55
2. Learning demands	.40										.78	1.29
3. Quant. demands	.43	.32									.64	1.56
4. Control of decision	.01	.05	-.12								.78	1.29
5. Empow. leader	.10	.10	-.01	.38							.44	2.29
6. Fair leadership	-.03	-.05	-.17	.23	.58						.45	2.21
7. Support from Superior	.01	-.02	-.16	.31	.69	.70					.37	2.73
8. Positive challenges at work	.40	.21	.14	.28	.30	.25	.26				.52	1.94
9. Social climate at workplace	.01	.01	-.13	.30	.47	.53	.51	.32			.61	1.63
10. OLBI-Ex	.12	.21	.41	-.24	-.23	-.32	-.33	-.26	-.36		.52	1.93
11. OLBI-Dis	-.15	-.06	.04	-.31	-.35	-.34	-.33	-.60	-.40	.55	.45	2.24

STUDY II

Using the target groups described in Study I, this study investigated how the four burnout groups related to self-reported physical and mental health, sleep disturbance, memory and life-style factors.

The result convincingly showed that burnout was associated with poorer self-rated health, more depression and anxiety, more sleep disturbance and perceived impaired memory. Overall, there was an increase in severity over the four groups in self-rated health (SRH), anxiety and depression, in the following order (from lowest to highest): non-burnout, disengaged, exhausted and burnout, indicating that health impairment and sleep disturbance may be more strongly related to the exhaustion component of the burnout syndrome.

The result also indicated that self-reported physical exercise and alcohol consumption played a minor role in discriminating between the burnout and non-burnout groups. A higher frequency of exercise was reported from the disengaged group, compared with the exhausted.

Although tinnitus and oral problems did not discriminate between the four burnout groups, there was an increase in occurrence over the four groups, in the following order (from lowest to highest): non-burnout, disengaged, exhausted and burn out. There was no difference between the exhausted and burnout groups, but both these groups reported a statistically significantly higher frequency of tinnitus and oral problems, compared with the non-burnout group.

In summary, employees with burnout had most symptoms, compared to those who experienced only exhaustion, disengagement from work, or no burnout. Health impairment and sleep disturbance may be more strongly related to the exhaustion component of the burnout syndrome.

STUDY III

Tested the effect of participating in a reflecting peer-support group on self-reported health, burnout, and on perceived changes in work characteristics.

A total of 8 peer-support groups started, with 5-8 participants in each group.

Comparison of change between groups, one year after the intervention, revealed favorable intervention effects in perceived quantitative demands at work ($F= 6.25, p = .014$) and in general health ($F= 6.91, p = .010$), when using pre-treatment scores as covariates.

Besides that, at 7 months follow-up a statistically significantly higher proportion of respondents in the intervention group experienced increased *development opportunities at work* and increased *participation at work*, compared with the control group. Although there was a tendency of intervention effect in perceived *support at work*, the difference was not statistically significant. 12 months follow-up revealed a tendency of intervention effects in all work conditions measured, although statistical significance was only found for *participation at work*, and *support at work*.

Seven categories of experiences from participating in a peer-support group were identified:

Talking to others in a similar situation. Participants said that listening to the situation of others gave a perspective to their own thoughts. It was a positive experience to share their problems with one another; this gave an opportunity to recognize oneself in others' experiences and also a feeling of not being alone. Positive validation from other group members and relief in sharing one's feelings with others were also described. The experience of support and being taken seriously created good feelings, and putting problems into words made them easier to handle.

Knowledge / Understanding. Participation gave time for reflection, and it was useful and constructive to elucidate the problems, and to see them in perspective. More knowledge about stress in general, stress-signals, and coping strategies was described, and also more understanding of its complexity was experienced.

Sense of belonging / Community. The peer-support group was encouraging and gave a sense of belonging, solidarity, and friendship.

Self-confidence. Increased self-confidence was described in terms such as "dare to say no more often now", "more safe now", "value myself higher", and "I have learned that I do not have to like everyone – and everyone does not have to like me".

The method / Structure. A structure, with frameworks for the group work was appreciated, and it was also emphasized that there was focus on the "real problems" in the group, and not just idle talk.

Relief of symptoms. An experience of decreased stress, stress symptoms and anger, and of less anxiety was described. Some respondents also reported sleep improvement.

Behavioural change. Reports of behavioural change included: "I will prioritize more now", "I do more things now by writing down a goal", "I have slowed down my tempo, and also changed a lot both at home and at work", "I have changed some behaviours, which resulted in improvement", and "I think differently now".

In summary, participation in a peer-support group increased perceived general health, reduced perceived work demands, and increased perceived participation and development opportunities at work, as well as support at work. At 7 months follow-up, 64.7 % (N= 33) of the participants had continued to meet, and 52.9 % (N= 27) at 12 months follow-up.

Reflecting peer-support groups with a problem-based method might serve as a useful and comparatively inexpensive tool in alleviating work-related stress and burnout.

STUDY IV

This study investigated the factorial structure of the Swedish translation of the Oldenburg Burnout Inventory (OLBI), and its predictive validity on long-term sickness absence (> 90 days).

The exploratory factor analysis produced two factors with all but one item loading on their predicted subscale of the OLBI, which supported the proposed two-factorial model of the OLBI.

The confirmatory factor analysis revealed that the goodness-of-fit indices CFI and NNFI of the two-factor model of OLBI did not meet the criterion of $\geq .95$ suggested by Brown (2006). The values were close to the criterion, and might therefore indicate acceptable model fit (Brown, 2006), and they met the criterion $\geq .90$ as suggested by Hoyle (1995).

The SRMR values showed acceptable fit for the model. The χ^2 goodness-of-fit was significant, and that might be related to the large sample size used (Jöreskog & Sörbom, 1993), $\chi^2(103 \text{ df}) = 2871.59 \ p < .001$.

However, the proposed two-factorial model (exhaustion and disengagement) of the OLBI was superior, compared to a model including only one burnout factor.

The two subscales of OLBI (exhaustion and disengagement) were statistically significantly correlated with future long-term sickness absence (> 90 days). The strongest correlation was found between the exhaustion subscale and long-term sickness absence due to psychiatric disorder (most often depression and reaction to severe stress).

In summary, the study provided additional support for the proposed two-factorial model of the OLBI, and also supported the factorial validity of the Swedish translation. Strong evidence for the predictive validity of the OLBI on future long-term sickness absence was also found.

DISCUSSION

First, the main findings in this thesis are presented and briefly discussed. Thereafter, I will try to synthesize some of the findings by discussing burnout as a possible intervening link between an adverse psychosocial work environment and the medical condition exhaustion disorder.

PEER-SUPPORT GROUPS IN THE PREVENTION OF STRESS AND BURNOUT

❖ **Participation in a peer-support group increased perceived general health.**

The clinical significance of this finding is difficult to decide. However, an experience of decreased stress, stress symptoms and anger, and of less anxiety was described by the participants in the open-ended questions. Besides that, more than 50 percent of them continued to meet a year after the intervention, indicating that the group meetings must have meant something positive to them.

Poor self-rated health has been found previously to be a powerful predictor of morbidity (Kaplan, *et al.*, 1996), and mortality (Idler *et al.*, 1997; DeSalvo *et al.*, 2006).

Positive experiences related to support from similar others were clearly reported from the participants, which might have contributed to the increase in self-reported health. According to Taylor (2007) socially supportive ties are clearly beneficial in times of stress, and social support has been tied to a broad array of health benefits. Taylor (2007) also suggests that both men and women benefit from social support, but women seem to be somewhat more likely to seek social support in times of stress. In addition to the classical theory of “fight-or-flight” as the primary physiological response to stress, Taylor *et al.* (2000) proposed a theory of female responses to stress characterized by a pattern termed “tend-and-befriend”. Tending refers to nurturing behaviours that protect offspring and self and thereby promote safety and reduce distress, and befriending is the creation and maintaining of social networks that might aid in this process.

The majority of the participants in our intervention were women, and consequently, before any conclusion about the usefulness of the method for men can be drawn, the intervention needs to be tested in groups including more men.

It has been suggested in a review by Uchino *et al.* (1996), that social support might have beneficial effects on physiological processes. Therefore, including outcome measures such as stress hormones or other biological markers in future replications of peer-support group interventions can be recommended.

❖ **The peer-support group intervention increased perceived participation and development opportunities at work, and support at work, as well as decreased perceived work demands.**

Although the intervention was directed at individuals, favourable intervention effects in perceived change of work conditions were also found. A possible explanation might be that: (1) the participants were encouraged and supported by the other group members to take action at work, for example by calling attention to their stressful situation, and when possible they also tried to prioritize among their work tasks, and (2) the supervisor became aware of the employee's high stress level and therefore initiated changes to improve the direct work environment. This is in line with the findings of Kompier *et al.* (1998 p. 166) that a combination of "bottom-up" (participation, worker involvement) and "top-down" (top management support) approaches was important for the success of a stress prevention programme.

Perceived increase in participation and development opportunities at work, as well as in social support at work were among the most pronounced findings, and these factors might be regarded as job resources. Study I revealed that it was the access to /lack of job resources that was crucial for whether a respondent was classified as burnt out or not. According to the J D-R model, access to adequate job resources might have a motivational potential (Bakker *et al.*, 2003).

As previously mentioned, more than half of the participants had continued to meet a year after the intervention, and some of them had even managed to receive consent from their supervisor to meet during work hours. This might indicate that the group meetings were perceived as valuable, not only for these participants, but also for the workplace as a whole.

Peer-support groups using a problem-based method could be a useful and comparatively inexpensive tool in alleviating work-related stress and burnout.

BURNOUT IN RELATION TO HEALTH AND SICKNESS ABSENCE

❖ **Burnout is associated with poorer self-rated health, more sleep disturbance and impaired memory.**

An association between burnout and sleep disturbances has been repeatedly described (*e.g.*, Melamed *et al.*, 1999; Grossi *et al.*, 2003; Ekstedt *et al.*, 2006). Study II revealed that sleep disturbance was more associated with the exhaustion component (which also seems reasonable), and so was health impairment.

Exhaustion appears to be the most obvious manifestation of burnout, which also correlates positively with workload and other stress-related outcomes (Maslach, 2003). However, it has been emphasized that focusing exclusively on the exhaustion dimension might lead to loss of appreciation of other aspects of the burnout syndrome (Maslach *et al.*, 2001a), for example, factors that might affect the quality of work and/or patient satisfaction.

❖ **The proportions of respondents with self-reported sickness absence and sickness presence during the last year were higher in the burnout and the exhausted groups.**

The study was cross-sectional, and consequently the result allows more than one

interpretation of the direction of causality. Data was also self-reported. However, a recent study (Voss *et al.*, 2008) showed good agreement between self-reported and register data on sickness absence over a 12 months period. Interestingly, 86% of the burnout group did not report high sickness absence. However, it should be noted that more than twice as many burnout respondents reported sickness *presence* two times or more during the past year compared to the non-burnout respondents. The most common reasons for sickness presence reported by the respondents in the burnout group were, “Loyalty to my workmates” (49.3%), and “Cannot afford the reduced income that sickness absence would entail” (43.1%) (data not presented). Vingård *et al.*, (2004) found insufficient scientific evidence in the literature about consequences of sickness presence, and consequently, conclusions could not be drawn from their review.

- ❖ **Strong correlations between the OLBI and future long-term sickness absence as measured by register data were found.** Study IV showed a strong correlation between burnout and future long-term sickness absence using register data, supporting the findings of Toppinen-Tanner *et al.* (2005). The strongest correlation (.34) was found between the exhaustion subscale of the OLBI and sickness absence due to psychiatric disorders (most often depression and reaction to severe stress), which currently is the most common reason for long-term sickness absence among women in Sweden, and the second largest for men (National Social Insurance Board, 2007). The result additionally underlines the importance of taking action to combat stress and burnout in organizations. Moreover, a study using the same data set as in Study IV revealed that the highest correlations with future long-term sickness absence due to a psychiatric disorder, were found in role conflict (.19), role clarity (- .15), and social climate at work (- .14) as measured by the QPS Nordic (Wännström *et al.* in press). That study also showed that these factors, as well as fair leadership, and support from superiors and co-workers, were more strongly correlated with future long-term sickness absence, than were job demands (also measured by the QPS Nordic). A systematic review by Allebeck and Mastekaasa (2004) showed no clear trend that high job demands resulted in sickness absence, while there was moderate scientific evidence found for low control of the working situation leading to higher sickness absence.

BURNOUT AND WORK CHARACTERISTICS

- ❖ **Additional support for the proposed two-factorial model of the Oldenburg Burnout Inventory, and support for the factorial validity of the Swedish translation was found.** This finding in addition to the result in Study IV suggests that the OLBI could be used, by for example Occupational Health professionals, to identify employees at risk for long-term sickness absence and offer them interventions to alleviate symptoms, combined with interventions to improve their direct work environment. Using burnout measures such as the OLBI in organizations might also be valuable, insofar that they can serve as an indicator, highlighting the need for preventive interventions to improve the working environment. A short version of the OLBI (MOLBI; Peterson, U, Demerouti, E.

and Gustavsson, J.P., to be published) is also available from the first author.

- ❖ **Additional support for the JD-R model was found**, insofar that job demands were more closely associated with the exhaustion dimension of burnout, while lack of job resources was more associated with disengagement. The conceptualization of the model is in line with the demand-control model (Karasek & Theorell, 1990), but differs in that it allows inclusion of a broad array of job resources, *i.e.*, more than decision latitude.

McVicar (2003) pointed out that the sources of stress seem to differ between practice areas and between individuals, and commonality of sources of distress may be difficult to assume. Therefore, in order to customize interventions, the JD-R model could be helpful in identifying demands and resources that are characteristic for the specific workplace, as reported by the employees in for example interviews or by questionnaire surveys.

- ❖ **Access to/lack of relevant resources at work appear to be crucial for whether a respondent was classified as burnt out or not.** (This will also be further discussed in the section “Burnout and Exhaustion disorder”).

This finding might have practical implications for the creation of preventive interventions in organizations. Job resources can, as previously mentioned, encompass a broad array of work characteristics. Study I included only six work characteristics that were thought to reflect job resources. Based on that result organizations should, in order to avoid negative consequences of burnout, provide a stimulating and supportive environment and allow individual autonomy. Fair and empowering leadership, and a positive social climate at work also appear to be important factors in the prevention of burnout. Interestingly, *social climate at work* was also negatively correlated with future long-term sickness absence in the study by Wännström *et al.* (in press). A recent longitudinal study by Maslach and Leiter (2008) showed that it was the perception of *fairness* in the workplace that determined whether an employee moved toward burnout or engagement at follow-up.

Job demands played a minor role in discriminating the burnout group from the non-burnout group, but as expected the non-burnout group experienced fewer job demands.

One interesting finding in Study I was that the exhausted group experienced high job demands, but also good access to job resources (of which control of decision was one). In the demand-control model (Karasek & Theorell, 1990), high job demands and high decision latitude (control) in combination characterize active jobs, which give rise to the highest levels of performance without negative psychological strain. However, the respondents in the exhausted group reported a similar pattern of answers to questions about health, sleep disturbance and sickness absence as the burnout group. But, as Karasek and Theorell (*ibid*) pointed out, even with a high demand/high control job there is an upper limit to the workload an individual can carry: “Individuals can fail to adapt successfully, as in the case of long-lasting strain” (p. 95).

BURNOUT AND EXHAUSTION DISORDER

In 2003, diagnostic criteria for a medical condition called *Exhaustion disorder* were formulated in Sweden (National Board of Health and Welfare, 2003, presented in Appendix 1). The diagnosis was meant to replace the term *burnout*, as the Swedish translation “utbrändhet” might be associated with an irreversible state (*ibid*). Unfortunately, there seems to be some confusion about the association between the two conditions, for example, in research reports and in the public debate in Sweden, and they are often falsely described as being equivalent. However, differences in their conceptualizations can be identified:

(1) Exhaustion disorder is a medical condition (ICD-10 code F 43.8). Burnout also occurs as a category in the medical classification system, but not as a disease. It is classified among “Problems related to life-management difficulty” (ICD-10 code Z 73.0).

As previously mentioned, a comprehensive theoretical framework for burnout is still lacking (Schaufeli & Buunk, 2003), and several definitions exist. Based on their review, Schaufeli and Enzmann (1998, p. 36) defined burnout as “a persistent, negative, work-related state of mind in “normal” individuals that is primarily characterized by exhaustion, which is accompanied by distress, a sense of reduced effectiveness, decreased motivation, and the development of dysfunctional attitudes and behaviours at work”.

(2) Burnout is most often defined by the three components; exhaustion, cynicism or disengagement, and reduced professional efficacy, whereas exhaustion disorder refers to physical and mental symptoms of exhaustion, particularly extreme fatigue, sleep disturbance and cognitive dysfunction.

(3) The diagnostic criteria for exhaustion disorder focus on physical and mental symptoms of exhaustion due to one or more identifiable stressors, *i.e.*, do not consider work as the only source of stress, which is the case for burnout.

Seeing that burnout was associated with self-reported sickness absence, as well as with future sickness absence register data (Study I and IV), which is in line with previous findings (Toppinen-Tanner *et al.*, 2005; Ahola *et al.*, 2008), it is suggested that burnout might be an intervening link between an adverse psychosocial work environment and an exhaustion disorder.

The findings in this thesis showed a similar pattern of answers to questions about health, sleep disturbance and sickness absence, on the one hand between the exhausted and burnout groups, and, on the other, between the disengaged and non-burnout groups. The two former groups reported poorer health and more sickness absence, supporting previous findings (*e.g.*, Schaufeli & Enzmann, 1998) that health impairment might be more associated with the exhaustion component of burnout. However, a combination of high levels of both exhaustion and disengagement, that is, a burnout syndrome, was associated with the highest levels of sickness absence, sleep disturbance and poorer health (Study I and II).

Regarding work characteristics, the results showed a different pattern. Study I revealed that the burnout group reported high job demands and *poor* access to job resources, while the exhausted group also experienced high job demands but reported *good* access to job resources. One possible interpretation could be that access to adequate job resources might serve as a protection against the development of burnout. Study I also indicated that it was the access to/lack of relevant resources at work (a fair and empowering leadership, a positive social climate at the workplace, control of decision and support from superiors) that were crucial for whether a respondent was classified as burnt out or not. This raises the question of whether burnout initially is more associated with access to/lack of relevant job resources. In that case, and if burnout is considered as a gradually developing condition in response to long-term stress at work (*cf.* Maslach & Goldberg, 1998b), health impairment is probably not the initial problem. Instead, experience of poor access to relevant job resources might cause disengagement, sense of failure and frustration. Disengagement might lead to withdrawal from work and to reduced motivation or commitment (Demerouti *et al.*, 2001a; Bakker *et al.*, 2003), and might in turn affect the quality of work, and might also, in “people work”, affect patient satisfaction (Halbesleben *et al.*, 2008).

Study I showed that the disengaged group experienced both *low* job demands and *poor* access to job resources. A possible interpretation could be that the respondents in this group were not stimulated by their jobs, and/or might have skills and capacities that are underutilized at work, and therefore distance themselves from work, as a coping strategy. Indeed, as shown in Table 2, strong negative correlations between disengagement and “Positive challenge at work” ($r = -.60$), and “Social climate at work” ($r = -.40$) were found. Thus, the respondents did not experience work as meaningful or challenging in a positive way, and neither did they experience the social climate at work as encouraging, supportive, relaxed or comfortable.

According to the existential perspective on burnout (Pines, 1993), “the most demanding aspect of a work situation is its lack of existential significance. People need meaning in their lives, and the failure to find such meaning will cause burnout” (p. 51). That perspective also proposes that overwhelming emotional demands, which not infrequently occur in “people work”, will lead to burnout when it is impossible to respond to these demands adequately – a failure to find existential significance at work is experienced. This line of research was followed in a study by Glasberg, Eriksson and Norberg (2007), which showed that “stress of conscience” was associated with both exhaustion and depersonalization. For example, “stress of conscience” from having to lower one’s aspirations to provide good care, was associated with depersonalization, as measured by the Maslach Burnout Inventory (Maslach *et al.*, 1996).

It seems reasonable that long-term experience of lack of adequate resources at work might gradually result in exhaustion, *i.e.*, a strain on the individual. A strain present for a long time and/or frequently repeated, might lead to health impairment. According to McEwen (2000), physiological “stress mediators” (particularly cortisol and catecholamines) are associated with both adaptation (allostasis), and pathophysiology (allostatic load), that is, they have protective effects in the short run (maintaining health), while they can have damaging effects with subsequent health impairment in the long run (for example exhaustion disorder, but also other physical disease).

Based on the findings in this thesis, and in order to explain the above suggested relationship between burnout and an exhaustion disorder, a conceptual model was outlined (Figure 3). However, the model needs to be further examined using a longitudinal approach, before any conclusions can be drawn about causality.

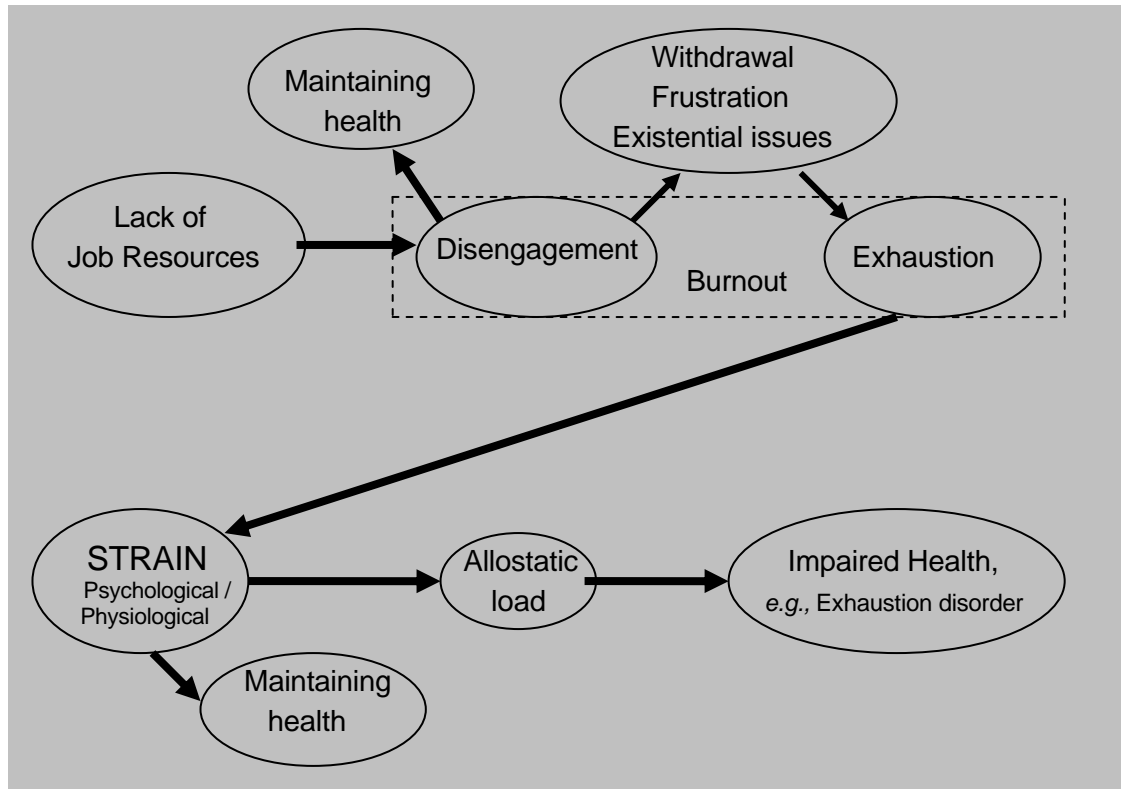


Figure 3. A conceptual model of burnout as a possible pathway to an exhaustion disorder, or other disease. Lack of adequate job resources might lead to disengagement, which initially can serve as a self-protection strategy, and not necessarily affect health. Disengagement might lead to withdrawal and/or frustration, which might have organizational outcomes. Disengagement might also be experienced as a failure to find existential significance at work. Long-term experience of lack of resources at work might gradually result in exhaustion, (disengagement and exhaustion constitute the two dimensions of a burnout syndrome), i.e., a strain on the individual, which initially does not necessarily affect health (adaptation), but might do so in the long run (allostatic load), with subsequent health impairment such as exhaustion disorder or other disease.

Both concepts serve useful purposes; **Exhaustion disorder** for diagnostics in persons with severe stress-related symptoms, not necessarily due to work stress, whereas **burnout** might be seen as an intervening link between an adverse psychosocial work environment and the medical condition exhaustion disorder. If burnout is a risk factor for the development of an exhaustion disorder, this further underlines for screening for burnout problems in organizations.

According to Schaufeli and Enzmann (1998), less severe burnout symptoms might be solved by taking organizational measures, while severe symptoms require individual treatment. The conceptual model outlined above is consistent with this line of reasoning.

Since burnout is classified as a life-management problem in the ICD-10 system, and not a disease, the diagnostic criteria for exhaustion disorder might be more appropriate to use in order to diagnose individuals with severe burnout symptoms.

Using burnout measures in organizations might be useful: (1) for regular “checkup” in organizations to enable preventive solutions, as suggested by Maslach and Leiter (2008), and (2) to be used by for example Occupational Health service professionals for early identification of individuals at risk, who should be offered interventions to alleviate symptoms (such as the reflecting peer-support group approach described in this thesis), together with workplace interventions to improve their direct work environment.

According to Maslach *et al.* (1998b) burnout develops gradually in response to chronic stress at work. Intervening early in this process would not only prevent much unnecessary suffering for the individual, but would also benefit the organization as a whole, and in the long run also the society.

METHODOLOGICAL CONSIDERATIONS

A response rate of 65 % in the questionnaire survey may appear lower than desirable, but it compares well with several recent studies in burnout and nursing (*e.g.*, 48.8% in Kilfedder *et al.* 2001 and 59% in Demerouti *et al.* 2000). 82% of the respondents were women, and this is not unexpected since women generally are over-represented in the healthcare professions.

Study I and II were cross-sectional, and consequently the results allow more than one interpretation of the direction of causality. However, they do show the respondents' pattern of answers, and the four groups actually related in different ways to questions about health and work characteristics. The proportion of misclassifications in the discriminant analyses was relatively low (predicted non-burnout when participants were actually burned out, and *vice versa*), and the discriminations therefore seem both meaningful and substantial.

Except for Study IV, self-reported data were used in this thesis, which might be a limitation due to common method variance. Recently, Spector (2006) argued that the term common method variance has reached the status of “urban legend”, and that it should be abandoned in favour of a more complex conception of the connection between constructs and their assessment, “...instead think for each measured variable what the likely sources of variance might be and how different features of method might control them” (p. 228). Some information is difficult to get with anything other than self-reports, *e.g.*, internal states such as thoughts and attitudes.

It could be argued that the different number of variables thought to reflect job demands and job resources respectively, used in Study I, might create a statistical artefact. Therefore, in order to achieve equal number of variables estimating each concept, a

discriminant analysis using the same job demand variables, but excluding the variables “positive challenge at work”, fair leadership”, and “empowering leadership”, was run. However, the result was similar to that in Study I (data not presented).

In Study II, discriminant analyses for women and men separately were performed, showing that the discrimination between the burnout and the non-burnout groups still remained for the first discriminant function (depression, anxiety, sleep disturbance, memory and neck- and back pain). The second function (alcohol consumption and exercise), discriminated between the disengaged and the exhausted group for men, but not for women. Therefore *post hoc* linear regression analyses were performed, showing that when gender was taken into account, there was no difference in self-reported alcohol consumption between the disengaged and the exhausted group, whereas the difference in reported physical exercise between the groups remained.

One of the strengths with study III is the randomized controlled design. However, a few critical notes are also in order. A low percentage of invited respondents agreed to participate in the intervention (22.9%), which might be a limitation of that study. One possible explanation might be that the participants were recruited based on their high level of exhaustion, and participation might therefore have been experienced as a further increase of their workload. Another possible reason might be that all are not comfortable with group discussions. Some respondents announced that they would only participate in groups confined to their own profession, and this is important to pay attention to in future replications of peer-support group interventions. A comparison between those who agreed to participate and those who did not, showed no differences in depression, anxiety or gender, whereas there were statistically significant differences ($p < .01$) in exhaustion, disengagement, and age. Those who did not agree reported higher scores in exhaustion and disengagement, and were younger. The majority of participants in Study III were women (96%), and consequently, no conclusions regarding the usefulness of the intervention for men can be drawn. The peer-support group intervention needs to be replicated outside healthcare, and also across different occupational groups including more men.

Most of the instruments used in this thesis are previously validated. Moreover, they showed satisfactory internal consistency (Cronbach's alphas) in the studies presented in this thesis. The instrument used to assess memory has not been formally tested and this result should therefore be interpreted with caution.

FURTHER RESEARCH

Suggestions for future research:

- ❖ Test the OLBI across occupational groups.
- ❖ Test the conceptual model presented, with a longitudinal approach.
- ❖ The low self-rated health reported in the exhausted and burnout groups deserves attention. Further studies examining SRH levels among healthcare workers, compared to other occupational groups, and particularly its association with stress, are needed.
- ❖ Augmenting the intervention tested in Study III with actions addressed more directly toward the organization, focusing more on resources at work, would be interesting to test.
- ❖ Replications of the peer-support group intervention in different occupational groups including more men, using additional outcome measures such as stress hormones or other biological markers, as well as health economic measures.
- ❖ Data from focus group interviews with some of the participants in the peer-support groups has already been collected, and should be further analyzed.
- ❖ The existential perspective would be most interesting to explore in future research, not only in the context of burnout and working life, but also in the context of sickness absence research (more than a third of all long-term sickness absence being due to psychiatric disorders, most often depression, anxiety disorders, and stress related conditions).

CONCLUSIONS AND CLINICAL IMPLICATIONS OF THE FINDINGS

- ❖ Peer-support groups using a problem-based method could be a useful and comparatively inexpensive tool in alleviating work-related stress and burnout. The intervention appears to increase self-reported health and decrease work demands. Besides that, an increase in perceived participation and development opportunities at work, as well as in support at work, was also found. The method has already been introduced to group leaders in some County Councils in Sweden, where it also has been applied. This kind of intervention could, for example, be offered to individuals at risk for stress and burnout by the Occupational Health Service. The Oldenburg Burnout Inventory could be helpful in identifying individuals at risk for future sickness absence.
- ❖ Results in this thesis showed that job resources were more important in determining whether a respondent was classified as burnt out or not, than were job demands.

This might have important implications for organizations in the creation of preventive strategies. For example, the Job Demand-Resources model might be useful in the creation of interventions aimed at preventing stress and burnout. Identifying the specific job demands and job resources at the workplace, gives the opportunity to obtain tailor-made interventions.

Based on the result in this thesis, organizations should, in order to avoid negative consequences of burnout, provide a stimulating and supportive environment and allow individual autonomy. Fair and empowering leadership, and a positive social climate at work also appear to be important factors in the prevention of burnout. This does of course not mean that job demands can be neglected, since there is an upper limit to the workload an individual can carry.

- ❖ This thesis shows that burnout is associated with poorer self-rated health, more depression and anxiety, and with future long-term sickness absence. Therefore, highlighting this problem in organizations is important!

TILLKÄNNAGIVANDEN

Jag vill rikta ett stort och varmt tack till **ALLA** som på ett eller annat sätt bidragit till att detta avhandlingsarbete nu kan presenteras!

Det finns också några som jag vill tacka speciellt:

Alla anställda vid Landstinget i Kalmar län som tog er tid att besvara enkäten. Alla ni som deltog i interventionsstudien och tålmodigt svarade på de många enkäterna. Ett stort och varmt tack till alla handledare i grupperna som på ett engagerat sätt gjorde ett fantastiskt arbete. Utan er alla hade det inte blivit någon avhandling!

Marie Åsberg, Professor emeritus - huvudhandledare och medförfattare, för att du på bästa sätt har varit min "role model" i forskningsarbetet. Du har under arbetets gång verkligen stöttat mig på allra bästa sätt, och också på ett klokt sätt ställt de "rätta" (men som jag ibland upplevt som "besvärliga och provocerande") frågorna kring det jag skrivit, men som jag faktiskt i efterhand insett har varit oerhört lärorikt och väldigt utvecklande. Varmt tack för det!

Gunnar Bergström, PhD – bi-handledare och medförfattare, för stort visat intresse och engagemang i mina förehavanden. Du har på ett föredömligt sätt axlat handledarrollen, samt också guidat mig i statistikens värld.

Mats Samuelsson, PhD – bi-handledare och medförfattare, för att du, på Högskolan i Kalmar, tidigt väckte mitt intresse för interventionsforskning. Du har alltid funnits där när jag behövt din hjälp.

Åke Nygren, Professor emeritus - medförfattare och mentor, för att du alltid har trott på min förmåga att klara av det här, men också för din förmåga att kunna entusiasmera. Du har också på många sätt varit min "role model" i forskningsarbetet.

Eva Demerouti, PhD, Utrecht University, The Netherlands – co-author and mentor, who initially guided me in the "jungle of burnout research". You are outstanding, always there to help and support. I have really learned a lot from you. It has been really nice to co-operate "on-line" with you, and hopefully, it will continue!

Petter Gustavsson, PhD- medförfattare, för gott samarbete och för att du tog dig tid att göra LISREL-analyserna.

Ingrid Wännström, Doktorand, för gott samarbete kring sjukfrånvarodata.

Rolf Sandell, Professor emeritus, för kloka och värdefulla metodsynpunkter i Studie IV.

Kristina Wahlberg, Doktorand och dörr-i-dörr-kollega på Stressrehab, Danderyds sjukhus, för alla goda middagar, trevligt sällskap på kulturella begivenheter och många härliga skratt, men mest av allt för att du har varit ett oersättligt stöd och bollplank under den här resan. Jag hoppas verkligen att vi kan förverkliga vår plan om fortsatt samarbete.

Elisabeth, Ulrika, Anna, Maria, Pia, Marie-Louise, Kristian, Kicki, Marie och Åke - mina kollegor i "blå huset" på Stressrehab, Danderyds sjukhus, för att ni på olika sätt har stöttat mig i det här arbetet, men också för att ni är så oerhört trevliga att jobba tillsammans med! Jag kommer att sakna er väldigt mycket.

Alla i AHA-projektet, Karolinska Institutet, under ledning av professor *Irene Jensen*, för gott samarbete och för att ni så vänligt delade med er av ert frågeformulär. Speciellt tack till *Eva Nilsson* och *Kristian Hagfors*, forskningsassistenter, för ert benägna bistånd med att skicka ut återkopplingar – vi hade en svettig sommar på "Nya Myntet", och *Anna Wiklund*, statistiker, för hjälp med randomiseringen.

Lisbeth Eriksson, högskolesekreterare Karolinska Institutet, för att du alltid lika vänligt hjälpte mig med alla praktiska frågor jag hade i början.

Agneta, Birgitta, Kathy och Nina, Administrationen, Karolinska Institutet-Danderyds sjukhus, för ert alltid lika trevliga och hjälpsamma bemötande.

Försäkringsbolaget Afa, Stockholm, för ekonomiskt stöd till projektet.

Landstinget i Kalmar län, för intresse, engagemang och vilja att satsa på förebyggande insatser för personalen, samt för ekonomiskt stöd till att genomföra projektet i Kalmar. Speciellt *Gunnel Nilsson*, landstingets projektledare, för att du på ett klokt och aktivt sätt jobbade för att det här projektet skulle genomföras, *Christina Samuelsson*, utvecklingsstrateg, för din värdefulla insats i handledarutbildningarna, *Kent-Inge Perseius*, PhD och före detta kollega på Nyckeln kurscenter, för att du inledningsvis uppmuntrade och pushade på mig att börja forska.

Mina föräldrar, och speciellt min mamma för att du alltid på ett klokt sätt har uppmuntrat mig, och för att du "delat med dig" av din envishet – "allting går bara man vill" – det har jag verkligen haft stor nytta av under det här arbetets gång.

Tobias, min son som jag är så stolt över, med sambo *Nina*, för all support och för att ni delar med er av välgörande entusiasm och framtidstro.

Håkan, min sambo, för att du oförtröttligt orkat agera bollplank för mina funderingar, och mest av allt för att du genom åren på många sätt har varit min allra bästa "coach".

REFERENCES

- Ahola, K., Honkonen, T., Isometsä, E., Kalimo, R., Nykyri, E., Aromaa, A., Lönnqvist, J. (2005). The relationship between job-related burnout and depressive disorders – results from the Finnish Health 2000 Study. *Journal of Affective Disorders*, 88, 55-62.
- Ahola, K., Hakanen, J. (2007). Job strain, burnout, and depressive symptoms: A prospective study among dentists. *Journal of Affective Disorders*, 104 (1-3), 103-110.
- Ahola, K., Kivimäki, M., Honkonen, T., Virtanen, M., Koskinen, S., Vahtera, J., Lönnqvist, J. (2008). Occupational burnout and medically certified sickness absence: A population-based study of Finnish employees. *Journal of Psychosomatic Research*, 64, 185-193.
- Allebeck, P., Mastekaasa, A. (2004). Risk factors for sick leave – general studies. *Scandinavian Journal of Public Health*, 32 (Suppl 63), 49-108.
- Arneson, H., Ekberg, K. (2005). Evaluation of empowerment process in a workplace health promotion intervention based on learning in Sweden. *Health Promotion International*, 20 (4), 351–359.
- Aronsson, G., Gustafsson, K., Dallner, M. (2000). Sick but yet at work. An empirical study of sickness presenteeism. *Journal of Epidemiology & Community Health*, 54, 502-509.
- Bakker, A.B., Demerouti, E., Schaufeli, W. (2002). Validation of the Maslach Burnout Inventory- General Survey: An internet study. *Anxiety, Stress and Coping: An International Journal*, 15, 245-260.
- Bakker, A.B., Demerouti, E., Schaufeli, W.B. (2003). Dual processes at work in a call centre: An application of the job demands – resources model. *European Journal of Work and Organizational Psychology*, 12 (4), 393-417.
- Bakker, A.B., & Demerouti, E. (2007). The Job Demands-Resources model: State of the art. *Journal of Managerial Psychology*, 22, 309-328.
- Bargellini, A., Barbieri, A., Rovesti, S., Vivoli, R., Roncaglia, R., Borella, P. (2000). Relation between immune variables and burnout in a sample of physicians. *Occupational Environment Medicine*, 27, 453-457.
- Bergman, H., Källmén, H. (2002). Alcohol use among Swedes and a psychometric evaluation of the alcohol use disorders identification test. *Alcohol & Alcoholism*, 37 (1), 245-251.

- Bergström, G., Björklund, C., Fried, I., Lisspers, J., Nathell, L., Hermansson, U., Helander, A., Bodin, L., Jensen, I. A comprehensive workplace intervention program and its outcome with regard to life-style, health and sick leave: the AHA-study. *Accepted for publication in Work*.
- Bittman, B., Bruhn, K., Stevens, C., Westengard, J., Umbach, P. (2003). Recreational music-making: a cost-effective group interdisciplinary strategy for reducing burnout and improving mood states in long-term care workers. *Advanced Mind Body Medicine*, 19 (3-4), 4 – 15.
- Bjelland, I., Dahl, A.A., Tangen Haug, T., Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale. An updated literature review. *Journal of Psychosomatic Research*, 52, 69 – 77.
- Borritz, M., Bültmann, U., Rugulies, R., Christensen, K. B., Villadsen, E., Kristensen, T. S. (2005). Psychosocial work characteristics as predictors for burnout: Findings from 3-year follow up of the PUMA study. *Journal of Occupational and Environmental Medicine*, 47 (10), 1015-1025.
- Brown, T.A. (2006). *Confirmatory Factor Analysis for Applied Research*. New York: Guilford Press.
- Burke, R.J. (1994). Stressful events, work-family conflict, coping, psychological burnout, and well-being among police officers. *Psychological Reports*, 75, 787-800.
- Burke, R., Richardsen, A. (2001). Psychological burnout in organizations. Research and intervention. In R.T. Golembiewski (Ed.), *Handbook of Organizational Behavior*, 2nd ed., New York: Marcel Dekker, 327-363.
- Carnevale, G., Anselmi, V., Busichio, K., Millis, S. (2002). Changes in ratings of caregiver burden following a community-based behavior management program for persons with traumatic brain injury. *Journal of Head Trauma Rehabilitation*, 17 (2), 83 – 95.
- Coffey, M., Coleman, M. (2001). The relationship between support and stress in forensic community mental health nursing. *Journal of Advanced Nursing*, 34 (3), 397-407.
- Cohen, S., McKay, G. (1984). Social support, stress and the buffering hypothesis: a theoretical analysis. In A. Baum, S.E. Taylor, & J.E. Singer (Eds.) *Handbook of Psychology and Health*. (Vol 4). Hillsdale, NJ : Erlbaum.
- Cohen, S., Syme, S.L. (1985). Issues in the study and application of social support. In S. Cohen & S.L. Syme (Eds.) *Social support and Health*. San Francisco: Academic Press.

- Cohen-Katz, J., Wiley, S., Capuano, T., Baker, D., Kimmel, S., Shapiro, S. (2005). The effects of mindfulness-based stress reduction on nurse stress and burnout. Part II: A quantitative and qualitative study. *Holistic Nursing Practice*, 19 (1), 26–35.
- Cordes, C., Dougherty, T. (1993). A review and an integration of research on job burnout. *The Academy of Management Review*, 18 (4), 621-656.
- Dallner, M., Elo, A-L., Gamberale, F., Hottinen, V., Knardahl, S., Lindström, K., Skogstad, A., Örhede, E. (2000). *Validation of the General Nordic Questionnaire (QPS–Nordic) for Psychological and Social Factors at Work*. Copenhagen : Nordic Council of Ministers.
- Demerouti, E., Bakker, A.B., Nachreiner, F., Schaufeli, W.B. (2000). A model of burnout and life satisfaction amongst nurses. *Journal of Advanced Nursing*, 32 (2), 454-464.
- Demerouti, E., Bakker, A.B., Nachreiner, F., Schaufeli, W.B. (2001a) The Job Demands-Resources Model of Burnout. *Journal of Applied Psychology*, 86 (3), 499-512.
- Demerouti, E., Bakker, A.B., deJonge, J., Janssen, P.P.M., Schaufeli, W.B. (2001b). Burnout and engagement at work as a function of demands and control. *Scandinavian Journal of Work, Environment & Health*, 27, 279-286.
- Demerouti, E., Bakker, A.B., Vardakou, I., Kantas, A. (2003) The convergent validity of two burnout instruments. A multitrait – multimethod analysis. *European Journal of Psychological Assessment*, 19 (1):12-23.
- DeSalvo, K., Bloser, N., Reynolds, K., He, J. & Muntner, P. (2006). Mortality prediction with a single general self-rated health question. A Meta-analysis. *Journal of General Internal Medicine*, 21, 267-275.
- Duarte Silva, P., Stam, A. (1995).Discriminant analysis. In L.G. Grimm and P.R. Yarnold (Eds.). *Reading and understanding multivariate statistics*. Washington, DC: American Psychological Association, pp.277-318.
- Ekberg, K. (1995). Workplace changes in successful rehabilitation. *Journal of Occupational Rehabilitation*, 5 (4), 253-269.
- Ekberg, K. (1997). Rehabilitation and prevention of work-related musculoskeletal disorders. In: HA. Waldron, C. Edling (Eds). *Occupational Health Practice*. Oxford: Butterworth/Heinemann, 294-302.
- Ekberg, K., Svedin, L. (1998). Rehabilitation and prevention. (In Swedish). *Läkartidningen*, 95, 2473-2478.
- Ekstedt, M., Söderström, M., Åkerstedt, T., Nilsson, J., Søndergaard, H-P, Perski, A.

- (2006). Disturbed sleep and fatigue in occupational burnout. *Scandinavian Journal of Work Environment and Health*, 32 (2), 121-131.
- Engström, L.-M., Ekblom, B., von Koch, M., Seger, J. (1993). *Lifestyle - Achievement - Health. Liv 90* (In Swedish) (No. 1). Stockholm: Folksam. Högskolan för Lärarutbildning. Idrotthögskolan. Karolinska Institutet. Korpen. Riksidrottsförbundet.
- Ewers, P., Bradshaw, T., McGovern, J., Ewers, B. (2002). Does training in psychosocial interventions reduce burnout rates in forensic nurses? *Journal of Advanced Nursing*, 37 (5), 470 – 476.
- Fourth European Working Conditions Survey (2005). Website:
<http://www.eurofound.europa.eu/ewco/surveys/EWCS2005/index.htm>
- Freudenberger, H.J. (1974). Staff Burn-Out. *Journal of Social Issues*, 30 (1), 159-165.
- Glasberg, A., Eriksson, S., Norberg, A. (2007). Burnout and "stress of conscience" among healthcare personnel. *Journal of Advanced Nursing*, 57 (4), 392-403.
- Glass, D.C., McKnight, J.D. (1996). Perceived control, depressive symptomatology, and professional burnout: a review of the evidence. *Psychology and Health*, 11, 23-48.
- Gorter, R.C., Eijkman, M.A.J., Hoogstraten, J. (2000). Burnout and health among Dutch dentists. *European Journal of Oral Sciences*, 108, 261-267.
- Graneheim, U. H., Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24, 105-112.
- Grossi, G., Perski, A., Evengård, B., Blomkvist, V., Orth-Gomér, K. (2003). Physiological correlates of burnout among women. *Journal of Psychosomatic Research*, 55, 309-316.
- Hallberg, U.E., Johansson, G., Schaufeli, W.B. (2007). Type A behaviour and work situation: Associations with burnout and work engagement. *Scandinavian Journal of Psychology*, 48, 135-142.
- Halbesleben, J. & Rathert, C. (2008). Linking physician burnout and patient outcomes: Exploring the dyadic relationship between physicians and patients. *Health Care Management Review*, 33 (1), 29-39.
- Hoyle, R. H. (1995). *Structural Equation Modeling, Concepts, Issues, and Applications*. Thousand Oaks, CA: Sage Publications.
- Härenstam, A., Rydbeck, A., Karlkvist, M., Waldenström, K., Wiklund, P. and the MOA Research Group. (2004). The significance of organisation for healthy

- work. *Arbete och hälsa*, 2004:13, 1-89. Stockholm: National Institute for Working Life.
- Idler, E.L., Benyamini, Y. (1997). Self-rated Health and Mortality: A Review of Twenty-Seven Community Studies. *Journal of Health and Social Behavior*, 38, 21-37.
- Janssen, P., de Jonge, J., Bakker, A. (1999). Specific determinants of intrinsic work motivation, burnout and turnover intentions: a study among nurses. *Journal of Advanced Nursing*, 29 (6), 1360-1369.
- Jenkins, R. & Elliott, P. (2004). Stressors, burnout and social support: nurses in acute mental health settings. *Journal of Advanced Nursing*, 48 (6), 622-631.
- Jöreskog, K., Sörbom, D. (1993). *LISREL 8: User's Reference Guide*. Chicago: Scientific Software International;
- Jöreskog, K.G., Sörbom, D. *LISREL 8*. Chicago: Scientific Software; 2006.
- Jöreskog, K.G., Sörbom, D. *PRELIS 2*. Chicago: Scientific Software; 2006.
- Kanji, N., White, A., Ernst, E. (2006). Autogenic training to reduce anxiety in nursing students: randomized controlled trial. *Journal of Advanced Nursing*, 53 (6), 729 – 735.
- Kaplan, G.A., Goldberg, D.E., Everson, S.A., Cohen, R.D., Salonen, R., Tuomilehto, J., Salonen, J. (1996). Perceived health status and morbidity and mortality: evidence from the Kuopio ischaemic heart disease risk factor study. *International Journal of Epidemiology*, 25 (2), 259-265.
- Karasek, R.A., Theorell, T. (1990). *Healthy work*. New York: Basic books.
- Kilfedder, C.J., Power, K.G., Wells, T.J. (2001). Burnout in psychiatric nursing. *Journal of Advanced Nursing*, 34 (3), 383-396.
- Knox, J. (2003). Leading dialogue processes to build commitment and reach shared understanding. In D. Ulrich, L. Carter, M. Goldsmith, J. Bolt and N. Smallwood (Eds.) *The Change Champion's Fieldguide. Strategies and Tools for Leading Change in Your Organization*. New York: Best Practice Publications, LLC, pp. 148-161.
- Kompier, M., Geurts, S., Gründemann, R., Vink, P & Smulders, P. (1998). Cases in stress prevention: The success of a participative and stepwise approach. *Stress Medicin*, 14, 155-168.

- Kristensen, T. S., Bjørner, J. B., Christensen, K. B., & Borg, W. (2004). The distinction between work pace and working hours in the measurement of quantitative demands. *Work & Stress*, 18, 305-322.
- Leiter, M.P., Schaufeli, W.B. (1996). Consistency of the burnout construct across occupations. *Anxiety, Stress and Coping*, 9, 229-243.
- Lisspers, J., Nygren, Å., Söderman, E. (1997). Hospital Anxiety and Depression Scale (HAD): some psychometric data for a Swedish sample. *Acta Psychiatrica Scandinavia*, 96 (4), 281-286.
- Mackenzie, C., Poulin, P., Seidman-Carlson, R. (2006). A brief mindfulness-based stress reduction intervention for nurses and nurse aides. *Applied Nursing Research*, 19 (2), 105 – 109.
- Marine, A., Ruotsalainen, J., Serra, C. & Verbeek, J. Preventing occupational stress in health care workers. *Cochrane Database of Systematic Reviews* 2006, Issue 4. Art. No.: CD002892. DOI: 10.1002/14651858.CD002892.pub2.
- Maslach, C., Jackson, S.E., Leiter, M.P. (1996). *Maslach Burnout Inventory Manual* (3rd ed.) Palo Alto, CA: Consulting Psychologists Press.
- Maslach, C., Leiter, M.P. (1997). *The Truth about Burnout*. San Francisco, CA: Jossey-Bass.
- Maslach, C. (1998a). A multidimensional theory of burnout. In C. Cooper (Ed.). *Theories of Organizational Stress*. New York: Oxford University Press Inc.
- Maslach, C., Goldberg, J. (1998b). Prevention of burnout: New perspectives. *Applied and Preventive Psychology*, 7, 63-74.
- Maslach, C., Schaufeli, W.B., Leiter, M.P. (2001a). Job Burnout. *Annual Reviews Psychology*, 52, 397-422.
- Maslach, C. (2001b). What have we learned about burnout and health? *Psychology and Health*, 16, 607-611.
- Maslach, C. (2003). Job Burnout: New Directions in Research and intervention. *Current directions in Psychological Science*, 12 (5), 189-192.
- Maslach, C., Leiter, M.P. (2008). Early predictors of job burnout and engagement. *Journal of Applied Psychology*, 93 (3), 498-512.
- Maudsley, G. (1999a) Do We All Mean the Same Thing by “Problem-based Learning? A Review of the Concepts and Formulation of the Ground Rules”. *Academic Medicine*, 74 (2), 178-185.

- Maudsley, G. (1999b). Roles and responsibilities of the problem based learning tutor in the undergraduate medical curriculum. *British Medical Journal*, 318, 657-661.
- McEwen, B.S. (2000). Allostasis and allostatic load: Implications for neuropsychopharmacology. *Neuropsychopharmacology*, 22 (2), 108-124.
- McVicar, A. (2003). Workplace stress in nursing: a literature review. *Journal of Advanced Nursing*, 44 (6), 633-642.
- Medin, J., Bendtsen, P., Ekberg, K. (2003). Health promotion and rehabilitation: a case study. *Disability and rehabilitation*, 25 (16), 908-915.
- Melamed, S., Ugarten, U., Shirom, A., Kahana, L., Lerman, Y., Froom, P. (1999). Chronic burnout, somatic arousal and elevated salivary cortisol levels. *Journal of Psychosomatic Research*, 46 (6), 591-598.
- Melamed, S., Shirom, A., Toker, S., Berliner, S., Shapira, I. (2006). Burnout and risk of cardiovascular disease: Evidence, possible causal paths, and promising research directions. *Psychological Bulletin*, 132 (3), 327-353.
- Melchior, M., Philipsen, H., Abu-Saad, H., Halfens, R., van de Berg, A., Gassman, P. (1996). The effectiveness of primary nursing on burnout among psychiatric nurses in long-stay settings. *Journal of Advanced Nursing*, 24 (4), 694 – 702.
- Michie, S., Williams, S. (2003). Reducing work related psychological ill health and sickness absence: a systematic literature review. *Occupational Environment Medicine*, 60, 3 - 9.
- Munro, B. (2005). *Statistical Methods for Health Care Research*. Philadelphia: Lippincott.
- National Board of Health and Welfare (2003). Exhaustion disorder. [In Swedish. Utmattningsyndrom – Stressrelaterad psykisk ohälsa] [Website: <http://www.socialstyrelsen.se>]
- National Social Insurance Board (2003). Psychosocial work environment & long term sick-leave. (In Swedish). [Website: <http://www.forsakringskassan.se>]
- National Social Insurance Board (2007). Statistics. (In Swedish). [Website: <http://www.forsakringskassan.se>].
- Neufeld, V.R., Barrows, H.S. (1974). The “McMaster Philosophy”: An Approach to Medical Education. *Journal of Medical Education*, 49, 1040-1050.
- Nilsson, L-G., Bäckman, L., Erngrund, K., Nyberg, L., Adolfsson, R., Bucht, G., Karlsson, S., Widing, M., Winblad, B. (1997). The Betula Prospective Cohort Study: Memory, Health, and Aging. *Aging, Neuropsychology, and*

Cognition, 4 (1), 1-32.

- O'Brien, R.M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, 41, 673-690.
- Oman, D., Hedberg, J., Thoresen, C. (2006). Passage meditation reduces perceived stress in health professionals: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 74 (4), 714 – 719.
- Paterniti, S., Niedhammer, I., Lang, T., Consoli, S.M. (2002). Psychosocial factors at work, personality traits and depressive symptoms. Longitudinal results from the GAZEL Study. *British Journal of Psychiatry*, 181, 111-117.
- Pines, A.M. (1993). Burnout: An existential perspective. In W.B. Schaufeli, C. Maslach and T. Marek (Eds.). *Professional burnout: Recent Developments in Theory and Research*, Washington, DC: Taylor & Francis, pp. 33-51.
- Pines, A.M., Keinan, G. (2005). Stress and burnout: The significant difference. *Personality and individual differences*, 39, 625 – 635.
- Rowe, M. (1999). Teaching health-care providers coping: results of a two year study. *Journal of Behavioral Medicine*, 22 (5), 511 – 527.
- Saunders, J.B., Aasland, O.G., Babor, T.F., de la Fuente, J.R., Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption. *Addiction*, 88, 791-804.
- Schaufeli, W.B., Enzmann, D. (1998). *The Burnout companion to study and practice: A critical Analysis*. London: Taylor & Francis Ltd.
- Schaufeli, W.B., Bakker, A.B., Hoogduin, K., Schaap, C., Kladler, A. (2001). On the clinical validity of the Maslach Burnout Inventory and the Burnout Measure. *Psychology and Health*, 16, 565-582.
- Schaufeli, W.B., Buunk, B.P. (2003). Burnout: An overview of 25 years of research and theorizing. In: M. Schabracq, J. Winnubst and C.L. Cooper (Eds.), *The Handbook of Work and Health Psychology* (2nd ed.). Chichester: Wiley & Sons, pp. 383-425.
- Schnelle, E. (1979). The Metaplan-Method. Communication tools for planning and learning groups. *Metaplan Series No. 7*.
- Schrijnemaekers, V., vanRossum, E., Candel, M., Frederiks, C., Derix, M., Sielhorst, H., van den Brandt, P. (2003). Effects of emotion-oriented care on work-related outcomes of professional caregivers in homes for elderly persons. *Journal of Gerontology: Social Science*, 58 (1), S50 – S57.

- Shanafelt, T.D., Bradley, K.A., Wipf, J.E., Back, A.L. (2002). Burnout and self-reported patient care in an internal medicine residency program. *Annals of Internal Medicine*, 136, 358-367.
- Shirom, A. (2002). Job related burnout: A review. In J. C. Quick & L. E. Tetrick (Eds.), *Handbook of occupational health psychology*. Washington, DC: American Psychological Association, pp 245-264.
- Shirom, A., Melamed, S., Toker, S., Berliner, S., Shapira, I. (2005). Burnout, mental and physical health: A review of the evidence and a proposed explanatory model. *International review of Industrial and Organizational Psychology*, 20, 269-309.
- Smith, K., Davy, J., Everly, Jr. G. (2006). An assessment of the construct distinctiveness of stress arousal and burnout. *Psychological Reports*, 99, 396-406.
- Spector, P. (2006). Method variance in organizational research. Truth or urban legend? *Organizational Research Methods*, 9 (2), 221-232.
- Sullivan, M., Karlsson, J., Ware, JE. (1994). SF-36 Hälsoenkät: Svensk Manual och Tolkningsguide (Swedish Manual and Interpretation Guide). Gothenburg: Sahlgrenska University Hospital.
- Sullivan, M., Karlsson, J., Ware Jr, J.E. (1995) The Swedish SF-36 Health Survey. Evaluation of data Quality, scaling assumptions, reliability and construct validity across general populations in Sweden. *Soc. Sci. Med.* 41 (10), 1349-1358.
- Sullivan, M., Karlsson, J. (1998). The Swedish SF-36 Health Survey III. Evaluation of criterion-based validity: Results from normative population. *Journal of Clinical Epidemiology*, 51, 1105-1113.
- Taylor, S., Cousino Klein, L., Lewis, B., Gruenewald, T., Gurung, R., Updegraff, J. (2000). Biobehavioral responses to stress in females: Tend-and-befriend, Not fight-or-flight. *Psychological Review*, 107 (3), 411-429.
- Taylor, S. (2007). Social Support. In H. Friedman and R. Cohen Silver (Eds.). *Foundations of Health Psychology*. New York: Oxford University Press, Inc.
- Tennant, C. (2001). Work-related stress and depressive disorders. *Journal of Psychosomatic Research*, 51, 697-704.
- Theorell, T. (2006). *I spåren av 90-talet. (Consequences of the 1990'ths in Sweden)* (In Swedish). Stockholm: Karolinska Institutet University Press.

- Tingström, P., Kamwendo, K., Göransson, A., Bergdahl, B. (2002). Validation and feasibility of problem-based learning in rehabilitation of patients with coronary artery disease. *Patient Education and Counseling*, 47, 337-345.
- Toppinen-Tanner, S., Ojajarvi, A., Väänänen, A., Kalimo, R., Jäppinen, P. (2005). Burnout as a predictor of medically certified sick-leave absence and their diagnosed causes. *Behavioral Medicine*, 31, 18-27.
- Uchino, B.N., Cacioppo, J.T., Kiecolt-Glaser, J.K. (1996). The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin*, 119 (3), 488-531.
- van der Hek, H., Plomp, H. (1997). Occupational stress management programmes: a practical overview of published effect studies. *Occupational Medicine*, 47 (3), 133 - 141.
- van der Klink, J., Blonk, R., Schene, A., van Dijk, F. (2001). The benefits of interventions for work-related stress. *American Journal of Public Health*, 92, 270 – 276.
- Wang, J. (2005). Work stress as a risk factor for major depressive episode(s). *Psychological Medicine*, 35 (6), 865-871.
- Vingård, E., Alexanderson, K., Norlund, A. (2004). Sickness presence. *Scandinavian Journal of Public Health*, 32 (Suppl 63), 216-221.
- World Health Organization. *International Classification of Diseases and Related Health Problems: ICD-10*. Geneva: WHO; 1992.
- Voss, M., Stark, S., Alfredsson, L., Vingård, E., Josephson, M. (2008). Comparisons of self-reported and register data on sickness absence among public employees in Sweden. *Occup Environ Med.*, 65, 61-67.
- Wännström, I., Peterson, U., Åsberg, M., Nygren, Å., Gustavsson, J.P. Psychometric properties of scales from the General Nordic Questionnaire for Psychological and Social factors at work (QPS_{Nordic}): Confirmatory factor analysis and prediction of certified long-term sickness absence. *Accepted for publication in the Scandinavian Journal of Psychology*.
- Ylipaavalniemi, J., Kivimäki, M., Elovainio, M., Virtanen, M., Keltikangas-Järvinen, L., Vahtera, J. (2005). Psychosocial work characteristics and incidence of newly diagnosed depression: a prospective cohort study of three different models. *Social Science & Medicine*, 61, 111-122.
- Zigmond, A.S., Snaith, R.P. (1983). The Hospital Anxiety and Depression Scale. *Acta psychiatrica scand.* 67, 361-370.

Zolnierczyk-Zreda, D. (2005). An intervention to reduce work-related burnout in teachers. *International Journal of Occupational Safety and Ergonomics*, 11 (4), 423 - 430.

Åkerstedt, T., Knutsson, A., Westerholm, P., Theorell, T., Alfredsson, L., Kecklund, G. (2002). To predict sleep disturbances, risk to fall asleep and mental tiredness. Three studies. (In Swedish). In P. Westerholm (Ed.), *Psychosocial load and risk factors for cardiovascular diseases. Work and health 2002:7*. Stockholm: Arbetslivsinstitutet.

Tentative diagnostic criteria for **Exhaustion disorder** (National Board of Health and Welfare, 2003):

- A. Physical and mental symptoms of exhaustion with a duration of at least 2 weeks. The symptoms have developed in response to one or more identifiable stressors which have been present for at least 6 months.
- B. Markedly reduced mental energy, which is manifested by reduced initiative, lack of endurance, or increase of time needed for recovery after mental efforts.
- C. At least four of the following symptoms have been present most of the day, nearly every day, during the same 2-week period:
 - 1) persistent complaints of concentration difficulties or impaired memory
 - 2) markedly reduced capacity to tolerate demands or to work under time pressure
 - 3) emotional instability or irritability
 - 4) insomnia or hypersomnia
 - 5) persistent complaints of physical weakness or fatigue
 - 6) physical symptoms such as muscular pain, chest pain, palpitations, gastrointestinal problems, vertigo or increased sensitivity to sounds
- D. The symptoms cause clinically significant distress or impairment in social, occupational or other important areas of functioning.
- E. The symptoms are not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., hypothyroidism, diabetes, infectious disease).

Coding instruction: If the criteria for major depressive disorder, dysthymic disorder or generalized anxiety disorder are met, then exhaustion disorder should be noted only as a sub specification (i.e. *with* exhaustion disorder). (Translated by Jörgen Herlofson)

APPENDIX 2.

Author(s), Year of publication, Country	Population	Method	Intervention	Result and Comments
Bittman , B. <i>et al.</i> (2003)	112 employees of a care retirement community. 24 men , 88 women. Aged 19 – 78 years.	RCT. The MBI was used. Measures at baseline, after the intervention (6 weeks) and after 12 weeks.	6-session Recreational Music-making.	According to the systematic Cochrane review (Marine et al., 2006) results were inconclusive for all subscales.
Carnevale, G. <i>et al.</i> (2002) USA, New Jersey	27 adults with brain injuries, and their caregivers. Mean age caregivers 47.5 (14.4). Gender for the caregivers is not presented	RCT 3 groups. An adapted version of the MBI was used to asses the care-givers experience of burnout at baseline, 1 week after the education and 14 weeks past baseline.	Group 1: Follow-along control Group 2: Received education Group 3: Received education plus intervention in behaviour management	No significant change in the MBI (Maslach Burnout Inventory) associated with the treatment. Small sample size.
Cohen-Katz, J. <i>et al.</i> (2005) USA	27 - the majority were nurses. 100% were women. Aged 32-60 years.	RCT. Waiting list. Measures at baseline, immediately after intervention, and 3 months after intervention.	Mindfulness-based stress reduction. 8 weeks	Exhaustion decreased and personal accomplishment increased in the experiment group. No differences in depersonalization.
Ewers, P. <i>et al.</i> (2002) United Kingdom	20 mental health nurses. 14 men, 6 women. Mean age interv. 43.4 (5.7) and control 41,7 (7.7)	RCT Waiting list. Measures at baseline and follow-up after completion of training (6 months).	Evaluate the effect of Psychosocial Intervention Training (PSI)	Significant changes in a positive direction on burnout scores in all three subscales of the MBI in the experiment group. All volunteered for the training group i.e., represent a self selected sample. Small sample size.

Author(s), Year of publication, Country	Population	Method	Intervention	Result and Comments
Kanji, N. <i>et al.</i> , (2006) United Kingdom	93 nursing students. Aged 19-49 year. 85 women, 8 men.	RCT 3 groups. MBI was measured at baseline and one follow-up.	Autogenic training, laughter therapy and no intervention respectively	No significant difference in MBI between the 3 groups after intervention
Mackenzie, CS. <i>et al.</i> (2006) Canada	30 nurses and nurse aides in long-term care settings. 29 women, 1 man. Mean age Interv. 48.6(6.5), Control 44.8 (8.2).	RCT Waiting-list. Measures at baseline and immediately after the 4 week intervention.	Mindfulness-based stress reduction program. 4 weeks.	Significant difference in the MBI-exhaustion and in depersonalization in favour for the intervention group. The training program had positive influence on personal accomplishment, although the Group *Time interaction only approached significance. Intervention participants were more exhausted than control group at baseline.
Melchior, M. <i>et al.</i> (1996). The Netherlands	A cohort of 161 psychiatric nurses was followed for 2-5 years. Aged 20-58 years.	Quasi-experimental design. Measures with 2 pretest and one follow-up after 1 year.	Test of the effectiveness of primary nursing on the burnout level.	Primary nursing did not show any influence on the burnout level (MBI).
Oman, D. <i>et al.</i> (2006) USA, Californien	58 health professionals. 50 women, 8 men. Aged 26-70.	RCT. Waiting-list. Measures at baseline, post test, and follow-up at 8 and 19 weeks.	Non sectarian, spiritually based self-management tools based on passage meditation	No significant difference in the three subscales of MBI. Exhaustion and personal accomplishment showed changes in a positive direction, but was not significant.

Author(s), Year of publication, Country	Population	Method	Intervention	Result and Comments
Rowe, MM. (1999) USA, Philadelphia	118 health care providers. Mean age 38.2 (7.6). Gender is not presented.	RCT 3 groups; Group 1: the intervention, Group 2: the intervention + 1 h refreshment at 5, 11 and 17 months, Group 3: Control . Measures at baseline, post test, 6, 12 and 24 months.	6 week program designed to improve coping	Short-term decrease in MBI-exhaustion and increase in personal accomplishment in group 1 and 2. Consistent decrease in burnout in group 2 throughout a two year period.
Schrijnemaekers, VJ. <i>et al.</i> , (2003) The Netherlands.	300 caregivers in homes for elderly. 155 intervention and 145 control group. 94% women. Aged 20-58.	Cluster-randomized trial. MBI was measured at baseline, 3, 6 and 12 months.	Training program in emotion-oriented care: - clinical lessons - training program - supervision meetings	Modest positive effect on the MBI in favour for the intervention group. Significant differences in exhaustion after 6 months, and in professional accomplishment after 12 months. The effect was not consistent over time. Differences present at baseline were accounted for in the analyses.
Zolnierczyk-Zreda, D. (2005). Poland	59 teachers. 69.8% were women. Mean age was 41.8 (7.1)	RCT. Measures at baseline and after 1 month.	2 day program focused at coping with stress	Emotional exhaustion was significantly reduced due to the intervention. No effect on personal accomplishment or depersonalization.